Strychnine

EW: [00:00:00] In January, 1893, it happened that I had for a few weeks been in the habit of taking an occasional dose of one of our stock dispensary mixtures - a tonic containing, amongst other things, a fair dose of strychnine. On the morning of Tuesday, January 10th, I went into the dispensary to take a dose of the tonic.

EW: I at once noticed a much more intensely bitter taste than was usual. I did not know quite what to do, and my first impulse was to take an emetic, but as the swallowing of saliva lessened the bitter taste every minute that I hesitated, I persuaded myself that the difference might only be fancy. Fifteen minutes elapsed, and I began to feel very restless.

EW: An indescribable nervous sensation came over me, as if there were rope pulleys running down to my extremities, which were gradually being drawn tight. I had to make an effort to prevent my mouth closing too soon as I spoke, and to dig my pen into the paper and write thick as if to form a fulcrum over which to lever my hand along the pages while a contra-force in my arm strove to dash the pen to the floor. My limbs were throwing off the control of will and moved erratically; when I wished to go on, my legs stopped, and when by a violent effort, I forced them to proceed, I could not pull up to a standstill without walking against a bed to steady myself.

EW: What I said or did, I cannot remember, but I managed to get along somehow, though, feeling as if head, hands, and legs belonged, not to me, but to three separated individuals, like a mechanical doll that has had all its limbs pulled with a jerk of the string. I said to Dr. Considine, "I am really very ill. I feel sure I am suffering from strychnine poisoning."

EW: I had taken six-tenth of a grain. I remembered that half a grain had caused death. I must prepare to die - to die fearfully, to die soon. The simple fact to a man that he is to die is a heavy blow for the strongest will or the stoutest heart - the thought was horrible!

EW: Latent under the guise of a harmless looking crystal, but more death-dealing than dagger or dynamite, the deadly drug seems to revenge its former subjugators when once it gets the upper hand.

EAU: Erin.

EW: I know.

EAU: Wow.

EW: That was a personal account of strychnine poisoning do by Dr. Uh WT Harris.

EAU: Wow.

EW: Isn't that

EAU: I have so many questions. So like, why did he, because what did he say that he was going to drink,

EW: Oh, strychnine like it's a stock dispensary mixture. It was a tonic that had strychnine in it.

EAU: but then he knew, but then he knew that it was more bitter, but so then

EW: So he, he, yeah. So he, he, he took the usual tonic that he always did, which has a strychnine and, and other things in it, you know, as you do.

EAU: yeah, as you

EW: And then he tasted it and he was like, whoa, this is really bitter. This is much more bitter than normal. There must be a higher dose of strychnine. Maybe didn't dilute it before, like

EAU: he knew, he knew something was off, but thought it was like, ah, NBD, and then he was like, it was too much strychnine, gonna kill me. So he knew that it could happen. Really? Like so many

EW: He, well, he convinced himself he was a doctor, so he convinced himself that the bitter taste was just in his head. And he's like, no, it's not, not more bitter than normal. I'm freaking out over

EAU: himself.

EW: Exactly. And then he's like, and that his limb started to not

EAU: Convulse. Mm-hmm. Yeah.

EW: And then there's like this, this account is actually much longer. I, I shortened it quite a bit. So he has these like panic moments and he is talking to this doctor. He is trying to walk around with this doctor. Anyway, uh, you can find the full account in a book called, Bitter Nemesis, the intimate history of strychnine by John

EAU: Buckingham.

EAU: I love that.

EW: I know. Uh, but yes. Well,

EW: hi, I'm Erin Welsh

EAU: And I am Erin Allmann Updyke.

EW: This is, This Podcast Will Kill You.

EAU: I'm so excited to talk all about strychnine today.

EW: I feel like, you know, we, we said okay, this season we're going to dive into these more like headline topics and we are absolutely going to do that. But um, you know, we're also gonna intersperse some ones that maybe are not so much like just focus on the grimness of reality

EAU: I mean, this is pretty grim,

EW: grim, but it also is like, when is the, when is the last time you saw strychnine in the news? I guess a Belgian PM was

EAU: I saw that.

EW: office last year.

EAU: Yeah. Um, yeah, no, it's a, it's rare. It's a rarity, which is good. I feel like there are still some important takeaways that we can learn, uh, from strychnine when it comes to current events or whatever. Um, [00:05:00] but no, it's gonna be, it's gonna be an interesting episode, kind of a classic TPWKY, even though it's not a, an infectious

EW: Yeah. Yeah. Uh,

EAU: to our roots a little

EW: yeah, we are, uh, I'm excited to, to talk all about it and learn all about, like, I, I don't know anything about how it works.

EAU: I don't know anything about the, the, I can't wait to tell you actually though. You're, because you're gonna be like, what?

EW: What,

EAU: Um, uh, I can't wait to learn about the history. I know literally nothing except I assume things like people were drinking tonics, you know,

EW: they were, of course they were for fun, for vitality, all of that good

EAU: Vitality.

EW: Uh, and speaking of drinks for vitality, just kidding. What are we drinking this week?

EAU: We are drinking up the bitter end. I mean, the bitter end.

EW: Yeah,

EAU: It's foreshadowing.

EW: it is foreshadowing and I, I'm not even gonna give you any more hint than that because I

EAU: You don't need it. Bitter end. What's in the bitter end? Erin?

EW: it's a bitter drink. It's got Campari, which is very bitter. It's got, uh, bitters, which are bitter, uh, orange, which is not bitter, but acidic. I guess rind would be bitter, but we're not doing the rind whatever and club soda. It's fine.

EAU: you can find the full, really official recipe for that quarantini and non-alcoholic placeborita. It'll just be non-alcoholic Campari. It exists, uh, on our website. This podcast will kill you.com under the episodes tab.

EW: Yep, check it out. Uh, also on our website, there's all all kinds of good stuff. We've got transcripts, we've got, uh, links to merch, to blood mobile, to

our bookshop.org affiliate account, our good reads list, and links to a contact us, us form if you want to share a firsthand account, suggest an episode, all of that stuff. Um, maybe some more stuff

EAU: Lots of good stuff there. You tell us. Um, if you haven't already subscribed to the exactly right network, YouTube channel, please do would love it if you're watching this video. Hello?

EW: Hello.

EAU: Um, still feels really weird, like, oh, I'm talking to a person through the camera. Anyways,

EW: we are doing it.

EAU: I think that's the point. Yeah. Um, or if you haven't rated reviewed, uh, and subscribed on whatever pod catcher that you like, uh, we're on iHeart radio and iHeart podcasts. We're on Apple of the podcasts and Spotify, all of them.

EW: All the stuff. Yeah.

EAU: Check it out now.

EW: I don't think there's any more business, so should we just get started? Great. Okay.

EAU: When we agreed to do this episode, Erin, I had no idea what strychnine was like. Not the slightest clue at all. Um, I knew that it came like from a plant or something, um, and I knew, I assumed it was some kind of toxin or poison. Uh, this is dark Erin, so just fair warning. It's about to get really, really dark. The symptoms of strychnine poisoning are horrific.

EW: yes.

EAU: That's my warning to everyone. Uh, the good news is that it's rare. Okay, so strychnine is an alkaloid. Which means it's a plant derived chemical, a plant derived compound that comes from the tree. Strychos nux-vomica I think that's how you say it sounds a lot like a Harry Potter spell.

EW: It does.

EAU: Um, but this is also called the strychnine Tree, or the Poison Fruit, which is a very apt name for it. And it is native, this tree is native to India and parts of Southeast Asia. And I wanted to just give everyone a bit of a sense of like what the, what this looks like.

EW: cool. Okay. I, I have a description too, but I was like,

EAU: Oh, good.

EW: in? Wait a second. This is really silly, but have you been watching White Lotus?

