

# Dendrology with J. Casey Clapp

## Ologies Podcast

### May 8, 2018

Heey, okay, so after last week's two-parter on fear, I hope everyone's just feeling calm, and strong, and collected, and most importantly: ready to talk about trees. Are you ready? Okay, here's the probably scenario, this is what I'm thinking is happening: you either fucking love trees, and that's why you're here, or you're like, "Good Lord, podcast Dad, what is this long-ass episode about trees even gonna cover? I'm gonna dive in, but only if it is full of infectious enthusiasm." And boy howdy, you doubters, you don't know the half of it. This episode will make you so pumped about trees, you're gonna be bummed about having skin and blood, you're gonna be so jealous of bark and sap. And you'll have new Scrabble words, and you'll start questioning if you should just string a hammock up in the backyard and live outside like a big ape-squirrel.

But first, let's get some business out of the way. I'll speak fast. Okay, it's important business, like telling you that you can be an Ologite who proselytizes with an Ologies shirt or pin or totes – if you wear totes – at [OlogiesMerch.com](http://OlogiesMerch.com). Thank you all for buying and wearing merch!

[Patreon.com/Ologies](https://Patreon.com/Ologies) is a portal through which you can also ensure that this podcast exists. Real talk, I have, like, 10 other jobs; this one takes the most time, and pays me definitely the least, but I love it the most, and Patrons help cover costs of hiring an editor to make sure I can put them out every week. And I'm still mulling over whether to have advertising, I'll be honest with you, because I know sometimes you don't want to hear ads, and I want you guys to be happy. You just want to hear about trees, maybe. So, I've turned down ads and I just raise income through Patreon, and if you think that's dumb feel free to tweet me about it, because maybe I'm doing business wrong, I probably am. I'm gonna read those tweets if you give me advice on that, just like I read... your reviews.

Ooooh, what a segue! So, rating and reviewing and making sure you're subscribe on iTunes - you can check right now, make sure you're subscribed - keeps Ologies just killin' it in the Science charts; we're still rubbin' elbows with the top 25 or 30 science podcasts ever, which is thrilling. And also, your reviews kinda brighten my cloudiest days, for real. This week, this one just delighted me. Jude Kenny wrapped up a review by saying:

*"Boy howdy," you may find yourself pulling off the road during your commute on a Tuesday to sit in the still of your car, staring at the window, while you ponder your life choices.*

Five stars! Thank you for that. Now, on to dendrology.

Okay, [*excitedly*] trees! You ready for trees? Okay, so: dendro comes from ye olde Greek meaning 'tree', and if you're like, "Why does that remind me of brain stuff?" Well, that's because the dendrite is a part of a nerve cell that looks a lot like a tree, so dendra, there you go: trees. So, you've got trees in the brain, you're gonna have trees on the brain after this, I'll tell you that much. You're going to be *pinning* for more arborist facts, *oak-ay*?

The term dendrologist is a little funky. Technically, it's anyone who studies trees, which this human being I interviewed has done. I have never met anyone with such a raw zeal or deep knowledge for and of trees. You will love him. He's been studying tree biology and dendrology since 2007, and he's currently a tree inspector for the City of Portland, Oregon. And he gives talks all over the world about trees. He teaches sold-out classes. I was like, "So... You're a dendrologist, right?" And he demurred at the title of dendrologist. I'm like, "Dude! This is like when I was goth. I didn't realize I was a goth until I looked back at pictures and I was like, 'Oh, I was definitely a goth.' You study trees, you're a damn dendrologist, accept it." But, he was like, *[non-committal]* eehhh... We'll get to that.

So, I was headed to Seattle for a day to shoot this show called *Innovation Nation*, that's one of my other jobs, and I thought, "There's gotta be tree people up here. There's so many trees." So I did a little googling, and I saw there was a sold-out tree workshop the day I was there, led by this Portland-based dude. And then I began very gingerly stalking him online, to try to get in touch. The only social media I could find was a Facebook account, and after following a few leads, I emailed his bosses and then presto! The next day I creepily invited him to hang out in my hotel room. I figured his bosses knew where he was, and I hoped he would not abuse his access to chainsaws. He did not. He was great.

We talked for literally 2 hours, which was very difficult to cut down – no tree pun intended – about so many burning curiosities: Do trees feel pain? How do they talk to each other? What's up with crown shyness? Does he have a favorite tree? Will trees make you write your novel any faster? Does he get sad when he looks at wooden objects? What is tree porn? And are there any super sad stories about trees? Spoiler: yes! And also great ones? Also yes.

So, I am gonna go out *on a limb* and say this is a great episode, so *stick* around for some really wonderful tree facts, will you? Lumber up – I swear to God that's gonna be the last tree pun... Please trust me – for a person, who is somewhat in denial about being a dendrologist, Casey Clapp.

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**Casey Clapp:** *[slightly out of range of mic]* I've never done anything like this before.

**Alie Ward:** Yay! This is gonna be great. So, this is your mic. You weren't the easiest person to gently stalk online.

**Casey:** Sounds fantastic! I didn't know I could be found. *[laughs]*

**Alie:** Yes, you could.

**Casey:** I didn't know anyone would ever look.

**Alie:** I was like: I must talk trees with him!

**Casey:** Oh my god, this is so flattering. Thank you!

**Alie:** Yay! Okay, I have a question.

**Casey:** Yes, go ahead.

**Alie:** Arborist vs. dendrologist. What's the difference?

**Casey:** An arborist specifically focuses on trees in the urban area. But most of the time an arborist is one who manages a tree in the urban area. So, if they're going to cut a tree, remove a tree, plant trees, they're the ones who usually have something to do with it. But then a dendrologist is usually someone that's more on the research side of the world, and they're like, "Okay, we're gonna study this plant, its characteristics – or this tree, more specifically – its characteristics and where it fits in with the rest of all the other trees in the world." So dendrologists basically work on the back end of things, classifying all the different trees into certain organizational standards.

**Alie:** So, can you call... If you study and you love trees, can you call yourself a dendrologist?

**Casey:** Yeah, I would say so!

**Aside:** Casey got his Bachelor of Science in Forest Management, with a focus on Urban Forestry. And then, he went and got a master's focusing on Arbor Culture. So it seems that an arborist deals with trees, knows a lot about trees, and a dendrologist studies identifying trees specifically. So, Casey studied dendrology, but is now an arborist, but you guys, anyone who knows this damn much about trees is a dendrologist in my book. Okay? Let's just agree, there are bigger issues in the world. Okay.

**Alie:** When you were going about your education, so Casey's deciding to study trees...

**Casey:** Yeah, what a beautiful time.

**Alie:** *[laughs]* ... where do you start?

**Casey:** Well, for me, this started with just a tenacity about nature. I liked to go outside and I liked to do things, I liked to play in the mud, and climb trees. And then I built a pond in my backyard, and I was like, *[pumped up]* "I love this! I'm gonna do it forever!" And then it ended up being that I hated landscape architecture. Like, "I can't do this, this is so in-functional stuff, it's all..." I could say frilly, but I don't think that gives them enough credit, they do very good work. But I was very much a person who needed to manage something, and it needed to be active, and it needed to have an amount of utility in the landscape.

So I was like *[non-committal]* "eh, I'm not really interested." But I was killing it at all the tree courses I was taking. I was just like, "This is immensely fascinating, I want to learn more about trees, for no other reason than learning it." So then I transferred over to Oregon State University and I did Forestry, which was a waaay huge overcorrection, because they don't do trees for anything but making money, for the most part. Like, "eh we're just gonna grow these trees to cut them down, to make pulp, make paper, make money, do whatever they're gonna do."

**Alie:** I didn't know that's what forestry was! I thought forestry was like tree-hugging, like every tree has a name. I had no idea!

**Casey:** Oh gosh, oh my, I wish! This is for the people who grew up on *FernGully*, where we're just like, "I love this so much!" It is an industry like any other nowadays, where you go out to mostly clear cuts, for all intents and purposes; they get a bad name, but they are

not actually that bad in the grand scheme. All they would do is go out and say, “Okay, we have this many trees; they’re growing this fast; we want to cut ‘em down in 50 years and make a profit. How can we do that?” So, it’s a really important thing and, you know, we have tables, and chairs, and pencils, and all these things that we use every single day. So it’s a really important renewable resource, but unfortunately they are looking at it more or less for dollar signs. Which is fine.

**Alie:** I was wondering, as someone who clearly loves trees...

**Casey:** Yeah, I got a lot of tattoos of trees.

**Alie:** Do you really?

**Casey:** Mm-hmm. Oh yeah, I’ve got photosynthesis tattooed across my chest.

**Alie:** You’re a walking PowerPoint, essentially.

**Casey:** *[laughs]* Yeah, sometimes! I try!

**Alie:** So wait, you have photosynthesis on your chest... What else do you have?

**Casey:** I’ve got a sugar maple on this arm. And then I have roots coming down off of this arm. And... I’m wearing a long-sleeved shirt, so you obviously can’t see it.

**Alie:** But your long-sleeved shirt, by the way, has trees on it.

**Casey:** Yes, it has a dawn redwood on the back!

**Alie:** *[laughs]* So, you’re covered in trees externally, and then also from a dermatological perspective.

**Casey:** Yeah, pretty much.

**Aside:** Casey also has a pair of white bark pinecones tattooed on the inside of his right bicep. They’re beautiful. His tattoo, I’m not making a comment about his bicep, good job... Either way, that’s your business. He has an acorn on his other bicep. And he also has a dodo bird to represent the delicate balance between endangered plants and animals. So he’s like a walking botanical garden pamphlet. Obviously, a very huge advocate for more trees in cities. And for me, I’m an LA resident, so this part of the conversation made my heart choke with longing. I was like *[groans sadly]*. Do you have trees in your city? You lucky son of a bitch.

**Casey:** So, every tree in the urban area is providing some amount of benefit to the city. Many times, people have no idea, and it’s a very subconscious sort of thing, but there are reasons why certain streets covered with trees or neighborhoods are more idyllic. And other people live in other places that have no trees on their streets, and it is a much hotter place, it’s more rigid, more sort of industrial and everyone is like ‘eh.’ It’s a little more of an uncomfortable space. So basically, what I do now is say, “Here are all the characteristic of trees: here’s how they flow; here’s how they function; and here’s how you can best use them on your site or in a city to accomplish all these great things that they do.”

**Alie:** Do you have a favorite tree?

**Casey:** I do, yeah, but it changes pretty constantly.

**Alie:** What is it now?

**Casey:** Right now, it would be the coast redwood, [*dopey voice*] which is so stereotypical, I know.

**Alie:** Why is it stereotypical? It's a majestic tree!

**Casey:** I know! I completely concur. But people have generally said... they come up with the first thing that comes to 'em, so a lot of times when I ask people, they're like, "Oh, willows!" And I'm like: "Cool." Eighty percent of people say willows or something like that.

