

**Lex Fridman Podcast #429 - Paul Rosolie: Jungle, Apex Predators, Aliens,
Uncontacted Tribes, and God**

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Lex Fridman

Where are we right now, Paul?

Paul Rosolie

Lex, we are in the middle of nowhere.

Lex Fridman

It's the Amazon jungle. There's vegetation, there's insects, there's all kinds of creatures. A million heartbeats, a million eyes. So really, where are we right now?

Paul Rosolie

We are in Peru, in a very remote part of the Western Amazon basin. And because of the proximity of the Andean Cloud Forest to the lowland tropical rainforest, we are in the most bio-diverse part of planet Earth. There is more life per square acre, per square mile out here than there is anywhere else on Earth, not just now, but in the entire fossil record.

Lex Fridman

The following is a conversation with Paul Rosolie, his second time on the podcast, but this time we did the conversation deep in the Amazon jungle. I traveled there to hang out with Paul and it turned out to be an adventure of a lifetime. I'll post a video capturing some aspects of that adventure, in a week or so. It included everything, from getting lost in dense, unexplored wilderness with no contact to the outside world, to taking very high doses of ayahuasca and much more. Paul, by the way, aside from being my good friend, is a naturalist, explorer, author, and is someone who has dedicated his life to protecting the rainforest. For this mission, he founded Jungle Keepers. You can help him, if you go to junglekeepers.org. This trip, for me, was life-changing. It expanded my understanding of myself and of the beautiful world I'm fortunate to exist in with all of you. So I'm glad I went and I'm glad I made it out alive. This is the Lex Fridman podcast, to support it, please check out our sponsors in the description. And now, dear friends, here's Paul Rosolie. I can't believe we're actually here.

Paul Rosolie

I can't believe you actually came.

Lex Fridman

And I can't believe you forced me to wear a suit.

Paul Rosolie

That was the people's choice, trust me.

Lex Fridman

Alright. We've been through quite a lot over the last few days.

Paul Rosolie

We've been through a bit.

Lex Fridman

Let me ask you a ridiculous question. What are all the creatures right now, if they wanted to, could cause us harm?

Paul Rosolie

The thing is, the Amazon rainforest has been described as the greatest natural battlefield on Earth, because there's more life here than anywhere else, which means that everything here is fighting for survival. The trees are fighting for sunlight, the animals are fighting for prey, everybody's fighting for survival. And so everything that you see here, everything around us, will be killed, eaten, digested, recycled at some point. The jungle is really just a giant churning machine of death and life is kind of this moment of stasis, where you maintain this collection of cells in a particular DNA sequence and then it gets digested again and recycled back and renamed into everything. And so the things in this forest, while they don't want to hurt us, there are things that are heavily defended, because, for instance, a giant anteater needs claws to fight off a jaguar. A stingray needs a stinger on its tail, which is basically a serrated knife with venom on it, to deter anything that would hunt that stingray. Even the catfish have pectoral fins that have razor-long, steak-knife sized defense systems. Then you, of course, the jaguars, the harp eagles, the piranha, the candiru fish that can swim up a penis, lodge themselves inside, it's the Amazon rainforest. The thing is, as you've learned this week, nothing here wants to get us, with the exception of, maybe, mosquitoes. Every other animal just wants to eat and exist in peace, that's it.

Lex Fridman

But each of those animals, like you described, have a kind of radius of defense.

Paul Rosolie

Yeah.

Lex Fridman

So if you accidentally step into its home -

Paul Rosolie

Yeah.

Lex Fridman

Into that radius, it can cause harm.

Paul Rosolie

Or make them feel threatened.

Lex Fridman

Make them feel threatened. There is a defense mechanism that is activated.

Paul Rosolie

Some incredible defense mechanism, I mean, you're talking about 17-foot black caiman crocodiles with significant size, that could rip you in half. Anacondas, the largest snake on Earth, bushmasters that can grow up to be nine to, I think even 11- feet long. And I've caught bushmasters that are thicker than my arms.

Lex Fridman

So for people who don't know, bushmaster snakes, what are these things?

Paul Rosolie

These are vipers, I believe it's the largest viper on Earth.

Lex Fridman

Venomous?

Paul Rosolie

Extremely venomous, with hinge teeth, tissue destroying venom. Like if you get bitten by a bushmaster, they say you don't rush and try and save your own life, you try to savor what's around you, look around at the world, smoke your last cigarette, call your mom, that's it.

Lex Fridman

So that moment of stasis, that is life, is going to end abruptly, when you interact with one of those.

Paul Rosolie

Yeah, I even have, even this seemingly -

Lex Fridman

Can I just pause at how incredibly beautiful it is, that you could just reach to your right and grab a piece of the jungle.

Paul Rosolie

It's like even this seemingly beautiful little fern. If you go this way on the fern, you're fine, as soon as, ou, as soon as you go this way -

Lex Fridman

Yeah.

Paul Rosolie

There's invisible little spikes on there, if you want to.

Lex Fridman

Oh, I see.

Paul Rosolie

Yeah.

Lex Fridman

I feel it.

Paul Rosolie

See that? It's like everything is defended. If you're driving on the road and you have your arm out the side, or if you're on a motorcycle going through -

Lex Fridman

Yeah.

Paul Rosolie

The jungle and you get one of these, it'll just tear all the skin right off your body. It's kind of doing that to me now.

Lex Fridman

So what would you do? Like we were going through the dense jungle yesterday, and you slide down the hill, your foot slips, you sliding down -

Paul Rosolie

Yeah.

Lex Fridman

And then you find yourself staring, a couple feet away from a bushmaster snake, what are you doing? You're, for people who somehow don't know, are somebody who loves, admires snakes, who has met thousands of snakes, has worked with them, respects them, celebrates them. What would you do with a bushmaster snake, face-to-face?

Paul Rosolie

Face-to-face, this has happened, I have been there.

Lex Fridman

It's nice.

Paul Rosolie

I've come face-to-face with a bushmaster and there's two reactions that you might get. One is, if the bushmaster decides that it's vacation time, if it's sleeping, if he just had a meal, they'll come to the edges of trails or beneath a tree and they'll just circle up, little spiral, big spiral, big pile of snake on the trail and they'll just sit there. And one time there was a snake sitting on the side of a trail beneath a tree, for two weeks, this snake was just sitting there resting, digesting it's food, out in the open, in the rain, in the sun, in the night, didn't matter. You go near it, barely even crack a tongue. Now, the other option, is that you get a bushmaster that's alert and hunting and out looking for something to eat and they're ready to defend themselves. And so I once came across a bushmaster in the jungle, at night, and this bushmaster turned its head towards me, looked at me and made it very clear, "I'm going to go this way." And so I did the natural thing that any snake enthusiast would do, and I grabbed its tail. Now, 11-feet later, by the head, the snake turned around and just said, "If you want to meet God, I can arrange the meeting. I will oblige." And I decided to let the bushmaster go. And so it's like that with most animals, a Jaguar will turn and look at you and just remind you of how small you are.

Lex Fridman

Like what did you see -

Paul Rosolie

"Keep going."

Lex Fridman

In the snake's eyes? How did you sense that this is going to be your end if you'd proceed?

Paul Rosolie

His readiness. I wanted to get him by the tail and show him to the people that were there and maybe work with the snake a little bit. As an 11-foot snake, the snake turned around and made it very clear like, "Not today, pal, it's not going to happen."

Lex Fridman

Is it in the eyes, in the movement, in the tension of the body?

Paul Rosolie

It was the movement and the S of the neck. It was as if you pushed me -

Lex Fridman

[inaudible 00:07:51].

Paul Rosolie

And I went, "Let's go, make my day."

Lex Fridman

Yeah.

Paul Rosolie

Like he just looked a little bit too -

Lex Fridman

Yeah.

Paul Rosolie

Too ready. He was like, "I love this."

Lex Fridman

Okay, alright. So you know.

Paul Rosolie

You just know, whereas like the snake you met last night.

Lex Fridman

Yeah, beautiful snake.

Paul Rosolie

Such a calm little thing, he just focuses on eating baby lizards and little snails and things. And that snake has no concept of defending itself, it has no way to defend itself. So even something the size of a blue jay, could just come and just pa, pa, pa, peck that thing in the head and swallow it and it's a helpless little snake. So it kind of depends on the animal, it depends on the mood you catch them in, each one has a different temperament.

Lex Fridman

The grace of its movement was mesmerizing, curious almost. Maybe I'm anthropomorphizing, projecting onto it, but it was -

Paul Rosolie

The tongue flicking was a sign of curiosity, it was trying to figure out what was going on. It was like, "Why am I on this treadmill of human skin?" They're just trying to get to the next thing, trying to get hidden, trying to get away from the light.

Lex Fridman

Also, the texture of the scales was really fascinating, I mean, it's my first -

Paul Rosolie

[inaudible 00:08:45].

Lex Fridman

It's the first snake I've ever touched, it's so interesting, it was just such an incredible system of muscles that are all interacting together to make that kind of movement work and all the texture of its skin of its scales. What do you love about snakes? From my first experience with a snake to all the thousands of experiences you had with snakes, what do you love about these creatures?

Paul Rosolie

I think, when you just spoke about it, that's the first snake you've met and it was a tiny little snake in the jungle and you spoke about it with so much light in your eyes. And I think that because we've been programmed to be scared of snakes, there's something wondrous that happens in our brain. Maybe it's just this joy of discovery that there's nothing to be scared of. And whether it's a rattlesnake that is dangerous and that you need to give distance to, but you look at it from a distance and you go, "Whoa." Or it's a harmless little grass snake that you can pick up and enjoy and give to a child. They're just these strange legless animals that just exist, they don't even have eyelids, they're so different than us. They have a tongue that senses the air, and they, to me, are so beautiful. And I've, my whole life, been defending snakes from humans and they seem misunderstood, I think they're incredibly beautiful. There's every color and variety of snakes, there's venomous snakes, there's tree snakes, there's huge, crushing anacondas, it's just... Of the 2,600 species of snakes that exist on Earth, there's just such beauty, such complexity and such simplicity. To me, I feel like I'm friend with snake and -

Lex Fridman

Okay.

Paul Rosolie

They rely on me to protect them from my people.

Lex Fridman

Friend with snake.

Paul Rosolie

Me friend snake.

Lex Fridman

Me friend snake. You said some of them are sometimes aggressive, some of them are peaceful. Is this a mood thing, a personality thing, a species thing? What is it?

Paul Rosolie

So as far as I know, there's only really two snakes on Earth that could be aggressive, because aggression indicates offense. And so a reticulated python has been documented

as eating humans, anacondas, although while it hasn't been publicized, they have eaten humans. Every single other snake, from boa constrictor, to bushmaster, to spitting cobra, to grass snake, to garter snake, to everything else, every single other snake does not want to interact with you. They have no interest. So there's no such thing as an aggressive snake once you get outside of an anaconda and reticulated python. Aggression, could be trying to eat you, that's predation, but for every other snake, a rattlesnake, if it was there, would either go escape and hide itself or it would rattle its tail and tell us, "Don't come closer." A cobra will hood up and begin to hiss and say, "Don't approach me, I'm asking you nicely, not to mess with me." And most other snakes are fast or they stay in the trees or they're extremely camouflage, but their whole MO is just, "Don't bother me. I don't want to be seen, I don't want to be messed with. In fact, all I want to do is be left alone and once in a while I just want to eat." And by the way, when you see a snake drink, your heart will break. It's the only thing that's cuter than a puppy, like watching a snake touch its mouth to water and you just see that little mouth going as they suck water in. And it's just so adorable watching this scaled animal just be like, "I need water."

Lex Fridman

In a state of vulnerability.

Paul Rosolie

Yeah, yeah.

Lex Fridman

But bro, there's nothing cuter than a little puppy with a tongue like slurp, slurp.

Paul Rosolie

A baby ball python.

Lex Fridman

Alright.

Paul Rosolie

Baby king cobra, man.

Lex Fridman

It's a take your -

Paul Rosolie

Baby elephant.

Lex Fridman

So what, they're like at a puddle and they just take it in?

Paul Rosolie

They can be at a puddle and they just take it in. Or one time in India, I was with a snake rescuer and we found this nine-foot king cobra, this God of a snake.

Lex Fridman

Oh, yeah.

Paul Rosolie

Ophiophagus hannah, is their Latin name and they're snake eaters, they're the king of the snakes, the largest venomous snake. And the people that called the snake rescuer, 'cause that's a profession in India, it had gotten into their kitchen or their backyard. And so we showed up and we got the snake and the snake rescuer, he knew, he looked at the snake and he went, to me, he said, "Why do you think the snake would go in a house?" And he was quizzing me. And I actually went, "I don't know, is it warm? Is it cold? Like sometimes cats like to go into the warm cars, in the winter." And he was like, "It's thirsty." He goes, "Watch this." And he took a water bottle, poured it over the, now, the snake is standing up. The snake stands up three-feet tall, this is a huge king cobra with a hood, terrifying snake to be around. He leans over to the snake and the snake is standing there trusting him. And he takes a water bottle and pours it onto the snake's nose and the snake turns up its nose and just starts drinking from the water bottle. Human giving water to snake, big scary snake, but this human understood, snake gets water, snake gets released in jungle, everybody is okay.

Lex Fridman

Okay, so sometimes the needs are simple, they just don't have the words to communicate them to us humans.

Paul Rosolie

Yeah.

Lex Fridman

And is it disinterest or is it fear, almost like they don't notice this? Or is it, we're a source, the unknown aspect of it, the uncertainty, is a source of danger?

Paul Rosolie

Well, animals live in a constant state of danger. Like if you look at that deer that we saw last night, it's -

Lex Fridman

Yeah.

Paul Rosolie

Stalking through the jungle wondering what's going to eat it, wondering if this is the last moment it's going to be alive. And it's like animals are constantly terrified of, that this is their last moment.

Lex Fridman

Oh, yeah, just for the listener. We're walking through the jungle late at night, and so it's darkness except our headlamps on and then all of a sudden Paul stops, he's like, "Shh." And he looks in the distance and he sees two eyes, I think you thought, "Is that a jaguar or is that a deer?" And it was moving its head like this.

Paul Rosolie

Uh-huh.

Lex Fridman

Like scared or maybe trying to localize itself, trying to figure out -

Paul Rosolie

Trying to see around the -

Lex Fridman

You're doing the same to it.

Paul Rosolie

Yeah.

Lex Fridman

The two of you like moving your head.

Paul Rosolie

Yeah.

Lex Fridman

And like deep into the jungle, like I don't know -

Paul Rosolie

Yeah.

Lex Fridman

It's pretty far away, through the trees you could still see it.

Paul Rosolie

Yeah.

Lex Fridman

That's fascinating.

Paul Rosolie

30-feet or so, yeah.

Lex Fridman

That's the thing to actually mention, I mean, with the headlamp, you see the reflection in their eyes.

Paul Rosolie

Yeah.

Lex Fridman

It's kind of incredible -

Paul Rosolie

Yes.

Lex Fridman

To see a creature, to try to identify a creature by just the reflection from its eyes.

Paul Rosolie

Yeah. And so the cats, sometimes, you'll get like a greenish or a bluish glow from the cats. The deer are usually white to orange, caiman, orange, nightjars, orange, snakes can usually be like orange, moths, spiders, sparkle. And so as you walk through the jungle, you can see all these different eyes. And when something large looks at you like that deer did, your first thing is, what animal is this that I am staring back at? Because through the light you see the bright light off the leaves. And I couldn't tell at first, because that actually, those big bright eyes, it could have been an ocelot, could have been a jaguar, could have been a deer. And then when it did this movement, that's what the cats do, they try to see around your light. I thought maybe Lex Fridman's here, we're going to get lucky, it's going to be a jag right off trail.

Lex Fridman

Your definition of lucky is a complicated one.

Paul Rosolie

Yeah.

Lex Fridman

It's a fascinating process when you see those two eyes trying to figure out what it is and it is trying to figure out what you are, that process. Let's talk about caiman.

Paul Rosolie

Sure.

Lex Fridman

We've seen a lot of different kinds of sizes, we've seen a baby one, a bigger one. Tell me about these 16-foot plus, apex predators of the Amazon rainforest.

Paul Rosolie

The big bad black caiman, which is the largest reptilian predator in the Amazon except for the Anaconda, they kind of both share that notch of apex predator. They were actually hunted to endangered species level in the seventies, 'cause they're leather, black scale leather. But they're coming back, they're coming back and they're huge and they're beautiful. And I was walking near a lake and I never understood how big they could get except for, I was walking near a lake last year and I was following the stream. And it's like when you're following a little stream and there's just a little trickle of water, and all of a sudden this river otter had been running the other direction on the stream. River otter comes up to me and I swear to God, this animal looked at me and went, "Hey," and I went, "Hey." And he was like, "Didn't expect to see me there." And he turned around, he like did a little spin, started running down the stream, then he turned around and you could tell he was like, "Let's go." And I'm not anthropomorphizing here, the animal was asking me to come with him. So I followed the river otter down the stream and we started running down the stream and the river otter looks at me one more time, is like, "Yo," jumps into the lake. And I'm like, "What does he want me to see?" Now, in the lake, there's river otters doing dives and freaking out and going up and down and up and down, and they're very excited, they're screaming, they're screeching. All of a sudden, and I've never seen anything like this except for in like Game of Thrones. This croc head comes flying out of the water, all of the river otters were attacking this huge black caiman, 16-feet -

Lex Fridman

Wow.

Paul Rosolie

Head, half the size of this table. And she was thrashing her tail around creating these huge waves in the water, trying to catch an otter, and they're so fast.

Lex Fridman

Yeah.

Paul Rosolie

That they were zipping around her, biting her, and then going around. And this otter, swear to God, inter-species, looked at me and went, "Watch this. We're fucking with this caiman."

Lex Fridman

Yeah.

Paul Rosolie

It was amazing. And for the first time, I got to stand there watching this incredible inter-species fight happening. They weren't trying to kill the caiman, they were just trying to mess with it. And the caiman was doing his best to try and kill these otters. And they were just having a good time in that sick sort of hyper-intelligent animal, like wolf sort of way, where they were just going, "You can't catch us."

Lex Fridman

Yeah, like intelligence and agility versus raw power and dominance. I mean, I got to handle some smaller caiman and just the power they had. You scale that up to imagine what a 16-foot, or even a 10-foot, any kind of black caiman, the kind of power -

Paul Rosolie

Yeah.

Lex Fridman

They deliver. Maybe, can you talk to that, like the power they can generate with their tail, with their neck, with their jaw?

Paul Rosolie

Yeah. Alligators and caiman and crocodiles have some of the strongest bite forces on Earth, think a saltwater crocodile wins, as the strongest bite force on Earth. And you got to hold about a foot, was it a four-foot spectacled caiman? And you got to feel, I mean, you're a black belt in jiu-jitsu. How do you compare the explosive force you felt from that animal compared to what a human can generate?

Lex Fridman

It's difficult to describe in words, there was a lot of power. And we're talking about the power of the neck, like the, what is it? I mean, there's a lot, it could generate power all up and down the body, so probably the tail is a monster, but just the neck. And not to mention the power of the bite, that, and the speed too. Because the thing I saw and got to experience is, how still and calm, at least from my amateur -

Paul Rosolie

Yeah.

Lex Fridman

Perspective, it seems calm, still. And then from that, sort of zero to 60, could just -

Paul Rosolie

[inaudible 00:19:36].

Lex Fridman

Just go wild.

Paul Rosolie

Just thrashing.

Lex Fridman

And then there's also a decision it makes in that split second, whether, as it thrashes, is it going to kind of bite you on the way or not?

Paul Rosolie

And that's where, of the four species of caiman that we have here, you see differences in their personalities as a species.

Lex Fridman

Yeah.

Paul Rosolie

And so you can like, just like you know, like generally, golden retrievers are viewed as a friendly dog, generally, not every single one of them, but as a rule. Spectacled caiman, puppies, you released one in the river and it did nothing, didn't bite one of your fingers, it just swam away. We dropped one in the river, and what did it do? It chose peace. Now, I had a smooth-fronted caiman a few weeks ago, and this was probably about a three-and-a-half footer. Not big enough to kill you, but very much big enough to grab one of your fingers and just shake it off your body, just death roll it, right off. And as I was being careful, totally different caiman than the one that you got to see, this one has spikes coming off it, they're like leftover dinosaurs. It's like they evolved during the dinosaur times and never changed. They have spikes and bony plates and all kinds of strange growths that you don't see on the other smoother caiman. And I tried to release this one without getting bitten and I threw it into the stream, gently into the water, just went waa, and tried to pull my hands back. And as I pulled my hand back, this caiman, in the air, turned around and just tried to give me one parting blow and just got one tooth whack, right to the bone of my finger. And a bone injury feels different than a skin injury, so you instantly go, "ou." And it just reminds you of, that's a caiman with a head this big and it hurt and I know that it could have taken off my finger. Now, if you scale that up to a black caiman, it's rib crushing, it's zebra-head removing size, just meat destroying. It's nature's metal, sort of just raw power.

Lex Fridman

So what's the biggest croc you've been able to handle?

Paul Rosolie

We were doing caiman surveys for years, and we would go out at night and you want to figure out what are the populations of black caiman, spectacled caiman, smooth-fronted caiman, dwarf caiman. And the only way to see which caiman you're dealing with is to catch it. Because a lot of times you get up close with the light and you can see the eyes at night, but you can't quite see what species it is. For instance, this past few months, we found two baby black caiman on the river, which is unprecedented here, we haven't seen that in decades. So it's important that we monitor our croc population. So I started catching small ones, in Mother of God, I write about the first one that me and JJ caught together, which was probably a little bigger than this table. And probably mid-twenties bravado and competition with other young males of my species, led to me trying to go as big as I could. And I jumped on a spectacled caiman that was slightly longer than I am, and I'm 59. So I jumped on this, probably, six-foot croc, and quickly realized that my hands couldn't get around its neck and my legs were wrapped around the base of its tail. And the thrash was so intense, that as it took me one side, I barely had enough time to realize what was happening, before it beat me against the ground. My headlamp came off, so now I'm blind, in the dark, laying in a river, in the Amazon rainforest, hugging a six-foot crocodile. And I went, "JJ," as I always do. But in that moment, before I even let go, I knew I couldn't let go of the croc, because if I let go of the croc, I thought she was going to destroy my face. So I said, okay, now I'm stuck here, if I just stay here, I can't release her, I need help. But I was like, I'm never ever, ever, ever going to try and -

Lex Fridman

Yeah.

Paul Rosolie

Solo catch a croc this big again. I knew in that moment, I was like, this is good enough.

Lex Fridman

So anything longer than you.

Paul Rosolie

Nah.

Lex Fridman

You don't control the tail, you don't -

Paul Rosolie

No, I -

Lex Fridman

You have barely control of anything, really.

Paul Rosolie

Yeah. And that's a spectacled caiman.