EAU: Okay. I Googled it, Erin. It is not the same tree as white lotus, white lotus. They called the suicide tree. And that is a tree that produces a totally different toxin that functions as like a cardiac glycoside. It would stop someone's heart. Um, I. We should, I was thinking the same exact thing. So not the same tree as in white Lotus, um, but does exist in some, at least of the same regions of the world. Um, and it doesn't look very similar 'cause that that fruit in white lotus was like this kind of, uh, like oblong shaped green thing. These look, these fruits look kind of like, I don't know, like a cross between an apple and an orange. So they have like a peel. They're kind of that, that size, like a large orange or something.

EAU: And they're orangey red in color when they're ripe. Um, and they have like, almost like a shell. But the peel doesn't quite look like an orange peel, but it, it has this sort of harder exterior. And when you cut into it or crack it open, there's this like white kind of jellyish pulp almost. Like if [00:10:00] you've ever seen a mangosteen or even like those poison fruits in, in white lotus, why do we keep saying it? Um, where it's like that whiteish kind of pulp and then there's these seeds inside. And the seeds, as is true for so many plant plant poisons that we've done on this podcast. Often the seeds have really, really high concentrations of these alkaloids. They're found throughout the plant. So the flowers have really high concentrations. The bark has strychnine, as well as other compounds like bruising, which are similar. Um, but the seeds are kind of where the money is.

EAU: Um, and they're these like flat, almost like hockey puck shaped little discs. They're pretty hard, but they're covered in almost this kind of fuzz.

EW: Huh?

EAU: Okay. Okay.

EW: Okay.

EAU: Questions?

EW: yeah.

EAU: Okay.

EAU: Give it to me.

EW: Who does anything eat the

EAU: Yes, yes. Um, oh, I wrote it down somewhere, exactly. Which, which animals do. But yes, there's a few different animals, horn bills, um, and certain types of langers, I think.

EW: wow. Okay. So they must just not be susceptible to strychnine

EAU: Erin, it is so interesting. So they can metabolize, they have like different ways to metabolize the strychnine.

EW: Okay.

EAU: Yes. So they, they have adapted

EW: And I'm guessing otherwise it's just like a pest,

EAU: otherwise

EW: pest repellent.

EAU: Exactly like many I know. I feel like we really, Matt Candeias, we miss you

EW: Yeah. We do.

EAU: because he would have a lot more great detail on like, what is this doing for the plant. I did read a very interesting like evolution of plant, um, these types of alkaloid chemicals and things in plants and like the fact of how much convergent evolution there is where so many different plant species end up independently evolving very similar types of compounds. strychnine is not one

of those. So strychnine is actually kind of unique and the way that it is created in the plant itself is through a very, very complex pathway. So the metabolism to create strychnine in the plant is very complex, which is super interesting. Yeah. Yeah. It's like one of the largest alkaloids out there. It's, yeah. So that's, that is the compound itself. It is present in this particular tree, but most people today are not necessarily exposed directly from this tree, but they're exposed via poisons, specifically Rodenticides, because that is what it is used in commercially though there have also been reported cases from contaminated herbal supplements and things like that. And then there could be like occupational exposures.

EW: Yeah, I think it's also used, I read in homeopathy some sometimes like tinctures, like intentionally included.

EAU: Oh dear. Yeah, that sounds like a bad idea. So, yeah, according to like the, uh, I got to go back to our favorite. Poison Control Centers

EW: ah, yeah.

EAU: to kind of get a sense of like where people are being exposed to strychnine today, there's three main routes that people tend to be exposed. It's either unintentional or accidental exposure. So whether that's to an herbal supplement or to um, a rodenticide or some kind of poison, but some kind of accidental exposure. Unfortunately, it is also still used in suicide attempts. Um, and then also adulteration of other recreational drugs. So a lot of times, uh, illicit or recreational drugs are mixed with a ton of other stuff, and sometimes that includes strychnine. Where are they getting it from? Why strychnine? don't know. I don't know, but occasionally that's where people are getting exposed to it from.

EW: Hmm. Okay.

EAU: And toxicity from strychnine truly is horrific. So I'm gonna walk us through what it looks like and then we'll talk about, we know exactly what is happening and why this is happening. So within potentially minutes of exposure, and most of the time this is gonna be an oral exposure, but it could be through mucus membranes or even like inhaling it if it's like an occupational exposure or something. But most of the time it's gonna be through ingestion within about 15 to 30 minutes. So really quick timeframe, it's absorbed into the bloodstream. And the initial symptoms are described very similarly to what the firsthand account that you read Erin was. Uh, and I'm gonna give a quote here, quote, apprehension. A heightened sense of awareness and muscle spasms, end

quote. And then we'll start to see these other symptoms. We start to see a generalized kind of hyperreflexia. So someone's reflexes will start to, you know, you imagine hitting your knee and your knee pops, so any of those kinds of reflexes will [00:15:00] start to like activate. And then we see this hypersensitivity to stimuli that triggers convulsions that can look very similar to seizures.

EW: So when you say hyper hyperact, hyperreactivity, is that what you

EAU: Hypersensitivity. Yeah,

EW: So that like, if you hit your knee, then it's like, not just boo, it's like

EAU: exactly. It's like woohoo. And then it's also like a muscle spasm on top of it. So like I bump into you and your arm starts to spasm, then your whole body starts to spasm. Then you go into this, what looks like a generalized tonic-clonic type of seizure. And we

EW: of like the convulsion and movement. Okay.

EAU: yeah. And then we'll see these kind of very characteristic types of muscle spasms. We'll see that the upper limbs tend to flex as they go into spasm. So they come in towards the chest and they, they have, uh, they have the contraction in this direction. The lower limbs and the back tend to extend, and so they are also contracting, but like in the opposite direction. So your legs are going outwards, and this can end up resulting in what's called opisthotonos.

EAU: Which we saw in tetanus as well,

EW: Yeah.

EAU: but that's when you have these muscle spasms of the back that are so powerful that we see the back and the neck arching backwards. It's like really, truly horrific. You'll get spasms in the muscles of the face and the jaw that result in contorting the face to look like a very severe grimace. This is called Reeses SCUs, again, seen in tetanus,

EW: Yeah.

EAU: and we see this kind of over and over again in these kind of spasm, convulsion type waves, and the person who is experiencing this does not lose consciousness the way that we see with typical seizures, which makes this that

much more horrific and also provides a clue as to what is going on. It's not just seizures because someone is very aware of what is happening to them, but they cannot control it.

EW: Okay. Okay. And this is all within like 10, 15 minutes.

EAU: So it all, yeah, it all starts within 10 to 15 minutes or 15 to 30 minutes or so depending on, you know, how much, what the dose was and all of that. Each one of these spasms can last anywhere on the order of like 30 seconds to a couple of minutes, but they often, without treatment, will get more intense, will last longer, and will have less time between each one of these spasm or convulsion episodes as this progresses.

EW: Mm-hmm.

EAU: So very often death will result from either respiratory arrest because your diaphragm and the muscles of your chest wall are also spasming, so then you cannot breathe.

EW: Okay.

EAU: Or from cardiac arrest, which could occur from, you know, not directly from the muscle of the heart spasming, but from things like electrolyte abnormalities that can happen because as your body is contracting this much, as all of your muscles are undergoing this much contraction, they can end up like releasing enzymes and causing something called rhabdomyolysis or other complications that then basically make your whole metabolic system really messed up and then your heart can't function and so then you can have cardiac arrest as well.

EW: Uh,

EAU: so, it's really horrific. And one of the papers, just to give you a sense of like, how long does this go on? Like what, what are we talking about? One of the papers that I read basically estimated that most. Most people, depending on the dose that they take, don't tolerate more than five to 10 of these spasm episodes before succumbing to death. So it's usually within a matter of hours

EW: Hours. Okay. And so. You said without treatment, what, what treatments are available are, is there an antidote?