**Alie:** Really?

**Casey:** It's really strange. No one thinks about it until you ask them the question.

**Aside:** Do you know what your favorite tree is? I was like, do I have a favorite? Yes, I do. It's an oak. I have a favorite tree. I guess we all do. But coastal redwoods, Casey's favorite, they grow from southern Oregon just down the central coast of California, all the way to about Santa Cruz. They grow in this fog belt right near the shore because that fog helps get moisture to the top of these 350-foot giant trees. And if you're needing to imagine a silhouette of one, if you're like, "What do they look like?" You know the logo for Stanford? That there is the image of El Palo Alto, one particularly famous local coastal redwood tree.

It's also the unofficial mascot of Stanford. It's dubbed, very creatively, The Tree. And according to Wikipedia, The Tree, despite very heroically replacing a decidedly more shitty mascot, The Tree has been called one of America's most bizarre and controversial college mascots. People hate it! It regularly appears at the top of the Internet's worst-mascot lists – which apparently exist – but I am gonna very publicly beg to differ, because once you have seen a GIF of a dancing, layered green tent with a very happy human being inside, your heart's gonna be won. I love it. Anyway, coastal redwoods, Casey's favorite tree.

**Casey:** So naturally I get it all the time, so I had a lot of time to think.

**Alie:** Okay.

**Casey:** So, specifically they're just the bomber trees; they are rot-resistant, so almost no funguses affect them; they are insect-resistant, so insects don't get into them, they don't eat the foliage, they don't get into the bark. Their bark is literally feet thick and it's fire-resistant, so nothing can penetrate it, fire doesn't burn it. Sometimes, fire will actually hollow out the inside of the tree but leave the bark alone. But then the trees actually survive, because they can sprout from any place that still has functionality down to the roots.

So, not only are they also the tallest trees in the world, some of the longest-lived, some of the biggest in terms of volume, so they have accomplished all of these superlatives. Then, on top of that, they can basically out-live anything, they don't have any more predators, and they can sprout! Most conifers can't do that; if you cut them down at the base, they're done, they're ended.

**Alie:** Really?

**Casey:** For a redwood, you cut it down at the base, and the roots just shoot up all these new sprouts. And you're just like, "Oh, the tree still lives; this is great!"

**Alie:** The roots are like: "I don't care, I'm gonna go ahead."

**Casey:** Exactly, yeah. So they're just the world's most bomber trees. And if you haven't been there, you should go, they are just... there is nothing like it in the world.

**Alie:** Quick anatomy lesson of trees.

**Casey:** Oooh, okay!

**Alie:** What are we dealing with? And also, true or false: the root system is as big as the actual branches and canopy.

**Casey:** Hmm, mediocrely both.

**Alie:** Okay, so give me an anatomy lesson.

**Casey:** Yeah, sort of both. Okay, so real quick: there are four main organs of a tree. First off, what is a tree? A tree, by some definitions is literally – this one guy on a book I have describes it as a bush with a stick up the middle. That's literally, he's just like... it's a pretty dumbed down version.

**Aside:** I tried to track down what this book might be, just to see if it had any other cool definitions, like that a flower is a leaf but on acid. But upon googling 'bush with a stick up the middle', literally all that turned up were photos of George W. Bush flipping people the bird. Oh, and also this video during his presidency as he's doing a soundcheck:

*[woman excitedly says: "Ooooooooooh! Were we rolling tape on that?"  
George W. Bush says: "Just a one-fingered victory salute."]*

I'm gonna say, by today's standards, that seems downright charming and presidential as hell. I'm fine with it. Anyway, a tree: a bush with a stick up the middle.

**Casey:** So, that's what we would define as a tree. Ninety percent of the things that you know of as a tree are a tree. But then there's things like a Joshua tree; that's technically a yucca, it doesn't put on annual rings the same way that a redwood or an oak would. Then there's banana trees, banana trees are actually just cells, there is no woodiness to 'em. You can go over and knock them over if you really want.

**Alie:** Really?

**Casey:** Not necessarily, it's probably not that easy, but they are just big, big cells, big things that are basically just large herbs. Just like a hosta or anything else.

**Alie:** Weird.

**Casey:** Yeah, so there's no actual woody parts in them, but we still call them trees. So *[falling doubtful noise]*, where's the definition going? So if we have a tree, we say it's got a woody thing, let's just use the Oregon white oak, for example. So, the Oregon white oak, one usually has a single stem, comes out, and has this big, nice, beautiful globe-like crown. So, there's four main organs: you have the roots, you have the stem and the branches, you have the flowering parts, and you have the leaves. Those are the four things that you would call organs in a tree. Just for simplicity's sake: four main organs.

So the roots of a tree, generally, at least in the Pacific Northwest and in our more temperate regions – this is going to blow so many minds – they are only in the top 2-3 feet of soil.

**Alie:** What?!

**Casey:** That's it.

**Alie:** That's it? Even the big guys?

**Casey:** That is it. Even big guys, yeah. So if you ever are looking at a tree... go out into the woods and you see a tree that's toppled over and it's picked up its entire root ball. If you measure from the top of that down to the very lowest root you're not going to get past 4 feet anywhere.

**Alie:** That's crazy! I always thought they went way down, but they go out.

**Casey:** They go out. Why go down any further if you can remain stable, and you got all your nutrients and all of your water and oxygen you need at the top? There's no reason to go down. You've got all the stuff you need. Basically, you have, imagine a wine glass or a... *[searching for words]*

**Alie:** An umbrella that has a base?

**Casey:** Exactly. An umbrella sitting on a platter would be the best way to imagine it. And that's why roots are so important. People are like: "Oh, *[scoffs]*, that's not that... You know, they go down." You're like: "No, no, no, no, it doesn't." People think it's that mirror image and it's definitely not.

**Alie:** Oh yeah, 'cause I feel like you do see that kind of mirror image a lot.

**Casey:** I got a friend who got a tattoo of that exact same thing. This is before I knew anything about it, but yeah, the roots go down and it almost mirrors the exact same thing going up. And it's a very romantic version, it's like, "Oh, that's great, you know, *[awed voice]* a reflection of below and above." But *[dismissive eh]*, it's completely false.

**Alie:** Oh my god, I had no idea. Okay, so, that's the anatomy of a tree.

**Casey:** There's one extra step. This is the next most important thing: trees are compartmentalizers, so if you cut off one of their branches, they will just close it off and keep moving, just like compartments in a ship. All you have to do is close it off, and then everything else can go on as normal.

They have these two main things: you have cambium layer, which is the vascular system of the tree, just below the bark, just outside the wood. That's where the trees grow and put on their new rings, that is where they send nutrients and water from the ground up. That's called the xylem. That's a good word if you play Scrabble, if you can fit that in on a triple word score with that 'X', man you're killing it, you're really doing well.

Oh man, one time I was making a joke. I know a lot of Latin terms for things, just 'cause it's the scientific names of plants and their parts, and I was playing Scrabble with a friend at a coffee shop in Portland, and this other guy came up and he was like: "Hey man, can I just play with you guys?" And we were like, "Yeah, yeah totally cool." And we made the joke as like, "Yeah, but we're only using Latin terms." And I swear to God, without even blinking an eye, the guy was just like, "Okay." And we're like: "[scared voice] What did we get ourselves into?!" He massacred us! Really nice guy, but oh my gosh. He. Knew. How. To. Play. Scrabble. He destroyed us.

**Alie:** What was his job? What was his deal?

**Casey:** No idea. I don't even remember. I didn't ask, it was just... We were shell-shocked. We had to leave that coffee shop and think to ourselves, "We're never playing Scrabble in public again. Certainly never with anybody else!"

**Alie:** It was Ken Jennings; it was just a Jeopardy champion.

**Casey:** [laughs] I know, just wearing a fake moustache, like [imitates cartoon villain].

**Alie:** Oh my god. Okay, so, xylem...

**Aside:** Okay, buckle up, because this part's gonna get a little technical, but you are going to learn a few new Scrabble words, as promised, and/or names for your gluten-free organic children: Cambium, Phloem, Photosynth, and Xylem, of course, which is Greek for wood. And yes, that is where the word xylophone comes from. So, Scrabble, Jeopardy, you're prepped for anything. Okay, back to xylem.

**Casey:** ... takes all the nutrients and water up to all the leaves. The leaves, they are doing the photosynthesis, so they're creating the energy from the sun. They start pulling all of their nutrients – or all their photosynthate is what some people call it, basically sugars – and they pull those down and that goes to the phloem, which is the pipes that go down, and that's basically it. Tree roots pull things up through the stem, and then puts things out to the leaves. The leaves are the factory, they create all the food, and they put that down and distribute it out to the rest of the tree.

**Aside:** Oooh, are you ready for a hot tree scandal? Okay, sometimes a tree breaks up with its own limbs! There's drama!



**Casey:** Many times, if there is competition, it actually cuts it off itself. If they are growing a limb out directly to another tree, they get shaded out, they are like: “eh, that’s too much energy I’m putting in and not getting enough back.” So they just cut it off, that branch dies, the rest of the tree keeps growing. And that is what people call self-shedding or self-pruning trees. It’s not really that the tree is just like, “Okay, I’m done!” and then drops a branch – some do, but that’s a completely different story – this one is more where the trees no longer feed it, literally close the compartment off to that branch. That branch slowly dies, and then as soon as it falls off – maybe a crow lands on it and it’s so decayed – it just topples to the ground. The tree then seals over that wound. Trees don’t *heal*, they *seal*. They specifically close it up and then continue to grow like nothing ever happened.

**Alie:** It’s like ghosting your own arm.

**Casey:** Exactly! Quite literally.

**Alie:** You just ice it out. You’re like, *[vocal fry]* “I don’t need this thing.”

**Casey:** “Yeah, listen, it’s not me, it’s definitely you. I’m sorry.”

**Alie:** “Not pulling your weight.”

**Casey:** “Yeah, I’ll send you a text.”

**Alie:** *[laughs]* “You’re out!”

**Casey:** But then the joke is: *[whispers]* it’s never getting that text.

**Alie:** I have a gossipy question.

**Casey:** Oh yeah, go ahead.

**Alie:** How do you feel about... the redwoods that they have carved an area where you can drive a car through?

**Casey:** Oh God, it’s mutilation.

**Alie:** Okay, that’s what I thought.

**Casey:** It’s not the worst, obviously the trees are still living, so they can get through it.

**Alie:** What’s the tree going through?

**Casey:** Oh, it’s going through hell, absolutely. Well, it went through hell. It’s basically like you get a tunnel carved through your stomach. But, imagine that we as humans, our bodies are just 100% connected to each thing. So if you get your arm cut off, your body is like, “Well, okay everything is messed up.” Then someone has to sew it up, blah, blah, blah, you don’t heal and grown a new arm.