Lex Fridman

Yeah.

Paul Rosolie

A black caiman is a whole other order of magnitude there. It's like saying like, "Oh, I was play fighting with my golden retriever versus I was play fighting with like," what's the biggest, scariest dog you could think of? The dog from Sandlot, a giant gorilla dog-thing, like a malamute, something huge. What are they called? Mastiffs.

Lex Fridman

Yeah. Mastiffs.

Paul Rosolie

Mastiffs.

Lex Fridman

I mean, you mentioned dinosaurs, what do you admire about black caiman? They've been here for a very, very long time, there's something prehistoric about their appearance, about their way of being, about their presence in this jungle.

Paul Rosolie

With crocodiles, you're looking at this mega survivor, they're in a class with sharks, where it's like they've been here so long. When you talk about multiple extinctions, you talk about the sixth extinction, Earth's going through all this stuff, the crocodiles and the cockroaches have seen it all before. They're like, "Man, we remember what that comet looked like." And they're not impressed.

Lex Fridman

Yeah, they carry this wisdom.

Paul Rosolie

Yeah.

Lex Fridman

In their power.

Paul Rosolie

Yeah.

Lex Fridman

In the simplicity of their power, they carry the wisdom.

Paul Rosolie

Yeah. And they're just sitting there in the streams and they don't care. And even if there's a nuclear holocaust, you know that there would just be some crocs sitting there, dead-eyed, in that stagnant water, waiting for the life to regenerate so they could eat again.

Lex Fridman

It's going to be the remaining humans versus the crocs and the cockroaches, and the cockroaches are just background noise.

Paul Rosolie

Yeah, they'll always be there. Sons of bitches.

Lex Fridman

We were talking about individual black caiman and caiman and different species of caiman. But whenever they're together and you see multiple eyes, which I'd gotten to experience, it's quite a feeling. There's just multiple eyes looking back at you. Of course, for you, that's immediate excitement, you immediately go towards that. You want to see it, you want to explore it, maybe catch them, analyze what the species is, all that kind of stuff.

Paul Rosolie

Yeah.

Lex Fridman

Can you just describe that feeling, when they're together and they're looking at you, sort of head above water, eyes reflecting the light?

Paul Rosolie

Yeah. So the other night, Lex and I were in the river with JJ, surviving a thunderstorm. We were in the rain and we had covered our equipment with our boats and the only thing that we could do was get in the river to keep ourselves dry. And so we were in the river, at night, in the dark, no stars, just a little bit of canopy silhouetted, with all this rain coming down, it was such a din, you could hardly hear anything. And all the way down river, I just see this caiman eye in my headlamp light, and I started walking towards it because I was like, "This is even better. We can catch a caiman while we're in this thunderstorm in the Amazon River." And when JJ went, "Paul, it's too far." JJ very rarely, like he'll make a suggestion, he'll usually

go like, "Maybe it's far." But in that situation, deep in the wilderness, unknown caiman size, he went, "Paul, it's too far, don't leave the three of us right now."

Lex Fridman

Yeah.

Paul Rosolie

We were too far out to take risks.

Lex Fridman

Yeah.

Paul Rosolie

We're too far out to be walking along the riverbed at night. Because then, right here at the research station, if you step on a stingray, you get evac'd, out where we went, nothing. So for me, seeing those eyes, I think I've become so comfortable with so many of these animals that I may have crossed into the territory where I feel so comfortable with many of these animals that they just don't worry me anymore. I mean, I looked at you in a raft, while you had a sizable, probably, about 12-foot black caiman right next to your raft. I watched its head go under.

Lex Fridman

The bubbles.

Paul Rosolie

The bubbles, it was all coming up right next to your raft, as he was just moving along the bottom of the river. 'Cause he looked at me, went under, and then my raft passed and yours came over him. So now, I'm looking back and your raft is going over this black caiman and I'm going, "I'm not worried at all." I was not worried. I was not worried that the caiman would freak out, I was not worried that he would try to attack you. I knew, a hundred percent, that caiman just wanted us to go, so he could go back to eating fish.

Lex Fridman

Yeah.

Paul Rosolie

That's it.

Lex Fridman

Man, it's humbling. It's humbling, these giant creatures. And especially at night like you were talking about. And for me, it's both scary and just beautiful when the head goes under, because underwater, it's their domain, so anything can happen. So what is it doing that its

head has gone under? It could be bored, it could be hungry, looking for some fish, it could be, maybe, wanting to come closer to you to investigate. Maybe you have some food around you, maybe it's an old friend of yours and he just wants to say, "Hi," I don't know.

Paul Rosolie

I have a few on the river, old friends.

Lex Fridman

Okay.

Paul Rosolie

No, when we see their heads go under, they're just getting out of the way. We're shining a light at them and they're going, "Why is there a light at night? I'm uncomfortable." Head under. So these caiman, again, you think of it as this big aggressive animal, but I don't know anybody that's been eaten by a black caiman. And the smaller species, smooth-fronted caiman, dwarf caiman, spectacled caiman, they're not going to eat anybody, again, at the worst, if you were doing something inappropriate with a caiman, like you jumped on it and were trying to do research and it bit your hand, it could take your hand off. But that's the only time, I've been walking down the river and stepped on a caiman and the caiman just swims away. And so in my mind, caiman are just these, they're peaceful dragons that sit on the side of the river. And so to me, they are my friends and I worry about them, because two months ago we were coming up river and on one of the beaches was a beautiful, about five-foot black caiman with a big machete cut right through the head. The whole caiman was wasted, nothing was eaten, but the caiman was dead.

Lex Fridman

Who do you think that was?

Paul Rosolie

Curious humans.

Lex Fridman

Just committing violence?

Paul Rosolie

Yeah, just loggers, people who aren't from this part of the Amazon, because a local person would either eat the animal or not mess with it. Like Pico would never kill a caiman for no reason, because it doesn't make any sense. So these are clearly people who aren't from the region, which usually means loggers, because they've come from somewhere else. They're doing a job here and they're just cleaning their pots in the river at night and they see eyes come near them, because the caiman probably smells fish. And then they just whack,

because they want to see it and they're just curious monkeys on a beach. And again, me friend of caiman, I protect from my type.

Lex Fridman

That said, you protect your friends and you analyze and study your friends, but sometimes friends can have a bit of a misunderstanding. And if you have a bit of a misunderstanding with a black caiman, I feel like just a bit of a misunderstanding could lead to a bone-crushing situation.

Paul Rosolie

But not for a little five-foot caiman.

Lex Fridman

Yeah.

Paul Rosolie

And I think that's incredibly speciesist of you.

Lex Fridman

About humans or about caiman?

Paul Rosolie

No, I'm saying -

Lex Fridman

Okay.

Paul Rosolie

Like all my friends do the same thing. They go, "You swim in the Amazon rainforest, you swim in that river." And I go, "Yes, every day." Backflips into the river, we've been swimming in the river how many times.

Lex Fridman

Yeah.

Paul Rosolie

With the piranha and the stingray and the candiru and the caiman and the anacondas, all of it, in the river, with us. And we just do it. And what's that for you? So what allows you to do that, knowing and having researched all the different things that can kill you, which I feel like most of them are in the river? What allows you to just get in there with us?

Lex Fridman

Well, I think it's something about you, where you become like this portal through which it's possible to see nature as not threatening but beautiful. And so in that, you kind of, naturally, by hanging out with you, I get to see the beauty of it. There is danger out there, well, the dangerous part of it, just like there's a lot of danger in the city, there's danger in life, there's a lot of ways to get hurt emotionally, physically. There's a lot of ways to die in the stupidest of ways. We went on an expedition through the forest, just twisting your ankle, breaking your foot, getting a bite from a thing that gets infected, there's a lot of ways to die and get hurt, in the stupidest of ways. In a non-dramatic, caiman eating you alive, kind of way.

Paul Rosolie

Yeah, it strikes me as unfair, because humans, we're still in our minds, so programmed to worry about that predator, that predator, that predator. What predator? We've killed everything. Black caimans are coming off the endangered species list, we exterminated wolves from North America. I actually heard a suburban lady one time, tell her son, "Watch out, foxes will get you." Foxes?

Lex Fridman

Yeah.

Paul Rosolie

They eat baby rabbits and mice.

Lex Fridman

Well, in the case of apex predators, I think when people say, "Dangerous animals," they really are talking about just the power of the animal. And the black caiman have a lot of power.

Paul Rosolie

A lot of power.

Lex Fridman

And so it's almost just a way to celebrate the power of the animal.

Paul Rosolie

Sure. And if it's in celebration, then I'm all for it, because my God, is that power. Like the waves of fury that you saw, like when that tail, I mean, you saw the tail of the spectacled, that perfect -

Lex Fridman

Yeah.

Paul Rosolie

Amazing thing, with all those interlocking scales that work -

Lex Fridman

Yeah.

Paul Rosolie

So it's like a perfect creation of engineering. And then when you have one that's this thick and all of a sudden that thing is moving with all the acceleration of that power, whoa, the volume of water, the sound that comes out of their throat, they're dragons.

Lex Fridman

We talked about the scales of the snake, with like the caiman, just the way it felt -

Paul Rosolie

Yeah.

Lex Fridman

Was incredible. Just the armor, the texture of it, was so cool.

Paul Rosolie

Yeah.

Lex Fridman

I don't know, like the bottom of the caiman has a certain kind of texture and it just all feels like power, but also all feels like designed really well. It's like exploring through touch, like a World War II tank or something like that, just -

Paul Rosolie

Yeah.

Lex Fridman

It's the engineering that went into this thing.

Paul Rosolie

Yeah.

Lex Fridman

That the mechanism of evolution that created a thing that could survive for such a long time, it's just incredible. This is a work of art, the defense mechanisms, the power of it, the damage it can do, how effective it is as a hunter, all of that. You could feel that just by touching it.

Paul Rosolie

Do you ever see the mashup where they put, side-by-side, the image of, I think it's a Falcon in flight, next to a stealth bomber and they're almost the exact same design. It's incredible, like that -

Lex Fridman

What's the equivalent for a croc? I don't know -

Paul Rosolie

Like you said, maybe a tank. Like -

Lex Fridman

Maybe a tank.

Paul Rosolie

But they're more like an armadillo, turtle.

Lex Fridman

Yeah.

Paul Rosolie

I don't know.

Lex Fridman

Like hippos and -

Paul Rosolie

Yeah, there may not be a war machine equivalent of a crocodile, it would've to have like a big jaw element to it.

Lex Fridman

In the water, I mean, we talked also about hippos. Those are interesting creatures from all the way across the world. Just monsters.

Paul Rosolie

Yeah.

Lex Fridman

Hippos and rhinos. Hippos are bigger, usually, or rhinos are bigger?

Paul Rosolie

Rhinos.

Lex Fridman

Yeah.

Paul Rosolie

Rhinos, after elephants, is the largest, white rhinos.

Lex Fridman

They can be terrifying too, again, when you step into the defense.

Paul Rosolie

Absolutely. But I have to tell you, after being around so many rhinos -

Lex Fridman

You have friend of mine?

Paul Rosolie

I have rhino friends.

Lex Fridman

Yeah.

Paul Rosolie

Black and white rhinos.

Lex Fridman

Yeah.

Paul Rosolie

And they're all sweethearts, and I mean -

Lex Fridman

Awesome.

Paul Rosolie

I mean, sweethearts. And I mean, when you look at a rhino, it's like a living dinosaur. I know it's a mammal, but somehow it's screams dinosaur, 'cause it seems like pleistocenic.

Lex Fridman

Yeah.

Paul Rosolie

And from another age, with the giant horn. And they're so much bigger than you think, like they're minivan-sized animals. We're not taller than they are at the shoulder. And they have this strange shaped head and the huge horn. ... at their shoulder, and they have the strange-shaped head and the huge horn, and they sit there eating grass all day. So if a rhino is dangerous to a human, it's because the rhino is going, "Don't hurt me. Don't hurt me. Don't hurt my baby." And then they're like, "You know what? I'll just kill you. It'll be easier, because you're scaring me right now." You're too close to that rhino. And so there again, I just think it's funny because humans, we're so quick to go, "Which snakes are aggressive?" Well, there are no aggressive snakes. "Rhinos can be dangerous." If provoked. Otherwise, they're peaceful, fat grass unicorns. They're really pretty calm. That we had these incredible giant animals and the largest animals on our planet, the black caiman, the rhinos, the elephants, all the big beautiful stuff is becoming less and less. And it almost reminds me, in Game of Thrones, they're like, "In the beginning," they're like, "there used to be dragons." And it was this memory, and it's like, we used to have mammoths, and we used to have stellar sea cows that were 16-feet-long manatees, and it's, there were things we used to have. The Caspian tiger that only went extinct in the '90s. Our lifetimes. And that's mind-blowing to me. That has haunted me since I'm a child. I remember learning about extinction and I went, "Wait, you're telling me that..." I remember being a kid and going, "By the time I grew up, you're saying that gorillas could be gone? Elephants could be gone? And because we're doing it? And then I remember looking at the nightlight being blurry because I was crying. I was so upset. And it was Lonesome George, that turtle, the Galapagos tortoise, where there was one left. And they said, "If we just had a female, he could live." And I as a six, seven, eight-year-old, that destroyed me.

Lex Fridman

We're all just trying to get laid, including that turtle.

Paul Rosolie

Including that turtle, for a few hundred years. Dude.

Lex Fridman

So for young people out there, you think you're having trouble, think about that turtle.

Paul Rosolie

Think about that turtle. Yeah. You know there's a turtle that Darwin and Steve Irwin both owned?

Lex Fridman

Yeah, I heard about that turtle. Man, they live a long time.

Paul Rosolie

Yeah.

Lex Fridman

They've seen things.

Paul Rosolie

They've seen things that, there's a great internet joke where they're accusing him of being incongruous with modern times. They're like, "He did nothing to stop slavery. He didn't fight in World War II."

Lex Fridman

Cancel the turtle.

Paul Rosolie

Yeah, cancel the turtle.

Lex Fridman

Oh, shit. What a world we live in. So it's interesting, you mentioned black caiman and anacondas are both apex predators. So it seems like the reason they can exist in similar environments is because they feed on slightly different things. How is it possible for them to coexist? I read that anacondas can eat caiman but not black caiman. How often do they come in conflict?

Paul Rosolie

So anacondas and caiman occupy the exact same niche, and they're born at almost the exact same size. And unlike most species, they don't have a size range that they're confined to. They start at this big, baby caiman are this big, baby anacondas are a little longer, but they're thinner and they don't have legs, so it's the same thing in terms of mass. And they're all in the streams or at the edges of lakes or swamps. And so the baby anacondas eat the baby caiman. Baby caiman can't really take down an anaconda. They're going for little insects and fish. They have quite a small mouth. Again, it's in their interest to hide from everything. A bird, a heron can eat a baby caiman, pop it back. And so they have to survive. But the anaconda and the caiman joust as they grow.

Lex Fridman

Can you actually explain how the anaconda would take down a caiman? Would it first use constriction and then eat it? Or what's the methodology?

Paul Rosolie

So anacondas have, I don't know, a three-point constriction system where their first thing is anchor. Something like jiu-jitsu. So the first thing is latch onto you.

Lex Fridman

I like how I'm writing this down like, "Alright, this is jiu-jitsu masterclass here."

Paul Rosolie

This is for when you're wrestling an anaconda, just in case.

Lex Fridman

And you'll be the coach in the sidelines screaming, "No, no, no..."

Paul Rosolie

"You got him, Lex!"

Lex Fridman

Yeah.

Paul Rosolie

"Don't let him take the back."

Lex Fridman

Yeah.

Paul Rosolie

Alright. So one time me and JJ were following a herd of collard peccary and JJ's teaching me tracking. So we're following the hoof prints through the mud, and we're doing this, and I'm talking about no backpacks, just machetes, bare feet, running through the jungle. And we come to this stream and JJ's like, "I think we missed him. I think they went." And I'm like, "No, no, no, they went here, look." And not because I'm a great tracker, because I can see a few dozen footprints, hundreds of individual footprints right there. And I'm going, "No, no, they just crossed here." And JJ was like, "You know what? We're not going to get eyes on them today." He was like, "It's okay." He's like, "We did good. We followed them for a long time." And I was like, "Cool." And then I was trying to gauge, "Can I drink this stream?" And I see a culpa. And a culpa is a salt deposit where animals come to feed because sodium is a deficiency that most herbivores have here. And all of a sudden I just hear like the sound of a wet stick snapping, just that bone crunch. And I looked down, and there's about a 16-foot anaconda wrapped around a freshly killed peccary. Wild boar. And what this anaconda had done was as all the pigs were going across the stream, the anaconda had grabbed it by the jaw, swiped the legs, wrapped around it, bent it in half, and then crushed it to ribs. And that's what the anaconda do, whether it's to mammals, to caiman, it's all the same thing. It's grab on, they have six rows of backwards-facing teeth, so once they hit you, they're never going to come off. You actually have to go deeper in and then open before you can come out. All those backward-facing teeth. So they have an incredible anchor system, and then they use their weight to pull you down to hell to pull you down into that water, wrap around you, and

then start breaking you. And every breath you take, you go, and you're up against a barrier. And then when you exhale, they go a little tighter and you're never going to get that space back. Your lungs are never going to expand again. And I know this because I've been in that crush, before JJ pulled me out of it. And so this pig, the anaconda had gotten it, and as the pig was thrashing and the anaconda was wrapping around it and bent it in half, and I just heard those vertebrae going. And so for a caiman, it's the same thing. They just grab them, they wrap around it, and then they have to crush it until there's no response. They'll wait an hour. They'll wait a long time until there's no response from the animal. They'll overpower it. Then they'll reposition, probably yawn a little bit, open their jaw, and then start forcing that entire... Now here's the crazy thing, is that an anaconda has stomach acid capable of digesting an entire crocodile where nothing comes out the other side. And when you see how thick the bony plate of a crocodile skull is, that that can go in the mouth and nothing comes out the other side, that's insane. And so it always made me wonder, on a chemistry level, how you can have such incredible acid in the stomach that doesn't harm the anaconda itself. And someone said that the mucus -

Lex Fridman

I thought it's able to digest - oh, it's some kind of mucus. Oh, the mucus, there's... Oh, interesting. There's levels of protection from the anaconda itself. But it seems like the anaconda is such a simple system as an organism.

Paul Rosolie

I know, but -

Lex Fridman

That simplicity, taken at scale, it can swallow a caiman and digest it slowly.

Paul Rosolie

I know, but my question was how on Earth is it physically possible to have this hellish bile that can digest anything, even something as horrendous as a caiman, scales and bones and all the hardest in nature, and then not hurt the snake itself. And I had a chemist explain to me that it's probably some sort of mucus system that lines the stomach and neutralizes the acid and keeps it floating in there, but my God, that must be powerful stuff.

Lex Fridman

What does it feel like being crushed, choked by anaconda?

Paul Rosolie

When an anaconda is wrapped around you and you find yourself in the shocking realization that these could be your last moments breathing, you are confronted with the vast disparity in power. That there is so much power in these animals, so much crushing, deliberate, reptilian, ancient power that doesn't care. They're just trying to get you to stop. They just

want you to stop ticking, and there's nothing you can do. And I find it very awe-inspiring when I encounter that kind of power. Even if it's that you see a dog run... You ever try to outrun a dog, and they just zip by you and you go, "Wow." Or you see a horse kick and you go, "Oh, my God, if that hoof hit anyone's head, it'd knock them three states over." And it's like there is muscular power that is so far, like you said, that explosive, that we dream of doing it. Imagine if a Muay Thai kickboxer could harness that caiman power, that smash. And so it's just awe-inspiring. I think it's really, really impressive what animals can do. And we're all the same makeup, for the most part. All the mammals, we all have, our skeletons look so similar, we all have... If you look like a kangaroo's biceps and chest, it looks so much like a man's, and same thing goes for a bear. Or you ever see a naked chimp?

Lex Fridman

Have I?

Paul Rosolie

There's chimps with alopecia.

Lex Fridman

Oh, shit. They're shredded. Yeah.

Paul Rosolie

And so it looks like a bodybuilder. It's got cuts and huge, huge everything. It's got pecs, and they got that face that's just like, "Just let me in."

Lex Fridman

"What now?"

Paul Rosolie

"Where's your wallet?"

Lex Fridman

"Do something." But yeah, but there's the specialization of a lifetime of doing damage to the world and using those muscles, it just makes you just that much more powerful than most humans because humans I guess have more brain, so they get lazy. They start puzzle-solving versus using the biceps directly.

Paul Rosolie

Well, yes and no. And I have this question. So that whole "you are what you eat" thing. Now, we one time here had two chickens. Now, one of them was a wild chicken from the farm, had walked around its whole life finding insects, and the other chicken was factory raised. And so we cut the heads off of both of them and started getting ready to cook them. Now, the factory-raised chicken was a much higher percentage of fat, had less muscle on its

body, was softer tissue, a lighter color. The farm raised chicken had darker, more sinewy muscles, less fat. It was clearly a better-made machine. And so my question is, is that what's happening with us? If you go see a Sherpa who's been walking his whole life and walking behind muskoxes and lifting things up mountains and breathing clean air and not being in the city, versus someone that's just been chowing down at IHOP for 40 years and never getting off the couch, I imagine it's the same thing, that you become what you eat.

Lex Fridman

Yeah. I mean, you and I, we're half dead running up a mountain. Meanwhile, there's a grandma just walking and she's been walking that road and she's just built different.

Paul Rosolie

With her alpaca on her shoulders.

Lex Fridman

With a baby. They're just built different, when you apply your body in the physical way your whole life.

Paul Rosolie

Yeah. You can't replicate that. Just like that chimp has those muscles from constantly moving through the canopy, constantly using those arms. Just like if you see an Olympic athlete or you hug Rogan.

Lex Fridman

Exactly the same.

Paul Rosolie

You just go, "Why is there so much muscle here?"

Lex Fridman

That's exactly what I feel like when you give him a hug. This is definitely a chimp of some sort. Just the constriction of anaconda, just the feeling of that, are they doing that based on instinct, or is there some brain stuff going on? Is this just a basic procedure that they're doing, and they just really don't give a damn? They're not like thinking, "Oh, Paul. This is this kind of species who tastes good," or is it just a mechanism just start activating and you can't stop it?

Paul Rosolie

With an anaconda, I really think it's the second one. I do think that they're impressive and beautiful and incredibly arcane. I think they're a very simple system, a very ancient system. And I think that once you hit predation mode, it's going down no matter what. This stupid mosquito, I'm going like this, and every time he just flies around my hand like I'm a big slow

giant, and he just goes around my hand and then he goes back to the same spot. And I'm like, "No," and then he comes right back to the same spot. It's like he's just going, "Fuck you."

Lex Fridman

Here's the question. If the mosquito is stupid and you can't catch it, what does that make you?