EAU: No, there's no antidote, um, at all that we have. Um, the treatment is focused on aggressively controlling these convulsions, and we do that using medicines that are very similar to what we would use for typical types of seizures.

EW: Okay. Like, what would that be like? What? What is the mechanism of action here?

EAU: I'm so glad you asked Erin. 'cause I feel like that's an important part before we talk about how we treat it. Yeah, so what, what is happening here? And and that will tell us why we can treat it the way that we do, even though we don't have any kind of specific antidote. So last season, Erin, we did an episode where I [00:20:00] quoted Taylor Swift and you didn't get it. I said, you need to calm down. You're being too loud. You need to just stop. Like, can you just not,

EW: episodes, maybe.

EAU: it was in stiff person syndrome because a very similar idea kind of applies here. So in that episode I was talking about the idea of these inhibitory neurotransmitters. So strychnine is affecting our. Nervous system's ability to inhibit contraction. So strychnine is blocking receptors in our nervous system that are usually in charge of inhibition, calming down or relaxing our nervous system, specifically our muscular nervous system.

EW: Okay.

EAU: So without this inhibitory influence, specifically strychnine is blocking glycine receptors, and glycine is one of our major inhibitory neurotransmitters, along with gaba, which is what we were talking about in stiff person syndrome.

EW: right.

EAU: So without glycine being able to bind to its receptor and do its job, there's this overwhelming increase in motor neuron impulses going to our muscles. And that is why we see these contractions and these spasms. And it just so happens that the particular site of action, this particular glycine receptor, is in a part of our spinal cord that is very specific to our motor neurons. It is not in our brain, in our rerum. And that is why you remain so aware of what is going on, because nothing is blocking the nervous system impulses in your brain. It's specifically blocking it in our spinal cord and in our musculature. Like what is, what is happening between our nervous system and our muscles, just making them contract. And if all of the descriptions that I read of what this disease

looks like sounded very similar to tetanus, it's because they are tetanus blocks the release of glycine. Whereas strychnine is blocking glycine action, but it's the same exact end result, essentially.

EW: Okay.

EAU: So that is what is happening. Does that make

EW: Yeah. Okay. And it also exp Yeah. Okay. That's, I mean, that, that's the only thing that I knew about St. strychnine was that it was like basically mimics tetanus almost precisely.

EAU: I had no idea about that, Erin.

EW: I mean, I only once I read about it,

EAU: Right, right, right.

EW: Before doing the episode, I had no idea.

EAU: Right, but like tetanus, we haven't, we have like tetanus, anti-toxin and things like that, right? But we, that doesn't work in strychnine because in strychnine you're blocking the receptors. So we don't have anything that is like an antidote to unblock those receptors. I. So the treatment is focused on aggressive control of these convulsions. We use the same types of medicines. Those are usually benzodiazepines or barbiturates, which are acting actually as GABA agonists, so they're acting on the other side of our inhibitory nervous system to try and increase inhibition and decrease those convulsions. Sometimes you even have to use a medicine that basically causes total neuromuscular blockade, so a paralytic, and that's like the type of medicine that you might use to intubate somebody before a surgery. And so in that case, it means that we're talking about intubation, we're talking about ventilator support and all of that. Activated charcoal can also be used if you get someone early enough to try and prevent further absorption. But it's a little, you know, tricky because if they've already started showing a lot of signs and symptoms, then if you cause a lot of vomiting, then you could trigger more of these convulsions. 'Cause they're triggered by any kind of, you know, a movement, a sound, a touch, any kind of stimulus can trigger these contractions.

EW: vomiting, it's not just like, because, and, and once you ingest it, like goes really quickly to your bloodstream. So will vomiting even help or,

EAU: So it has been shown that activated charcoal can help to slow down overall absorption of it. Yeah, but it's, it is a balance.

EW: Um, oh, I had a question and now I forget what it is.

EAU: Was it? How much of this can kill you?

EW: That was one of my questions. Yeah.

EAU: I can tell you that it's a very small amount, Erin. Um, the lethal dose is often reported as about 60 to a hundred milligrams. Uh, for an adult, that's about one to two milligrams per kilogram of body weight.

EW: What does that look like? Like,

EAU: Yeah, I knew you were gonna ask that. Um, so I couldn't get a perfect answer to this. Uh, but I tried really hard. So we're gonna air and math this a little bit. Um, the seeds of the strychnine [00:25:00] tree. Which again, often have high concentrations of strychnine. They're about one, one and a 5% strychnine by weight, I think, I think by weight, but they're about one and a half percent strychnine. And a Google search suggested that each seed weighs between three and seven grams per seed.

EW: Okay.

EAU: So if we call it five grams per seed and one and a half percent of that is strychnine, then we're talking about potentially one seed containing about 75 milligrams. So one seed potentially could be enough to kill a person,

EW: how much do you need?

EAU: 60 to a hundred milligrams, depending on your body

EW: Okay. And so that's, that, that is the question that I actually wanted to, that I wanted to ask was if someone, like, if someone does recover, how does that happen? And is it like, how long does that take? Is it the recover? Like what is the half-life of this compound in the

EAU: Hmm, so glad you asked about the half-life. The half-life is about 10 to 16 hours, so we do eliminate it. It's primarily metabolized through the liver.

EW: Through the

EAU: Uh, some of it excreted through the kidneys, but mostly through the liver. So we basically have to break this down and metabolize it to then eventually get rid of it through our liver's metabolic kind of detoxification system. Um, it, it is fairly rapid, 10 to 16 hours, but because this is such a rapid onset disease, right, where it's being absorbed into your bloodstream and starting to show symptoms within a matter of minutes, most people will die within that timeframe if they don't have any access to supportive care, depending on the dose, right? If this is just causing muscle spasms but doesn't end up affecting your respiratory muscles. At least to a degree that it's causing respiratory arrest. If it is not causing, you know, further electrolyte abnormalities, you don't end up with kidney damage or rhabdomyolysis or something like that. People do survive exposure to strychnine frequently.

EW: Okay.

EAU: I do not know if there's any data on whether people can develop a tolerance to it and like what that would look like in terms of, are you upregulating your glycine receptors or something like that so that you're not having as much of a reaction. I don't know.

EW: I, I, what I read is suggested that no, there is no such thing as like IOC canine powder, strict knot.

EAU: which makes sense because like why, why would there, why would there be?

EW: Yeah.

EAU: Um, yeah, so that's, I mean, that's strychnine.

EW: it's um,

EAU: so, so, so awful.

EW: Yes.

EAU: Erin,

EW: Yeah.

EAU: we don't use this in medicine today. I.

EW: No, we don't today. We have historically.

EAU: I am assuming that we have, can you walk me through how we figured this out, why people thought it was a good idea to use this and for what and when did they stop?

EW: Totally, totally.

EAU: Okay.

EW: do it.

EAU: Okay.

EW:

EW: Erin, you just, you just took us through like a, a, it's, it is a really dark. Thing. Um, and I, I think that this could be an opportunity now to, like, do we wanna lighten things a little bit?

EAU: always.

EW: Okay. What I'm gonna ask you to do is go to that link that I sent you

EAU: Okay.

EW: and uh, press play and we'll play for about 30 seconds.

EAU: 30 seconds. Okay. I'm gonna press play now.

EW: Okay.

EAU: Okay.

EW: Okay, okay. Okay. So,

EAU: I have no idea what I was listening to. Erin. I was kind of rocking out. Got a little weird what's going on.

EW: that is a band called strychnine.

EAU: The band is called strychnine.

EW: is

EW: called strychnine. So when I told my husband that we were doing strychnine next as a topic, he goes, oh my God, will you play a song from my high school band called Strychnine?

EAU: stop it. This is Jon's band.

EW: is Jon. When he was 15, he was the drummer.

EAU: No way. Called

EW: strychnine. So I was like, yes, of course. I thought you'd enjoy that little treat.