Trees are compartmentalizers, so if you cut a hole in their stomach, they’re just going to block off everything around that hole and keep moving like nothing ever happened. Because everything else is going on around the tree itself, and the wood is actually, basically, inert. It’s just a physical structure holding the tree up.

**Aside:** Okay, remember the cambium layer from earlier? So, as we recorded we were both drinking tea, raided from my hotel minibar, and Casey had a visual metaphor for the cambium layer, which really helped. He said, "If you're looking a full coffee cup, the coffee inside would be the wood, the mug would be the cambium layer, and the outside of the mug would be the bark." Does that make sense? So, the cambium layer is like super important in terms of keeping a tree alive.

**Casey:** So all you have to do is keep that cambium layer alive. If you put a tunnel through one of those redwoods, then it's like, "Oh shoot! Well, now there's a big hole in it." The tree doesn't like it, but it'll get through it, you know, just like anything else. Just like if a fire came through and the fire burned a hole in one side and then burned out the other side as well. The tree will be fine. Well, assuming the tree lives, it'll be fine, it will just continually seal over those wounds and protect itself.

**Aside:** I went to go look up which tree this was, and I found out there is tons of gutted tunnel trees in California. We have made an industry. An *indus-tree*. [*sad wah-wah-wah sound*] Oh God, I'm so sorry. I'm sorry! That pun came out of nowhere! It was like a burp during a job interview. I'm sorry.

We've made quite a few park attractions out of tunneling out the trunks of these behemoth trees and just trying to drive cars through them. We're monsters. And we love road trips. We're just doing our best.

But in researching this, I also found out about the Hercules tree, which an eccentric rancher dug out a 12x9 foot room into and tried to live in it. God bless him. But the tree was just weeping sap onto his face at night too much, so they were just like [*frustrated*] "aagh," and they just made it into a gift shop.

But, there are a good handful of tunneled-out trees down the California coast and two big ones have fallen. Most recently, this one called the Pioneer Cabin Tree, which toppled and very dramatically shattered in early 2017 after some severe weather. The Calaveras Big Tree Association remarked, "The storm was just too much for it." The storm was too much for it?? The storm? You're gonna blame the storm? That's like knifing someone with a machete and then saying that it's probably a metal allergy killed them. Anyway...

**Casey:** But it also sucks that you can't drive through it anymore unless you have a Mini Cooper, because they did it way back with the Mini Ts, or the Model Ts, and now we're driving Hummers and they're like, [*deep macho voice*] "Make the hole bigger!" It's the worst.

**Alie:** Now, talk to me a little bit about how trees talk to each other. Because I feel like there was some research, or something came out recently, about how trees can talk to each other through their roots. And everyone was like, [*dramatically*] "Whhhaatt??!"

**Casey:** Aah! Looking at it, thinking the trees are watching them, it's like, [*dramatically*] "oh my God!"

**Alie:** It's also so cruel to think that that story made the newspapers, which are dead trees. Which is horrifying! [*exclaims dramatically*]

**Casey:** They cut down a tree, and like, “This tree's not talking to you, but the ones that are still living are.”

**Alie:** *[dramatically]* Oh God.

**Casey:** *[laughs]* It is.

**Alie:** So how do the roots communicate? Do they share nutrients? Do they talk to each other? What's happening under the surface?

**Casey:** Oh, this is so fascinating. So, the book you're talking about is called *The Hidden Life of Trees*, I think? Not to be confused with *The Hidden Life of Plants*, a pseudoscience book from many years ago, which is absolutely interesting to read, but very silly.

**Aside:** Alright, I looked this up and the weird one is actually called *Secret Life of Plants*, it's kind of like this woo-woo 1973 volume about botanical sentience, the authors of which gave lie detector tests to house plants after trying to communicate through ESP. It's out there.

They also postulated that their little green friends “might originate in a supra-material world of cosmic beings which, as fairies, elves, gnomes, sylphs, and a host of other creatures.” *[doubtful]* Ehhh... Okay. They made a movie about it, which is not to be confused with David Attenborough's *Private Life of Plants* documentary in which he tickles a Venus flytrap. Anyway, not *Secret Life of Plants*, not *Private Life of Plants*, Casey's talking about the *Hidden Life of Trees*.

One author, the German Peter Wohlleben, describes that trees feed each other sugars through their roots when one is sick or dying, and they communicate to each other using chemical and electrical cues in response to stimulus, not unlike how humans use vocal cues to say, “Hey fools, there are donuts in the break room,” or how we type posts on secret Facebook message boards saying, “Watch out, this hipster dude sucks, do not lay with him.” Girls do that, by the way.

**Casey:** It really comes down to... When we communicate as people, I say something to you – there's no physical connection between us – I just say something, and you hear and then you act on it. A tree, everything is a stimulus that comes from something. So all the roots, if it's the same species, their roots can graft together.

**Alie:** What?!

**Casey:** Yeah, it's kind of mind-blowing, but what's going on underneath the soil – which, the soil is probably the most important thing that you can ever consider about a tree; most people look up, but there is an entire underground system of things that no one ever thinks about. Regardless, the way it works with the hidden life of plants is they graft themselves together. So if you have really, really thin bark on those root hairs, and those root hairs touch each other, then they can basically start passing... the cambium layer sort of connects. So something comes out, takes a left, and then goes into another root. Could be from the same tree, but if it's the same species then they'll actually connect together and you can get an entire forest of all these trees connected.

Which is fascinating, but it's not like one tree is connected to all the rest like a network; it's kind of like the Internet, where you have one computer, then another computer, then another tree, then another tree, then another tree that all may have or may not have these root hairs connected.

Then there's a sublayer on that, which is mushrooms, mycelium. This is the new thing that really blew up. *RadioLab* did a whole thing on it, and everyone was like, [*impressed confusion*] "Aah! Mushrooms! What? Trees?!" There are an insane amount of mushrooms, that are – actually, people have more genetic things in common with mushrooms than we do with trees and other plants.

**Alie:** That's crazy.

**Casey:** It's crazy to think about, they're basically sentient things. That's not true, strike that from the record.

**Alie:** Right... uh, we'll give them honorary sentience.

**Casey:** Honorary... Yes, we'll take it. So basically, what they do is all these fungus have this mutualistic relationship, it's called symbiosis. What they do is, a fungus has root hairs or mycelium that's microscopic, much smaller than the root hairs of a tree.

So if you are a tree growing in a place like, say, Southern Oregon, then you have a much dryer condition. Tree roots are a certain size – maybe the size of your finger for this instance –so you're like, "Aw, man, I can only reach into a certain size crack, where this water is." And the water is held up within these smaller pores in the soil.

If the trees can't physically get their roots in to grab it then it's basically not available. So this fungus ends up getting this mutualistic relationship: the tree gives the fungus sugars that it produces up in the canopy, so the fungus gets some food, and then the fungus, if our fingers are the size of root hairs, then our hair – our actual, physical hair – is something of the size of the fungus. So the fungus goes like, "Oh, yeah, I can go ahead and grab that water!" So the fungus goes in and basically creates a whole second level of roots for this tree.

The way you can tell if a tree needs water – this is great – it's kind of like a straw, where on the very tippy top you have evaporation, evapotranspiration. Evapotranspiration is literally the process of water going from the ground through a plant or a tree out into the air.

So what they do, or how the trees function, is they grab some water, do some photosynthesis or do whatever they do, and then some water escapes. So when that water is released into the atmosphere, just like you're drinking out of a straw, one molecule pulls on the next, pulls on the next, pulls on the next, using capillary action, all the way down the tubes of the tree, to the soil, into the roots, and then all of a sudden that root is pulling up another little molecule of water and you get this full cycle.

So as soon as the trees have this pressure deficit, where it's sucking more water into the air than it has in the ground, then the fungus will be like, "Oh wow, there's a pressure

deficit!", and water just osmoses over to that area. So it's not that everything is communicating, like the tree is "[old-timey voice] Oh, I need water! Fungus, give me water!" It's more like there's all these scientific processes or these natural processes that are functioning in this very specific system that then one little molecule gets pulled up, pulls on the next molecule, pulls on the next molecule, so on and so forth until the fungus gives it a molecule, and then there you go.

**Aside:** Side note, I learned of this from a biology teacher years ago, and it's always stuck with me, that this chain of water keeps the plants healthy. So to prolong the life of cut flowers, if anyone ever gives them to you, trim the ends about an inch underwater to prevent getting an air bubble in the stem, and then they'll last longer.

So there you go! Don't say I never surprise you with flower facts. And if it's been a while since anyone got you flowers, go get yourself some flowers for a few bucks at Trader Joe's or something. Just pretend they're from your weird old pal Ward over here. You deserve it, kiddo! Just cut them underwater, that's all I ask.

**Alie:** Do you dream about trees?

**Casey:** Yeah, but usually it's related to work in a negative way, where I'm just like, [heartbroken] "Oh, I'm gonna have to have you cut down." Trees need a certain amount of space to grow, because their roots are really what matters. They have to grow out to stabilize the tree, to get new nutrients, and all that sort of thing. So as soon as you have a situation where a tree is in conflict with development, most of the time development's gonna win.

So you go over... I tell people all the time, so you measure diameter – you take a tape and you measure around the tree and it tells you the diameter of that tree – so you have to literally reach around the tree and then grab the diameter tape to pull it around, so you're literally hugging a tree every single time. And when I was up here in Seattle, with these huge developments, you go into a forest, and you'll be like, "This is a beautiful forest. Oh my God, this is gorgeous." You hug every single tree, and then look up, and say, "Okay, they're all healthy, they're good." You look back at the plans, and there's a subdivision going in, and you just put X's over every single tree.

**Alie:** [heartbroken] The one that you hugged!

**Casey:** I know! All of the ones, yeah! There are some big ones, where you're just like: "You are older than every single person alive right now."

**Alie:** Oh my God!

**Casey:** I know! And as a city worker, now every chance I get – not every chance, when it's appropriate and allowed by code – I'm like, "No, you may not cut down that tree. You have to do *this* to protect it!" And then usually, if you're working with good developers, which there are many, they're just like, "Okay, sweet, yeah, what should we do? How should we do this?" And then we get it set, and we save a tree, and it's just so stellar.

Because then when you get done, you have this building – like, I was talking about neighborhoods earlier, if you have an old house, an old building, with these two huge trees in front of it, you get this sense of stateliness, but also permanence, where it's like: that house exists, that has existed there, the trees, they're there, they exist. And then it's like nothing is ephemeral, it's all that exists.