Paul Rosolie

Fucking stupid. Dude, I flicked a wasp off me the other day, it flew back like 12 feet, and then in the air, corrected, and then flew back at my face. It made so many calculations and corrections and decided to come back and let me know about it. And I was like, "Shit."

Lex Fridman

And that wasp probably went back to the nest, said, "Guess what happened today?"

Paul Rosolie

"This bitch-ass kid from Brooklyn tried to flick me and I showed him what's up. I had him running."

Lex Fridman

They had a good chuckle on that one. You actually mentioned to me, just on the topic of anacondas, that you've been participating in a lot of scientific work on the topic. So really, in everything you've been doing here, you are celebrating the animals, you're respecting the animals, you're protecting the animals, but you're also excited about studying the animals in their environment. So you're actually a co-author on a paper, on a couple of papers, but one of them is on anacondas and studying green anaconda hunting patterns. What's that about?

Paul Rosolie

So the lead authors of that paper, Pat Champagne and Carter Payne, are friends of mine, and what we started noticing, for me began at that story I told you where we were coming across the stream and we saw the anaconda had been positioned just below a culpa. And then other people began noticing that anaconda seemed to always be beneath these culpas where mammals were going to be coming. And that contrasted with what we knew about anacondas. Because what we understood about anacondas that they're purely ambush predators and they don't pursue their prey. But what we began finding out here, and Pat led the process of amazing scientists, he worked with Acadia University for a long time, worked with us for a long time, and he was one of the first to put a transmitter in an anaconda right around here, and we were able to see their movements. And that's what these papers are showing is that they actually do pursue their prey. They do move up and down using the streams as corridors through the forest. They actually do pursue their prey, they actually do seek out food. I mean, think about it. It's a giant anaconda. Obviously, it can't just sit in one spot. It has to put some work into it. And so they're using scent and they're using

communication to use the streams. So you could be walking in the forest in a very shallow stream And see a sizable anaconda looking for a meal.

Lex Fridman

So in the shallow stream, it moves not just in the water but in the sand.

Paul Rosolie

Yeah.

Lex Fridman

So it also likes to burrow a little bit?

Paul Rosolie

They burrow quite a bit. And so these large snakes operate subterranean more than we think.

Lex Fridman

Interesting.

Paul Rosolie

There's times that you'll go with a tracker, you go with the telemetry set and it'll say, "Tu tu tu tu tu," we'll be over the snake. Snake's underground. Snake has found either a recess under the sides of the stream, you saw it last night, where all the fish have their holes under the side of the stream. There was a six-foot dwarf caiman right in the stream, right where we were standing, and he had his cave. He goes under there. They know. They have their system.

Lex Fridman

We walked by it.

Paul Rosolie

We walked by it. And he stuck his head out because he thought we'd gone. And then we turned around and I just got a glimpse of him because I was in the front of the line, and he just went right back into his cave. "You guys are not going to touch me." And so yeah, with the anacondas, it's been really exciting. And in 2014, JJ and me and Mohsen and Pat and Lee, we ended up catching what at the time was the record for *Eunectes Marinus* scientifically measured. It was 18 feet six inches, 220 pounds, one of the largest female anacondas on record. And since that time, these guys have been continuing to study the species, continuing to just, again, just add a little bit by little bit to the knowledge we have of the species. And studying green anacondas in lowland tropical rainforest, you've seen how hard it is to move, to operate, to navigate in this environment. And so when you think of the fact that in order to learn anything about this species, you have to spend vast amounts

of time first locating them, and then finding out a way to keep tabs on them, even if you get lucky enough to see an anaconda by the edge of a stream. To be able to observe it over time, to learn its habits or to put a radio transmitter on it or to take any sort of valuable information from the experience is almost impossible. And so a lot of the stuff that I wrote about in Mother of God, us jumping on anacondas and trying to catch them, and at first it just seemed like something we were doing to just try and see them. But it ended up being that we were wildly trying to figure out methodology that would have scientific implications later on, because now it's allowing us to try and find the largest anacondas. And people used to say, "There's no way there's 25-foot, 27-foot." Well, there's just that video of the guy swimming with the twenty-foot anaconda. And so now as we keep going, I'm going, "Well, maybe through drone identification, we could find where the largest anacondas are sitting on top of floating vegetation. And even then, how do we restrain them so that we could measure them and prove this to the world? It's a side quest, but -

Lex Fridman

So by doing these kinds of studies, you figure out how they move about the world, what motivates them in terms of when they hunt, where they hide in the world as the size of the anaconda changes, so all of that, those are scientific studies?

Paul Rosolie

Yeah. I mean, look, there's so much that we don't know about this forest. We don't know what medicines are in this forest. We don't know. With a lot of the 1,500, there's something like 4,000 species of butterflies in the Amazon rainforest. And of the 1,500 species that are here in this region, all of them have a larval stage, caterpillars. And each of the caterpillars has a specific host plant that they need to eat in order to become a successful butterfly, to enter the next life cycle. And for most of the species that fill the butterfly book, we don't know what those interactions are. I recently got to see the white witch, which is a huge moth. It's one of the two largest moths in the world. It's the largest moth by wingspan.

Lex Fridman

Wow.

Paul Rosolie

Huge. It looks like a bird. Big white moth. I believe that we still don't know what the caterpillar looks like. It's 2024. We have iPhones and penis-shaped rocket ships. We don't know where that moth starts its life. We still haven't figured that out.

Lex Fridman

By the way, the rocket ships are shaped that way for efficiency purposes, not because they wanted to make it look like a penis. Speaking of which, I have ran across a lot of penis trees while exploring, and they make me -

Paul Rosolie

Have you?

Lex Fridman

I know it's not just a figment of my imagination. I'm pretty sure they're real. In fact, you explained it to me, and they make me very uncomfortable because there's just a lot of penises hanging off of a tree.

Paul Rosolie

Yes.

Lex Fridman

I don't know what the purpose is. I don't know who they're supposed to attract, but certainly, Paul really enjoys them.

Paul Rosolie

Yeah. Yeah. Well, clearly you've done some research and you've noticed a lot of them. I haven't even seen them.

Lex Fridman

There was a time when I almost fell, and to catch my balance, I had to grab one of the penises of the penis tree and, unforgettable. Anaconda, the biggest, baddest anaconda in the Amazon versus the biggest, baddest black caiman. Because you mentioned there, there's a race. If there's a fight, the UFC in a cage, who wins? Underwater.

Paul Rosolie

This is the biggest and the baddest?

Lex Fridman

The biggest and the baddest that you can imagine given all the studies you've done of the two animals. Species.

Paul Rosolie

The biggest and the baddest. You're talking about an 18-foot, several-hundred-pound black caiman versus a 26-foot, 350-pound anaconda.

Lex Fridman

Yeah.

Paul Rosolie

I think it's a death stalemate. I think the caiman slams the anaconda, bites onto it, the anaconda wraps the caiman, and then they both thrash around until they both kill each other. Because I think the caiman will tear him up so bad -

Lex Fridman

And the caiman is not going to let go. He's going to get back -

Paul Rosolie

The caiman is never going to let go, but then he's going to realize that he's also being constricted, so then he's going to stop and he's going to keep slamming down on that anaconda, and the anaconda is just going to keep constricting. But if the caiman can do enough damage before the anaconda... Again, it's almost like a striker versus a jiu-jitsu. If you can get enough elbows in before they lock you -

Lex Fridman

How fast is the constriction? So it's pretty slow.

Paul Rosolie

No, it's incredibly quick. So it's you take the back and get me in chokehold, it's that. It's I have maybe 30 seconds, maybe, on the upward side, if you haven't cinched it under my throat. But if you've gotten good position, it's over.

Lex Fridman

Is there any way to unwrap a choke, undo the choke, defending -

Paul Rosolie

No. Not unless you have outside help. Unless you have another human or another 10 humans coming to unwrap the tail help you. But for an animal, like if a deer gets hit by an anaconda, there's no way. They don't stand a chance.

Lex Fridman

So the black caiman would bite somewhere close to the head and just try to hold on and thrash.

Paul Rosolie

Here's the thing, every fisherman knows this, the biggest fish, they're smart. And more importantly, they're shrewd. They're careful. A huge black caiman that's 16 feet long isn't going to be messing with a big anaconda. They won't cross paths. Because while they technically occupy the same type of environment, that black caiman is going to have this deep spot in a lake and that anaconda is going to have found this floating forest black stream backwater where it's going to be, and they'll have made that their home for decades,

and they'll already have cleaned out the competition. So maybe if there was a flood and they got pushed together, they could have some sort of a showdown, but almost more certainly is that when they get to that size, that caiman, at any sign of danger, boom, right under the water. It's like what do you learn when you're a black belt? What do you do with a street fight? You still run away. There's no reason for a street fight. And I think the animals really understand that. There's no reason for this.

Lex Fridman

So a giant anaconda and a giant black caiman, they could probably even coexist in the same environment just knowing, using the wisdom to avoid the fight.

Paul Rosolie

Yeah. Or they would have a big showdown and one of them would either die or have to leave. They would have a territorial dispute.

Lex Fridman

Yeah. Without killing either of them.

Paul Rosolie

Dude, nature. Anything could happen. One of the things that me and Pat wrote up was that I saw a yellow-tailed cribo, which is like a six-foot rat snake eating an oxyrhopus melanogenys, which is the red snake that we found last night. And just, no one had ever, in scientific literature, we'd never seen a cribo eating an oxyrhopus before. And so I had the observation in the field, I sent it to Pat Champagne, Pat writes it up, paper. That's a really cool system, because we're just out here all the time, you end up seeing things. JJ's dad saw an anaconda eating a tapir. Tapir's the size of a cow.

Lex Fridman

Damn.

Paul Rosolie

And that guy didn't lie. Some people, you trust your sources on that. He saw enough stuff, he didn't need to make up stories. And you know what I love now is when you ask people, when we were going up the mountain with Jimmy, JJ said to him, he goes, "Have, you ever seen a puma up here in the mountains?" And Jimmy goes, "They're up here." And JJ went, "No, no, no, have you seen it?" And Jimmy went, "No, never seen one." And you know how most people will go, "Yeah, yeah, yeah, I've seen it." That makes me trust the person when they admit, "No, I haven't seen it."

Lex Fridman

"They're up here. I haven't seen it." And Jimmy has been living there his whole life.

Paul Rosolie

His whole life.

Lex Fridman

There's pumas in the mountains?

Paul Rosolie

Mountain lions, pumas, whatever the... There's all different names for them. They're distributed from, I think from Alaska down through Argentina. They're everywhere. It's extremely successful species. From deserts to high mountains, everything.

Lex Fridman

I think you're saying pumas have a curiosity, have a way about them where they explore, follow people, just to kind of figure out... Just that curiosity as opposed to causing harm or hunting and that kind of stuff. What is this about?

Paul Rosolie

I think it's based in predatory instincts, but I also think there is a playfulness to higher intelligence animals that you don't see in lower intelligence animals. And so something like a rabbit, for instance, you're never going to see a rabbit come in to check you out. You can't even think of it like that. A rabbit is just going to either eat or run away. There's really two settings. When you think of something like a giant river otter or a tayra, which is, they call it manco here, it's a huge arboreal weasel, and they'll come check you out. I woke up at my house the other day and there was a tayra climbing up the side of the house, and he was looking down at me sleeping. And it's like he came to check me out. It's like they're smart enough and they're brave enough, here's the important thing, they know that they can fend for themselves, they can fight, they can climb, they can run. And so they're like, "I'm curious. I got time, let me check this out."

Lex Fridman

Yeah, they're gathering information. I wonder how complex and sophisticated their world model is, how they're integrating all the information about the environment, like where all the different trees are, where all the different nests of the different insects are, what the different creatures are by size, all that kind of stuff. I'm sure they don't have enough storage up there to keep all that, but they probably keep the important stuff, to integrate the experiences they have into what is dangerous, what is tasty, all that kind of stuff.

Paul Rosolie

I think it's more complex than we realize. You go back to that Frans de Waal book, Are We Smart Enough to Know How Smart Animals Are? There's so many incredible examples of controlled studies where the researchers weren't understanding how to shed being so insurmountably human and understand that there are other types of intelligence. And

whether that's elephants or cats. So big cats, for instance, we just saw a camera trap video from last night where you see one of our workers walk down the trail, and then five minutes later a cat behind him.

Lex Fridman

By the way, we were walking just exactly the same area, also exact same time. Yeah.

Paul Rosolie

Yeah. So we're out there and there's deer and there's cats, and there's a jaguar and there's a puma, and there's all these animals out there, and we're out in the night in the inky black night in this ocean of darkness beneath the trees, and we're just exploring and getting to see everything, and there's all these little eyes and heartbeats. I love the jungle at night, man. It's the most exciting thing.

Lex Fridman

One of the things you do when you turn off the headlamp, complete darkness all around you, and just the sounds.

Paul Rosolie

Everything you hear, the cicadas, the birds, they're all screaming about sex all the time, so they're just trying to get laid. So all of them are making mating calls. Now, the trick is to make your mating call without attracting a predator. But at night, what amazes me is that for us, it's so... From the caveman logic of, it's hard to make fire here, it's hard to even light a fire here, to having this incredible beam of, all of a sudden we can look at the jungle and walk through that darkness. Then we're seeing the frogs on those leaves, and the snakes moving through the undergrowth, and the deer sneaking through the shadows. It's almost as supernatural as skydiving. It's a strange thing to be able to do that technology allows us to do. We're doing something really complex, and we're walking on trails that have been cleared for us, that we've planned out. And so walking through the jungle at night, you just get this freak show of biodiversity, and I'm addicted to it. I truly love it.

Lex Fridman

Except for the times over the last few days when we walked through jungle without a trail, and that's just a different experience.

Paul Rosolie

Well, how would you categorize if somebody said, "Lex, I think I'm going to go for a hike through the jungle, not on the trail," what would you tell them?

Lex Fridman

Every step is really hard work. Every step is a puzzle. Every step is a full of possibility of hurting yourself in a multitude of ways. A wasp nest under a leaf, a hole under a leaf on the

ground where if you step into it, you're going to break a knee, ankle, leg, and going to not be able to move for a long time. There's all kinds of ants that can hurt you a little or can hurt you a lot. Bullet ants. There's snakes and spiders and... Oh, my favorite that I've gotten to know intimately is different plants with different defensive mechanisms, one of which is just spikes, so sharp. I don't know if you brought it, but there's -

Paul Rosolie

I didn't bring it. I didn't bring it.

Lex Fridman

Where's my club? There's an epic club with spikes. But there's so many trees that have spikes on them. Sometimes they're obvious spikes, sometimes less than obvious spikes, and it could be just an innocent, as you take a step through a dense jungle, it could be an innocent placing of a hand on that tree that could just completely transform your experience, your life, by penetrating your hand with like 20, 30, 40, 50 spikes and just changing everything. That's just a completely different experience than going on a trail where you are observer of the jungle versus the participant of it.

Paul Rosolie

Yeah.

Lex Fridman

And it truly is extreme hard work to take every single step.

Paul Rosolie

Now, just think about this, I think scientifically, because people like to summarize, people like to get really, really cavalier with our scientific progress, and they go, "We've already explored the Amazon." It's like, well have we? Because in between each tributary is, let's say just between some of them, let's just say a hundred miles of unbroken forest. Who's explored that? Maybe some of the tribes have been there, maybe. Some areas they haven't been. Now, when you're talking about scientists, whether they're indigenous scientists, western scientists, whatever, so many of the areas in this jungle that is the size of the continental US still have not been accessed. And the places where people are doing research, see, I've been down here long enough, I see all the PhDs come down here and they all go to the same few research stations. They're safe. They have a bed. If you get heli-dropped into the middle of the jungle in the deepest, most remote parts, you're going to find micro ecosystems. You're going to see little species variations. You're going to see a type of flower that JJ has never seen before, like what happened the other day. As you start walking through new patches of forest, you start finding new species, and everything here changes. You just go a little bit upriver and the animals you see differ. You go on this side of the river versus on the north side of the river, there's two other species of primates there

that don't exist here. And that's in the mammal paper that we did with the emperor tamarins and the pygmy marmosets that the rangers found.

Lex Fridman

Yeah. The mammal papers looking at the diversity of life in this one region of the Amazon. Can you talk more about that paper? Mammal Diversity along the Las Piedras River.

Paul Rosolie

Once again, the mammal paper, Pat Champagne the prodigy, he was leading on this with a bunch of other scientists who have worked in the region, including Holly O'Donnell out of Oxford, myself. I really just made a few observations. The Junglekeepers Rangers got featured because they're the ones that spotted a pygmy marmoset that had previously been unrecorded on the river. I got to contribute because I had the only photograph that I believe anyone has of an emperor tamarin on this river. It's the first proof of emperor tamarin on this river, and that's exciting. It's exciting because you can post a picture or share a scientific observation or write about something, and then what happens is you get these couch experts, these armchair experts who will come and say, "No, no, you don't get blue and yellow macaws there. I can tell from my bird book, it says they're not there." And they'll tell you you're wrong. "No, you don't get woolly monkeys there or emperor tamarin." But we have proof. And so we're coming together to try and add to that knowledge.

Lex Fridman

My general amateur experience of the species I've encountered here is, "This should not exist. Whatever this is, this is not real. This is CGI. What?" Just the colors, the weirdness. I mean, I think I called it the Paris Hilton caterpillar because it's like furry. It looks like a -

Paul Rosolie

Looks like Paris Hilton's dog.

Lex Fridman

Yeah, yeah. It's really furry and it's transparent. All you see is this white, beautiful fur, and it's just this caterpillar. It doesn't look real. Do you think there are species... How many species have we not discovered? And is there a species that are extremely badass that we haven't discovered yet?

Paul Rosolie

If you look up how many trees are in the Amazon rainforest, it's something in the order of 400 billion trees. There's something like 70 to 80,000 species of plants, individual types of plants here, 1,500 species of individual types of plants here, 1,500 species of trees. It's so vast that it's comparable, the scale is only comparable to the universe in terms of stars and galaxies and for the sheer immensity of it. And so we're describing new species every year and just walking on the trail at night, you and I have seen, you see a tiny little spider hidden

in a crevice. And has the scientific eye ever seen that spider before? Has it been documented? Do we know anything about his life cycle? There's still so much that's here that is completely unknown. We have pictures of all these butterflies. Somebody went out with a butterfly net and caught these butterflies, took a picture of it, gave it a name, put it in a butterfly book. What do we know? What host plant do they use for their caterpillars? What's their geographical range? What do we actually know? Not that much. So are there creatures out here that haven't been described? Absolutely.

Lex Fridman

And some of them could be extremely effective predators in a niche environment.

Paul Rosolie

Yeah. Absolutely. I mean certainly in the canopy, 50% of the life in a rainforest is in the canopy, and we've had very limited access to the canopy for all of history. If you wanted to get up into the rainforest canopy, you basically have to climb a vine or with scientists, when I was a kid, I always used to see them with the slingshots or the bow and arrows. They would shoot a piece of paracord over a branch, pull the rope up and then do the Ascension thing. And then you're up in this tree getting swarmed by sweat bees, getting stung by wasps. You're trying to do science up there in that environment. It's incredibly hostile and so having canopy platforms... I actually met a guy at a French film festival who had used hot air balloons to float over the canopy of the Amazon and then lay these big nets over the broccoli of the trees. And the nets were dense enough that humans could walk on the nets and then reach through and pull cactuses and lizards and snakes, whatever. Just take specimens from the canopy. That's how difficult it is that scientists have resorted to using hot air balloons. And so having a tree house, having canopy platforms, it's starting to be more and more access to the rainforest canopy. And so we're beginning to log more data. We've even observed in our tree house, which is supposed to be the tallest in the world, we're seeing lizards that we don't see on the ground, lizards that have never been documented on this river. We're seeing snakes where they're saying, "We saw this snake inside a crevice, on that tree, in the strangler fig, and we don't know what it is." It's just people haven't been up there.

Lex Fridman

And that's where a lot of the monkeys are.

Paul Rosolie

Yeah.

Lex Fridman

There's just a lot of dynamic life up there.

Paul Rosolie

Yeah. I mean when you wake up in the canopy in the morning, in the Amazon rainforest, as soon as the darkness lifts, as soon as that purple comes in the east in the morning, the howler monkeys start up, and then the parrots start up, and then the tinamous start going, and then the macaws start going, and pretty soon everybody's going, and the spider monkey groups are all calling to each other. And it's just the whole dawn chorus starts and it's so exciting.

Lex Fridman

So you're saying when they're screaming, it's usually about sex.

Paul Rosolie

Sex or territory, usually.

Lex Fridman

Sex and violence or implied violence -

Paul Rosolie

We try to be -

Lex Fridman

... or the threat of violence.

Paul Rosolie

Yeah. I mean howler monkeys in the morning, they're letting other groups know this is where we're at.

Lex Fridman

Yeah.

Paul Rosolie

We're going to be foraging over here. You better stay away. And so it's a little bit respectful as well. There is order in the chaos.

Lex Fridman

So just speaking of screaming, macaws are like these beautiful creatures. They're lifelong partners. They stick together.

Paul Rosolie

Monogamous.

Lex Fridman

They're monogamous. You see two of them together. But when they communicate their love language seems to be very loud screaming.

Paul Rosolie

Yeah.

Lex Fridman

What do you learn about relationships from macaws?

Paul Rosolie

That it can be loud and rough and still be loving.

Lex Fridman

And still be loving. But is that interesting to you that there's monogamy in some species, that they're lifelong partners, and then there's total lack of monogamy in other species?

Paul Rosolie

It's all interesting. I mean there's the anti-monogamy crew who's like, "We were never meant to be monogamous. We're supposed to just be animals." And then there's the other side of the crew that's like, "We were meant to be monogamous. We are monogamous creatures. That's what God wanted between a man and a woman." And then other people are like, "Yeah. But I know about these two gay penguins, and so that's natural too."

Lex Fridman

Yeah.

Paul Rosolie

And so then everyone tries to draw their identity. They're trying to justify their identity off of the laws of nature. So the fact that macaws are monogamous really doesn't have anything to do with anybody except for that it's beneficial for them to work together to raise chicks. It's difficult. They rely on ironwood trees or aguaje palms, and it's difficult to find the right hole in a tree. There's only so much macaw real estate. And so they need to use those holes. And each one of those ancient trees, it's usually 500 years or more, is a valuable macaw generating site in the forest. And so if those trees go down, you lose exponential amounts of macaws, and that's how you get endangered species. And so that's why we're trying to protect the ironwood trees.

Lex Fridman

Another ridiculous question.

Paul Rosolie

Tell me.

Lex Fridman

If every jungle creature was the same size -

Paul Rosolie

Oh, boy.

Lex Fridman

... who would be the new apex predator, the new alpha at the top of the food chain?

Paul Rosolie

Dude, that's like Super Smash Brothers of the jungle.

Lex Fridman

Oh, yeah.