EAU: I loved it. I remember you saying that there was like a band called strychnine that you, but then I a, I totally forgot about it, like entirely. Um, and [00:30:00] also it Jon's

EW: It was Jon's band so he's thrilled.

EAU: Oh, he's famous now. Are they on Spotify?

EW: I don't believe that they are.

EAU: Oh,

EW: that they had to like, dig up an old CD and then like burn it to the computer kind of a thing. I know. I was like, can I get a t-shirt? Like, do you still have

EAU: Do they?

EW: Um, he thinks somewhere, but he couldn't find one.

EAU: We should start selling strychnine merch. It's a crossover.

EW: we go. Okay. So

EAU: Oh my God. Why did, why was their band named strychnine? Was he like a nerd or did it just sound like deadly?

EW: I think it was, yeah, it was deadly. I, I'm not sure, like, oh, I wish I could ask the genre. What he said was, oh, I forget. It was something like, um, post metal. No, I don't know. I I'm gonna mess

EAU: metal.

EW: it was like punk metal. I, I don't know. I don't know Genre.

EAU: I love dead. Erin, I wanna listen to the whole song now. How did you pick that exact clip? I wonder.

EW: Well, because this morning he came in and I was like, oh, I'm gonna play, which is the song that is like the instrumental song? 'cause I wanna, I wanna put it into like little bits here and there. And, uh, he, this one, it's eight minutes long, the whole of it. And I was like, well, I'm not gonna play the whole thing. So like, what? And he's like, well, you gotta wait for the chorus then. And so we listened and listened and it was like, yeah. Started basically like at two minutes, 45 seconds in. And I was like, okay, I'll start at two 30.

EAU: I love it. What a treat.

EW: so glad. Um, okay. Are you ready to learn about the history of strychnine?

EAU: I so ready.

EW: Have you ever been to Stanford?

EAU: Yeah.

EW: Oh, really?

EAU: mean, like to visit the campus. Yeah.

EW: Okay. I've never been, um,

EAU: It's beautiful. I was obsessed with it in high school.

EW: Did you happen to visit the arboretum on

EAU: No, Erin. I was in high school.

EW: Okay. Well, I love, I love an arboretum,

EAU: I walked around the quad and I was

EW: Oh

EAU: could I go to school here? And then I was like, no, I can't get into Stanford.

EW: Well, okay. If you had visited the arboretum, you may have spotted the Stanford mausoleum, which holds the remains of Leland Stanford, Jane Stanford, and Leland Stanford Junior. And in case you're wondering, yes, these are the Stanfords that gave their name to Stanford University In that mausoleum, you might have seen Jane's memorial Stone. I think it's only open like one day to the public a year, which reads, quote, Jane Stanford, born in mortality. August 25th, 1928, passed to immortality February 28th, 1905. Yeah. Jane was the last of these three Stanford's to pass, and her death essentially insured the continued operation of the university through the gift of much of her estate, not your average gift. Then again, Jane Stanford was far from average in life as well as in death.

EAU: I cannot wait for this, Erin.

EW: On that fateful February day in 1905. She did not pass into immortality as her husband. Leland had 11 years earlier through heart failure, or as her son Leland Jr. Had 20 years earlier from Typhoid Fever when he was 15.

EAU: Oh gosh.

EW: Jane died not from natural causes, but as the coroner's jury put it "strychnine poisoning with felonious intent by some person or persons to this jury, unknown" and.

EAU: Oh my God.

EW: Why would anyone wanna kill one of the founders of Stanford University and who might have been the culprit? are questions that I'll get to later on.

EAU: Oh my gosh. The amount of like, what do you call it when you're like dragging me along by a string Like, I'm like, come on. What?

EW: Oh, you're gonna have to wait 'cause we gotta, we gotta first answer why strychnine? Right.

EAU: Yeah,

EW: Okay. So to get at that question, it's worth taking a trip through the history of strict of strychnine itself. As you described for us, Erin, strychnine is a substance derived from the nuts of certain trees. The, well, the most well known being the Strychnos nux-vomica tree. Um, and now I don't have to describe this here, so let me just scooch on down. Okay. Um, so yeah, the poison is in the nuts of those trees and people had known about the deadly qualities of strychnine or rather nux ika, which is what the unrefined powder from these nuts was called for centuries until they like isolated the compound itself. And they had used it as a poison for pests. Ika, by the way, it doesn't have anything to do with vomiting that doesn't make you vomit. It's the Latin for ulcer or abscess. And the powder was apparently used sometimes to treat skin sores.

EAU: Hmm. [00:35:00] Interesting. Okay.

EW: But it didn't really become all that popular like a household name in many parts of the world until the 18 hundreds. I. During this time, many people bought into this idea that every plant on earth served some sort of purpose for humans. For humans, right? Like it's only there for

EAU: an anthropocentric idea.

EW: I mean, yeah, it, it, it makes sense, right? As people were actually making the links between things like cin bark, which is where quinine comes from, which is used to treat malaria, um, willow bark and aspirin, and, and Bella, Donna Opium. I mean, like, there's a lot,

EAU: Yeah. Sure.

EW: It was like all plants had to have some medicinal purpose, and if a plant seemed toxic, that was interpreted as it being very likely beneficial in small doses. Like there had to be two sides to

EAU: Mm-hmm. Mm-hmm.

EW: In many ways, strychnine was just another one of these plant derived ingredients, popular in tonics, tinctures, pills, creams, et cetera. No one had done any scientifically rigorous tests on what exact benefits it provided. They just kind of assumed that it did. It was like, okay, well, it, if it, it kills rats, so it must be good in small doses for humans.

EAU: Okay.

EW: Seriously. Yeah.

EAU: Okay.

EW: It was advertised as a treatment for deafness, headache, intestinal worms, prolapsed, rectum, lead poisoning, rheumatism, diabetes, catatonia, strangulated, hernia, cholera, just to name a few.

EAU: I bet.

EW: Just like the spectrum of

EAU: spectrum, Erin, anytime there's a spectrum that wide, you just know, come on.

EW: Right. It's, it's not, yeah. Yep.

EAU: Sounds like what they think collagen will treat today. Sorry.

EW: 100%.

EAU: Mm-hmm.

EW: do anything. Doctors experimented with injecting strychnine up the urethra and into the bladder to treat urinary retention. Can you imagine?

EAU: okay. But I mean at least that I can see the basis for, you know, it sounds awful, but

EW: Yeah,

EAU: Yeah. But at least that it is gonna cause spasm. So if it causes bladder spasm, will that help Your urinary retention?

EW: There's there's a certain logic to

EAU: Exactly. Okay. I'm

EW: it was, it was also hailed as an excellent performance enhancer and overall vitality booster, especially popular with athletes. And I think that people viewed the tetanus like effect that it had as a way to counteract weak muscles or paralysis of different forms, so they would try to use it to treat paralysis.

EAU: that we weren't gonna be talking about current events here, but this feels a lot like, I'm just, sorry.

EW: But yeah, I mean it that, that's the thing is that like reaching for something that's like quote unquote natural

EAU: Right. Exactly. Yeah. Yeah.

EW: In the 1904 Olympics in St. Louis, Missouri, the winner of the marathon clocking in at three hours, 28 minutes, and 53 seconds, which is glacial compared to today's record of two hours and 35 seconds.

EAU: oh, wow. Okay. I was like, I have literally no idea

EW: Yeah. I mean, it's

EAU: that's fast or slow.

EW: a great time. Like three hours and 28 minutes is like, you could, yeah. It's,

EAU: I think I could do a marathon in three days.

EW: oh yeah. No, it's not something I could do. But I mean that, like, that is not

EAU: right. Compared to today. Okay. Uhhuh.

EW: But the, the winner of this marathon collapsed of exhaustion several times during the race, and at one of these collapses, a few miles before the finish line, his trainers gave him raw egg, white brandy, and strychnine.

EAU: Wow. What a combo.

EW: carried over the finish line.