So people... I'm like, "Hey, when you get done with your building, it's gonna look like it was here for the last fifty years." And people are gonna walk out, they're gonna see these beautiful limbs in front of their house, in front of their patio – or not even patio, like your deck if you're in an apartment building or something – and you can just chill out there, and there are just gonna be birds hanging around, it's gonna be ten degrees cooler on your deck, rather than the deck where they cut down and planted the little tiny trees.

You know, there's always rotations, things are always coming and going, but it's really nice if we can keep the big ones that are really, like, outstanding trees.

**Alie:** You're a tree advocate!

**Casey:** Oh my God! Yes I am! Every chance I get!

**Alie:** You're a friend to trees!

**Casey:** Yeah, yeah!

**Alie:** I do wanna go back and ask about – I realize I should have asked you this question next – I've been seeing a lot of information on the Internet about crown shyness?

**Casey:** Crown shyness?

**Alie:** Canopy shyness? Where the very top of a tree, the tops of the trees tend not to touch each other?

**Aside:** So if you haven't seen pictures of what I think is very coyly dubbed crown shyness – it's also known as canopy disengagement, which sounds like you're talking about divorced lovers, as far as vibes – but it looks like if you looked up at a tree canopy and all of the trees just stopped just short of touching. It looks like super wicked mosaic art, or maybe like a huge leafy puzzle, and your brain is like, "Whoa, what?! Plants must have minds! Or maybe nothing is real, and I'm on drugs; that's so pretty and crazy!" I fact-checked Casey's following explanation, and dude's on the money. It's almost as if he knows a shit-ton about trees.

**Alie:** What's the deal with that?

**Casey:** Honestly, I've never really given it a second thought. The only thing I that I can think of, which happens in trees nowadays – and this may be completely conjecture, so we'll just put a little dot next to that – if you look up, the whole canopy of the trees is swaying and moving back and forth, and if there are other trees next to it, they're swaying back and forth into each other. So a lot of times, trees will hit each other and actually break off limbs, and basically, it's competition at its highest, where they're actually literally putting in punches towards each other.

**Aside:** So it's less like a mystical tango, and it's more just like a windy mosh pit.

**Casey:** But other than that, I really can't think of a good reason, aside from getting light. If they aren't touching, then they're not shading each other out. So they can just stay right there. No one's asked me that before. I have to think about it.

**Alie:** I think it's something that just came out on the Internet.

**Casey:** Oh, did it? Okay, nice! I'm very bad on the Internet. I'm the worst millennial in the world.

**Alie:** Yeah, you were hard to find!

**Casey:** Nice, that's great!

**Alie:** Which is good, 'cause you were outside, not looking at a screen!

**Casey:** Exactly.

**Alie:** What about *The Lorax*, did you read *The Lorax* as a kid?

**Casey:** Yeah, I did. Actually, I have a Truffula tree tattooed on my arm as well.

**Alie:** Hell yes, you do!

**Aside:** Casey showed me the underside of his left arm, where he has a little Truffula tree from *The Lorax*, which is this Dr. Seuss ecological epic kids' book about a dude who cuts down a bunch of fluffy, beautiful trees to make pajamas. And he destroys the environment, leaving a smoggy apocalyptic wasteland. In the book, and on Casey's skin, the word 'Unless' appears etched into kind of a rocky pulpit. [*clip from The Lorax cartoon, "Unless someone like you cares a whole awful lot, nothing's going to get better. It's not."*] It's pretty damn depressing.

P.S. After *The Lorax* was released, a logging company got super p.o.-ed, and published a competing pro-logging book called *The Truax*. And people were like: "... logging company, can you just fucking not?" Anyway, a good reminder not to burn the Earth because of pajamas. Okay. Let's talk about old-ass trees.

**Alie:** Speaking of this: dendrochronology?

**Casey:** [*excitedly*] Oh my God!

**Alie:** Let's talk about aging trees and tree rings. How can you tell the age of a tree looking at rings? And what are some of the oldest trees? And does it hurt the tree when you're boring into them to get a core sample? Let's talk about tree rings.

**Casey:** Oh, this is so great! Basically, dendrochronology is strictly the study of tree rings. Tree rings... It's pretty well-known, at least in the temperate regions, every tree grows for a certain amount a year, and then it goes dormant, then it grows for a certain amount of year, then it goes dormant. So each time it grows, it puts on a new ring of wood on every single surface: on the trunk, on all the branches, on the roots. That is just an annual count. For us, we treat it like a count, for the tree it's actually the tree getting stronger every single year. Sometimes it'll put more wood on if it's a really good year; sometimes

it'll put less wood on if it's a shorter year – or a shorter growing season or harsher growing season.

**Alie:** So the rings, if the rings vary in width, it usually means maybe there was better conditions, better water, and it grows more that year. And then maybe there's a drought, and the rings get closer together?

**Casey:** Precisely, yeah, exactly.

**Aside:** So in California, which is where the oldest trees grow, thank you very much, we've got bristlecone pines, and foxtail pines, and in the central mountain area the oldest ones grow. They look like alive driftwood; they're craggy, and dense, and ancient, and they look like it's just been a slow-motion struggle to get out of the rocky, dry earth around them. The oldest specimens have been found in the White Mountains in Inyo National Forest, which is in eastern central California – it kind of borders on Nevada. I don't think there's a lot going on there other than a bunch of old trees.

**Casey:** But if you have a tree that is, say, 2,400 years old, then you have a climactic record for 2,400 years of what was going on, like, "Oh, in year A.D. 2 there was not very much wood, that was a bad year in the mountains of central California." So what they can do, or what they've done with dendrochronology, you can look back specifically in these trees, the bristlecone pines, and what they do is they basically say, "Okay, let's find a living tree, let's find the oldest one." The oldest one, I believe, is called Methuselah. No one knows exactly where it's at. There's another super-sad story about the oldest oldest tree; it was so sad!

**Alie:** What happened?!

**Casey:** Oh man, this is the worst story.

**Alie:** Tell it to me! I'm ready. Tell it to me, I can handle it.

**Casey:** You gotta feel bad for the guy who did it. It was not his fault; he's a victim just as much as the tree. People are gonna go crazy if they hear me say that, but I'm gonna stick to my narrative here.

**Aside:** Casey's talking about this tree named 'Prometheus'. In 1964 a geography grad student by the name of Donald Rusk Currey was poking into trees to find out more info about the Little Ice Age. He was using this thin increment borer to take what should have been a harmless core sample about the diameter of a pencil. Dendrochronologists use them all the time, not a biggie.

**Casey:** He just had some of these borers – the increment borers, what you're talking about, when you drill into the tree to measure the rings – he had one of those. Most of the nice ones are made over in Switzerland, and if you break it then it's several thousand dollars, and you have to get a new one or have them fix yours, that sort of thing. These trees, because they grow so slowly and have such dense rings, their wood is really hard to get into. So as soon as you drill in and pull out this core, it's really difficult sometimes to get the actual increment borer back out of the tree without breaking the increment borer.



He drilled into the tree with one increment borer and it got stuck; he drilled in with another one and it got stuck. So he was like, "Okay, well, both of my increment borers are now stuck in this tree, what am I gonna do?" Then the guy when over to the Forest Service and said, "Hey, can I just cut this tree down? You know, I'll count the ring and all these things, you know, it's for science." He has all the permits, everything was on the up and up, and there was one tree that he happened to be working on, of all the thousands and hundreds that were around him, he just walked up and was like, "You! I'm gonna measure you!"

So he did it, cut it down, and the USDA Forest Service, whoever was up there, was just like, "Yeah, go ahead. Sounds good, there's a hundred different of them, that's fine. This tree, for all intents and purposes, is not special." Other than the fact that it's innately special because it's a really cool kind of tree – now protected, I believe in California. So he cut it down, started to count the rings: "One, two, three, six, thousand, four thousand, *[drifts off]* ..." It was 4,700 years old! The oldest recorded living thing on the planet!

**Alie:** *[dramatically]* Nooooo!

**Casey:** I know!

**Alie:** *[crying]* Nooooo!

**Casey:** It was so tragic. The collective shock in that world, because apparently there were... not environmentalists, but there were certain intrepid people who had known about this tree. But people who study trees and find these superlative trees, the biggest, the fattest, the this – other than General Sherman, the biggest giant sequoia in the world – all the other trees are very hidden. The tallest redwood, I think it might be the Stratosphere Giant – there's a couple that are named – no one knows exactly where it is, or very few people, because they don't want this thing to happen.

They don't want people to go and like, "Oh, I'm just gonna take one cone," and then all the cones are gone, and stamp all the way around the soil and cause the tree to die.

**Alie:** They're like protected celebrities.

**Casey:** Exactly, yeah! They're so protected, and so it's like, "Oh no, are you kidding me?! The one tree?!" So everyone got super mad at him, was like, "You cut down the oldest tree!" And you have to see, this guy's a researcher, studying these trees, doing dendrochronology, so it's not that he was just like, *[villainously]* "We're gonna log it and turn it into a table." He's just like, *[stammering]* "No, I... How... I wasn't... *[desperate noises]*" And then for the rest of his life he was just absolutely vilified.

**Alie:** Oh my God, Casey, I'm literally crying. It's just so sad!

**Casey:** I know! And you look back on it, and you're like: "I can't believe...!" Like, literally 4,700 years! When you conceive of that... The pyramids were built 6,000 years ago. So 2,000 years before Christ was born, these trees were *already* growing. When Christ was born, they were already ancient trees by our standards; they were already 2,000 years old,

2,700 maybe. It's one of these things where you're just like: "How can... [*grasping for words*] ... oh my God." It's hard to conceptualize.

**Alie:** What did the guy do? Did he go into the witness protection program?

**Casey:** I know, he should have! He just kind of disappeared. I think he changed careers, stopped doing anything, and just sort of settled out. But this one person remembered his name, and he was doing something and someone brought it up, and was like, "Hey, aren't you the guy who killed the world's oldest tree?" And he was just like, "Gah! Don't open up that wound again!" It's a really sad story. But the guy didn't do it on purpose! He was just in the wrong place at the wrong time in the wrong tree. It was so sad.

**Alie:** I mean, chances are if you're up there boring trees, you love trees.

**Casey:** Exactly, yeah. It's mind-blowing.

**Aside:** I got so sad for the tree, and also because this guy probably ended up living under a bridge, and his family probably never talked to him again, probably couldn't get a job, had to eat out of the garbage, give up all of his science dreams, for one mistake.

I looked into it, and it turns out he did just fine. He had a successful career in academia, he was a geography professor, nothing to do with trees. He didn't even have to change his name, or wear a wig, or shave his eyebrows so no one recognized him.

You guys, I once got fired from a job in college for defrosting the mini-fridge wrong and breaking it. This guy just sailed through life, killing the world's oldest thing!