Paul Rosolie

That's incredible.

Lex Fridman

Yeah.

Paul Rosolie

Like bullet ants. If you had a bullet ant that was this size.

Lex Fridman

Yeah. Can it be like a tournament?

Paul Rosolie

So everyone is pound for pound ratioed for efficiency. So you have basically a six-foot bullet ant versus a huge black caiman versus an anaconda versus ocelots that are the size of jaguars versus -

Lex Fridman

Yeah. Well, let's go bullet ant versus black caiman. Same size.

Paul Rosolie

But they're comparable size?

Lex Fridman

Same size.

Paul Rosolie

I don't know, man. I never thought about it. I mean bullet ant has these giant, giant, giant mandibles that could probably grab the black caiman and then at that amount of venom, you're talking about a bucket of venom going into that black caiman. Black caiman going to get paralyzed immediately.

Lex Fridman

Well, insects have just a tremendous amount of strength. I don't know how they generate, what the geometry of that is. The natural world can't create that same kind of power in the bigger thing, it seems like.

Paul Rosolie

It seems like.

Lex Fridman

It seems like ants and just these tiny creatures are the ones they're able to have that much strength. I don't know how that works, what the physics of that is.

Paul Rosolie

Yeah. So like a leaf cutter ant lifting that leaf, that doesn't make any sense.

Lex Fridman

Yeah. It doesn't -

Paul Rosolie

It doesn't make any sense.

Lex Fridman

I don't know if that's the limit of physics. I think it's just the limit of evolution of how that works.

Paul Rosolie

One of the most interesting limits that I heard somebody talking about recently was the reason that dinosaurs didn't get bigger, even bigger because the conditions on Earth were favorable towards it was that at some point their eggs reached this physical limits, that their eggs reached a size, the eggs were so big that that eggs need to breathe for the embryo to survive. And their eggs reached a limit where in order to have a shell that could hold the mass of the liquid and the young dinosaur, if they got bigger, it wouldn't be permeable anymore. And I thought that was so interesting because the entire size of

physical creatures was determined by how thick shell can be before it breaks or before it can't pass air through it.

Lex Fridman

Yeah. There might be a lot of the biophysics limits -

Paul Rosolie

That's fascinating stuff.

Lex Fridman

... just like the interplay between biology, chemistry, and physics of a life form, because this thing there's a lot involved in creating a single living organism that could survive in this world. And being big is not always good, being a big creature for many reasons. Like you were saying, the big creature seemed to be going extinct for many reasons, but in the human world is because they're seen to be of higher value.

Paul Rosolie

Given the current size of the jungle, I think that the MVP, the pound-for-pound goat is ocelots. I mean you're talking about a mid-size 40-50 pound cat that can climb. That does, unlike a jaguar, a jaguar every time it hunts, it's going after a deer. It catches a deer. The deer could hit it with its antlers, it could tear it with its hooves, it's risking its life for that meal. An ocelot, ocelots walk around at night and they climb a tree, eat a whole bunch of eggs, eat the mother bird too, kill a snake, maybe mess around and eat a baby caiman. They can have whatever they like and they're sleek enough and smart enough to get away from predators. They don't really have predators and so they occupy this perfect niche where they can hunt small prey in high quantity without taking on big risks. And so if you had to choose an animal to be, it would probably be like an ocelot or I would say giant river otters, which are so damn cool because the locals call them lobos de rio, river wolves, because they're so tough and they're so social and they're so like us, because they're intensely familial groups. They live in holes by the sides of lakes and they swim through the water and they catch fish all day long, piranhas. They eat them just like, the scales go flying as they eat these piranhas. And they're so joyous in the way they swim and they have friends and they have family and I think we could relate to being a river otter, really, because I can't picture being a cat and being so solitary and just marching along a 15-mile route and making sure there's no other cats coming in on your territory and marking that territory. It seems very solo and very cat like -

Lex Fridman

The lonely existence.

Paul Rosolie

Lonely existence.

Lex Fridman

And we humans are social beings.

Paul Rosolie

We're so social. And so to me, river otter is like having a big Italian family. You're constantly eating, you're freaking out, just causing problems with the black caiman.

Lex Fridman

Take down a black caiman.

Paul Rosolie

Yeah. Start street fights.

Lex Fridman

Yeah. Yeah. Yeah. It's a family thing. You mentioned piranhas.

Paul Rosolie

Yeah.

Lex Fridman

They're a source of a lot of fear for people. What do you find beautiful and fascinating about these creatures? They're also kind of social, or at least they hunt and operate in groups.

Paul Rosolie

Yeah. Not in the mammalian way though. Piranhas are in large schools, but fish are so different. I can talk to you all day about how much I'd love to be an otter. Also, going back to the fighting thing, otters and weasels muscle a day tend to be very loose in their skin. So if you grab an otter, it can still rotate around to bite you.

Lex Fridman

Yeah.

Paul Rosolie

So it's like if I grab you by the back, you're stuck.

Lex Fridman

Yeah.

Paul Rosolie

You grab them by the skin, they can rotate around and just shred you apart. So they're really cool fighters. Piranha fish. I don't identify with fish in terms like that. I think living out here

has made me think of fish as a rapid food that can or can't be gotten. To me, when I see a piranha, I think about how I want it to taste.

Lex Fridman

Yeah. So fish is a food source for so many creatures in the jungle.

Paul Rosolie

Yeah.

Lex Fridman

So they're primarily a food source, but piranhas are -

Paul Rosolie

Predators.

Lex Fridman

I mean they're predators. They're serious predators.

Paul Rosolie

They are serious predators. I found a baby black caiman not that long ago, and he was missing all of his toes because the piranhas had eaten them off. It was really sad. He just had these stumps and he was swimming around the water and I was like, "You are not going to make it." He was like eight inches, and he was such a cute little puppy. He had those big eyes. And I was just like, "Man, you already are missing all your toes." I was like, "It's just a matter of time." Now he can't get away so some big agami heron is going to come and just nail him, pop him down his throat, and that's the end of that for the caiman.

Lex Fridman

I mean nature is mental.

Paul Rosolie

Nature, sure, is mental.

Lex Fridman

Bite off a little bit, and then makes you vulnerable. And then that vulnerability is exploited by some other species, and then that's it. That's the end.

Paul Rosolie

But humans are brutal too. Like that story we heard about that guy the other day who caught a stingray on a fishing hook, chopped its tail off to make it safe for humans, cut a piece of the stingray off so he could use it for bait, and then threw the live fish back in the river. To me, that is incomprehensible amounts of cruelty with flawed logic in every

direction. If you're going to use the thing as bait, use it as bait. If you're going to remove its tail, well, then just kill it altogether.

Lex Fridman

Yeah.

Paul Rosolie

Or if you want to save the animal and not kill it, then don't maim it before you return it to its... It was such a weird -

Lex Fridman

So if you kill an animal, you want to use it to its fullest by using it as a food source, by cooking it, by eating every part of it, all that kind of stuff.

Paul Rosolie

Yeah. So we've been eating pacu in your time here.

Lex Fridman

Fried pacu is great. Fried pacu.

Paul Rosolie

Amazing. It's delicious. Full of nutrients. You could tell it makes you healthy.

Lex Fridman

Yeah.

Paul Rosolie

I feel like we have better workouts so that we can go harder in the jungle. And so a few months ago in August when the river was down, there was a day that the river was clear. And a friend of mine, Victor, who's married to a native girl, he said, "It's time to go pacu fishing." And at the time, we were stuck out here and we had no resupply. Everybody was busy. And so everyone was demoralized. The staff was hungry. We were hungry. And it really became this thing of like, "Hey, go catch us some pacu." They were working on the trails. They were installing the solar. We were working hard and we didn't have food. And so we went out to the river, and what we did was we went up river, we camped on the beach, and in the morning, Victor's wife was canoeing with the paddle, dead quiet. Don't let the paddle touch the wooden boat. Nikita was balancing in the middle of the thing, Victor's on the front with this huge fishing rod, and I'm sitting there and he goes, "I'll catch the first one. You catch the second one." And he's got this huge fishing rod and a piece of half rotten meat from the day before. And he's smacking it against the water. 6:00 AM. He's just letting it smack against the water. And I'm going... And we're floating down the river and I'm going, "This is not going to work." And we're floating and we're floating, and a half hour passes and

I'm going, "It's dawn. I want to go back to sleep. I'm just not a morning person." And all of a sudden a fish hits that line, almost pulls this man off of his feet. And He swings the thing in. The fish comes on the boat. And then I realize he's got a big metal mallet on the boat so that you could try to shut that fish off. And it's this huge oar shaped, thick, muscular pacu. And as soon as I saw that fish, I just thought, "Wow. The strongest of this species for millions of years have been swimming in this river, and suddenly we've..." Through this incredible combination of the boat, and the cord, and the hook, none of which we made, and the skill that he had from knowing how to fish a pacu, because otherwise there's no chance that you're getting that fish. They hide. They're very, very suspicious of what you're doing. We had gotten this fish onto the boat and boom. You hammer it like a caveman. Boom. It doesn't die. Boom. You have to crush its skull. And now you have this fish and you're holding this genetic material, this sustenance for your life that has been developing since the dinosaur times. It's so beautiful. The act, the sacred act of eating that, of the fish, of the competition with the fish. And we spent the morning fishing. We got three pacus. Three huge giant vegetarian piranha. And I just remember touching them with so much reverence, thinking about the incredible history and how that before these rivers existed, those pacus were swimming through the water and trying to survive through history, through history, through history, until we took just a few. And we did it respectfully and we did it when we needed it most, not at a time when it was just for fun and it was really, really special.

Lex Fridman

Well, humans, using them for sustenance, there's a collaboration there. That's something also that I've seen in the jungle. That there's creatures using each other and it's like a dance of either mutually using each other or it's parasitic or symbiotic. It's interesting, there's a medicinal plant you grabbed that was full of ants that were trying to murder you by biting. But they were defending the plant that they were using for whatever purpose, but there's a clear dance there of the ants using the plant, and the plant existing, therefore other applications and other use for humans and there's that circle of life happening. But the ants were defense... So the plant didn't have its own defense mechanism, the ants, the army of ants was there to protect the plant.

Paul Rosolie

Remember, we put our backpacks down at that one spot, and it was like the ants got on your backpack. And I said, "Oh, shit. This is that tree." Did you actually get bitten by one of those? Because they're incredibly painful, the tangarana one. They're like -

Lex Fridman

Yeah. Surprisingly painful, because they're small. Luckily, I have not been bitten by a bullet ant yet.

Paul Rosolie

But it's amazing because they live inside the tree.

Lex Fridman

Yeah.

Paul Rosolie

The tree comes standard with holes in it that allow ants to move and to exist safe, and it protects their eggs, and they protect the tree. And so we saw that spot where there was a perfect circle around the trees, because the ants had excavated the other vegetation so that those trees could have no competition to grow. The incredible calculation of how ants know to come programmed to garden that tree, and the tree somehow has been genetically informed to have ant habitat within itself. It's mind-blowing. And actually is the foundation of a lot of existential confusion for me, because how the hell is this possible?

Lex Fridman

Yeah. One of the things you mentioned that's also a source of a lot of existential confusion for me is ants, and the intelligence of different creatures in the forest. There's these giant colonies, there's these just giant systems. But even just looking at a single colony of ants, them collaborating, leaf-cutter ants is an incredible system. So individually, the ants seem kind of dumb and simplistic, but taken together, there is a vast intelligence operating that's able to be robust and resilient in any kind of conditions, is able to figure out a new environment, is able to be resilient to any kinds of attacks and all that kind of stuff. What do you find beautiful about them?

Paul Rosolie

As you said, just leaf-cutter ants in this jungle.

Lex Fridman

Yeah.

Paul Rosolie

That's forgetting all the other hundreds of species of ants that are in this jungle. But just the leaf-cutters, apparently, digest roughly 17% of the total biomass of the forest, everything, all these giant trees, all that leaf litter, 17% of that, almost a fifth of this forest cycles through leaf-cutter ant colonies. So they're constantly regenerating the forest. They're a huge source of the driver of this ecosystem. And so to me, when you see them working, it's, again, like I said, you see your friends as you go through the jungle. You see all the K-POK trees. You see a cunea tree. So there's leaf-cutter ants doing what they're supposed to do. And it's just so beautiful. I find them very beautiful army ants. They're so tough. They're so ready to fight. They have this huge mandibles. They're just ready to, they're transporting their eggs. They're moving from here to there. Anything that's in the way is getting eaten. They're just savage and they're kind of cute for that unless you're tied to a tree.

Lex Fridman

The savagery is cute.

Paul Rosolie

Yeah. It's reassuring. You want certain things to be tough. That's their part.

Lex Fridman

Oh, that everybody plays a part in the entirety of the nature mechanism?

Paul Rosolie

And a powerful play.

Lex Fridman

Yeah.

Paul Rosolie

But the army ants are so savage. If you step on army ants, they will all kamikaze just attack onto your feet and they'll just sacrifice their own life for the good of the thing. And they'll be trying to kill your shoes, and there's something funny about that, to me. There's something like kind of reassuring, again, unless, imagine if you're going through the jungle and you slip and you fall and you twist your knee and you fall in just the right way, but you can't get up.

Lex Fridman

Yeah.

Paul Rosolie

You Can't. You're stuck there.

Lex Fridman

Yeah.

Paul Rosolie

And then army ants find you.

Lex Fridman

Yeah.

Paul Rosolie

They will take you apart. There are records of horses that have been tied up and army ants come and they'll take out the whole horse.

Lex Fridman

Imagine the pain of that.

Paul Rosolie

It might be raining on us very hard very soon.

Lex Fridman

You want to pause?

Paul Rosolie

No. I think we'll stay here until the ship goes down.

Lex Fridman

We should mention that there's this one source of light and we're shrouded in darkness.

Paul Rosolie

And now the night shift is going to take over soon, and we are in the Amazon rainforest.

Lex Fridman

What does the rainforest represent to you when you zoom out and look at the entirety of it?

Paul Rosolie

Carl Sagan's Pale Blue Dot resonated with a lot of people. That everything you've ever heard of, all the heroes, all the villains, all of your ancestors, every achievement, tragedy, triumph, everything has happened on that one spot. This one tiny, tiny little rock that has life on it. And to me, the rainforests represent the crown jewel of that as far as we know and to the best of our knowledge and with our shrewd scientific brains at their fullest capacity, this is still the only place that we know that has life. And given that, the fact that there are still these tropical, towering, complex ecosystems that we barely understand, crawling and full of the most incredible life. To me, it's so wonderful. It's so incredible. The waterfalls and the birds and the macaws and the jaguars, it's barely believable. If you were to theoretically tell a hypothetical alien, "I live on this planet and there's just these places where everything is interconnected, everything means something to something else and the whole thing is this system that keeps us alive. And each tree is pumping air into the river, and there's an invisible river above the actual river and the whole thing goes into stabilizing our global climate." And each little tiny leaf cutter ant somehow contributes to this giant, biotic orchestra that keeps us alive and makes our environment possible. That is beautiful. I love that. And so the rainforests to me are the greatest celebration of life and probably the greatest challenge for us as a global society because if we can't protect the crown jewel, the best thing, the most beautiful part, then we're really, really missing the point.

Lex Fridman

Yeah. The diversity of organisms here is the biggest celebration of life that is at the core of what makes Earth a really special thing. That said, you and I have been arguing about aliens for pretty much the day I showed up. Alright. You brought a machete to this fight. Luckily, the table is long enough where -

Paul Rosolie

I can't reach -

Lex Fridman

... you can't reach me. To you, Earth is truly special.

Paul Rosolie

Yeah.

Lex Fridman

You don't think there's other Earths out there, millions of other Earths in our galaxy. When you look up, we were sitting in the Amazon River.

Paul Rosolie

Okay.

Lex Fridman

Dark, the storm rolled over and you started counting the stars.

Paul Rosolie

Yeah.

Lex Fridman

One, two, and that was once you can count the stars, that was a sign that the storm will actually pass. Eventually, it'll pass. And that's what you were doing, three, four, five and it's going to pass. You're not going to have to sit in that river for all night. So just a couple hours to keep yourself warm. Okay. Each of those stars, there's Earth-like planets around them.

Paul Rosolie

Okay.

Lex Fridman

Why do you think there's no alien civilizations there?

Paul Rosolie

You can write down a calculation on a napkin, you can cite different Hollywood movies, you can point up to the pieces of light in the stars, but if I talk about show me a single cell that's not from this planet, it's still not possible. And so I agree with you that the likelihood is there, all indications point to it. It would be fascinating, especially if it was done, especially imagine finding a planet of alternative life forms, not necessarily even intelligent. Imagine just a planet of butterflies, whatever, something else. That would be amazing, but I'm concerned with the reality that we have in front of us is that this is the spaceship. This is life.

Lex Fridman

Yeah.

Paul Rosolie

And so right now given that reality, maybe that's the case, maybe there are other planets or maybe we are the first, maybe life originated here, maybe God, the universe, whatever, maybe this is it. This is the testing ground for something bigger and this complexity and this diversity of life and this life that we have is that important. And I think that part of what we do when we go, "Oh, yeah, but there's other planets where..." First of all, we're taking an assumption into reality without... I mean aliens right now are about as real as Santa Claus. We think they're out there, but we're not sure. Maybe a little more real because it could make sense. No one has an alien. No one's seen an alien. No one's even seen cellular life. And so I'm not, again, if they showed up tomorrow, great. Let's study them. But right now we have this very simple threat going on where we can't stop killing each other in our living environment. And so while some people can specialize in looking to the stars and to other planets and talk about being an interplanetary species. I'm very much concerned with the fact that here in our home turf, our living environment where the air is good and the rivers are clean and the trees are big and there's macaws flying through the sky and salmon in the rivers, not only do we have a responsibility to each other and to our children to protect this incredible gift that is our entire reality. It seems kind of weird too, at some point, conservation seems ridiculous. You're begging people to not pollute the things that keep them alive. It's almost silly at a point. But we have this incredible thing where there are fish in the ocean and in the rivers that come standard with life on Earth. And we're harming the ability of Earth's ecosystems to provide for that life. And we are the generation that's going to decide if those systems continue to provide life to all the people on Earth and all the generations. And by the way, all the other animals that exist for their own reasons, other consciousnesses that we're just beginning to understand, elephants, humpback whales, whatever, families of giant river otters, not everything can be seen from a human perspective. These are other species that have their own stories. And so I'm more biocentric than anthropocentric in that I think that nature is important, but I also believe that we are special. We are the most intelligent animal.

Lex Fridman

So one, I agree with you, there's some degree to which when you imagine aliens, you forget if for a moment how special and important life is here on Earth.

Paul Rosolie

Yes.

Lex Fridman

But it's also a way to reach out through curiosity in trying to understand what is intelligence, what is consciousness, what is exactly the thing that makes life on Earth special? Another way of doing that, and I see the jungle in that same way is basically treating the animals all around us, the life forms all around us as kinds of aliens. That's a humbling way, that's intellectual humility with which to approach the study of what the hell is going on here?

Paul Rosolie

Yeah.

Lex Fridman

This is truly incredible. Are the animals we've met over the last few days conscious? What is the nature of their intelligence? What is the nature of their consciousness? What motivates them? Are they individual creatures or are they actually part of the large system? And how large is the system? Is Earth one big system and humans are just little fingertips of that system, or are each of the individual animals really the key actors and everything else is in the emerging complexity of the system? So I think thinking about aliens is a necessary... I like my town with a little drop of poison from Tom Waits is a necessary perturbation of the system, of our thinking, to sort of say, "Hey, we don't know what the fuck is going on around here."

Paul Rosolie

Sure.

Lex Fridman

And aliens is a nice way to say, "Okay. The mystery all around us is immense." Because to me, likely, aliens are living among us. Not in a trivial sense, little green men, but the force that created life I think permeates the entirety of the universe. That there is a force that's creative.

Paul Rosolie

Now the force that created life is a big one. And then the other thing is, what do you mean by that there's aliens living among us? You mean extraterrestrials?

Lex Fridman

Yes.

Paul Rosolie

Living among us?

Lex Fridman

Yes.

Paul Rosolie

You believe that?

Lex Fridman

Not like 100%, but there's a good percentage. I don't know it's possible for there not to be a very large number of alien civilization throughout just our galaxy.

Paul Rosolie

But that's different than saying that they're living among us. If you tell me that there's aliens living five galaxies over and that they're just out there somewhere, I'm more on your side than that they're here, because just like Bigfoot, we have camera traps. We have DNA sequencing through water now. You're telling me no one found one wingnut of a ship in all... The Egyptians up until right now, no one in Russia saw a crashed ship, took a picture, tweeted that shit real quick and...

Lex Fridman

I think there's no Bigfoot, there's no trivial manifestations of aliens. I think if they're here, they're here in ways that are not comprehensible by humans, because they're far more advanced than humans. They're far more advanced than any life forms on Earth. So even if it's just their probes, we cannot just even comprehend it. I think it's possible that they operate in the space of ideas, for example, that ideas could be aliens, feelings could be aliens. Consciousness itself could be aliens. So we can't restrict our understanding of what is a life form to a thing that is a biological creature that operates via natural selection on this particular planet. It could be much, much, much more sophisticated. It could be in a space of computation, for example. As we in the 21st century are developing increasingly sophisticated computational systems with artificial intelligence, it could be operating on some other level that we can't even imagine. It could be operating on a level of physics that we have not even begun to understand. We barely understand quantum mechanics. We use it. Quantum mechanics is a way we used to make very accurate predictions, but to understand why it's operating that way, we don't. And there's so many gigantic powerful cosmic entities out there that we detect, sometimes can't detect, dark matter, dark energy, but it's out there. We know it exists, but we can't explain why and what the fuck it is. We give it names, black holes and dark energy and dark matter, but those are all names for things

that mathematical equations predict, but we don't understand. And so all of that is just to say that aliens could be here in ways that are for now and maybe for a long time going to be impossible for humans to understand.

Paul Rosolie

So aliens in the strict biological sense, like horseshoe crabs, we agree that we haven't found physical aliens?

Lex Fridman

The only way I can imagine finding physical aliens is if alien species, they're trying to communicate with us humans or with other life forms, and are trying to figure out a way to communicate with us such that we dumb humans would understand. Let's create a thing...

Paul Rosolie

There's a moth the size of a small eagle.

Lex Fridman

That's trying to get us 15 minutes of attention.

Paul Rosolie

It just might -

Lex Fridman

Big fan of the podcast.

Paul Rosolie

Okay. Lex, I love you. Alright. So wouldn't it be interesting, it'd be really fascinating to me if we found out that there were aliens living among us and we couldn't see them. And what some of the people were calling aliens, the scientists, the religious people we're calling angels.

Lex Fridman

Yeah.

Paul Rosolie

And then everybody had this realization that whether you call them aliens or angels, there are these other, there is way more to the universe than we're realizing. Just for me, the fact that there's -

Lex Fridman

There's a skull on the table.