EAU: Does that count?

EW: He still won. I think the, the first winner, um, like took a cab or something and he was like, I got tired. Like I or Carriage to the finish line was like, I got tired. He got found out.

EAU: What?

EW: Why would you enter the race? I don't

EAU: my God. I have so many questions that, that's for a different episode. Okay.

EW: But strychnine was available at basically any pharmacy throughout the 1800s and into the early 1900s and included in tons of proprietary medications for athletes, for adults, for children, for everyone. Strychnine for all

EAU: Strychnine for all.

EW: Strychnine for all. It was super cheap to import and so it was a great money maker.

EW: There were skeptics, of course, like people who recognized it as the poison that it was, and then there were people who were like, well, it's not harmful, but I don't really think it does anything. I'm switching to arsenic. But

EAU: oh nooo

EW: that was a real one. Yeah.

EAU: Okay.

EW: Mm-hmm. But for decades, the champions of strychnine greatly outnumbered the naysayers. The WD-40 of Victorian Medicine is what John Buckingham called it. It was the author of that Bitter, bitter Remedy book. [00:40:00] Bitter Nemesis. Yeah.

EAU: That's hilarious, I like that a lot.

EW: It was especially popular as a last resort injection given by doctors to patients that seemed to be not long for this world as, as Buckingham writes quote, how many famous Victorians left this world with the words ringing in their ears? There is just one other thing that I may try.

EAU: Oh no.

EW: Yeah.

EAU: Oh gosh.

EW: To give you a sense of just how popular this stuff was in the 1880s, London was importing around 500 tons of the nux vomica nuts each year.

EAU: What?

EW: Can you even, I can't even comprehend Yeah. Each

EAU: What?

EW: To be used in medications as a performance enhancer, as a rat poison, or mouse or vole or rabbit or cat or dog or whatever you, whatever your target pest species is. And of course, as a weapon of murder. I don't think they were importing it for the purpose of murder. I'm just saying that it was used

EAU: Once it was there, it was useful for that.

EW: When it comes to poisons of the 18 hundreds, strychnine does not come close to the popularity of arsenic. Unlike arsenic, which is tasteless, colorless, odorless, and dissolves easily strychnine is extremely bitter and does not easily dissolve. As poisoning cases increased in the 18 hundreds, especially using arsenic, additional protections were added to these substances and you had to at least record like who purchased the poison or medication and how much of it they purchased. I don't know, like how you do Id checks and like to verify

EAU: Mm-hmm. Mm-hmm.

EW: which is a plot point in a book that I read about strychnine

EAU: Oh,

EW: apparently the rise in poisonings overall may have been driven in part, not just by easy access to these substances, but also because life insurance was beginning to become a thing and so you could take out a policy on someone and slip a little bit of arsenic or strychnine into their coffee, and that before there were tests you couldn't confirm that it was poison. Yeah.

EAU: I mean, it feels though, like the way that you die with strychnine is fairly obvious.

EW: that's, so that's the thing. Yeah, it is. It is very obvious. I mean, and this was also pre tetanus vaccine, so maybe tetanus cases were more common, but still like, I don't know. I mean, I think it was enough, it was obvious enough that there was a motivation for chemists to develop tests, and they did this for arsenic and then for other, other poisons such as strychnine.

EAU: Okay.

EW: But yeah, as you said, like it causes very distinctive symptoms, but that didn't stop poisoners. The most famous of these, or infamous rather of these strychnine poisoners was William Palmer, whom Charles Dickens called the greatest villain that ever stood in the old Bailey.

EAU: Whoa.

EW: The greatest villain he is, he killed or is suspected of having killed several people, including his friend, his brother, his mother-in-law, his children. Just a really dark, really dark character. Yeah, infamous. His trial marked a huge step forward in forensic medicine and the use of expert testimony from medical and forensic witnesses during a CRI a criminal trial.

EAU: Okay.

EW: Agatha Christie's time as a drug dispenser during both World Wars inspired her writing, which of course featured many characters using poisons like strychnine to dispatch their relatives and friends. Her first book, uh, which was the first to include Poirot, like her famous detective featured strychnine, the Mysterious Affair At Styles. This is the one that I read where it was a plot point that,

EAU: uh, okay.

EW: yeah. Uh, it's also in Sherlock Holmes. It has, and, and or had a certain level of notoriety back in the day for a time strychnine murders or suicides via strychnine weren't, they weren't necessarily commonplace, but neither were they Totally unheard of, and there certainly would've been many opportunities for Jane Stanford's murderer to have read about one of these cases and gotten the idea to use strychnine in their own murder plot.

EAU: Hmm.

EW: In 1905, at 76 years old, Jane Stanford had led quite the life. She and her husband, Leland had grown incredibly wealthy and influential in California over the second half of the 18 hundreds. Leland, who was at one point, the governor of California and a US senator, was very involved in the railroad business and was widely considered a robber baron.

EAU: Hmm.

EW: They were one of the wealthiest families in the US at this time, equivalent to like today's billionaires,

EAU: Okay.

EW: in 1868, at the age of 39, Jane gave birth to their son Leland, Jr. And I mentioned her age because at that time, that was like an older age for a first time mom. And because they had been trying [00:45:00] for years and years and years, I think they got married when she was like 22. So they had been trying for years for a kid and, and nearly, nearly gave up hope. And then Leland Jr. Was born. He was much loved every whim attended to. And so when he died tragically at the age of 15 from Typhoid Fever, it was beyond devastating for Jane and Leland. And Leland Sr. And so to honor his memory, they opened Stanford University, which was essentially a shrine to him. And over the course of their lives, they gave about $1.4 billion in today's dollars to the university. Yeah. And because of their founders' roles and the huge sum of money that they contributed, they stayed incredibly involved and steered it however they wanted, which was not always in a popular direction. Jane was very into spiritualism, like communing with the dead, and she mm-hmm. And she regularly had conversations with her dead son who would help guide her in how to structure the university, who to hire, which grants to give, how to write her will. Mm-hmm. And this, so this was a time when spiritualism was very popular, like the late 18 hundreds. And so, but it was also very frowned upon. It was seen as like crass. And so Jane and those around her tried to hide her interest in the subject as best they could, but it was kind of like an open secret.

EAU: Okay.

EW: She and Leland Senior also imposed their personal values on how the university should operate. Neither had spent time at universities themselves, and they viewed a quote unquote classical education as useless and cruel. They were like, Harvard, Yale, what a waste of time. You're not preparing anyone for the real world.

EAU: Oh,

EW: they wanted to start a university that would actually prepare students for life in the real world. I don't,

EAU: What does that mean?

EW: I don't know. I don't. Um, but I know that they wanted their university to be open to both men and women. So they supported co-education from early on, poor and rich with training in the sciences, liberal arts and practical arts like agriculture. Their supporters admired their drive to enable people of all classes, though not necessarily of all races. Admissions for black people were, yeah, they were limited for years. Um, they wanted to enable people to excel and to have access to an education while their critics called it a money laundering scheme or restitution for their ill-Gotten wealth. Maybe it's everything. Leland Stanford Junior University opened in 1891 with 15 faculty and 559 students, which actually made it the largest college in the far west.

EAU: Oh wow.

EW: At the helm of the university was David Star Jordan, the first president of Stanford University. Though, not the Stanford's first pick, they tried to go like a bunch of other people before him. They poached him from his role as president of Indiana University after several others turned him down.

EAU: Hmm.

EW: Uh, Jordan's training was in biology and medicine and his research interests revolved around cataloging fish. But his true passion was eugenics.

EAU: I, it's, this is one of those weird moments, Erin, where I'm like, I know his name because we just were talking about

EW: We just were

EAU: when we were at Indiana University. Like it's one of those weird coincidences,

EW: there was like the street named

EAU: Uhhuh, the the river. The river Jordan that they renamed.