Prometheus, at 4,862 years old, was considered to be the oldest living thing in the world until 2012, when a newer oldest one was discovered; it was a tree that was 5,062 years old.

And you're like, "Well, what's that one's name, if the other one was named Prometheus?" Good question. The new oldest one is unnamed! No one's ever named it, frankly that really bothers me. It's like the oldest alive thing on Earth, call it Jeff, or Yvon, fucking anything. Anyway, I gotta calm down. I gotta take a breather.

**Casey:** So those are the oldest trees. What he was studying, dendrochronology... To answer your question: yes, when you drill in it does cause a wound in a tree, but just like that big tunnel, it's just a smaller wound. The tree will compartmentalize over it.

**Alie:** And you just have to go halfway through?

**Casey:** So yeah, if you can hit that pith, pull it out, then boom, there you go, you've got all the rings of that tree, as long as that tree was living that entire section. But they're so close together that you have to actually get a microscope and a tiny little pin to actually count them out, because you can't see it with the naked eye many times; it just looks like this black sort of thing. You have three or four thousand rings, four thousand individual lines, in the span of maybe three feet, four feet. It's crazy.

So this guy, dendrochronology, what he was studying – this is just so fascinating – basically the way it works is: you drill into the tree, you have a living tree. You can measure: okay, that tree is 4,000 years old. Cool.

Now you look next to it, and you see a dead tree. That dead tree likely was living before the tree that was alive that you just measured. So you can say, “Okay, I can measure and drill into that tree, pull out this ring, and then match up those rings.” Because remember: each one’s growing in the same place, so its rings are gonna have the same thickness and the same chemical compounds, for instance carbon – which is where this story is gonna go, it’s gonna get great.

What they do is, “Okay, let’s match up this living tree with this dead tree.” And then all of a sudden they realize, “Wow, this dead tree was alive a thousand years previous.” So I get now an extra 1,000 years to add onto it once you match up those overlapping parts of their lives. Then you find another tree that’s even older, that’s a dead standing snag that you’re just like, “Oh man, that tree’s been gone for hundreds of years,” but it’s still standing there because there’s no decay that’s up there. This is like at 11-12,000 feet of elevation. There’s nothing up there that’s affecting these trees, at least not historically.

So now you find an even older dead tree, and you’re like: “Okay, cool, this older dead tree, now I can match up with that other dead tree.” And you just keep on getting these overlapping things. They just find all these trees, match up all of their different rings together, and then: boom, you can count back – as long as you’re 100% sure that all those rings are from the same year.

**Aside:** So they can match all these rings together, and by now they’ve amassed something like 10,500 years of records for climate and carbon in the atmosphere. Now, what’s very cool is they can use that record as a reference to the amount of C4 or carbon in the trees, and they can compare it to how we carbon date artifacts for certain civilizations. So it’s like a dendrochronologist getting featured on an anthropologist mixtape.

**Casey:** What they did is they recalibrated all the machines, or at least some machines, retested these things and found that they were completely off. Where they’re like, “Wow!” So we actually had to redo what we thought about European history, for example, because we redid our carbon dating and realized, “Wow, we’ve been kind of off.”

**Alie:** So trees are a paper trail in every way!

**Casey:** Yes, pun intended. *[DJ airhorn]*

**Alie:** Okay, I have a question about, how do trees grow around benches, and bicycles, and fences? You know you see those pictures where a tree is eating a bicycle and you’re like: “What is life?!” What’s happening?

**Casey:** How did that happen? Oh, it’s great. I’ve seen exactly the one you’re talking about. In fact, it’s an old banana-seat bike up in a tree, and the caption I read underneath it was: “Oh, someone left this bike against this tree in 1930, and it grew up.” A.) That tree was probably 40 years old, so it’s not really 1930; it’s just an old bike. But trees aren’t like

grass, where if you cut grass, the growing part of that grass is at the base, it's at the crown of the plant, right at the soil level. So it comes out and then moves up.

Trees, once they grow to a certain point, that will be there forever. If they put out a branch at one foot, that branch will always be at one foot. It'll probably die at some point, or get cut off, and then the tree will grow around it and you don't have to worry about it. Basically, that bike was *put* 20 feet up in that tree. 100%, that's how they grow. They can't lift anything in that regard.

**Aside:** Oh God, okay, quick aside on the backstory of this bike. Ugh! It went viral with this caption: "A boy left his bike chained to a tree, and then he went away to war in 1914, and his parents left it there as a memorial." But yeah, like Casey says: [*French accent*] bullshit. Okay, so first off: the US did not go to war in 1914. Secondly, the real owner of the bike didn't have parents! In the 1950s on Vashon Island in Washington, this kid named Don Putz lost his dad in a house fire, which is [*Southern accent*] so sad, and a bunch of locals donated items to the family; it was a mom with five kids. And so he got a bike, and he hated the bike. It sucked!

So one day he just ditched it in a swamp, and someone must have found it, hung it in a tree, the tree grew around it. So he had no idea until 40 years later, he's grown up, he's a sheriff, he visited this tree landmark on a vacation back in his hometown, and he was like: "Well hot damn, that's my bike! And it sucks!" And he says: "It just belongs to the tree now." Which, I'm guessing from the way it was wedged into the tree's crotch, and it had to grow into its flesh, that the tree hates the bike too.

**Casey:** But what they can do is grow around things, so trees grow and they react to different forces around them. So if there is a... Oh, there's actually a great picture I have, oh my gosh! It's a tree in the Sierra Nevada, it's a common juniper, and there is this big horizontal stack of granite, just growing out, and the tree was growing just right next to it.

So as the tree got bigger and bigger, all of a sudden it kept starting to push on that rock. The rock wasn't budging, so then it can't push out any more, but it's still gonna put on these rings. So the tree ends up growing out above and below it. The rock just stays right where it is, and the tree just keeps pushing out over the top, pushing out over the bottom, and literally starts to encompass that physical rock. So it got to the point where it looked almost like the tree had been poured over the rock. As though it came down and just poured off the side of it, but it was just the wackiest picture, and I wish I could find it.

**Alie:** Oooh! I wanna look that up! I have more questions, but I hope you're not – are you late for anything?

**Casey:** No, I literally have nothing. I told a friend I would grab a beer, and that's it.

**Alie:** Okay good, because people have questions. Hold on...

**Casey:** People have questions?! This is so exciting!

**Alie:** I know, okay wait...

**Casey:** I could do this all night.

**Aside:** Warning: weird question. Bear with me.

**Alie:** Okay, do you think that certain trees have certain personalities? Like... I know that that sounds like a very weird magical question, but do you see a tree – maybe this is just ‘cause I have a little bit of synesthesia, where numbers and letters have different personalities – but do you ever feel different vibes from different trees?

**Casey:** I would say so, yeah. But, I don’t know, it’s definitely not in a specific sense where I’d be like, “Oh, what’s up! That’s my bro, that’s my tree! You know, we’ve been hanging out for years.” And then I look over to another tree, and I’m like, “Ugh! [huffs] Birches! I can’t... they just look at me wrong all the time.” It’s not quite that explicit, but my view is colored by what the tree’s doing, like the characteristics of it.

If I see one tree I’m like, “Ugh! You are overplanted, you fall apart all the time, you put out flowers and they stink, and you pull up the sidewalk. You are just not a good tree, I don’t want anything to do with you.” It’s not how I feel, like [disgusted] “oh, I hate you!” but then you’re like, “Well, but... If you just wanna hang out later, that’s cool.” That’s kind of like what it is.

**Aside:** Like when I was a kid, we had a tree growing up that had a bend in it, and you could sit in it like a chair, and we nailed a table up there so you could perch up there and sip a soda in the woods. This tree always seemed... just so benign! Kind of like a cool grandpa that’s like, “Sure, you can nail a table into my flesh and put a Diet Pepsi on it, you little brat. I love ya.”

**Alie:** What do you think about *The Giving Tree* book? Does it make you cry a lot?

**Casey:** Oh, it does! I have it. I built these shelves, and it’s on the shelf up above my bed. I love that book!

**Alie:** Wait, did you build the shelves out of wood?!

**Casey:** I did! But I reused it, it was a pallet. And I turned it into these cool shelves, and I filled it up with cones and tree books and certifications – I think one of my degrees is up there or something like that.

**Alie:** [squeals excitedly] So are you ready for some questions from some Patrons?

**Casey:** Yeah, this is so exciting! I had no idea!

**Alie:** There’s so many questions I had to cut them off. I don’t think I’ve ever gotten this many questions on my Patreon.

**Casey:** Holy heck, okay! Oh my God, the pressure is on!

**Alie:** Patrons get to ask questions to the ologists, so... oh my gosh, okay. I’m gonna just run through, it’s a rapid-fire round, answer as quickly as you can, and we’ll get through as many as we can.

**Casey:** That sounds good, I think I can do it. Is there a chime at the end when I run out of time?

**Alie:** No, I should have a whistle. Okay, here we go: Beth Frausto wants to know: Do trees feel pain when we trim them?

**Casey:** They do, but not in a strict sense. This also goes back to *The Hidden Life of Trees*, where whenever we personify a tree, and we give it sort of a humanistic thing, we're always selling it short a little bit, because you really don't wanna say that the tree 'feels,' because then everyone's gonna be really sad when they're cutting down trees. Actually, maybe that might be a good thing. Yeah, I may take this back.

Regardless, usually scientists try not to do it, except for this one instance with *The Hidden Life of Trees*. That was probably the single greatest thing to happen to science about trees, because some guy brought it down to a relatable level for the rest of humanity. And all of a sudden people were like, "Wow! Trees, they DO feel, they DO think, they do this." And then scientists are like, "Um, I'm just gonna say yes, just because that means that we're on the same page now."

**Alie:** It's good for branding.

**Casey:** Exactly, it's great! So they do feel pain, but the pain isn't so much that they are like, *[hisses in pain]* "Ow!" They're more... because they're compartmentalizers, so all that does is create a reaction that says, "Oh! I need to protect myself. Something may get in."

**Aside:** Y'all do this with dating? Heeey! *[low slow male voice: "Oh yeah!"]*

**Casey:** Either it's gonna get an insect that is gonna come in, or it's gonna be a fungus, or both, or a multitude of other things. So as soon as you prune a tree it will get a wound. It's not that the tree is feeling hurt, but the tree will then respond to that. So they'll respond *[snaps fingers]* immediately, especially by the next year, and they will just put on new wood to cover over it, so it puts in these three walls of chemical protection and then grows a fourth wall of wood over the top to seal over that wound.