Paul Rosolie

Yeah. There's a skull on table.

Lex Fridman

There's now a skull on your hand.

Paul Rosolie

There's now a skull in my hand of a monkey with a bullet in its head that I found on the floor of an indigenous community where they eat monkeys. I didn't kill the monkey, so save your comments. But in terms of the animals, I think that when I see space, my feeling, and I'm not requiring anybody else to have this feeling, but because we know, because it's the only place that we know that there's life and we have no idea how it started. I just think it's so important to protect it. And for me, it's just as much about our children as it is about the little spider monkeys and the little baby caiman that are in the river right now, because life is so beautiful.

Lex Fridman

Yeah.

Paul Rosolie

And I think that there's a huge amount of intellectual responsibility that we can transfer off of ourselves if we go, "Yeah. The rivers are filled with trash and, yeah, extinction is happening, but we have to be an interplanetary species anyway, because at any moment this could all end from an asteroid and everything's going to shit anyway, and so it's like we're fucking up this planet." And so we're just being angry teenagers who are going goth for a while. And it's like what if you just rolled up your sleeves, and said, "Holy shit. Wait a second. We can pretty much do whatever we want..." I said, holy shit, wait a second. We can pretty much do whatever we want. We can fly all over the world. We can do heart transplants, we can watch Netflix in the Amazon if we wanted to. We could do all this amazing stuff. We can capture on video our adventures and go back and watch them again and again and again. There's so much incredible opportunity that technology has allowed us to do, and we're the richest in history. We could do everything. We could cross the whole planet in a second, and it's like, that's an amazing time to be alive. And if we just don't fuck up the ecosystems and kill all the other animals, we got it made.

Lex Fridman

It is true that we can destroy ourselves with nuclear weapons, but it also is true that that snake that I got to handle yesterday is one of the most beautiful things Earth has ever created. In that little organism is encapsulated the entire history of Earth, and it's beautiful. Both things are true. We should worry about the existential destruction of human civilization through the weapons we create, and we should become multi-planetary species as a backup for that purpose. But also remember, this place is really, really special and

probably, if not difficult, probably impossible to recreate elsewhere. And by the way, there's something incredibly powerful about a skull.

Paul Rosolie

If you ever hold a human skull, it'll weigh on you for a sec because you look into the hollow eyes of this face and suddenly you go, you feel your own cheek, you feel your own skull, and you go, holy shit. You go, what is going on? It's like taking acid. You just go, oh boy, I forgot that I'm a ghost inhabiting a meat vehicle on a floating rock.

Lex Fridman

But even a monkey, it's like looking at a ancestor, not a direct ancestor, but it's like you're looking at a puddle, at a reflection.

Paul Rosolie

A little blurry, but it's still living.

Lex Fridman

It's a little blurry, but it's still there. It's still there. And the roots of who we are is still there, and it's all incredible. Do you ever think of the tree of life, just where we came from?

Paul Rosolie

Yeah.

Lex Fridman

The jungle is ephemeral. It's a system that just keeps forgetting because it's just churning and churning and churning, and churning. It has, in some ways, no history. But to create the jungle, to create life on Earth, there's a deep history of lots of death, sex and death.

Paul Rosolie

A festival of sex and death. Life on Earth.

Lex Fridman

That's what I see in the skull.

Paul Rosolie

There's something terrifying about that image to me. Every now and then at night, you hold that skull and it just reminds you that you're temporary.

Lex Fridman

Yeah. Both you and I will one day have one of those.

Paul Rosolie

Yeah.

Lex Fridman

Mine will be bigger.

Paul Rosolie

My, God.

Lex Fridman

The male competition continues.

Paul Rosolie

The silverback slaps the lesser male once again.

Lex Fridman

Do you have a lighter?

Paul Rosolie

Yeah, bro. You want to light this blunt?

Lex Fridman

Yeah. What are your favorite animals to interact with?

Paul Rosolie

My favorite, absolute favorite animal to interact with is 100% elephants, which there's no elephants here, but I've been incredibly privileged to spend some time with elephants, both in India and in Africa. And I think that they're so smart and so complex that we do a really bad job of understanding what an elephant really is. I think that most children probably think of elephants as something cuddly. Most adults probably have a similar misconception of them. When you see an elephant, when you see a 12-foot tall bull elephant with bone coming out of its face with huge tusks and those giant... It's an octopus faced butterfly eared behemoth that's a survival machine. And it'll look at you and just go, do I have to kill you to keep safe? And it's just they're so tough and they have dirt on their back and they have flower petals and the little hair. You realize they have hair all over their body. And the power to throw a car over, to flip it. Just one of the most impressive animals on Earth. And I think that I've gotten really good at interacting with wild elephants in a way that's respectful to them. And I think that when an elephant allows you to be in its space, it's because you're showing submissiveness and respect for the elephant's space. And they're so intelligent that they're communicating with seismic vibrations through the Earth, that they have a matriarchal society, that they can remember the maps of their ancestors and they know how to find water, that they can solve problems. They're such beautiful animals and they're

so... Talk about aliens. They're so alien looking, these big, weird heads and the trunks with all those muscles. And they're so different than us, but yet I actually think that we grew up together. They raised us, sibling species, that we've inhabited the same epoch in history, and we've relied on the ecosystems that they've created. And I think that they have a deep understanding of humans, elephants, and I think I see them more like aliens, more like non-human beings that we share the Earth with. I don't see it as we're humans and they're animals. I actually see elephants as a separate society along with humans as one of the dominant species on the planet.

Lex Fridman

Almost every species, especially the intelligent ones, especially the big ones, are their own societies that overlap and sometimes co-develop.

Paul Rosolie

Yeah, I think whales, I think elephants. I think that there's those higher... No one's suggesting that sardines somehow need human rights or something, but I think that elephants need representation in governments because they influence their landscape, they engineer their environment. They have emotions, they have families, they have burial rituals. They're so like us, and yet we treat them like they're just oversized cows that we have to be scared of. They're not the same as domesticated livestock. They're one of the treasures of Earth. Look, let's just say little green men showed up and they said, well, what's Earth? It's, well, there's mountains, there's rivers. It's, well, how do I do this? There's mountains, rivers, there's elephants. It's one of the first things a baby learns is elephant, even if he's never seen one. It's just so iconic on Earth. Like you said -

Lex Fridman

Darren Aronofsky.

Paul Rosolie

... Darren Aronofsky, the elephant walking over the camera. I haven't seen it. You said it's incredible.

Lex Fridman

At the Sphere, the Postcard from Earth, it's a celebration of Earth in all forms. And one of the critical big creatures in that film is an elephant. And it steps over the audience and the whole Sphere reverberates that power. Some of it is size, some of it is, how did Earth create this? It is a weird looking creature, but we take it for granted because we've accepted that this Earth can create this kind of thing, but it is weird, beautifully weird.

Paul Rosolie

Oh, it's beautifully weird. Elephants, there's something really impressive and wise about them. There's also beautiful weird that doesn't come with so much grandeur. To me, a

giraffe is beautifully weird, but they're 18 foot tall camel deer things with giant necks. And they're strange, and they're absolutely serenely beautiful, but they don't have that deep intelligence that elephants have. There's something that elephants have.

Lex Fridman

Do you see it in their eyes?

Paul Rosolie

You see it in their eyes.

Lex Fridman

How does the intelligence manifest itself?

Paul Rosolie

Well, this is the thing. A lot of people, a lot of when I was reading Frans de Waal's book, a lot of what he was saying was that people give elephants human problems to solve in controlled environments and call it a study on elephant intelligence. Whereas if you're watching wild elephants and you're in the wild, you're going to be watching them in a way that they're looking... You've pulled up in a safari vehicle or you've pulled over to the side of the road and the elephants are wary of you so they're not acting natural. But as soon as you start watching wild elephants, truly in the wild and comfortable with your presence, you see how they start caring for their babies or how they can get annoyed. I once watched elephants around a water hole, and there's this warthog, and I don't know why, but this warthog decided he needed to get in. And there was this young male elephant, and he kept turning around to this warthog and just being, don't make me do it. Now, this elephant did not need to hurt the warthog. And the warthog was just, I need a drink, I need a drink, I need a drink. Much simpler brain. The elephant was, you could just tell. He was, watch this. And he just went and crushed the warthog like it was a big beetle, and crushed his pelvis. And the warthog dragged itself away on its front legs and probably went off to die. But this young elephant put out his ears and he paraded around with his tail up and he was, look what I did. Destruction. And it's like, that's a very relatable type of... He was annoyed with the warthog. And so you see them do these things. The most magical thing, and I've spoken about this many times, was that I was walking with a herd of semi-wild elephants that were crossing through a village in India, because elephants have lost a lot of their territory because there's so much population in India. And so we were crossing through a village, which is very delicate because the matriarchs are leading the babies, and there's villagers who have no idea what an elephant is, and they're watching the elephants cross. And the matriarchs backed this girl up against a wall, and she was terrified standing there with her back against the wall, and the elephant just put a trunk out and touched the girl's stomach. And then the other elephants came and they all started touching her stomach. And the ranger there explained to me, he just went, "She's pregnant. They know she's pregnant. They can smell, they can tell, and they're curious." And all the female elephants came to

investigate the pregnant girl. And she had no idea what was going on. And so it's like that stuff. That stuff...

Lex Fridman

And it's cool to hear that with the crushing and the pride of a young elephant that there's a complexity of behavior. It's just like with humans.

Paul Rosolie

Yeah, it's not always pretty.

Lex Fridman

That's the thing, man. Humans are capable of good and evil, and sometimes we attach these words. I love that there's just... It's an orchestra of different sounds. And that one is sex.

Paul Rosolie

That's a bamboo rat calling out for a mate.

Lex Fridman

A mate. Alright.

Paul Rosolie

Good luck.

Lex Fridman

Good luck to you, buddy.

Paul Rosolie

Good hunting.

Lex Fridman

Humans are capable of evil things and beautiful things, and I wonder if animals are the same. You think there's just different personalities and different life trajectories for animals as they develop in their understanding of social interaction, of survival, of maybe even primitive concepts of right and wrong within the social system. Do you think there's a lot of diversity in personalities and behavior? Just like different people, is there different elephants?

Paul Rosolie

Of course. And what I really like is that you said, is there a perception of what's right and wrong? Because elephants have a code of ethics. The simplest example is that as young males begin to grow, they start developing these tusks and those tusks are a tool and they use them. For Indian elephants, the females don't have tusks and the males do. The females

kick the males out of the herd. The females keep all the sisters and the aunts and the cousins together, but the males are their own thing. And so here's the thing. What you get is these crews of male elephants and the older males, there's play fighting that goes on around, two young males can play fight, but the older males, they'll kick some ass. They'll show them how to behave, they'll explain who gets to talk to the females, who gets to interact, who gets to mate, who gets the best vegetation to eat. And so there's an order established and so young male elephants have to be taught how to act. Just like a teenage human, has to be taught you can't just haul off and break another kid's nose. There's going to be consequences. Maybe you'll get suspended or maybe that kid will get his friends and beat the living shit out of you. Whatever it is, society regulates your behavior. And elephants have a very strict, very predictable... The males teach the males how to run things, and the females, which really have the final say, they're matriarchal, they're the ones leading the herd where to go. The males follow where the wise females tell them where to go.

Lex Fridman

That regulation mechanisms from that emerges a moral system under which they operate what's right and wrong?

Paul Rosolie

For an elephant, yeah.

Lex Fridman

For an elephant.

Paul Rosolie

Right and wrong for an elephant is not the same as what's right and wrong for a grizzly bear. If you're a male grizzly bear and you see a female with cubs, you just kill those cubs and then you can mate with her and put your own cubs in there. And that's a whole different type of ethics.

Lex Fridman

The value of child life is different from species to species. Some of them hold it sacred, some of them not at all.

Paul Rosolie

And that's why I think I resonate so much with elephants because I think that we are matriarchal, at least I grew up matriarchal, women were the force in my life. My family and most of my friends' families, women have the final say. And I feel like that's the way it is with elephants. You might be bigger and stronger, but it doesn't really account for much if you're not smarter and more emotionally intelligent and you know how to take care of the group.

Lex Fridman

Just to zoom out into the ridiculous questions as we were talking about aliens, there's a lot of people trying to understand, trying to study the origin of life.

Paul Rosolie

Oh, I love this.

Lex Fridman

First of all, what do you think is life versus non-life? When you look at ants or even the simplest of organisms, we saw a frog in a stream yesterday, that was a leaf frog. It was as flat as a sheet of paper and it does a lot of weird things and it found a way to exist in this world. But that's a single living organisms with a bunch of components to it, but there's a life form that exists in this world. What is the difference between that and a rock? What is the essence of that life? This might be an unanswerable question. There's probably a chemistry, physics, biology way of answering that. What to you is that?

Paul Rosolie

I think, to me, life is something that grows in response to stimuli, like in basic biology 101. And I'm fine with that. I don't need it to be more romantic than that. But I think it's actually comical, how do you get from a rock to an orangutan? And our answer for that is primordial soup. Maybe there was just stuff on Earth and then the stuff just got up and started walking. Maybe there was nothing happening and then all of a sudden there was a cell and the cell had function, and then it complexified and then it started reproducing and found male and female parts. What? We are so under equipped to understand how the hell we got here, let alone ants or even bacteria.

Lex Fridman

I see this in very simple mathematical models like something called game of life, they're cellular automata. You can see from simple rules and simple objects when they're interacting together, as you grow that system, complex objects arise. That emergence of complexity is not understood by science, by mathematics at all. And it seems like from primordial soups, you can get a lot of cool shit. And the force of getting from soup to two humans on microphones, not understood, and it seems to be a thing that happens on Earth. I tend to think that it's a thing that happens everywhere in the universe, and there's some deep force that's pushing this along in some way. I don't want to simplify it, but there is something that creates complexity out of simplicity that we don't quite understand. And that's the thing that created the first organism, living organism on Earth. That leap from no life to life on Earth, that's a weird one.

Paul Rosolie

That's a weird one. I think that, what, the Earth is 4.5 billion years old, and you can imagine just this rock of a planet with rain and storms and elements and iron and granite and just

random stuff. It's pretty easy to imagine that. But then I remember that book, I think we all had the same book when we were kids, and they show this fish-like animal crawling out of the primordial soup, and it's, bro, you just missed the most important part. Author of that book, bro. And I think the first bacteria came in around 3.7 billion years ago so there's at least a bunch of billion years where there's just nothing, it was just a planet. And then we start seeing fossils of the first bacteria.

Lex Fridman

And the bacteria stuck around for -

Paul Rosolie

Long time.

Lex Fridman

- a long time, a billion, 2 billion years. It's just very, very long.

Paul Rosolie

Just bacteria.

Lex Fridman

Just bacteria. But a lot of them, a lot of them. There's probably a lot of innovation, a lot of murder, a lot of interaction. And then there's a few big leaps along the history of life on Earth. The predator-prey dynamic, that was a really cool innovation. It's almost like innovations, like features on an iPhone. It's nice. Predator-prey, eukaryotes, complex multicellular organisms emerging from the water to land. That was weird. That was an interesting innovation. Whatever led to humans, there's a lot of interesting stuff there.

Paul Rosolie

See, I can't even get that far. I can't get from rock and sand to cells. That's a huge... Everything around us that has cells, it's wild. And I could imagine being on another planet and how incredibly valuable this thing would be. It's impossible to replicate. I'm looking at it through the candlelight right now, and I can see all of the structures in this leaf, the incredible structures in this leaf that look exactly like the veins in my arm, which look exactly like the rivers that are flowing across this landscape. And it's like life has this overwhelming pattern that it uses and it's so beautiful. I just think it's... When you imagine the days of the lightning and the volcanoes and the primordial soup, there's a big gap there. And it's fascinating to think about, and it's fascinating to see how different people's belief systems lead them to different answers there.

Lex Fridman

Not to give any spoilers, but Postcards from Earth, Darren Aronofsky's film, the idea there is there's probes that are sent out from Earth -

Paul Rosolie

Oh, that's so cool.

Lex Fridman

... to all these other planets. And each probe contains two humans, a man and a woman, and those two humans are in love. Think of a couple in love. They're sent there with all the information, basically a leaf that holds the information of what it takes to create life on other planets, to recreate an Earth on other planets. And the two humans hold all the information for the things that make life on Earth special, especially in human civilization, love, consciousness, the social connection. All that information is sent in the probe and the Postcard from Earth is those humans waking up, remembering all the information that is Earth, a celebration of all the things that make Earth magical throughout its history, all the diversity of organisms, all of that. You're loading all that in to create life on that new planet, which is something I think alien civilizations are doing. They're sending probes all throughout the galaxy and they just haven't arrived yet, but anyway. That's another...

Paul Rosolie

That's so beautiful. I want to see that so much, and one of the things that I love about Aronofsky's work is *The Fountain*. And what I find so beautiful about that is that now here he's saying, okay, we're sending probes out to other worlds, alien civilizations. And in *The Fountain*, it was what I thought he did so beautifully was braid together those three stories, where in one, I don't remember if he's in a spaceship or if that's supposed to be his soul. The other one, he's a scientist in comparable times to ours, and then he's the Spanish Explorer. But either way, there's the tree of life and it braids together all of the major religions. And it made me think of that quote that you hear where it says... Oh God, what was it? "Christ wasn't a Christian, and Buddha wasn't a Buddhist, and Mohammed wasn't a Muslim, they were all just teachers who are teaching love." And it's like *The Fountain* says, nature is that driving force and it's our job to understand that the game is love. And that's what the main character in *The Fountain* needs to learn is that it's nature that's going to carry your soul through this thing, and that there's so much you don't understand, and the epiphany at the end. God, I love that movie. God, I love that movie.

Lex Fridman

Among many things you're also an artist is trying to convert the thing that is nature into the thing that we humans can understand, the complexity, the beauty of it. That's what Darren Aronofsky tried to do with those couple of films. That's something that I hope you do actually in a medium of film too, that would be very interesting. And you do that in a medium of books currently. How much do you think we understand about the history of life on Earth?

Paul Rosolie

I think we got it all wrong. N, I don't know. It seems like they change it all the time. They say that Easter Island, when I was in college, they were big on telling you that Easter Island they

ruined their environment and they had environmental collapse, and that's why there's nobody on Easter Island. It was a cautionary tale. We could ruin our environment. And now it seems like they've changed their mind on that. And then when humans entered North America, seems to be hugely up to speculation. And Africa, that we all spread out of Africa, and then the Pleistocene Overkill Extinction theory, and it seems like every few years they update it and they change it and they say, "Oh, no, no, no, no. The guys from 10 years ago, actually my new theory is the best theory. Let's write some books and get me on Letterman." And it seems like there's a new prevailing theory, that's really always exciting and edgy, about how we got here and where we came from and how we dispersed and maybe even has some political implications like how we should use the Amazon moving forward. The Amazon was engineered by people, so fuck it, let's just cut it down.

Lex Fridman

Yeah, I tend to believe that we mostly don't understand anything, but there is an optimism in continuously figuring out the puzzle of that.

Paul Rosolie

Sure.

Lex Fridman

We, offline, talked about the Graham Hancock, Flint Dibble debate on Rogan. I like debates personally. Flint Dibble represents mainstream archeology, and I actually like the whole science, the whole field of archeology. You're trying to figure out history with so little information. You're trying to put together this puzzle when you have so little and you're desperately clinging onto little clues and from those clues using the simple possible explanation to understand. And now with modern technology, as Flint was trying to express, that you can use large amounts of data that's imperfect, but just the scale and using that to reconstruct civilizations. There are different practices from the little details of what things they eat, how they interact with each other, what art they create to when they existed, what are the timeframes, all that kind of stuff. And that starts to fill in the gaps of our understanding. But still, the error bars are large in terms of what really happened. And that leaves room for things like Graham Hancock talks about lost civilizations, which I like also because you have a humility about, maybe there's giant things we don't know about or we got completely wrong. And that's always good to remember.

Paul Rosolie

It's confusing to me to imagine what... I don't even know, where'd the Egyptians go? What happened? It seemed like they were doing so good. They had so much cool shit. But I was reading anthropological stuff in the Amazon about tribes that just through their societal structures and through their hunting practices that didn't really develop practices that worked and bands of people that went extinct before they could turn into larger societies. And there's a lot of people that got it wrong. For every explorer that leaves Borneo and

arrives in South America, there's probably hundreds more that just die at sea, get eaten by sharks, avalanche. And it's so fascinating to me that all of us really, past our grandparents, don't really even know where we came from. Do you know who your great great great grandparents are?

Lex Fridman

No.

Paul Rosolie

No.

Lex Fridman

There's methods of trying to figure that out, but really again, the error bars are so large that it's almost like we trying to create a narrative that makes sense for us, that I'm 10% Neanderthal, therefore I can bench press this much and therefore my aggressive tendencies have an explanation. When in reality there's so much diversity of personalities that they far overshadow any possible histories we might have.

Paul Rosolie

Your aggressive tendencies don't have any explanation.

Lex Fridman

No, you listen to me right now.

Paul Rosolie

I'm sorry. Don't hit me again. Don't choke me out again.

Lex Fridman

Yeah, man. One of the things you and I talk a lot about is different explorers. Who do you think is... I'm just throwing ridiculous question one after the other. Who do you think is the greatest explorer of all time?

Paul Rosolie

Oh God. I love Shackleton, but I hate the cold, so I can't even read about it. I hate the cold so much. I can't even go there for fun. I think Percy Fawcett in the Amazon was the GOAT in terms of just sheer... The last of the Victorian era, march forward, go deeper, just stop at nothing and then eventually take such big risks that you never come back. It's hard for me to relate to that exploration because, to me, I'm such a softie, I wouldn't want to leave my family behind, I wouldn't want to... Even if you told me that I could leave Earth and go exploring and I could go touch the moon, I'd be, nope. Absolutely not. The highway is dangerous enough. I would never risk dying in space. This guy left his home, went out into

the jungle, out there with horrendous gear compared to the camping gear we have today, no headlamp, and just explored for years on end.

Lex Fridman

Well, let me actually push back. You have that explorer. There is definitely a thing in you, just me having observed you behave in the jungle and in the world, you're pulled towards exploration, towards adventure, towards the possibility of discovering something beautiful, including a small little creature or a whole new part of the rainforest, a part of the world that is, holy shit, this is beautiful. I think that's the same imperative. Maybe not going out to the stars, but I could see you doing exactly the same thing. He disappeared in 1925 during an expedition to find an ancient lost city, which he and other people believed existed in the Amazon rainforest. There's that pull, I'm going to go into there with shitty equipment with the possibility of finding something.