EW: I think it's called something else now. Technically. Campus Creek maybe. Yeah. But um, yeah. Yeah.

EAU: This is so interesting. Keep going, keep going. Yeah. He's a eugenics.

EW: He's a eugenics. I'm not gonna go into his eugenics. Like it's just, you know

EAU: That's who he was.

EW: So he was, yep. He was always resentful, quote that he owed his job to a message from a dead child. End quote. Spiritualism embarrassed him greatly, and he thought that the whole lot were frauds, but he lapped up the opportunity to lead Stanford University.

EAU: Okay.

EW: Yep. You know? Yeah. He had to, he had to work under the Stanford's direction and basically create this university from scratch, which is a big undertaking. But he also held all the power to hire and fire faculty with Jane only intervening in extreme circumstances. No committee to listen to, no compromises. He had to make, he could just hire his buds.

EAU: Mm.

EW: For years. Yeah, for years, the setup seemed to work fairly well. He was more or less viewed as like a ben, like a benevolent dictator,

EAU: Okay.

EW: and then Jane wanted to get more involved. She thought that religious teaching should be required, specifically Christianity. This was against the university's laws of like, there's gonna be no religious focus. She [00:50:00] regretted co-education and wanted to forbid women from enrolling. She was

like, I'm worried about the influence that they're having. Um, she took issue with certain outspoken professors and wanted them fired. Jane had grown resentful of Jordan's extensive power and wanted to curtail it. Jane and Jordan began to see each other as the obstacle preventing them from achieving their vision of the university. Jane began to draw up plans to have him removed as president and given an honorary research position. She also, as was her habit, changed her will several times throughout this period, including having the bulk of her wealth go to Stanford as a gift, which I don't think was too appreciated by some of the other people who would then receive less in her will.

EAU: Oh, I see.

EW: I got the impression, uh, that Jane was not the easiest person to get along with kind of demanding and expecting everyone to fall in line. Her family members and employees, her personal maid, her Butler, her companion slash secretary, bore the brunt of this having to go along with her every whim, no matter how unreasonable and like an infected wound that resentment festered

EAU: hmm.

EW: in January, 1905. For someone in Jane's life, that resentment spilled over into a murderous hatred.

EAU: Hmm.

EW: On the evening of January 14th, police were called to Jane's 41,000 square foot residence in San Francisco's Knob Hill.

EAU: Okay.

EW: Yeah,

EAU: I'm feeling a lot of very mixed emotions at all of this.

EW: I know. I

EAU: like a lot.

EW: It's a lot. Jane had gotten violently ill after drinking from the bottle of mineral water left on her bedside table, which is she had every single night. You know, this is her ritual. She'd only taken a sip of the unusually bitter tasting

water, and then got incredibly ill. Was like, this is really bad. I feel terrible. What's going on? She had recovered by the morning, but was shaken by the incident, suspecting that someone was trying to poison her. Tests later revealed she was right. They, the, the bottle had been dosed with strychnine, about fourths of a grain when the lethal dose was around half a grain. Grain was like an old measurement, and I'm not really sure how it translates, but just to put it in perspective, yeah. Half a grain was the lethal dose. All her employees claimed innocence, surprise, surprise, uh, including her companion slash secretary, 39-year-old Bertha Burner and Elizabeth Richmond, Jane's personal maid, a "quiet little mouse of a woman." Jane seemed to harbor her own suspicions after the murder attempt. Jane had Richmond, her personal maid move bedrooms and shifted her duties to other maids, and they had like. Been fighting a lot anyway, and a few weeks later, Richmond was fired. Um, there, Jane, there was like some incident where Jane had flown into a rage if Richmond didn't perform a task precisely to her liking. And Richmond was defensive and impatient and it was just like, I think there was a period of like hiring, re firing type thing, which happened with many of her other employees. Um, actually Richmond also though, had trouble keeping her story straight. Like times and dates didn't line up. She claimed, oh, well I, I didn't get fired, I quit. Dunno.

EAU: Mm-hmm.

EW: Bertha Burner was another strong suspect in this attempt. She also had a hard time keeping her facts straight and may have harbored some anger towards Jane for the demands that she made on her and how powerless she was to negotiate against them. She was her mom's, her mom who was ill, her sole caretaker. And so she was dependent on Jane for income and was also included in the will, but she also had to leave her mom frequently because Jane would be like, I wanna go travel now. I wanna go here, I wanna go there, and I wanna be gone for months at a time. Richmond and Burner. The, so the, uh, personal maid and her, her companion slash secretary had the best access to Jane's room and could have slipped in easily to add some strychnine to her bottle for their own reasons, or they could have been persuaded to do so by someone else like Jane's butler. Albert Beverley, who was another disgruntled employee slash former employee. Uh, he also had like wrecked another estate or like messed with the ball water in another estate of Jane's 'cause he got fired. Or I, I don't know.

EAU: Okay.

EW: Or maybe David Star Jordan, who as we know was about to be ousted as president. If Jane got her way,

EAU: that's where my money is, but what do I know?

EW: Jane and her relatives enlisted the help of the Morse detective agency to investigate who was behind the [00:55:00] poisoning. They did this because they didn't want the police to get into involved because they didn't want publicity around

EAU: makes sense? Yeah.

EW: And the detective agency concluded that it was all an attempt to discredit Jane's companion Bertha Burner orchestrated by jealous coworkers. They didn't like the influence that she had on, uh, Jane.

EAU: what an interesting conclusion.

EW: Yeah, no one seemed to buy the story. Like, not even the, the detectives themselves, they were just like, well, yeah, here's, here's what we got, and no one pushed back. I, I don't know, Jane herself seemed at a loss as she wrote, quote, I am not quite so sure of health and life as heretofore death in a natural way would not be a calamity for. I have much and dearly loved ones waiting for my advent there, but I am startled, even horrified that any human being feels that they have been injured to such an extent as to desire to revenge themselves in a way so heroic as has happened. End quote,

EAU: Yeah.

EW: struggling to cope with the shocking knowledge that someone wanted her dead, and dealing with the ongoing tension with Jordan. Jane decided to take a trip to Hawaii. Accompanying her on this trip would be Bertha Burner and a handful of other employees. Before she left, Jane wrapped up some business, including signing a statement to prevent any legal challenge to the money that she left the university, which suggested that she still feared for her life.

EAU: Hmm.

EW: They set off on February 15th and everything seemed to be going smoothly for almost two weeks. February 28th, 1905, A Tuesday started out like any other day. Jane woke up around eight 30, which is when she usually woke up, didn't have too much on the schedule, some sightseeing, maybe some light shopping. After a big lunch, dinner consisted of a simple soup and Jane started to get ready for bed around 8:15 PM she asked Bertha to prepare her evening medicine, which was a cascara capsule. This was a popular laxative that

had a small amount of strychnine. It was really popular that that is not. Necessarily unusual, maybe in this context, and baking soda, which she took often, like a about a half teaspoon of as an antacid.

EAU: Okay.

EW: Bertha allegedly also took a capsule of this cascara stuff. The laxative laxatives were really popular for a while. Yeah,

EAU: No one was eating fiber, I guess.

EW: probably not. I don't know. At some point in the middle of the night, Jane became violently ill. She was awoken by a spasm that threw her to the floor. She cried out for help and a doctor eventually arrived, but couldn't do much. He tasted the baking soda at her bedside and found it to be extremely bitter, which combined with her spasms made him immediately suspect strychnine. He tried to get Jane to throw up, but she, she just could not. Bertha too stood helplessly by, as did a couple other people who were awoken by the commotion. Jane knew she was dying in between spasms. She said, "oh God, forgive me. My sins is my soul prepared to meet my dear ones." And, this" is a horrible death to die." I'm gonna read you a quote from who killed Jane Stanford by Richard White. "As the final spasm took hold, her body went rigid. The soles of her feet were turned inward toward each other with the in steps arched extremely, and the toes pointing forward. Her knees were widely separated. Her eyeballs protruded, her pupils dilated, her jaws were fixed, her fingers contracted, and the thumbs dug into the palms of her hands. Her respiration stopped. She never breathed again. From the time the doctor entered the room until the last spasm, 10 minutes had passed." It's

EAU: It really is so horrific, Erin.