**Alie:** Mm-hmm, and they're like, "Never happened."

**Casey:** Exactly. It's like it never happened. So, it's not like they feel pain, but they react to the wound in a way that is best protecting them from any other pathogen, or insect, or something that's gonna come in and get 'em. So anytime you cut a tree and then it starts pushing out sap, it's kind of like bleeding, especially if you cut it during the growing season, where it's just pushing out as much energy and sugars as it can to its leaves to grow big and strong. You cut that off, all of a sudden there's a bunch of pressure inside the tree literally pushing all this sap out. But that sap is also covering over that wound and making it an impenetrable place for all these other insects and things to get in, so it's actually literally sealing itself.

**Alie:** Right, that's like a varnish, kind of.

**Casey:** Yeah, exactly.

**Alie:** Delicious varnish. That actually leads me to my next question. Dustin Mills wants to know: How many different kinds of trees can you get syrup from? And does that hurt the tree?

**Casey:** Oh man! It does, it hurts it just like anything else, but it kind of hurts it in the same way that if you give blood you're hurting yourself. So, they have plenty of stored nutrients and stored sugars and all these things. You can get syrup from almost any kind of tree, it just depends on if it's delicious, or if it's soooo diluted to where it just takes way too much effort to actually get it.

There's a tree called a sweet gum, for all you nerds that is liquidambar styraciflua; wonderful tree, also one of those trees where it's like, "Gah, I wish you weren't planted so much in the urban area," 'cause they just tear up sidewalks, but some of the best fall color you're ever gonna get in a tree. They're beautiful, from orange to yellow to purple to red, it's just wonderful. But what they do is they used to tap them... that's why they call it sweet gum, 'cause they would tap 'em in the south, and then they would collect all of the tree sap, you boil it down to get all the water out, and you get this sugar. Some taste really good, some have other chemicals in it that make them less tasty.

People have used them on birch trees, and on other different maples, all bunches of different species of maples. But the reason we use sugar maple right now is because it has the highest concentration of sugar per amount of sap. It still takes hours and hours to boil it off to create the actual thing, of which there's no recipe. Every bit you get, they're just looking at, they're like, "Eh, looks done!"

**Alie:** Really?!

**Casey:** Yeah, there's no actual, like, 'boil it for ten minutes.' It's 'boil it until it looks right.'

**Alie:** That's so analogue!

**Aside:** Sidenote confession, a little FYI: I always thought that maple syrup just kind of dripped out of trees as is. Like you could just wander in the forest with a pocket full of waffles, just get a little smear here or there, but the sap actually comes out clear, kind of like water. And it takes 40 gallons of it to boil down and make one gallon of maple syrup. Which seems like a lot of tree tears, but they tap a bunch of 'em, they get just a little bit from everyone, so don't be too sad. You can continue to brunch unencumbered by guilt.

**Alie:** Zach Tarble wants to know: What's the science behind tree grafting and budding? Because a lot of fruit trees are just grafted? What the hell, dude?!

**Casey:** Yeah, oh, this is so great! Every banana you've had has been a literal clone of every other banana you've ever had.

**Alie:** What the hell's up with that?!

**Casey:** I know!

**Aside:** So this is true, I just looked it up. It's crazy! Wild bananas are kind of short and squat, they're full of a bunch of pebbly seeds. Nobody loves them. And so we have

cultivated this seedless, sterile one from a single specimen way back. So all the bananas that we eat now, all of them, of the Cavendish variety, come from one single banana plant way back we just keep splicing.

So just think this: if you're in love with Michael B. Jordan, say, or Frances McDormand, and you have both eaten a banana, you have the same banana's genes in your colon as them at one point. Isn't that exciting?

Cavendish got popular in the 1950s because all the bananas we used to eat, also clones – they were called 'Fat Mitchells' or 'Gros Michels' – they were wiped out by a fungus. So apparently, you know the banana flavor we taste that tastes like fake banana, we're like, *[mumbles]* "This is not what banana tastes like," those taste like the old-timey phased-out Gros Michel bananas, which all died! Is this weird to you? It's so weird to me. *[clip from "Yes! We Have No Bananas!" song, old-timey male voice singing: "Yes! Of course, we have no bananas. We have no bananas today"]*

**Casey:** Same thing with apples: all the apples that are sweet delicious or golden delicious or whatever it is, they all came from one single tree.

**Alie:** That's weird.

**Casey:** It's great. So what they do, it's really weird and... Oh man, it kind of makes you feel like, when you look at those trees... Maybe this is a personality, where it's like this weird Igor tree that's like, "Oh my gosh, you're Frankenstein! You just have all these different parts growing on to you. And it's just like... you look so grizzled and worn, and it's like you're just a mishmash of parts from other trees." Anyway...

**Alie:** I didn't even know that was a thing until very recently.

**Casey:** Oh my gosh! Oh yeah, it's hidden knowledge, I guess. What they do is they find the ones that have the best root stock, and they say, "Okay, this one's really good, but it just gets these tiny little crabapples that are not very delicious." They're just like, "Oh, these are sour!" So you cut that, and you can find another tree that happened to have this one crazy apple that's huge and delicious and sweet and whatever.

You cut that bit off, one of those limbs, and then as long as it's the same size, you just literally put it together with a little bit of tape around it and some... I forgot the compound, but there's like a sort of compound that they put on there that encourages the cambium layer to come back together.

Literally all you're doing is matching up those cambium layers. As long as the stem is the same size, you can match up both cambium layers around, cover that with tape, and then it literally just grafts itself into it, and it's as if the tree has a now whole-functioning system again.

**Alie:** That's nuts!

**Casey:** It's crazy!

**Alie:** It's just like organ transplants!



**Casey:** Yeah, exactly.

**Alie:** But more successful.

**Casey:** Uh-huh, but having said that, apples are just completely pointless and I'm just gonna say this right now...

**Aside:** So sidenote: how does Casey like them apples? Well, he does not. He launched into an impassioned four-minute anti-apple rant, which I'm just gonna recap. They were sold as health food via propaganda after Prohibition, because all these cider apples could no longer be sold to make hooch, you see?

I looked into this: checks out. So now apples are, in Casey's eyes, forced on us as snacks. He does not like them. I love him for this.

**Casey:** Where it's just like, *[frustrated]* aah! Everyone who buys apples, and like, "I'm gonna eat it as a snack!" I'm like, you're just gonna get hungry. You should bring cheese. You should at least get cheese and some peanut butter. I'm not gonna eat it, but go ahead."

**Alie:** I've never heard someone who was such an apple-phobe!

**Casey:** And the reason that I know that that's not good for the apple trees, and it's like not happy, is because these trees get so laden with apples to where they're literally breaking their own branches because of the weight, and it's just like: you guys are turning these into monsters! This tree can't even support itself, and it's ripping apart...

**Aside:** I'm telling you: dude hates apples. Also Casey, I'm so sorry, I was literally eating an apple as I was writing these asides. *[slow-motion]* Life is just complicated.

**Alie:** Radha Vakharia has a question: why do some trees lose their leaves in the winter and others don't?

**Casey:** Aha! I love this question! This comes down to a specific... basically, a strategy. If you think of trees as having a budget: one part of their budget goes towards growing tall and competition, physically getting to be a big size, growth. Then another part of that budget would be towards reproduction, 'cause there's no point in growing unless you can reproduce. The third part, the third big part, would go towards protection.

You can do any amount of energy put into any one of those three categories. Obviously there's a couple more categories, it's very simplified in this instance. You have a tree, it's growing, and it gets too cold. And it's not that it actually gets too cold for the leaf itself, it's that wind continually rips through and damages that leaf. So what some trees have opted to do, or what has worked for them, is instead of having just these dinky little leaves that get just completely destroyed during the wintertime, or the water freezes in the ground so the trees can't pull it up, or it gets too cold up in the air and ice crystals actually form in the leaf itself and rip it apart.

It's really bad when leaves and tissues like that freeze, just the same as if our fingers froze; the reason we get frostbite is because actually the ice crystals in our fingers

expand out, just 'cause we know ice expands, and it rips apart the cells. *[Alie horrifiedly calls ay-yay-yay-yay]* It's awful, it's just terrible.

**Aside:** P.S.: That's a noise I make when my butthole clenches in sympathy pain, so you're welcome. And is that how frostbite really works? It is. I never knew. Casey is just a fount of knowledge. He's more like a tap of sweet fact-sap for our brains to boil down.

**Casey:** So for some trees what they decide to do, or what worked for them, is they made their leaves just a little bit tougher. So they put more of their energy into making that leaf really strong: making it waterproof, making it less edible, adding more lignin and more things that make it more distasteful to different animals.

Some trees put a lot of energy into their leaves. Because they put a lot of energy into their leaves they now can hold them, but they don't wanna just let them drop, because that was so much energy! You just can't drop that onto the ground and then regrow it again the next year. So really tough leaves, they can withstand the conditions, so as soon as spring comes – if you get an early spring – the trees that are evergreen are already ready to go, they are photosynthesizing, spring comes, boom, they are *[snaps fingers]* right off the bat.

They would be able to compete better in that instance, whereas the deciduous trees are still dormant, they have not been growing over this entire season, they've dropped their leaves. But because they haven't put so much effort and energy into those leaves, they can put it into something else, i.e. into growing really fast, or putting out a lot of fruit.

You get a tree that is deciduous, drops its leaves, goes dormant, and then as soon as spring hits and conditions get really good, they shoot up by two or three feet sometimes. While you have these other trees that have put a lot of energy into their leaves, they have less energy to put into growing tall, less energy into defense.

It's just more of a balance of which is more functional for this tree at the right time. Sometimes deciduous doesn't make any sense because the conditions are so good, where you're like, "Oh, why get rid of my leaves? There's no good reason." Up here it's usually water is a limiting factor, so their leaves start to desiccate, lose all their water, then they drop 'em, and they just wait.

**Alie:** So it's more just about favorable conditions than it is about climate? It really depends on what's best for the tree.

**Casey:** Yeah, most of the time. Obviously climate has something to do with it, you know, we have evergreen trees here because why lose your leaves if you can just photosynthesize for 80% of the year? Just go for it.

**Alie:** And then in the meantime they're living off of stored sugars?

**Casey:** Mm-hmm. Exactly, yeah. They're always respiring, 100% of the year, you know. Trees are the only things – or rather, certain plants are the only things – that can produce their own food and then respire to use it. We're respiring, every living thing uses respiration to breathe, and that's why we breathe out carbon dioxide and water.

Trees do the exact opposite, they take carbon dioxide and water, turn it into oxygen and a simple sugar, or a long chain of sugars. So all they do is just store it, store it, store it, and then just sit there and eat sugar all year around until they can start growing again.

**Alie:** Just snackin’.

**Casey:** Yeah, it’s really nice. It’s delicious, I wish I could do it.

**Alie:** Do you think that planting more trees will save the environment?

**Casey:** Um... Yes. I’m just gonna say blatant: Yes.

**Alie:** We’ll just leave it at yes, and move on.

**Casey:** Yeah, always plant more trees. There’s so many good reasons that we could do 1,000 more hours of talking about.