Paul Rosolie

And they said he ran into uncontacted tribes and started goofing off. I think he started dancing and singing. The tribes were ready to kill him, and he started goofing and doing a song and a dance and just being ridiculous. And the tribes were, what now? And they're, wait, wait, wait, wait, wait. Don't shoot him yet. That's a funny one. And actually he, on a human level, used humor to save his own life on multiple occasions, to the point where he deescalated the situation where it was, "Look, we're not here to fight. We have a pile of maps. All my guys have beriberi, dengue, malaria. We're dying out here. If you guys just go on your merry way, we'll go on our merry way." Incredible. He was so tough. And then that guy from Shackleton's Expedition ended up on one of Fawcett's expeditions and you go, oh yeah, he's a proven explorer. He's been through the Antarctic. And the guy was, fuck the jungle. Absolutely fuck the jungle. And there's a great quote where he says, "Without a machete....," something, I don't remember exactly the words he used, but he said, "Without a machete in this environment, you don't last." And you know that now. In that tangle, to just take three steps that way, I would immediately be taking on... I'm not wearing shoes right now. Bullet ants, venomous snakes, spikes through my feet, tripping over myself. I don't have a headlamp. Unbelievable risk right there. We're sitting on the edge of tragedy.

Lex Fridman

Can you explain what the purpose of the machete in this situation is? What is a machete? How does it work? How does it allow you to navigate in this exceptionally dense environment?

Paul Rosolie

This is the tool that I spend most of my life carrying. This is in my hand for 90% of my time. And in the jungle, you really need a machete. There's so much plant life here that you have to cut your way through. And like a jaguar, an ocelot, a lot of these other animals that are more horizontally based and low to the ground, they can make it. Like when we got stuck in those

bamboo patches and we were just hacking through them. And it's dangerous, and as you hit the bamboo it ricochets and there's spikes, and then one piece falls and it pulls a vine that has spikes on it, and that hits you in the neck. The jungle is savage to humans. But if you are an agouti, a little rodent, or a jaguar, or a deer, you can slip through this stuff. And the deer have developed really small antlers, they can just weave through low to the ground. And so for us being these vertical beings walking through the jungle, it really helps to be able to move the sticks that are diagonally opposing your movement at all times, so a machete is just a very, very useful tool. It can help you pull thorns out of your body. As you saw last night, we can use it to find food.

Lex Fridman

You went machete fishing. You cut a fish head off with a machete. It was swimming and then you basically macheted the water. And the other fascinating thing about that fish without its head, it kept moving.

Paul Rosolie

That was amazing.

Lex Fridman

It was just using, I guess, its nervous system to swim beautifully. There's so many questions there about how nature works.

Paul Rosolie

Well, let's explain it, because the way the machete hit this fish, it took just his eyes off and his lower jaw was still there, so it was really just the brain and the top jaw that came off. And this fish, as the dust cleared in this stream, this fish was... I found it very haunting in a very interstellar way. It was just the programming was still there, but the brain was gone and the fish was just still moving and it was going to die, but it was still swimming and it looked like a live fish. It was gruesome.

Lex Fridman

And you're still trying to catch it, which is interesting to watch.

Paul Rosolie

And I still had to work to catch it. Because every time I caught it would freak out and then it would jump back in the water. And I'm programmed here from years and years of living in the Amazon that everything can hurt you so you actually become quite... If a moth lands on, you flick it because it could be a bullet ant. And so even the fish here, a lot of the fish here have spikes coming out of them. And so even though I know that fish, I know its name, I've eaten them many times, as I was holding it, when it would twitch with that explosive power, just like the Cayman, I would get that fear response and release it. And so that happened

three or four times before I finally said, this is stupid. Even though he's slippery, he hasn't got a head. I can hold onto him and I put them in my pocket.

Lex Fridman

Put him in your pocket.

Paul Rosolie

And then we fried him up and we ate him.

Lex Fridman

And he was delicious. And I'm grateful for his existence, of his role, and for my existence on this planet, this brief existence that I was able to enjoy that delicious, delicious fish. The machete is used to cut through this extremely dense jungle. There's vines, by the way. There's rope like things that are extremely strong and they go all kinds of directions. They go horizontal and all of this. We have a tree right above us that makes no sense. There's a tree that failed, and then a new tree was created on top of - failed and then a new tree was created on top of it. It just makes no sense. It feels like sometimes trees come from the sky, sometimes they come from the ground. I don't really quite understand how that works because there's new trees that grow on old trees and the old trees rot away and the new trees come up, that whole mechanism.

Paul Rosolie

Strangler figs. And so strangler figs, as you go across the world's ecosystems, that whole belt of, whether you're in rainforests in the Amazon, the Congo Indonesia, all across the tropics you have strangler figs. And the amazing thing that this species does, it's become a keystone species across the planet with a hyper influence on its ecosystem wherever it is, because they produce fruit in the dry season when the rest of the forest is making it hard for animals to find fruit, to find food. And so the bats, the birds, the monkeys, they all go to the strangler fig. They eat the fruit. And the fruit, of course, is just tricking the animals. The plants are tricking the animals into carrying their seeds to another tree. And so they're getting free transportation. Monkey takes a poop on another tree after eating strangler figs, and then that strangler fig sends out its vines, gets to the ground, and then, as soon as it begins sucking up nutrients, out competes that tree for light grows hyper drive around the trunk of that tree and then eventually that tree will die and the strangler fig will win because it got a boost up to the top. Whereas these little trees down here, they're going to have to wait their turn. They have to wait until a tree falls until there's a light gap and then they have enough food to grow quick. And so this whole thing is an energy economy. Everything is just trying to get sunlight. And so strangler figs, yeah, top-down trees growing, parasitic top-down octopus trees growing over other giant trees. And you've seen the size of some of the trees here.

Lex Fridman

So back to Percy Fawcett and exploration. What do you think it was like for him back then 100 years ago, God damn, going through the jungle?

Paul Rosolie

Well, see, the thing is those guys didn't go with the locals. They came down here with mules and they tried to do it their way. And so he's one of the people that wrote about the green hell, the jungle as the oppressive war zone where there's nothing to eat and everything is killing you. I think that, that image is so wrong because, as you saw last night, we could go. If we went out with JJ right now, we would machete fish some fish, we could start a little fire, we'd do it all in shorts. To JJ, it's green paradise, and it's intense, but if you know what you're doing, which the local people surely do, well then, just beneath the sand, there's turtle eggs that you can eat and inside the nuts on the ground there's grubs that you can eat. And if you really needed to, you could just jump on a caiman and eat that because their tails are pretty full of meat and it's like there's actually unending amounts of food here. They were a strange bunch.

Lex Fridman

If you're able to tune into that frequency, I feel like you and JJ are able to tune into the frequency of the jungle that is a provider, not a destroyer of human life. I think to be collaborated with, not fought against.

Paul Rosolie

Yes, but we're coming at that with our modern lens because we're coming down here with, I've survived how many infections in the jungle where those probably would've killed me before. So my dead-ass opinion of the jungle would've been "overwhelming and collective murder, as Herzog says. And so Percy Fawcett was coming down here with this view of it's trying to kill us at all times. We are flying down here and coming out here with our superior medicines and our ability to survive infections, and so it is different for us. It is different. We're coming at this very, very different. But Fawcett to me was the last of the real swashbucklers, the really batshit crazy explorers that just went out into the dark spaces on the map. And it's very hard for me to identify with him. But. For instance, Richard Evans Schultes from Harvard, that's someone where you go, okay, now we're getting to the point where I can start to understand. Just like the conquistadors. And they tell you the conquistadors showed up, the Spanish killed 2,000 Inca on the first day, and then they marched to this city and can you imagine yourself just slaughtering a bunch of women and children and soldiers and then just drinking some wine and doing it again tomorrow? I can't actually wrap my head around that.

Lex Fridman

Yeah, it just seems like an entire different world. No.

Paul Rosolie

Different world.

Lex Fridman

Different value system.

Paul Rosolie

Different value system.

Lex Fridman

A different relationship with violence and life and death I think. We value life more. We resist violence more.

Paul Rosolie

Yeah. If we saw a car accident, I feel like if I saw a car accident or if you see a little bit of war, some violence, it affects you. These people were so comfortable with those things. It was such a normal part of their... The Spartans, the Comanches, they became so comfortable with war to the point that it became what they did as a culture.

Lex Fridman

And they celebrated it too.

Paul Rosolie

They celebrated it.

Lex Fridman

And direct violence too, like taking that machete and murdering me, or if I got to the machete first me murdering you.

Paul Rosolie

Not a chance, bitch.

Lex Fridman

And then I would put it on Instagram show off. And the number of DMs I would get from murdering you with a machete.

Paul Rosolie

Meanwhile, half the world right now is messaging me saying, "My DMs are filled with take care of Lex. Don't lose Lex. Make sure Lex comes back safe. Lex is a national treasure. We love Lex. Make sure he holds a snake." The amount of love that is out there.

Lex Fridman

Meanwhile, I emerge from the jungle with blood around me with a machete and I take over the Instagram account.

Paul Rosolie

He's very humble. He doesn't want hear about the love.

Lex Fridman

Alright, so what do you think makes a great explorer, whether it's Percy Fawcett, Richard Evans Schultes? By the way, I'll say who Richard Evans Schultes is. He's a biologist. So that's another lens through which to be an explorer, is to study the biology, the immense diversity of biological life all around us.

Paul Rosolie

Richard Evans Schultes, I know about him from reading Wade Davis's book, *One River*, which is this big, hefty 500 or 600 page tome about the Amazon, and it covers two stories. It's Richard Evans Schultes, and I think it's in the '40s. I think it's pre-World War Two era era where he's in the Amazon looking for the blue orchid and the cure for this and that, and he's pressing plants and he's going to these Indigenous communities where they still live completely with the forest and they drink ayahuasca and they talk to the gods and he learns about how they believe that the Anaconda came down from the Milky Way and swam across the land and created the rivers. He came down and even though he was a western scientist from Harvard, he embraced the Indigenous perspective on the world, on creation, on spirituality. And he resigned himself and gave himself fully to that and spent years and years traveling around parts of the Amazon that had hardly been explored and certainly never been explored in the way he was doing it, and the ethnobotanical spiritual way of what medicinal compounds are contained in these plants and how do the local Indigenous people use and understand them? For example, of 80,000 species of plants in the Amazon rainforest and 400 billion trees in the Amazon rainforest, the statistics of likelihood that through trial and error that humans could discover ayahuasca, it's astronomical, that one of these trees and a root when put together allow you to go and access the spirit realm and see hallucinogenic shapes and talk to the gods. That's almost enough to inspire spiritual thought itself, the fact that trial and error, it would take millions of years or something. I forget what the figure is, it's incredible. But Richard Evans Schultes was one of the first people that came down and saw that. And then *One River* is where Wade Davis comes back, I believe, in the '70s. And the heartbreak of the book is that all of these incredibly wild places with naked native tribes and these intact belief systems, Wade Davis comes back and a lot of the same places that Schultes went, now there's missionary schools and they're wearing discarded Nikes and whatever. I don't know if there's Nikes in the '70s, but Western stuff has made it in. They've been contacted, domesticated, forced into Western society, and a lot of them then forget the thousands and thousands of years that have gone into creating the medicinal botanical knowledge that the Indigenous possess about how to cure ear

infections and how to treat illnesses from the medicinal compounds flowing through these trees is lost in a single generation with the modernization.

Lex Fridman

Yeah, he wrote *The Plants of the Gods: Their Sacred Healing and the Hallucinogenic Powers*. That is interesting. You mentioned how to discover that. How do you find those incredible plants, those incredible things that can warp your mind in all kinds of ways? Of course, physically heal, but also take you on a mental journey. That's interesting. So you don't think trial and error is possible?

Paul Rosolie

I was reading about ayahuasca and they were saying statistically, if you put 1,000 humans in the Amazon and gave them villages to live in, because humans are a communal species, it would take tens and tens of thousands of years or perhaps even centuries before even the possibility. It's like that thing, a bunch of chips on a keyboard how they write Hamlet. It's astronomical odds to get to, oh wait, this and this dose together. What the local people believe is that the gods revealed this secret through the jungle to us as a link to the spirit world, and that that's how we know this. Because if they didn't remember it from their ancestors, we would have no idea how to get this information from the wild.

Lex Fridman

So I will likely do ayahuasca. What do you think exists in the spirit world that could be found by taking that journey?

Paul Rosolie

I think that ayahuasca is, I can only speak from personal experience, and for me it was as if your brain is a house you've lived in your entire life and it's a big house, it's a mansion, and there's many, many rooms that you didn't even know exist. Hidden rooms behind the bookshelves, under the floorboards, rooms that you had no idea were there. And some of them are fantastic and some of them are terrifying basements. And ayahuasca takes you on a journey through that. At its most effective, you sit in front of the shaman with the candlelight, with the sounds of the jungle, and you drink this substance. And after that, what happens is the journey is all inside and the shaman is supposed to be able to guide you through that. But in my experience, you're so deep inside like falling through nebulae out in space. No physical form. Or crawling through the jungle. It's really, really powerful. It's not like the recreational drugs that everyone does where you go, "I did mushrooms and I could see music and I was talking to my friends." But no, you're face down on the floor, usually vomiting, sometimes shitting, having dialogues with the creator. And that can be traumatizing as well as amazing.

Lex Fridman

It's a really good way of looking at it. It's a big house and you get to open doors that you never had before and discover what rooms are there inside you. You ever think about that, that there's parts of yourself you haven't discovered yet or maybe you've been suppressing? How much are you exploring the shadow?

Paul Rosolie

Oh, boy.

Lex Fridman

So say you, me, Carl Jung, and Jordan Peterson are on a deserted island together.

Paul Rosolie

Fuck. I didn't even make my bed today.

Lex Fridman

There's no bed in an island.

Paul Rosolie

Great. I want to see you and Jordan Peterson do Ayahuasca together. I think that's the thing. Ayahuasca, to me, I've told you about, I've experienced some things that really made me believe that there's a benevolent force around us, but to me, Ayahuasca was a ride through the scariest parts of the universe to be like, here's what it could be like. That's where I came up with my idea that deep space or just space, outer space is just the outside of the video game. And this is it. Because when I was on Ayahuasca, I was one of the jungle creatures and I wasn't Paul and I didn't have a name. And for a long time I saw many things. I arrived at this spot in the jungle where there's a big tree and all the animals were there and they were all, not in words, not in any language that we can understand, but they were all discussing what to do about the threat. It was all leaving. It was all flying up, and it was fire and the jungle was being destroyed. And then after that it was just space and stars and silence, crushing vacuum silence for years. And that was terrifying. That was fucking terrifying. When I came back and I had hands, man, I could remember my own name.

Lex Fridman

You grounded. Things are simpler. You're back inside the video game. What are the chances you think we're actually living in a video game?

Paul Rosolie

When you say a video game, it implies that there's a player. Who's the player? It's God?

Lex Fridman

No. There's a main player, usually. That's not going to be God. God is the thing that creates the video game.

Paul Rosolie

So then we're just...

Lex Fridman

And then some of these are NPCs. I'm an NPC.

Paul Rosolie

You're an NPC? Jesus Christ. So I'm the main character?

Lex Fridman

Yeah, you created me.

Paul Rosolie

Is this Halo where you can kill the NPCs?

Lex Fridman

I see how you put the machete behind you.

Paul Rosolie

Okay, I think I'm just going to take a stand here. I'm just sick of fucking playing it halfway. I think that because people live indoors in climate controlled boxes in cities far away from nature, they've completely lost track of everything that's real. And they've started to think that we're living inside of a simulation. Notice that nobody carrying an alpaca up a mountain thinks that we're living inside of a video game. They all know that it's real because they've had babies on the floor of a cold hut. They understand the consequences of life. They understand the fish and how hard it is to get them and the basic rules of the wind and the rain and the river and that we all have to play by those. Talk to a grieving mother and ask her if she's living inside a video game. And to me, this whole thing of, are we living in a simulation, to me, that's the infirmity of society starting to parody itself. It's people going, "I have no meaning in my life anymore. So is this even real?" And again, go ask the Sherpa, go ask the Eskimo. They're not worried.

Lex Fridman

You forget what fundamentally matters in life. What is the source of meaning in a human life, if you talk about such subjects. Nevertheless, you could for a time stroll in the big philosophical questions. And if you do it for short enough a time, you won't forget about the things that matter, that there is human suffering, that there is real human joy that is real. Our time in the jungle was very hard.

Paul Rosolie

Did you suffer enough to know that it's real?

Lex Fridman

Yeah. Man, I was hoping we were in a video game that whole time.

Paul Rosolie

That's actually a really good way to... There was this moment that I watched where you were washing a shirt in this pathetic puddle because we had no water and because we had walked all day and tripped all day and gotten thorns in our hands and our feet and our legs, and we were lost in the jungle and it was nighttime and we didn't know if a big tree was going to just fall on us and mousetrap kill us. There was a lot of uncertainty, but I watched something very special happen to you, and that was, I saw you crouching by the side of this puddle, it wasn't even a flowing stream, so we couldn't drink it, and you were just trying to wash the sweat off of your shirt. And you looked at me and you just said, "The only thing that I care about right now is water." And I feel like in that moment we were united in the simple reality of the fact that we were so thirsty that it hurt and that it was a little scary.

Lex Fridman

Yeah, it was scary. But also there was a joy in the interaction with the water because it cools your body temperature down and there's a faith in that interaction that eventually we'll find clean water because water's plentiful on Earth. It's like a delusional faith that eventually we'll find. It was just a little celebration. I think the cooling aspect of the water, because the body temperature is really high from traversing the really dense jungle, just the cooling was somehow grounding in a way that nothing else really is. It was a little celebration of life, of life on Earth, of Earth, of the jungle, of everything. It was a nice moment. I think about that. Had a couple of those. There was one in the puddle and one in the river. One was full of delusion and fear, and the other one was full of relief and celebration.

Paul Rosolie

There's this thing that they say where all the pleasure in life is derived from the transitions. When you're cold, warm feels good. When you're hot, cold feels good. When you're hungry, food feels good. And when you're that thirsty, water becomes God and it's all you want. And also the other thing is that, when we're out there, it felt so good to be so lost and so tired. How would you describe the physicality of what we were doing, the level of physical exertion?

Lex Fridman

Well, it's something that I haven't trained. I don't even know how you would train for that kind of thing, but it's extremely dense jungle so every single step is completely unpredictable in terms of the terrain your foot interacts with. So the different variety of slippery that is on the jungle floor is fascinating. Because some things, the slope matters, but some roots of

trees are slippery, some are not. Some trees in the ground are already rotted through so if you step through, you're going to potentially fall through. It could be a shallow hole. It could be a very deep hole with some leaves and vegetation covering up a hole where, if you fall through, you could break a leg and completely lose your footing or fall rolling downhill. And if you roll downhill, I'm pretty sure there's a 99% probability that you'll hit a thing with spikes on it. So there's so many layers of avoiding dangers, of small dangers and big dangers, all around you with every single step. So there's a mental exhaustion that sets in, just the perception. And just observing you, you're extremely good at perceiving, having situational awareness, of taking the information in that's really important and filtering out the stuff that's not important. But even for you, that's exhausting. And, for me, it was completely exhausting just paying attention, paying attention to everything around you. So that exhaustion was surprising. Because there's moments when you're like, "I don't give a anymore. I'm just going to step. I'm just going to [inaudible 02:41:22]."

Paul Rosolie

And so that's it. You go, "I don't care anymore," and you reach out, and I'm just going to lean against this tree. And then what happened every time?

Lex Fridman

You get spikes in it. Yeah, yeah, yeah.

Paul Rosolie

And then you have to care.

Lex Fridman

And then there's just bad luck because there is wasp nests. There's just a million things. And that is physically, is mentally, psychologically exhausting, because there's the uncertainty, when is this going to end? It's, in our particular situation, up and down hills, up and down hills, very steep downward, very steep upward, no water, all this kind of stuff. It's the most difficult thing I've ever done, but it's very difficult to describe what are the parameters that make it difficult because I run long distances very regular. I do extremely difficult physical things regularly that on some surface level could seem much more challenging than what we did. But no, this was another beast. This is something else but it was also raw and real and beautiful because it's what the explorers did. It's what Earth is without humans. And also just the massive scale of the trees around us was the humbling size difference between human and tree. It's both humbling in that, "That tree is really old. It's the time difference, lifetime difference, and just the scale, it's like, holy shit. We live on an Earth that can create those things. Makes me feel small in every way, that life is short, that my physical presence on this Earth is tiny, how vulnerable I am. All of those feelings were there. And in that, the physical endurance of traversing the jungle was the hardest journey that I remember ever taking, every step. And then that made making it out of the jungle and then made it the swim in the water that we could drink, that was just pure joy. It was probably one

of the happiest moments in my life just sitting there with you, Paul, and with JJ in the water, full darkness, the rain coming down and us all just laughing having made it through that, having eaten a bit of food before and the absurdity of the timing of all of it that it somehow worked out. And how we're just three little humans sitting in a river. Just our heads emerged barely above water with jungle all around us. What a life.

Paul Rosolie

That was a real adventure.

Lex Fridman

That was a real adventure.

Paul Rosolie

That was a real one.

Lex Fridman

Yeah. I'll never forget that. So it's a real honor to have shared that. Of course, we had very different experiences. When you saw a caiman in that situation, you're like, "I have to go meet that guy. That's a friend of mine."

Paul Rosolie

Well, I mean we were in the river in a thunderstorm, just our necks above, we're all laughing our asses off. I mean, we're in the river with the stingrays and the black caiman and the piranha and all the electric eels and everything, and it's pitch black out. And then, what were we doing? We're holding our headlamps up and there were those swirling moths, the infinity moths, all making those geometric patterns. And it's like we were just three ridiculous primates, three friends in a river, just laughing because we were safer in that river than we had been in there. And we were rejoicing that the thunderstorm was, compared to the war zone that we'd been living in, the thunderstorm was safe. And it really was a beautiful moment.

Lex Fridman

And also, very different life trajectories have taken these three humans into this one place.

Paul Rosolie

Yeah.

Lex Fridman

It's like, what?

Paul Rosolie

Yeah. That's true.

Lex Fridman

Wow. Is this the universe that would? Because we're like those moths, you know what I mean? We come from some weird place on this Earth and we'd have all kinds of shit happen to us and we're all pursuing some and some light, and we ended up here together enjoying this moment. That's something else. It just felt absurd, and in that absurdity was this real human joy. And damn, water tasted good.

Paul Rosolie

Oh, water's good. Man, water and those little oranges, those things. And then I would just say, do you feel, I feel like running, no matter how much I run, I feel like you run, you do a workout, and then you stop. Maybe people who do ultras feel this, but I felt like we woke up, it was like, wake up at dawn. 6:00 a.m, let's start walking. Break camp, go. And it's like pretty much you just don't stop all day. And it's level 10 cardio all day long and you're sweating buckets and there's no water. And it's like you would never put yourself through that voluntarily. You couldn't. You would never have the resolve to continue torturing yourself, except for that we were trying to make it to freedom to get out. And it's like the obsession of that with the compass and the machete and the navigating, fuck.