EW: Horrific.

EAU: Yeah.

EW: Yeah. death bore all the hallmarks of strychnine poisoning

EAU: Mm-hmm.

EW: attested to both the doctor that had witnessed her death and the one who examined her postmortem. Right? And this is, this is how Bertha told the story too. strychnine. we, can we agree on that?

EAU: Absolutely. It's strychnine,

EW: Okay. And if

EAU: every part of that description is strychnine.

EW: Strychnine, and if that wasn't enough, tests later confirmed the presence of strychnine in both the baking soda at her bedside table, as well as in her stomach. Was it self-administered or was it murder? The answer to that question held great significance for [01:00:00] the future of Stanford University. If it was self-administered, that could call into question her final note, gifting Stanford, the bulk of her fortune.

EAU: right.

EW: If it was murder, it will embroil the university in scandal. The ideal scenario would be that she died of natural causes mistakenly attributed to strychnine.

EAU: Oh gosh.

EW: The police strongly suspected murder, and the search was on for the culprit immediately. Bertha emerged as the lead, but not the lone suspect. There were many other ones that were kind of like swirling around. Bertha was the only one present at both poisonings. The only one with access to both the poisoned mineral water in the first attempt and the baking soda in the second. She had an alleged connection with PJ Schwab, who was a druggist in California, who would've had access to strychnine. She, her story changed a bunch of different times about her, her location, her role, where she got the baking soda, all these different things. And I think that she bore some resentment toward Jane, although it, not all, not all of the records have survived, but Jane had thwarted some romances of Bertha's, um, including from the Butler who was married and, but then like she, yeah, Bertha had stolen from Jane from various, in various points of time. And like I said, Bertha was really frustrated that she had to tend to Jane on her long travels instead of being able to be in San Francisco to care for her sick mother. Jane had recently announced that she wanted to go on a really long trip to Japan, and so that would've, again, taken her away. Circumstantial evidence against Bertha was mounting, but then arrives David Star Jordan.

EW: A few days after her death, Jordan and some other folks associated with Jane or Stanford, traveled to Hawaii to retrieve her body and on the boat ride

over, they had plenty of time to decide what the police should actually conclude. Jordan, who was initially of the belief that she was murdered and even, uh, encountered her after the first poisoning and said, oh, that sounds like strychnine poisoning. He began to walk all that back. Maybe it was an accidental poisoning, and then that turned into, I actually don't think it was poisoning at all. It was it, I think it was natural causes a heart attack. Apoplexy and bronchitis were all things floated.

EAU: that totally makes sense.

EW: I remember. He had medical training, he had gone to medical school, and so he should have recognized the signs of strychnine poisoning while most papers pushed back against this new narrative that he was trying to spout. A few began to pick up the story and a few more were paid off by Jordan to suppress the story entirely. And one paper reported, you're gonna love this, that she had a case of indigestion that she mistook for poisoning. And this led to hysteria

EAU: Ah,

EW: mimicked strychnine poisoning leading her to die of fright.

EAU: ah. You knew hysteria had to come into it at some point.

EW: I just like, I know that hysteria is used in so many things, but I just, strychnine poisoning is like so, so extreme and characteristic.

EAU: extreme and it's so specific, like it's either strychnine or it's tetanus. Okay. And there was no wound.

EW: There's no, yeah. Yeah.

EAU: Yeah, it

EW: I know. I know. And this is all with tests that had confirmed the presence of strychnine.

EAU: Right.

EW: The, this denial though that it was poisoning, worked in Bertha's favor, whose actions and words had been under the microscope since Jane died and whose story changed more than once, drawing more suspicion on herself and

whether or not Bertha was the one responsible, which it does look like she was, in retrospect, given the evidence that has survived, if she had been responsible or not been responsible, saying that it wasn't poisoning, would've removed any of the issue whatsoever, whether she was guilty or not. Right? Bertha needed Jordan and his natural causes theory to avoid a murder trial. And Jordan needed Bertha to keep his role as President and Jane's gift to Stanford because if it wasn't. Then it could have drawn in into question everything.

EAU: Mm-hmm.

EW: Maybe Bertha Misremembered. What she saw suggested Jordan and Bertha accordingly changed her testimony

EAU: Wow.

EW: where she initially stated that Jane died in great agony with her limbs and jaws rigid. She changed it to say that no, she died peacefully, softly. Her revised testimony eliminated any detail suggestive of strychnine poisoning.

EAU: What?

EW: Yeah. And when this altered story reached the newspapers, it [01:05:00] was met with incredulity. Like exactly what you, just, your reaction like, do you really expect us to believe this? How could you possibly say it was natural causes the papers ripped Jordan apart who said quote, "I do not care what the people think or what the constables say. I am firm in my opinion."

EAU: Good for you, bro.

EW: but also. The outcry didn't amount to much. That was, that was it. He had gotten doctors and other people to discredit the autopsy. He got the lead witness to change their testimony. I say he, but like, so it's unclear exactly. These things happened. The autopsy was discredited. The lead witness changed their testimony and there was this vested interest in having this be classified as a natural death. The investigation petered out and no one was held responsible for Jane Stanford's murder.

EAU: What

EW: Yeah. Uhhuh.

EAU: do you think they tell this like on the tours of Stanford?

EW: I don't

EAU: I've never been on a tour. Maybe I went on a tour, but I can't remember, it was like 20 plus years ago.

EW: That's a good question. I mean,

EAU: someone who went to Stanford tell us like, do they talk about this? I wanna know what's the, what's the vibe?

EW: what's the vibe? Yeah. Um, I. There's a whole class taught on this actually at Stanford, I'm pretty sure at Stanford. It's by the, the person, um, Richard White, who I have quoted throughout here, the Who killed Jane Stanford. This book is like, based on a course that he has taught, and it's because it's, what's really fascinating about the book and what I didn't really go into very much in this history section is, um, how it kind of does show this period of history, the class dynamics between you've got like this billionaire and then all the people who have to basically respond to her every whim and grow resentful of that. There's a lot of, um, racial aspects of this too, whereas like Chinese immigration is very high and there are a lot of, um, Chinese immigrants working in San Francisco. And so then suspicion is on them as well because it's like, oh, well, just, just totally racist.

EAU: right, right.

EW: Yeah. Um, but it's

EAU: and I bet there's like an extra level of like hating her because she's a billionaire, but also because she's a woman, so she's more demanding,

EW: She's more

EAU: more unreasonable.

EW: also it does seem like she was

EAU: Demanding, and unreasonable.

EW: Yeah. So it's just a really, it's a really complicated story. Um, but it's, there's a lot there. And I think, I mean, there's not going to be a satisfying

conclusion to this, as with most like, cold cases, I would say. But I think that finally there has been recognition that she was murdered.

EAU: Murdered.

EW: Yeah. Yeah. And, um, yeah, I mean, uh, David Star Jordan served as president of Stanford until 1913, and that's when he was given the role of Chancellor

EAU: Okay.

EW: Bertha Burner lived out the rest of her life quietly. I think she died in 1945. At one point, she published a biography of Jane's life and denied until her last breath any role that she played in her murder.

EAU: Hmm,

EW: Yeah, the death of Jane Stanford did not bring about the end of strychnine, but it did Mark sort of like the beginning of its decline in popularity. Not because of her death, but just because timing wise, within a few decades of the 20th century, the start of the 20th century, it stopped being included in many proprietary medicines and remained a chemical curiosity, incredible for being one of the most complex chemicals known with chemists. Finally synthesizing it with very low yield in 1954, like minuscule yield. And since then it's found a small place in some, um, homeopathic remedies, as I mentioned, and in certain religious ceremonies.