**Alie:** Do you think there are certain trees... Josh Bruce wants to know: Are there certain trees that are better for the environment than others?

**Casey:** Yeah, I would say so. But really, it’s not necessarily better for the environment, it’s better for, maybe the micro-environment. So, small trees that don’t cast a lot of shade over a lot of cement: not really doing a lot. A big, huge, large tree that shades over a bunch of cement, and lowers the heat-island effect in the city, which is just the fact that in the cities it’s warmer temperatures than in the associated crop land or forest land, it’s just cooler out there and warmer in here.

That’s because we have so many impervious surfaces that are taking in heat and then bouncing it back out. So if we have a big tree that’s growing over the top of that, then we’re shading out that area. And if we do that over the scale of the entire United States, then all of a sudden we’re, like, losing millions of tons of carbon just by having one tree shading our house during the hottest time of the day.

So in that instance, yes, some are better at accomplishing our objectives in terms of helping out the environment. But for the most part: yeah, plant a tree, it’s always gonna be great.

**Alie:** Okay, a couple more questions from... I got so many questions, there’s no way that I could possibly answer all of these. This would be like a seven-hour episode.

**Casey:** Yeah, who listens to *Hardcore History* here? Okay, yeah, I’m ready, let’s do it.

**Alie:** Mark James has a great question: Are bonsai trees actually trees or are they shrubs with pretension?

**Casey:** Oh man! Can I say both?

**Alie:** Yeah, sure!

**Casey:** I’m gonna say both, then. They do have a certain amount of pretension, but it was given, enforced upon them.

**Aside:** So Casey compares bonsai cultivation with traditions like, oh you know, corsets and foot binding. And if I may add my two cents: I'd say let's lump in modern-day high heels. Which... we're gonna look back with just horror. Please mark my words. Your grandkids are gonna look back at probably a holographic photo album of present-day women in evening gowns just grimacing and carrying strappy stilettos at the end of a party, and ask: "Grandma, what in turd's name were you thinking? This is a nightmare! How did you live? Why did you not stab people with your shoes?" And we will say, "It was just what you did. Now lather up my stumps, will you, child?"

**Casey:** Same exact thing, where they're completely torturing these trees in every way. They are beautiful, they're pretentious, and a bonsai tree is technically a tree, but literally bonsai means a 'tree in a pot.' So that's all it is, they just really take it seriously sometimes. And I wish I could do it, it's actually so hard to do, people will be like, "Oh, I can do that." You'll kill your tree, I guarantee. Those trees are so well-taken care of, it's obscene.

**Alie:** They're like show dogs.

**Casey:** They are! Oh my gosh, that's the best way to look at it, yeah! You can almost see 'em prancing around and all these things.

**Aside:** And looking this up I learned that it's actually pronounced: *bone-sai*, which you can say if you're feeling pretentious. So that being said, recently a centuries-old pine *bone-sai* sold for 1.3 million dollars. For a single *bone-sai*. That's a lot of money for a *bone-sai*. I got this information on a *bone-sai* website called: [bonsaiempire.com](http://bonsaiempire.com), which has a lot of information about *bone-sais*.

**Casey:** And so what they do, is you have this small tree – it's a regular tree. If you take a bonsai redwood tree, you pull it out of its pot, and you put it in the ground, you give it a thousand years, it will be 300 feet tall.

**Alie:** *[in disbelief]* Noooo!

**Casey:** I swear to God, they're exactly the same trees as every other species that exists. Every bonsai is the same tree as the regular species that grows out and gets huge. Japanese black pines are a great example. They get huge, they're really nice beautiful trees. They will use those as bonsai trees more often than not.

**Alie:** No way.

**Casey:** Yeah. All they do is you pull them out during the dormant season, you clip the roots a little bit, and you put them back in. You add a little bit of fertilizer or something, just to sort of keep them going, sometimes, and then you prune the top, and you sort of shape the tree exactly. But every time you do that, when you cut off any amount of roots, you're taking away a food source for the tree, or a nutrient and water source. So it's like, "Okay, well, now I have to regrow that root." So they're putting a lot more effort into constantly re-growing.

And you're also cutting off that stored starch in that area. You're cutting off a root, you're taking away a certain amount of stored energy and lessening the ability for that

tree to get nutrients and energy later. So all you're doing is torturing that tree. Literally if you could hear screams, during the wintertime you would just hear these little tiny like *[high-pitched scream]* as they cut off all the roots, and then they put them back down and then they shape them.

That's why the trees stay small, because they're literally bound in this pot, the same way feet would stay small if you bound them in shoes – which you shouldn't do, it's an atrocious thing...

**Aside:** So I just went down a real rabbit hole about foot binding, which is now illegal. But for centuries it involved breaking young girls' toes, then soaking them in animal blood and then wrapping them into deformity. And that was just, like, accepted, kind of like our modern stilettos, because it made the legs look muscular and it was an erotic treasure for men. The girls' hobbled gait was supposed to tighten their vaginas. Let's just say I'm making that noise again. *[clip from earlier in the episode when Alie horrifiedly called ay-yay-yay-yay]*

**Casey:** ... at least for the feet. The bonsai trees, eh, like I said: they don't *feel* pain, but they certainly will respond to it. You're basically keeping that tree in a very stressed state its entire life.

**Alie:** Oh, it's like Munchausen by Proxy, where you see your kid and you're like, *[hysterically]* "I'm gonna stunt your growth, so you never leave me!"

**Casey:** Oh, God, that's exactly what it is, it's terrifying.

**Alie:** Okay, one last question. Gillian Page Jefferson wants to know: Hiiiiii, just curious, are there certain types of trees that produce more oxygen than other trees?

**Casey:** Oooh, I don't know.

**Alie:** I don't know either!

**Casey:** I do know that it's a chemical equation. It's literally for X amount of carbon and sugar used, you get an X amount of oxygen. So it wouldn't be necessarily that one tree produces just more oxygen; it's that one would make more photosynthesis. Some trees just pump it out and then store the energy, so you can cut 'em down and they'll just keep growing back. Those might be ones that probably produce more, but it's just because they're working overtime, it's not that they're actually producing more with less. Same amount, same equation, it's just:  $1+2=3$  every single time. So yeah, probably.

**Alie:** So if you wanna plant trees, you should probably consult like a local arborist and say, "Hey, what's the best kind of plant?"

**Casey:** Yeah, I completely concur.

**Alie:** We touched on this a little bit, but the last two questions I always ask are: What is your least favorite thing about what you do? What is the hardest part? What is the most annoying part? What is your least favorite?

**Casey:** I would say the hardest part is convincing people – and this is more hard like a challenge – is convincing people to understand trees in... I don't wanna say the way I understand trees, but to at least give them a better appreciation of how the trees affect them. A lot of people are like, "Oh, I've gotta cut down this tree!" or "Oh, this tree's dangerous!" And I'm like, "Well, no it's not, and here's why." And I explain it through, and most of the time I get people who are just like, "Oh, okay, cool, I never knew that", or "I never thought about it that way."

But then I try to explain the benefits of trees, and I'm like: "Hey, when you go to work and you look out your window and you see this landscape with trees, maybe a pond, grass, that sort of thing, and then you compare it..." They've done studies on this, this I can confirm – ...

**Aside:** I went and fact-checked this later, and it's true. There are a bunch of studies done in different situations all pretty much... same outcome.

**Casey:** ... on the other side of the building, where it's just a brick wall that they're looking at. If you guys are doing the same job, you're getting paid the same, the person with the view of the landscape of the trees will have more production, be more productive, less stressed, and they'll be more satisfied with their job. The person on the other side will have less of those things all across the board.

They've done all these studies and they said: "Wow, you know, if you are sitting in a hospital bed and you're recovering, and you look out the window and you see trees; those people use less pain medication and recover faster than the same exact person, same exact situation without that view."

**Alie:** Oh my God!

**Aside:** There's this well-known short story about two men in a hospital, one is blind, the other describes the scenes out the window to him... Turns out, the window was just overlooking a brick wall, but his roommate made up these beautiful scenes to help the other guy. I tried to look up the original author for this, and it can only be traced to a guy named Harry Buschman. Harry Buschman, Buschman, super appropriate for a nature episode. Or perhaps Harry Buschman was a name adopted in the wild and crazy hairy 1960s, Harry Buschman.

**Casey:** So I'm trying to convince people, I'm like: "Hey, listen, you don't understand: you cut down this tree, I can tell you there's gonna be physical effects. It's gonna cost money, first off. Second off, if you don't hire someone who knows what they're doing, they could drop some part on your house or your car, so pay for good work. Number three, you're gonna have... Maybe more sun's gonna hit it, you're gonna have more rain, you're gonna have now drainage problems, 'cause you don't have this huge thing pulling up water from the ground all the time. Then on top of that, you're gonna have maybe less privacy, you're gonna have more stress, because things are gonna be a little bit hotter, you're gonna see more pavement, there's gonna be more direct lines that are harsh. So there's all these micro-things that really add up. So the hardest part, I think, for me – or well, it's

not necessarily hard for me, it depends on the audience – is to convince someone, “No, you don’t want to cut down the tree, and here’s why. Here’s why it’s doing a lot more good that you may not even know about.” But when you do the before and after, you’re gonna be like, “Man, I’m really stressed right now!” It’s like, “Well, have you been staring at pavement, or have you been looking at a tree?”

**Alie:** Oh! I forgot to ask one question. How do you feel about Christmas trees?

**Casey:** Christmas trees are fun! They’re great! I always have a real Christmas tree.

**Alie:** You don’t mind that they’re getting cut?

**Casey:** No, not really, no, not in that regard. ‘Cause they’re small, and if you’re really comparing them, you can just regrow another one in like five or eight years. It doesn’t take that long.

**Alie:** I was gonna go fifty-fifty. I was like, “Casey’s either gonna hate Christmas trees, or he’s gonna love ‘em.” I didn’t know what side of the line you were gonna end up on. That was a surprise to me, I was like... Easily you could have been like, “Christmas trees are an abomination. Everyone should have a tumbleweed with some lights on it.” I don’t know...

**Casey:** Seems reasonable, yeah. But yeah, I like it, and also, if you think about all the other things: it’s a ruraler side of the world that grows Christmas trees, so you’re supporting that economy buying a \$25 noble fir, something like that. They try to make them perfect; I hate that. Just let a tree grow, cut it down, put it in your house, you’ve got a tree! You don’t need to worry about making it perfect, like, you know, a pyramidal-shaped thing, you know, sheered to within an inch of its life.