Lex Fridman

I think there's something to be said about the fact that we didn't think through much of that and we just dived into it. I think we were laughing, enjoying ourselves moments before, and once you go in you're like, "Oh shit."

Paul Rosolie

Oh shit.

Lex Fridman

And you just come face to face with it.

Paul Rosolie

Yeah.

Lex Fridman

I think that whatever that is in humans that goes to that, that's what the explorers do. And the best of them do it to the extreme levels.

Paul Rosolie

Well, I think that what we did was to a pretty extreme level because we left the safety of a river, of knowing where we were, and voluntarily got lost in the Amazon with very little provisions on a very, now that we're back, now that we experienced what we experienced, I really can't stop thinking about how fucking stupid it was that we did that. Because if we had gotten lost, Pico was saying to me, "If one of you had broken your leg, it's days in either

direction." Even if they had sent help for us, help would take how long to scour all that jungle? Sound doesn't travel. Even a helicopter, even if they looked for us, they wouldn't be able to see us. How would we signal for help? You can't really build a fire. And so it's like, if anything had gone wrong, if we'd gone a few degrees different to the west, would've taken us two more days. If we'd gotten injured, it'd be carry through that. And so somehow only afterwards am I really going, wow, thank God we got out of this. Thank God. After I see so many people going, make sure nothing happens to Lex Friedman, I'd be the deadest motherfucker on Earth if anything happened.

Lex Fridman

It somehow works out.

Paul Rosolie

It does seem to somehow work out.

Lex Fridman

Let me ask you about Jane, Goodall, another explorer of a different kind. What do you think about her, about her role in understanding this natural world of ours?

Paul Rosolie

I think that Jane is a living historical treasure. I think somehow she's alive, but she's already reached that level where it's like Einstein, Jane Goodall, there's these incredible minds. And growing up as a child, my parents would read to me because I was so dyslexic. I didn't learn to read until I was quite old. And my mom was a big Jane Goodall fan and all I wanted to hear about was animals. And so I would get read to about this lady named Jane Goodall, this girl who went to Africa and studied chimps and who broke all the rules and named her study subjects even though that wasn't what she was supposed to do and she became this incredible advocate for Earth and for ecosystems. And she seemed to realize as her career went on that teaching children to appreciate nature was the key. Because they're going, that thing where she says, "We don't so much inherit the Earth from our ancestors, but borrow it from our children. We're just here. We're just passing through." And so if we destroy it, we're dimming the lights on the lives of future generations. And so she's been really, really cognizant of that. And she's been a light in the darkness in terms of saying that animals have personalities and culture and their own inalienable rights and reasons for existing and that human life is valuable. She's very big on that. Every day we influence the people around us and the events of the Earth, even if you feel like your life is small and insignificant, that you do have an impact. And I think that's a really powerful little candle out there in the darkness that Jane carries.

Lex Fridman

What do you think about her field work with the chimps?

Paul Rosolie

Badass. The fact that she did what she did at the age that she did at the time that she did is incredible. It's actually incredible. She has that explorer gene, and she also has that relentless. Relentlessness is this incredible quality. She travels 300 days a year educating people, talking around the world, trying to help bolster conservation now before it's too late. And traveling 300 days a year is not fun. Traveling at all can be not fun.

Lex Fridman

So I started reading the River of Doubt book you recommended to me on Teddy Roosevelt. That guy is badass on many levels, but I didn't realize how much of a naturalist he was, how much of a scholar of the natural world he was. That book details his journey into the Amazon jungle. What do you find inspiring about Teddy Roosevelt and that whole journey of just saying, "Fuck it. I'm going to the Amazon jungle," of taking on that expedition?

Paul Rosolie

Well, I mean, Teddy Roosevelt, you could write volumes on what's inspiring about him. I think that he was a weak, asthmatic, little rich kid that wasn't physically able, that had no self-confidence, and he had pretty severe depression. He had tragedy in his life and he was very, at least for me, he's been one of the people, one of the first historical figures where he wrote about the struggle to overcome those things and to make himself from being a weak asthmatic little teenager, to strengthening himself and building muscle and becoming this barrel-chested lion of a guy who could be the President, who could be an explorer and one of the rough riders. Just everything he does is so hyperbolically incredible. To come out of war and have the other people you fought with go, "This guy has no fear," he must've just been a psychopath and had no fear. And then proving it further was that thing where he was going to give a speech to a bunch of people and he got shot in the chest.

Lex Fridman

[inaudible 02:53:00].

Paul Rosolie

It went through his spectacle case and through his speech, and even though the bullet was lodged in his chest, this man said, "Don't hurt the guy that shot me." I believe he asked him, why'd you do it? And then as he's bleeding and in the rain said, "No, no, no. I'm not going to the hospital. I'm going to keep going with the speech." What a badass. That's incredible.

Lex Fridman

But going to the jungle on many levels is really difficult for him at that time. There's so many things, so many more things even than now that can kill you, all the different infections, everything. And the lack of knowledge, just the sheer lack of knowledge. So that truly is an expedition, a really, really challenging expedition. There's lessons about what it takes to be a

great explorer from that, the perseverance. How important do you think is perseverance in exploration, especially through the jungle?

Paul Rosolie

I think it's all there is, if you hear about the people. And I think that, that is a tremendous metaphor for life, because whether you hear about that plane that crashed in the Andes and the people were alone and freezing and they had to eat each other, some of them made it out, some of them kept the fire burning. And Teddy Roosevelt voluntarily, after being President, threw himself into the Amazon rainforest and survived. Came so close to dying, but survived. And so perseverance is all of it. I think that's our quality as a human.

Lex Fridman

So they also mapped. On the biology side it's interesting, but they mapped and documented a lot of the unknown geography and biodiversity. What does it take to do that? So when I see you move about the jungle, you're capturing a creature. You take a picture, write it down so you can find new creatures, find new things about the jungle, document them, a scientific perspective on the jungle. Back then there was even much less known about the jungle. So what do you think it takes to document, to map? ...less known about the jungle. So what do you think it takes to document, to map that world and new unexplored wilderness?

Paul Rosolie

I mean, they're clearly pressing botanical specimens. They're probably shooting birds. And Roosevelt knew how to, knew how to preserve those specimens. I mean, he really was a naturalist, so he knew exactly. So if he's seeing these animals to them, whereas we'll take a picture and identify it, they were harvesting specimens, taking them with them, drying them out. For them, it was totally different. And it could be the first, there's, I don't know, I forget what JJ said, there's something like 70 species of ant birds here and it's like, so how likely are you to be the first person to ever see this one species of bird? And so for them, phew, as you have this bird and so perfectly preserving that specimen. And I think a lot of non-scientific people don't realize that every species from blue whale to elephant to blue jay to sparrow, whatever, whatever it is, whatever species we have on record, there are scientific specimens and the first people to see them, shot them. And museums are filled with these catalogs preserved birds that these explorers brought back from New Guinea and South America and Africa and then put into these drawers. And now we labeled them and we said, this is red and green macaw, this is scarlet Macaw, this is brown crested ant bird. And they're just categorized.

Lex Fridman

That book of birds you have, it is encyclopedia of birds.

Paul Rosolie

Yo.

Lex Fridman

What?

Paul Rosolie

The human achievement in these pages.

Lex Fridman

For people listening, Paul just flipping through a huge number of pages. Is this in the Amazon or is this in Peru?

Paul Rosolie

This is just here. This is birds of Peru. Dude pages on pages of toucans and aracari and hummingbirds and ant birds and smoky brown woodpecker and tropical screech owl, which we just heard, by the way. It's endless. Who knew there were so many birds? I had no idea there was so many birds.

Lex Fridman

Documenting all of that. I mean there's also, which we got to experience and you're pretty good at also is actually understanding and making the sounds of the different birds. What's your favorite bird song to make?

Paul Rosolie

Undulated tinamou, because in the crepuscular hours of dawn and dusk, they're usually the ones that make up what is considered by many to be the anthem of the Amazon.

Lex Fridman

Can you do a little bird for us?

Paul Rosolie

(singing). That's what a undulated tinamou sounds like. And it's usually like, "Oh, it is getting to be afternoon." It's almost like hearing church bells on a Sunday. It's like you just, there's something about it, you go, "Ah! There it is."

Lex Fridman

And like you were saying, it's a reminder, "Oh, that's a friend of mine".

Paul Rosolie

Yeah.

Lex Fridman

Surrounded by friends.

Paul Rosolie

I have so many friends here.

Lex Fridman

What does it take to survive out here? What are some basic principles of survival in a jungle?

Paul Rosolie

Cleanliness. I mean really, we talked about this, but keeping, I have so many holes in my skin right now. Look, I have a mosquito... There we go. I have so many spots that I've scratched off of my skin because mosquito bites me and then I scratch it. Or the other big one is that I worry that I have a tick. Not deliberately, not with my thinking brain, but my simian brain just wants to find and remove ticks and so I scratch. And then if my fingernails get too long, I remove my skin and then those get infected in the jungle. And so staying hyper clean, using soap, like basic stuff, keeping order to your bags, order to your gear, things in dry bags, make sure... We explained that we got in the river during a thunderstorm. We didn't explain why we did that because the thunderstorm came when we had eaten dinner, but we hadn't set up our tents and so we decided to cover our bags with our boats that we had been carrying, our pack rafts that we'd been carrying in our backpacks, so all of our gear would stay dry. So the only thing we could do is either sit in the rain and be cold or sit in the river and be warm. And so keeping our gear dry, momentary discomfort for future, that to me was an incredibly smart calculation to make, is you got to be smart out here, you can not running out of a headlamp while you're out on the trail and being stuck in that darkness. It really takes just being a little bit on your toes. And I find that that necessity of being on your toes is a place that I like to live in. It's just the right amount of challenge here.

Lex Fridman

So keeping the gear organized and all of that, but also being willing to sort of improvise. I've seen you improvise very well because there is so much unknowns, there's so much chaos and dynamic aspects that planning is not going to prevent you from having to face that in the end of the day.

Paul Rosolie

No, it's been really funny watching you sort of shed your planning brain. Like day one, it was very much like "So are we going to...", and then I could see your brow sort of furrow and I would go, "I don't know what time we're going to get there." And you'd go, "Well, just tell me." And I'd be like, "I don't know what the jungle's going to let us do." "Let's record the podcast tomorrow." Okay, but if it rains, if it gets windy, if a [inaudible 03:00:39] comes, if there's a Jaguar with rabies, anything could happen. Landslides, like anything, literally.

Lex Fridman

It's tree, I mean the thing you mentioned, trees falling. That's a thing in the jungle.

Paul Rosolie

That's a major thing in the jungle.

Lex Fridman

Holy shit. First of all, a lot of trees fall and they fall quickly and they could just kill you.

Paul Rosolie

They fall quickly. They're huge. We're talking about trees that are the size of school buses stacked and connected to other trees with vines so that when they fall, this millennium tree, this thousand year old tree, boom, it shakes the ground, pulls down other trees with it. So if you're anywhere near that for a few acres, you're getting smashed. That's the end of you. And so the jungle, at any moment that you're out there could just decide to delete you. And then the leaf cutter ants and the army ants and the flies and everything, you'll be digested in three days. You'll be gone. Gone. No bones, nothing.

Lex Fridman

Who do you think would eat most of you?

Paul Rosolie

I would hope that a king vulture with a colorful face would just...

Lex Fridman

Dramatically just going there [inaudible 03:01:43].

Paul Rosolie

...get in there right in the arse. Just like nature is metal. Just like when they walk in through the elephant's ass. I'd want that on camera trap. I think that would be a great way to go.

Lex Fridman

And we slowly look up and just kind of smile at the camera.

Paul Rosolie

Yeah. It'll just rip out your intestine and just shake it. Just victorious over your dead body.

Lex Fridman

Well, but also honor a friend. That's another way to go.

Paul Rosolie

Yeah, sure. But you look so, your white naked ass laying there in the jungle, you'd be like face down in the shit.

Lex Fridman

That's why you always have to look good. Any moment, a tree can fall on you and a vulture just swoops in and eats your heart.

Paul Rosolie

That's right.

Lex Fridman

We talked about Alone, this show a bit.

Paul Rosolie

Yo. Rock House.

Lex Fridman

Yeah. What do you think about that guy? Rock House Roland Welker from season 7, he built the Rock House, he killed the musk ox with bow and arrow and then finished it with a knife.

Paul Rosolie

And had the GoPro mounted to document it. That's a really mind-blowing.

Lex Fridman

I mean, so for people who don't know that show, you're supposed to survive as long as possible. On season 7 of the show, they literally said you can only win it if you survive a hundred days. And there's a lot of aspects of that show that's difficult, one of which is it's in the cold. The other is they get just a handful of supplies, no food, nothing, none of that. So they have to figure all of that out. And this is probably one of the greatest performers on the show, Roland Welker, he built a rock house shelter. So I mean, what does survival entail? It's building a shelter, fire, catching food, staying warm, getting enough energy to sort of keep doing the work. It takes a lot of work. Like building the Rock House, I read that, it took 500 calories an hour from him, so he had to feed himself quite a lot. You're lifting 200 pound boulders and still the guy lost, I read, 44 pounds, which is 20% of his body weight. So that's survival. What lessons, what inspiration do you draw from him?

Paul Rosolie

I think he was fun to watch because he had this indomitable spirit. He wasn't there to commune with nature, he was there to win. And he was like, to me, that's the pioneer mentality. He goes, "I'm a hunting guide. I'm out here. I'm going to win that money. I'm going to survive through the winter." He wasn't worried. I feel like so many people, they worry

second guessing themselves, "Am I in a video game? I don't know. What's my...", just questioning their entire existential identity. And this guy was like, "You know what? There's a muskox over there. I'm going to shoot it. I'm going to stab it now. I'm going to make a pouch out of its ball sack and I'm going to live off that for the next few months and win a half a million dollars." And that's an amazing amount of pragmatic optimism that I just enjoyed. And every time he would go, "We got to get back to Rock House", and it became, even though he is all alone, he had a big smile on his face. And what made that season so great was that it was him and then it was Callie. And Roland had the muscle and could make Rock House and then Callie was the opposite. She was this girl who, yes, she could hunt with her bow and she knew how to fish and she wasn't using raw power, but what was so endearing about her was that how much she loved being out there. As hard as it was, and as isolationist as it was, she was smiling. Every time the show cut to her, she was like, "Hey everybody, it's morning. Can you believe the frost?" You've been out there for a hundred days! Amazing. I think it was really an amazing show of that the game is all here. The game of life, the game of alone and the game of life because that's the same thing.

Lex Fridman

Yeah. She maintained that sort of silliness, the goofiness, all through it when the condition got really tough. And she had a very different perspective as you know Roland didn't want any of the spirituality, it's very pragmatic. And for Callie, it is very spiritual connection to the land. She said something like she wanted not only to take from the land, but to give back. I mean, there's this kind of poetic spiritual connection to the land. It's such a dire contrast to Roland. But she's still a badass. I mean to survive no matter what, no matter the kind of personality, you have to be a badass. I think she took a porcupine quill from her shoulder.

Paul Rosolie

That was crazy. I think it went in somewhere completely different and it migrated to their shoulder.

Lex Fridman

Yeah.

Paul Rosolie

And the way they understood that is because they have, I said, that's impossible. I remember that she's pulling up her shirt and she's like, there's something. And then she pushes it out. And I remember I was like, "Hold up, hold up, hold up, hold up. How?" And it was because the barbs, once it goes in, as you move and flex your body, it moves a little bit each time and it gets migrated. I didn't even think of that shit.

Lex Fridman

Plus, if I remember correctly, I think she caught two porcupines. The second one was rotting or something, or it had an infected body, whatever.

Paul Rosolie

It had the spots on it.

Lex Fridman

Yeah.

Paul Rosolie

She chose not to eat it.

Lex Fridman

No. And then she chose not to eat it at first, and then she decided to eat it eventually, yeah.

Paul Rosolie

Oh. I forgot that.

Lex Fridman

And she starves, that was an insane sort of really thoughtful, focused, collective decision. Waiting a day and then saying, "Fuck it, I need this fat." And that was the other thing, is like fat is important.

Paul Rosolie

Oh, yeah.

Lex Fridman

It's like meat is not enough. You learn about what are the different food sources there. Apparently there's rabbit starvation is a thing because when you have too much lean meat, it doesn't nourish the body. Fat is the thing that nourishes the body, especially in cold conditions. So that's the thing.

Paul Rosolie

Yeah, she was incredible. And I thought as brash and sort of fun as Roland was, she represented a much more beautiful take on it. It was really heartbreaking when she lost. And like you said, still a badass. It's kind like Forrest Griffin vs Stephan Bonnar. It doesn't matter who won. You guys beat the out of each other.

Lex Fridman

And she didn't really lose, right? She got evaced because her toe was going...

Paul Rosolie

Frostbite.

Lex Fridman

Frostbite. A hundred days, you think you can do a hundred days?

Paul Rosolie

Honestly, I've done... 18 years in the Amazon, man, at this point, I could. I wouldn't sign up for another a hundred days. At this point, I don't have that to prove I've survived in the wild and I wouldn't want to voluntarily take a hundred days away from everyone I know.

Lex Fridman

Yeah, the loneliness aspect is tough.

Paul Rosolie

We're not meant for that. I really love the people I have in my life and I wouldn't, and you see it on the show, a lot of the people, big tough ex-Navy SEALs who are survival experts who know what they're doing, they get out there and they go, "You know what? I miss my family." And they go, "It's not worth it." They have this existential realization. They go, "I only got so many years here. This is crazy. It's just some money. Fuck it." And they go home.

Lex Fridman

That's funny because you sometimes feeling yourself in the jungle and you're alone. And there's another guy, Jordan Jonas Hobojordo, he's the season 6 winner. And he said that the camera made him feel less lonely. I've heard of him from multiple channels, one of the things is he spent all of his twenties living in Siberia with the tribes out there.

Paul Rosolie

Whoa.

Lex Fridman

Herzog Happy People. And so he actually talked about that it's one of the loneliest time of his life because when you went up there, he didn't speak Russian and he needed to learn the language. And even though you have people around you when you don't speak their language, it feels really, really lonely. And he felt less lonely on the show because he had the camera and he felt like he could talk to the camera. There is an element when you have in these harsh conditions, if you record something, you feel like you're talking to another human through it, even if it's just a recording. I sometimes feel that maybe because I imagine a specific person that will watch it and I feel like I'm talking to that person.

Paul Rosolie

Well, I noticed that when things got especially hard, and they did get especially hard when we were out in the wilderness, that you would begin filming to share that struggle. But I also think that I've used that at times where, yeah, you go, well, maybe if I, because if you can tell someone else about it, then you're on the hero's journey. And then it sort of has to make you

braver and it changes how you, because you're "I'm cold and I'm tired and I'm hungry and this hurts and that hurts and I don't know when we're going to make it and how is this going to go?" And then all of a sudden you go, "Well guys, we're here and we're going that way." And then you're like, "Well, I got to keep going" because you're like, they're still out there if you forget.

Lex Fridman

You have to step up. That's one of the reasons I want a family. I think when you have kids, you have to be the best version of yourself for them.

Paul Rosolie

All my friends with kids that I've seen them go through, where until you have a family, you're just playing around, man. I mean, you could do important work, you can have skin in other games, but it's once you have a little tribe of humans that depends on you. If you take that seriously, if you want to do that right, it's one of the hardest things you could do. And it just changes everything.

Lex Fridman

How has your life changed since we last met?

Paul Rosolie

Speak about changing, everything.

Lex Fridman

So you've been, for people who don't know, pushing Jungle Keepers forward into uncharted territories, saving more and more and more and more rainforests. There's a lot I could ask you about that. There's a lot of stories to be told there. It's a fight, it's a battle. It's a battle to protect this beautiful area of rainforest of nature. But since we last met, you've continued to make a lot of progress. So what's the story of Jungle Keepers leading up to the moment we met and after and everything you're doing right now?

Paul Rosolie

18 years ago when I first came to the jungle, I was a kid from New York who always dreamed since I was six years old, maybe even younger, of going to a place where animals were everywhere and there's big trees and skyscrapers of life. And so being dyslexic and not fitting in school and reading about Jane Goodall and having Lord of the Rings be one of the things I grew up on, I just chose to come to the Amazon and the first person I met was this local indigenous conservationist named Juan Julio Duran, who was trying to protect this remote river, the Las Piedras River, which in history, apparently Fawcett referenced either the Las Piedras, but he called it Tahuamanu and said, "Don't go there, you'll surely die from tribes." And so there's very few references to this river in history. It's stayed very wild because it's been a place that the law hasn't made it, that the government hasn't really

extended to, we're sort of past the police limit. And so JJ was out here ages ago, trying to protect this river before it was too late. And when I met him, I was just a barely out of high school kid with a dream of just seeing the rainforest, let alone seeing a giant anaconda or having any sort of meaningful experience or contribution to the narrative. And somehow overall, the years that we began working together and sparked a friendship and began exploring and going on expeditions and bringing people to the rainforest and asking them for help and manifesting the hell out of this insane dream that we had. I mean, we didn't even have a boat. We would take logs down the river, we would have to cut a tree down. Every time we wanted to return to civilization, we'd have to cut down a balsa tree and float down the river.

Lex Fridman

Float down the river on it, yeah.

Paul Rosolie

It's madness. It's madness. It's pure madness. And I don't know what made us keep going, but along the way, people showed up who cared and who wanted to help. And if it was a movie, it wouldn't even necessarily be a good movie because you'd go, "Oh, please. You're just telling me that you just kept doing the thing and just magically people showed up." But yeah, that's what happened. That's exactly the way it went. We kept doing the thing that we loved. We said, it doesn't matter if we don't have funding or a boat or gasoline or friends or anything. We just kept going. And along the way we found someone who could help us start a ranger program. And then we found Dax Dasilva who helped us fund the beginning of Jungle Keepers. And then people like Mohsen and Stefan who were there making sure that this thing actually took flight off the ground. And then right around the time that we were wondering what was going to happen and if we're all going to have to quit and get real jobs and if we could actually save the rainforest from the destruction that was coming, Lex Fridman sends me a DM and honestly changed the entire narrative because up until then we had been playing in the minor leagues pretending, trying real, real hard and the listeners of your show in the moments after you published your episode with our conversation began showing up in droves and supporting Jungle Keepers putting in five, ten, a hundred, a thousand, we started getting these donations and the incredible team that I work with, we all went into hyperdrive, everybody, everybody started going nuts. We all started spending 16-hour days working to try and deal with the tidal wave that Lex sent towards us just because so many people knew that we were doing this, that it was an indigenous led fight to protect this incredibly ancient virgin rainforest before it was cut and people resonated with that. And so we got this huge swell of support and this year we've protected thousands and thousands of more acres of rainforest because of that swell of support.