EAU: Okay.

EW: But maybe there's more to strychnine today. So Erin, what can you tell me?

EAU: There's not, I'll tell you what I know though.

EW: Love it.

EAU: So I got to go back to the, uh, annual report of the National Poison Data System last cited in one of our poison control episodes last year. Um, the 2023 report, it comes out at the end of the year. So this came out at the end of 2024. Okay. But it's from 2023 data. There were 25 case mentions and 22 single exposures of strychnine poisoning that were reported to the National Poison Data System. That was for, so it's interesting, they split it into strychnine, that's

non rodenticide. And then Rodenticide exposure specifically. So 25 case mentions, 22 single exposures of non rodenticide, strychnine poisoning.

EW: Okay.

EAU: Nine of [01:10:00] those ended up treated in a healthcare facility, which means that the rest of them weren't. So whether they were a small enough, you know, exposure that, or just a suspected exposure, but they ended up not needing to go to a hospital or anything, which is good, no deaths reported.

EW: Wow. Okay. Great.

EAU: And then when it comes to rodenticide, this is where we see the majority. So 44 case mentions of strychnine containing rodenticide exposure with 31 single exposures. 15 of those ended up needing to be treated in healthcare facility, but still no deaths, which just goes to show that we have gotten much better at treating this. Although what I think is so interesting, Erin, is that I was, um, as I was digging into this, to try and see, you know, like how do we treat it today versus how we used to treat it. Um, I read a report, a case report from 2023 that happened at my hospital, the one that I worked at my emergency room for residency. Um, it was like people that I knew, I was like, I know these people.

EW: that's amazing.

EAU: They probably don't know me, but I know them. Um, and it is, it was exactly almost exactly the same as the case reports that I read from the early nineties, just in terms of like how the case presented, what they did, what all of the treatments were, like, all of that. And it's just so interesting to me that like we still don't have anything that is specific to treat strychnine.

EW: Mm.

EAU: Uh, it's all just sort of supportive care in the same way that it has been for a long time. So it really just comes down to access to care, identification of what an exposure is, knowing that it was strychnine. So in the ER having like a, knowing what this looks like, right? Because you have to be able to identify it really quickly.

EW: Yeah. And so if you, basically it's strict iron, tetanus, and so with tetanus, are you looking for a wound, like,

EAU: Yeah, potentially. Yeah, yeah, yeah,

EW: What's a differential

EAU: Or some, some other, some other kinds of, yeah,

EW: Yeah.

EAU: clues. I think that tetanus two tends to be a bit more, um, insidious.

EW: I see

EAU: If I remember correctly. I'd have to go way the heck back. Um, the onset, exactly Right, right, right, right. Whereas this is like an, an ingestion or an exposure. And then very quickly thereafter you have symptoms. Um, I usually try and include like, so what's the updates on information? I got very little for you, Erin.

EW: I'm not surprised.

EAU: You had mentioned, Erin, that it was, what'd you say? The 1950s that we finally were able to synthesize

EW: strychnine. Yeah. It's still like, even today, it's like very low yield. Many, many, many steps. Oh, did

EAU: it's so 2022 a paper came out in nature that was like actually trying to figure out the biosynthesis of this and all of the steps. And that was the first time that they actually figured out like how intrinsically, what are all of the steps for this to actually be produced in the plant and how can that help us to make this outside of the plant? What are we gonna do with it when we make it outside the plant? I don't know. I don't know. But I mean, basic chemistry and basic chemical biosynthesis research is very important for our general foundation of knowledge. So I'm not discounting

EW: No, no. I mean also just to understand the complexity and like the, the evolution of the production of these things, and also our response to them and the variability in the responses. Like there's so much,

EAU: Right. Yeah. And this strychnine is strychnine and there's a few other like bruine, which is also present in the same plant. Um. They're very, very

interesting compounds because like we said, they are so complex. The pathway that is required to create strychnine has so many steps and is such a long pathway that it is a very unique and it's a very structurally unique compound. So like what drives or what drove the evolution of that compared to so many other cases where we see this convergent evolution in chemical defenses, right. Why exactly, like what exactly is strychnine defending against? Why did it evolve to be so incredibly toxic? It also, like the toxicity really varies in terms of what species we're looking at. So like humans, even though such a small amount can kill us, we are relatively resistant to strychnine compared to some other animals who are even more sensitive to its effects. And then you also have some animals like Hornbills or green Langers who can eat these fruits and not have any issue. So yeah, so that, like that part of the whole story that I didn't dig as much into, because I'm not Matt Candeias of in defense of plants Um,

EW: us are except

EAU: I know we can't compare. Uh, but it is, it is a really, really interesting part of the story. And so I do think there is a lot of research being done on that part of the story. I don't know if anyone's working on specific antidotes. My guess is probably. Not that many people because of how rare of an exposure it tends to be. It's also [01:15:00] like not legal to be used as a rodenticide or as any kind of poison in a lot of countries. So it's only some places in the world that you can even really easily get access to strychnine. Um, and then there's also regulations about like, you have to have it be certain colors or things like that to make it more obvious that it's a poison rather than just something benign.

EW: Yeah.

EAU: But that is the horrible toxin that is strict. Nine.

EW: Yes.

EAU: The end

EW: The end um, sources. Okay. I read, uh, uh, there are some papers, but mostly I relied on books for this. There's of course, the book Bitter Nemesis, the Intimate History of strychnine by John Buckingham. And then there's Who Killed Jane Stanford, A Gilded Age Tale of Murder, deceit, spirits, and the Birth of a University by Richard White. And then of course, I gotta throw in, uh, the Mysterious Affair Styles by Agatha Christie.

EAU: Love it. I had a number of papers, not that many papers. These were pretty nice overview papers. There was one by, um, Palatnik et al 1999 in clinical toxicology called Toxic Kinetics of Acute strychnine Poisoning. Um, the paper that I mentioned that was from my hospital was published in the American Journal of Emergency Medicine in 2023 by Harden et al. There was a chapter from a book, the book was called Handbook of Toxicology of Chemical Warfare Agents, uh, from 2020. And I read the chapter on strychnine in that, which was also helpful. And then I also cited those 2023 and the 2022 if you're interested. Annual report of the National Poison Data System. Um, but there's more sources as always for this episode and all of our episodes. We've got that evolution paper too. It's all there on our website. This podcast will kill you.com.

EW: yes. Um, thank you to Blood Mobile and Strychnine

EAU: Strict nine.

EW: for Pro providing the music for this episode. Um, I will also, I forgot to mention that song. I don't know if this is even relevant because I'm gonna try to find out a way if I can post this or not. Like, so people can listen to the whole song if they want the full eight minutes. It's called Afterlife

EAU: Erin

EW: And it's by strychnine starring Jon Velotta and other band members. I'm gonna get flack 'cause I don't remember who's

EAU: band.

EW: The 15-year-old Jon Velotta on drums.

EAU: I love it. Why don't, why don't you guys have a drum set in your house? Does he not

EW: I've been trying to get him to get like an electronic one, but our house just isn't that big.

EAU: Okay. Well, he could have room for it in his little office

EW: That's what I keep

EAU: corner. Yeah. Okay. Uh, thank you also too, Tom and Leanna and Brent and Pete and everyone else at Exactly right. Uh, for all that you do for us, Jess. Thank you. Love it.

EW: Thank you.

EAU: couldn't do it without you.

EW: Really, really. Uh, and thank you to our listeners. Uh, we also couldn't do it without you. Thanks for listening. Tell us what you think.

EAU: Yeah. We enjoyed this episode. We hope that you did too. Uh, and as always, a special shout out to our patrons. Thank you so, so, so much for your support. It really does mean the world to us.

EW: it does well, until next time. Wash your hands.

EAU: You filthy animals.