**Alie:** Ugly trees are fine trees!

**Casey:** Yeah, ugly trees are fine trees! I just love... in fact, some of the coolest trees, if you ever look up the bristlecone pines, those old, old trees, they are so gnarly. You’re like, “Wow! Are you even a thing?”

**Alie:** I’m gonna go deep into some tree porn later, and just start looking up, I’m just gonna start Pinterest-boarding a whole tree thing.

**Casey:** Yeah, I actually have a book I call ‘tree porn’, because it has a long picture – it’s called *Tree*, I think, it’s very fancy – and it has these centerfolds of like tall redwoods, and so I’m like leaning back, I’m like, “Oh, yeah, that is a huge tree.” Everyone’s like, “Oh my gosh, Casey, get a room!” I’m like, “No, no, no, I’m doing this right here on the couch. I’m looking at this tree.” It’s hilarious.

**Alie:** But Casey, it’s printed on a dead tree!

**Casey:** I know! The irony is so thick. But I have to say, it’s a renewable resource!

**Alie:** It’s a renewable resource.

**Casey:** If it’s done correctly, logging is absolutely gonna save the world. We’re doing things right now with trees, it’s called cross-laminated timber, CLT. It is gonna be the future,

and I'm absolutely sure of this. They're doing it in Germany, we're just now in Oregon getting a couple mills on board to start doing it, but basically think really thick plywood, where you have boards going left and right, then you have 'em turn 90 degrees and they're going that direction. And you're just doing this over and over and over until you get this big like six-inch thick piece of panel, and then you can cut that into whatever shape you want and put it together like Legos.

Literally, they said if you hear like hammers and nails on one of these sites where they're building this structure, then something went wrong. Because they just sort of fit in together, and then they're less fire-resistant, this is the funniest thing, it's wood...

**Alie:** Wait, more fire-resistant.

**Casey:** Yes, sorry, more fire-resistant, sorry.

**Aside:** So this new type of lumber is too dense to burn, which is also a really good self-deprecating way of deflecting an insult: too dense to burn. Now, it's also what's called a carbon sink, because it traps carbon dioxide and keeps it there, which helps counter climate change and global warming, which is necessary if we don't want to be swallowed by boiling oceans. *[ding!]*

**Casey:** So it should be the future, I'm really looking forward to it. Ideally.

**Alie:** That's really optimistic, 'cause I wasn't sure what the future was gonna be, and this is good to know.

**Casey:** Yeah. I hope it is, I hope it is, because if we can get it to the extent where almost all of our buildings are now timber-framed again, we can make sure that all of our trees are grown properly and under certain conditions. Wood is naturally good at moving, so you don't have to worry about the tensile strength, everything's already built into the fiber itself, and on top of that: it's nicer to look at wood than it is cement, so it's like: yeah, this is so much more pleasant than, you know, anything else.

**Alie:** I know. Oh, I would so much rather have a wooden table than a glass one.

**Casey:** Yes, absolutely.

**Alie:** I just... It's so comfortable!

**Casey:** They're just so much nicer, there's just something warm and sort of homey about it. It's like going into an old wood-paneled cabin or something, where you're just like, *[old-man voice]* "Oh, this is home. Yeah, I can do this. Where's my pipe?"

**Alie:** *[old lady voice]* Oh, cozy! It's like a big wooden womb! I love it!

**Casey:** Yeah, it's just the best! Exactly, it's delightful.

**Alie:** Now to end on a happy note: what is your very, very favorite thing about what you do? I know this is gonna be hard for you.

**Casey:** This is, oh man! But really, it's looking at trees almost every single day. And most of them are all different trees, or different situations of trees, so I go out and I see a



dogwood one day, and I get it protected from a development. I'm like, "Nope, you have to retain this tree, it's an awesome tree. You did it." That makes me go home so happy.

But then because of what I do and because of, sort of, who I am – it's not necessarily part of my job, just part of my being, I guess – where I can go out and find these trees. It's like, "You know what? Today I'm gonna go out to this part of the world, or this part of Oregon, and I'm gonna find these trees." And drive out, and it's this huge long adventure, and then you plop out in this little grove, and there's just these stunningly massive trees around you that have been completely untouched and protected from logging, so you're like *[incomprehensible overwhelmed incredulous sound]*. Like, you're incredulous in how incredible these trees are.

So that's not quite a part of my day-to-day job, but that's my favorite thing, where I get to go out and, like, find these cones, and find these trees, and be like, "Yes, I've been there, I've seen it, they're incredible. I know how they grow, I've seen them fall, and die, and grow up again." So that's probably the really nicest part.

The other nice part, that I really like, is actually just telling people about trees. Like, if I could just sit down and do something like this, and someone's like, "Tell me about trees." I'm just like, *[chuckle]* "where to begin!" And then I can just do it for hours, so I think my favorite part is when someone's actively, interestedly is listening to me, that's when I'm just like, "They're taking this in, they like it, okay. They're still here, all right, one more hour, one more slide, let's just keep going."

**Alie:** *[laughing]* When you've found an ear to tree tales it's a happy day?

**Casey:** Yeah! This was just a happy day, yeah. And if I can convince someone that they don't want to cut down their tree, if I can change that mind. Trees are incredible things, and humans are way too hubristic in the idea – I'm not even sure if that's a word, but I use it often...

**Alie:** Sure it is!

**Casey:** *[under his breath]* Yes!

They think, we think that we know better than the trees, or better than the ecosystem that's been developed over millions of years. When someone's like, "What should I do to make this tree healthy?" My answer's like, "Let it grow." The only reason that we prune trees is because of us. Trees don't need help.

**Alie:** Yeah, it's like: trees know what's up. Trees are like: "Excuse me? Um, I've been evolving for millions of years. How dare you?!"

**Casey:** Yes, it's like: "Listen, how long have you been here, kiddo?" So then, one of my old bosses said it all the time, he's like, "There's no reason to prune a tree, other than human reasons to prune a tree." They will do it themselves if they have to, or they will fall apart and die, and then another tree is gonna take its place, that's called the circle of life, that's how it goes.

**Alie:** Speaking of circle of life, one more morbid question.

**Casey:** Ah, let's go for it.

**Alie:** When you die, do you wanna be planted in one of those tree pods?

**Casey:** Oh, yeah, totally! I don't know anything about it, but the answer is yes! I would love that, I would love a natural burial where they don't embalm me, or don't put me in a box or anything like that. And if they do, make it an alder box so it decays in thirty seconds. Put me in the ground, and then plant a tree right on top, so that I can... At some point, everyone else in the world will be like, "Casey became that tree. Wow."

**Alie:** You're gonna become a tree one day!

**Casey:** I would love that!

**Alie:** I mean, hopefully not anytime soon. In another long time, please.

**Casey:** Yeah, fingers crossed I will outlive all the trees I plant in my life. But yeah, that would be so nice – obviously I wouldn't be thinking about it then – but to know that my individual cells, my molecules, have literally been transformed into something else.

**Alie:** Yup. I don't think that I've ever met anyone as enthusiastic about trees.

**Casey:** Ha! Yes! That's perfect. So far, I haven't met anyone either. Maybe a couple of people, but... Yeah, at least I can give them a good run for their money. Thank you, I'm happy to hear that!

**Alie:** Thank you so much for doing this.

**Casey:** Yeah, of course, yeah, thanks for having me, this is wonderful.

**Alie:** This ruled.

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To continue to bask in Casey's infectious tree enthusiasm, you can see his brand-new seedling of an Instagram account, which I half encouraged and half just straight up pressured him to start. He said he was gonna start it anyway, and I just said, "Listen, dude, do it before Tuesday." You can follow him on [Instagram](#) @Clapp4Trees. It's a brand-new account, it's so exciting, so you can find him there. I'll also put a link in the show notes.

So Ologies is on [Instagram](#) and [Twitter](#), @Ologies, and I'm on both, @AlieWard ([Twitter](#) or [Instagram](#)), and there's a group full of very warm curious folks at [Ologies Podcast](#) on Facebook, thank you Hannah Lipow and Erin Talbert for adminning.

You can also obtain Ologies objects at [OlogiesMerch.com](#), there are pins, there are dad hats, shirts, totes, and we've got phone cases... We've got it! Sales support the making of the podcast. Thanks Shannon Feltus and Boni Dutch for helping run that, you guys rule.

And thank you always to Steven Ray Morris for editing. This was a beast of an episode, I usually have between 14-25 asides, and this one had 40.

And he charges me by the hour, so thank you to all the Patrons at [Patreon.com](#) for essentially paying him, and for submitting such great questions. Asking smart people dumb questions is

literally the only way anyone learns... anything in life. And if you think your question is dumb, I guarantee, like, 12 other people wanna ask it, and they're gonna be thankful that you did.

You can become a Patron for as little as a dollar a month, and that supports the show, so if it's worth the price of a sandwich per year, or whatever... consider it. You get to ask your questions and see behind-the-scenes pictures and videos and such.

Now the music was written by Nick Thorburn of the band Islands, which is a very nice band.

And now, if you stick it out to the very end, you know I tell you a secret. And this week it's that I never learned how to type. Even though I have been a professional writer for a decade, I skipped that elective in high school, so my hands, when I write, just hover in weird places on the keyboard, sometimes just a pointer finger, and I'm pretty fast, but I make a ton of typos. I make so many mistakes, and I get so embarrassed when Steven Ray Morris is working in the same Google Transcript Document and there's just so many red underlines. It's just, like, red lasagna noodles all over it.

It wasn't until a year ago that I learned why keyboards have those weird knobs on the F and the J keys, I just thought they were... weird mistakes on all keyboards. So I downloaded a learn to type program, I only got a few lessons in, and I need to dedicate some time to it, because I type like a T-Rex trying to operate a space ship.

Okay, berbye.

*First half-hour transcribed by your sweet book-loving, Sims manipulating, always-takes-pickles-off-of-her-burger next-door neighbour, Cassie. London, ON, Canada.*

*Remainder transcribed by Janou, new cat mom and everything enthusiast. Dordrecht, The Netherlands.*

### **Some links which you may find useful:**

[What is dendrology, exactly](#)

[Stanford's Less Shitty Mascot](#)

["The storm was too much for it."](#)

[Canopy shyness](#)

[Trees are sentient, and other mindfucks](#)

[Secret Life of Plants aka ESP with plants](#)

[David Attenborough's Private Life of Plants](#)

["Hidden Life of Trees,"](#) Casey's book reach

[Lorax's "Unless" prophecy](#)

[All the maple syrup info you'll need](#)

[This guy killed the world's oldest tree](#)

[How do you like them apples? HE DOESN'T](#)

[Expensive bone-sighs](#)

[Foot binding is not in fashion](#)

[Nature makes us productive](#)

[We have no bananas, we just have one single Cavendish bananas](#)

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