Lex Fridman

So current 50,000 acres, what's the goal, what's the approach to saving this rainforest?

Paul Rosolie

Since we printed this, it's gone up to 66,000 acres. And as you know, in each of those little acres are millions and millions of animal heartbeats and societies of animals. And the goal here is that we're between Manu National Park, Alto Purús National Park, the Tambopata Reserve, we're in a region that's known as the biodiversity capital of Peru, one of the most bio-diverse parts of the Western Amazon. And we're fighting along the edge of the Trans-Amazon Highway. And so it's just a small group of local people and some international experts who have come together and used these incredibly out of side of the box strategies to sort of crowd fund conservation to go, "Look, we know that this incredible life is here. We have the scientific evidence, we have the national park system. If we can protect this before they cut it down, we could do something of global significance. All these Jaguars, all these monkeys, all these undescribed medicines, the uncontacted tribes that we share this forest with could all be protected." And people have stepped up and begun to make that happen. And there's people from all over the world and it's incredible.

Lex Fridman

But what's the approach? So trying to, with donations, to buy out more and more of the land and then protect it?

Paul Rosolie

So the approaches that currently the government favors extractors. So if you're a gold miner or an illegal logger or you just want to cut down and burn a bunch of rainforests and set up a cacao farm, the government's fine with that. It doesn't matter. You're not really breaking the law if you're destroying nature.

Lex Fridman

So as long as you're producing something from the land, they don't see it as a loss, that nature was destroyed permanently?

Paul Rosolie

Yeah, it's just wilderness. It's sort of just beyond the scope of, or the local people that technically own the land out here, the local indigenous people, for instance, we fought this year to help the community of Puerto Nuevo, who's been fighting for 20 years to have government recognized land. These are indigenous people in the Amazon, fighting to protect their own land. And you know what it was that was holding them back? They didn't understand how the system of legal documents worked to certify that titled land. They didn't really have the funding to go from their very, very remote community into the offices and so Jungle Keepers helped them with that. And so really all we're doing is helping local people protect the forest, that is their world. That's it.

Lex Fridman

If people donate, how will that help?

Paul Rosolie

If people donate to Jungle Keepers, what you're doing is you're helping someone like JJ, who's an indigenous naturalist who has the vision, who has seen forest be destroyed, he's trying to protect it before it's too late. You're saving mahogany trees, ironwood trees, kapok trees, skyscrapers of life, just monkeys, birds, reptiles, amphibians, birds, mammals, this entire avatar on Earth, world of rainforest that produces a fifth of the oxygen we breathe and the water we drink, this incredible thing. As far as I know, it's the most direct way to protect that. And so the fact that we have large funders who give us a hundred thousand dollars to protect this huge swath of land and that goes through things like this and through Instagram, it goes directly to the local conservationists who work with the loggers to protect that land before it's cut. But one of the most impactful things that has happened this year in the wake of our last conversation was that I got an email from a mother and she said, "I'm a single mom and I work a few jobs and I can't afford to give you a ton of money, but me and my kids look at your Instagram often after dinner, and they really want to protect the heartbeats. They really want to protect the animals and the rainforest. And so we give \$5 a month to Jungle Keepers." And it was, to me that was so impactful because I used to be that little kid worried about the animals. I saw how a few million raindrops can create a flood.

Lex Fridman

Yeah. I ask that people donate to Jungle Keepers. You guys are legit. That money is going to go a long way, junglekeeper.org. If you somehow were able to raise very large, so the raindrops would make a waterfall, a very large amount of money, I don't know what that number is, maybe \$10 million, \$20 million, \$30 million, what are the different milestones along the way that could really help you on the journey of saving the rainforest?

Paul Rosolie

If we did, if let's just say some company organization or if enough people donated it, let's just say we got that \$30 million. That money would go directly into stopping logging roads, into creating a corridor, a biological corridor that connects the uncontacted indigenous reserves with other tribal lands, with Manu National Park, with the Tambopata, which establishes essentially the largest protected area in the Amazon rainforest. And what makes this groundbreaking is that we're not doing this in the traditional way. We're doing this, take it to the people. And that's what's been so exciting is that when he started this, when JJ started this 30 years ago, he had no idea. His father wanted him to be a logger. He didn't have shoes until he was 13 years old. He grew up bathing in the river. He had no idea that a bunch of crazy foreigner scientists were going to show up and some guy in a James Bond suit was going to come down here with microphones. And that all of a sudden the world would know that he was on this quest to protect this incredible ecosystem. And all those little aliens.

Lex Fridman

Well, that's all the important thing to remember, that the people that are cutting down the forest, the loggers are also human beings. They've families, they're basically trying to survive and they're desperate and they're doing the thing that will bring them money. And so they're just human beings at the core of it. If they have other options, they will probably choose to give their life to saving the community, to first and foremost providing for their family, and after that, saving the community, helping the community flourish. And I think probably a lot of them love the rainforest. They grew up in the rainforest.

Paul Rosolie

Yeah. I mean, look at Pico.

Lex Fridman

Yeah.

Paul Rosolie

Pico used to be a logger, full-time logger, long-time logger. Now he loves conservation. He's like, [foreign language 03:23:46].

Lex Fridman

Yeah, it's all about just providing people options. There's some dark stuff on the goldmine stuff you've talked about. You showed me parts of the rainforest where the goldmines are, and they're just kind of erasing the rainforest.

Paul Rosolie

Yeah.

Lex Fridman

So at the edges, that's when the mining happens and it's this ugly process of they're just destroying the jungle just for the surface layer of the sand or whatever that they processed to collect just little bits of gold. And there's also very dark things that happen along the way as the communities around the goldmines are created. So that the entirety of the moral system that emerges from that, that has things like prostitution where one third of the women that are drawn into that sex traffic and prostitution are minors under 17 years old, 13 to 17-year-old. There's just a lot of really, really dark stuff.

Paul Rosolie

I think that we have a rare chance to do something against that darkness. I think that this is an example of local people who have taken action, done good work, been good to the people that have visited, harnessed a certain amount of international momentum, and now we're on the cusp of doing something historic. And so for the children in the communities along this river, it won't be being a prostitute in a gold mine. It'll be becoming a trained ranger.

Like last month, our ranger coordinator and one of our female rangers went to Africa for a ranger conference. And it's like we're beginning to, this is someone from a little tiny village with thatched huts upriver, she went to Africa to talk about being a professional conservation ranger. And it's like that's changing lives. And her daughters then, she's married to Ignacio, the guy, their kids are going to grow up seeing their parents walking around with the emblem on and go, "Oh, I want to." And then people like Pico and Pedro and all these guys that work here are going to go, "Well, we have to protect this forest", and then they start getting fascinated about the snakes. And then they start caring about the turtle eggs. And then all of a sudden they have a way of life and nobody needs to go steal anybody's kids to be a prostitute in a gold mine. That's horrible. And so it's really a win-win for the animals, for the rangers, for the rainforest, for people, it's biocentric conservation. It's just making everything better.

Lex Fridman

Yeah. I've read in an article that said, "An estimated 1200 girls between ages of 12 and 17 are forcibly drafted into child prostitution around the communities in the gold mines, at least 1/3 of the prostitutes in the camp are underage. The girls had ended up in the camp after receiving a tip that there were restaurants looking for waitresses and willing to pay top dollar. They jumped on a bus together and came down to the rainforest. What they found was not what they were expecting. The mining camp restaurants served food for only a few hours a day. The rest of the time, it was the girls themselves who were on the menu. Literally at the end of the road, and without the money to return home, the girls would soon become trapped in prostitution."

Paul Rosolie

It's interesting to me that the most devastating destruction of nature, the complete erasure of the rainforest burned to the ground, sucked through a hose, spit out into a disgusting mercury puddle, like the complete annihilation of life on Earth, goes hand in hand with the complete annihilation of a young life. It's like it's all based around the same thing. It's the light versus the dark, it's the destruction in the chaos versus a move towards order and hope. And it is incredibly dark and this region is heavy with it.

Lex Fridman

Well, I'm glad you're fighting for the light. Is there a milestone in the near future that you're working towards, like financially in terms of donations?

Paul Rosolie

There is. In the next year and a half, as you saw in your time here, there's roads working around the Jungle Keepers concessions. All the work that the local people are doing to protect this land is trying to be dismantled by international corporations that are subcontracting logging companies here. And really what we need is \$30 million in the next two years to protect the whole thing. You've seen the ancient mahogany trees, you've seen

the families of monkeys, you've seen the caiman in the river. All of this is standing in the pathway of destruction. That road, they're going to come down that road, and men with chainsaws are going to dismantle a forest that has been growing since the beginning. This is so magical. Do you see the snake over there?

Lex Fridman

Yeah.

Paul Rosolie

Do you?

Lex Fridman

There's a snake.

Paul Rosolie

Okay. I'm just going to, don't move. I don't want you to move. I'm going to just, this is one of the most beautiful snakes in the Amazon rainforest. This is the blunt-headed tree snake, my favorite snakes. I've been hoping that you would get to see this snake. I have been praying.

Lex Fridman

Oh, boy.

Paul Rosolie

Okay. Okay. Let's just go right back into this. Okay. Look at this little beauty creation. Let's keep you away from the fire. Look at this little blunt-headed tree snake.

Lex Fridman

Wow.

Paul Rosolie

Such an incredible.

Lex Fridman

So tell me about the snake.

Paul Rosolie

Harmless little snake. If you put your hand out, he'll probably just crawl onto your hand. Just be real careful with the fire. So look, I'm just going to put them like this... Put him like this. We're going to... Yeah, let's just snake safety. So he's a tree snake. Yep. Nice and slow. Nice and slow. Nice and slow. So you nice and slow. Just really slow. Just be the tree. Be the tree that he climbs on. And this is again, this is a snake that's so thin and so small. There you go. There you go. Nice and slow. Just be the tree. Let him crawl around. So he is going to try

and do all this stuff. Let me see if I can just calm him down for a second. Let me just see. He's a very active little snake. So see like the snake the other night. Just look at this. I can see the light through his body. To me, this is an alien. This is strange little life form. His eyes are two thirds of his head. I'm not joking. You look at their skull. He's so tiny. He's so tiny.

Lex Fridman

For people listening, there's a snake in Paul's hands right now is very... It's long, of course, but very skinny. Very skinny.

Paul Rosolie

Very, very light. And also for everyone listening, the odds of that as we're sitting here, doing this podcast, that a snake would just be crawling by in the jungle, might sound like something that would happen. But the density of snakes in the Amazon rainforest makes this a very unique experience.

Lex Fridman

Can you tell me a little bit about the coloration scheme? A little bit brown?

Paul Rosolie

Yeah. Just to describe this as we were talking here, it's just a banded white and brown snake, with this tiny little head about the size of my pinky nail. Two thirds of this snake's head is made up of its gigantic eyes. It's got a small mouth, and it's about a third as thick as a pencil. It's basically a moving shoestring. It's incredibly, incredibly thin. The only thing I am thinking, Lex, is that if we have Dan come and just do some shots of...

Lex Fridman

Yeah, that's true.

Paul Rosolie

Dan.

Lex Fridman

So what are we looking at here?

Paul Rosolie

The snake that was crawling behind us in the jungle that we were talking about jungle keepers and what we could do, and the snake just showed up at that moment. And this is a very active little snake who's out for a hunt tonight and wants to find something to eat. So this is a blunt-headed tree snake, totally harmless, little... Literally a moving shoestring. Super beautiful little animal. When you talk about aliens, to me, this is an alien. What are you thinking? What are you doing right now? What do you think about the fact that you are being handled by these giant humans?

Lex Fridman

And as you were saying, it reaches up to the leaves, you get closer.

Paul Rosolie

Yeah. The snake just naturally knows to go look. You just put them anywhere near leaves and he is like, I got this. He just wants to go right up into that tree. I just want you to try holding them and real gentle, just be the tree. And just do the same thing you learned last night, just nice and gentle. Yep. And see, he's holding onto my finger right now. He's just going up. There you go. Perfect. Nice and easy. He's a little erratic. He's a little goofy.

Lex Fridman

Maybe he's camera shy. Maybe a fan of the podcast. And gigantic eyes relative to his body size. Oh -

Paul Rosolie

Jeez.

Lex Fridman

... hello, moth. Traffic, traffic in the jungle.

Paul Rosolie

And then for everyone listening as we're handling the snake that we found that was crawling by us, literally by our shoulders as we're talking, a bat flies through, no joke, eight inches from Lex's ear. Just zips past his head as he's holding a snake while we're sitting here in the jungle is just... We're just in it now. Now, he's going to try and back up.

Lex Fridman

And how do you...

Paul Rosolie

Yeah, why don't you... Let's encourage him to come back this way.

Lex Fridman

He's weaved this way.

Paul Rosolie

He's okay. He's just trying to back up. Yeah, right there. Release.

Lex Fridman

Oh.

Paul Rosolie

Release. Okay. This is what I'm going to do. We're going to say thank you, Mr. Snake.

Lex Fridman

Thank you, Mr. Snake.

Paul Rosolie

Thank you, Mr. Snake. Go back up into the tree. Here we go. There you go. There you go. There you go. And then we can resume normal podcasting now, because -

Lex Fridman

We really are in the jungle right now.

Paul Rosolie

We really are in the jungle. That's one of my favorite snakes. That's one of my favorite little aliens on this planet. Look at that.

Lex Fridman

And it's going on some long journey. It's going to -

Paul Rosolie

Up into the canopy.

Lex Fridman

... carry the rest of the night. So that little snake is one of the millions of life forms heartbeats that you're trying to protect.

Paul Rosolie

Exactly. To me, after almost 20 years down here, the people here have become my friends, the caiman on the river, the monkeys. When I fall asleep at night, I think about all the different forests that when they bulldoze this forest, when they chop down these trees, that they vanish, that we take away their world. And in that very evolutionary historical sense of remembering the primordial soup, it's like this little creature is surviving out here somehow. And we have the chance to save it. And even if you don't care about the little creature on the pale blue dot, each of these little creatures contributes to this massive orchestral hole that creates climactic stability on this planet. And the Amazon is one of the most important parts of that. And each of these little guys is playing a role in there.

Lex Fridman

So one of the other fascinating life forms is other humans, but living a very different kind of life. So uncontacted tribes, what do you find most fascinating about them?

Paul Rosolie

What I find most fascinating about the uncontacted tribes is that while me and you are sitting here with microphones and a light, somewhere out there, in that darkness, in that direction, not so far away as the crow flies, there are people sitting around a fire in the dark. Probably with little more than a few leaves over their heads, who don't even have the use of stone tools, who only have metal objects that they've stolen from nearby communities. They're living such primitive, isolated nomadic lives in the modern world. And they're still living naked out in the jungle. It's truly incredible. It's truly remarkable. And I think that it's because they can't advocate for themselves. They can't protect themselves. It's sort of like, well, we can let them get shot up by loggers and let their land get bulldozed while they hide. They have no idea that their world is being destroyed. But they're the scariest and most fascinating thing out there right now in the jungle.

Lex Fridman

Because you've spoken about them being dangerous, what do you think their relationship with violence is? Why is violence part of their approach to the external world?

Paul Rosolie

So from the best I understand it that at the turn of the century, industrial revolution, we had sudden immense need for rubber, for hoses, and gaskets, and wires, and tires and the war machine. And the only way to get rubber was to come down to the Amazon rainforest and get the local people who knew the jungle to go out into the jungle and cut rubber trees and collect the latex. And Henry Ford tried doing Fordlandia, tried having rubber plantations, but leaf blight killed it. And so you had this period of horrendous extraction in the Amazon where the rubber barons were coming down and just raping and pillaging the tribes and making them go out to tap these trees. And the uncontacted tribes said, no. They had their six-foot-long longbows, seven-foot-long arrows with giant bamboo tips. And they moved further back into the forest. And they said, we will not be conquered. And since that time, they've been out there. And it's confusing, because in a way, they're still running scared a century later. And their grandparents would've told them, the outside world, everyone you see in the outside world is trying to kill you. So kill them first. So can you blame them for being violent? No. Is this river still wild? Because loggers were scared to go here, for a long time for almost a century late? That's why this forest is still here? Yes. And so is it a human rights issue that we protect the last people on Earth that have no government, no affiliation, no language that we can explain? We don't know what their medicinal plant knowledge is. We don't know their creation myths. We know nothing about them. And they're just out there right now with arrows and arrows living in the dark, surviving in the jungle, naked without even spoons. Forget about the wheel, forget about iPhones. They got nothing. And they're making it work.

Lex Fridman

We don't know their creation myths. So they have a very primitive existence. Do you think their values... First of all, do you think their nature is similar to ours? And how do their values differ from ours?

Paul Rosolie

This is complicated because the anthropologist in me wants to say that they have a historical reason for the violent life that they have. They experienced incredible generational trauma some time ago. And because they've been living isolated in the jungle, that has permeated to become their culture, they've become a culture of violence. But yet, the contacted modern indigenous communities that we work with, that are my friends that work here... Just the other day, we were speaking to one of them who was pulling spikes out of your hand while he was explaining that he tried to help them, the brothers, Los Hermanos, he tried to help them. He tried to give them a gift. And what did they do? They shot him in the head.

Lex Fridman

Yeah. He said, there are brothers. And he tried to give them bananas.

Paul Rosolie

Plantains.

Lex Fridman

Plantains, boat full of plantains. And they shot at him.

Paul Rosolie

They shot three arrows at him, and one of them actually hit him in the skull and put in the hospital, and he got helicopter evacuated from his community. And so he's brave for surviving, but he's a lucky survivor. They are incredibly accurate with those bamboo tipped arrows. And those arrows are seven feet long. So when you get hit by one, they come at a velocity that can rip through you. And the range on a shotgun is way shorter than the range on a longbow. You're talking about a couple of hundred meters on a longbow. And they're deadly accurate. They can take spider monkeys out of a tree. And so there's stories of loggers, and I've seen the photos of the bodies of loggers who attacked one of the tribes. And the tribes hadn't done anything. But these loggers came around a bend. They started shooting shotguns at the tribe, and the tribe scattered into the forest. And as the loggers boat went around a bend, they just started flying arrows. Took out the boat driver, boat skidded to the side, and then everybody was standing in the river and you can't run. And the tribe just descended on them and just porcupined them full of arrows.

Lex Fridman

Shotgun versus bow. There's a shotgun shell here, by the way, from the loggers.

Paul Rosolie

Yeah, we picked that up yesterday. Was that yesterday?

Lex Fridman

That was... I don't know.

Paul Rosolie

I don't know.

Lex Fridman

One of the things that happens here is time loses meaning in some kind of deep way that it does when you're in a big city, in the United States, for example, and there's schedules and meetings and all this kind of stuff. It transforms the meaning, your experience of time, your interaction with time, the role of time, all of this. I've forgotten time and I've forgotten the existence of the outside world.

Paul Rosolie

And how does that feel?

Lex Fridman

It feels more honest. It also puts in perspective like all the busyness, all the... It kind of takes the ant out of the ant colony and says, hey, you're just an ant. This is just an ant colony. And there's a big world out there. It's a chance to be grateful, to celebrate this Earth of ours and the things that make it worth living on, including the simple things that make the individual life worth living, which is water, and then food and the rest is just details. Of course, the friendships and social interaction. That's a really big one actually. That one, I'm taking for granted because I didn't get a chance yet to really spend time alone. And when I came here, I've gotten a chance to hang out with you. And there's a kind of camaraderie, there's a friendship there that if that's broken, that's a tough one too. You spent quite a lot of time alone in the jungle. Ever get a alone out here?

Paul Rosolie

Yeah. Yeah. I mean, the first 15 years we were doing this, there would be times that JJ would be busy in town with his family. And for sheer love of the rainforest, I would have to come alone out here. And we didn't have running water. I didn't have running water. I didn't have lights. All I had was a couple of candles in the darkness and a tent. And I was 20-something years old, living in the Amazon by myself. Your boat sunk. And yeah, it's incredibly lonely. I had to learn through experience because I thought there's a period, I think when you're young... As a young man, I had this thing. I wanted to prove that I could be like the explorers. I wanted to prove that I could handle the elements, that I could go out alone, that I could have these deep connective moments with the jungle. And it's like, I did that and that's

great. And you know what? The kid from Into the Wild learned right before he died in that bus? That if you don't have somebody to share it with, it doesn't matter.

Lex Fridman

But some kind of even just deep human level, even if you have somebody to share it with... You ever just get alone out here. Just this sense of existential dread of what... The jungle has a way of not caring about any individual organism because it just kind of churns. It's like it makes you realize that life is finite quite intensely.

Paul Rosolie

For me, it's comforting being out here, because I find the rat race, the national narrative, the need to make money, to worry about war, to be outraged about the newest thing that politician said and what that actor did. And there's always just this unending media storm. And everyone's worried and everyone's trying to optimize their sunlight exposure and find the solution and buy the right new thing. And to me coming out here, first of all, I mean something out here because I can help someone. I can help people. I can help these animals. And so I find my meaning out here. But also, there's losing the madness over the mountains. It's nature has always, and for many people, been where things make sense. And to me, I think I'm a simple analog type of person. That it makes sense that when it rains, you get in the river to stay warm and you wait for the dawn and you see a little tree snake and it makes more sense. And I think that the overwhelming teeming complexity that is inside the ant mound of society can be dizzying for some people. And I think that maybe it's the dyslexia, maybe it's just that I love nature, but now when I land in JFK, I feel like a frightened animal. As if you released some animal that had never seen it onto a Times Square, and you could just imagine this dog with its ears back, running away from taxis and just cowering from the noise. And it's just hustle and bustle and people are brutal, and how much you want it for? Get in the car, screaming over the intercom and just everything, sensory changes and let's get home. Okay, let's go. You got a meeting, you got to get to the next place. You got to give a talk. You got to say... Out here, when we finish up here, what are we going to do? We're going to eat some food, maybe go catch a crocodile. Go walk around the jungle a night. It's slower. It makes sense. And again, there's that deep meaning of that here, we can be the guardians for good. We can hold that candle up and know for sure that we're protecting the trees from being destroyed. And it's that simple thing of just, this is good. There you go. It's simple. In society, I feel like everyone's always losing their minds and forgetting the most basic of fundamental truths. And out here, you can't really argue with them. When we needed water, it was like, shit, if we don't get water, we're fucked. And that's, to me, that's where the camaraderie comes from. Because no matter what, we could go to the most fancy-ass restaurant through the biggest, most famous people in the world. It doesn't matter. We still remember what it was like standing around in the jungle going, fuck, we're scared and we don't have water. We got reduced to the simplest form of humans. And that's something. And we survived. And that's cool.

Lex Fridman

And you take all those people in their nice dresses and their fancy restaurants, you put in those conditions, they're all going to want the same thing, that's water.

Paul Rosolie

Yes.

Lex Fridman

It's all the same thing.

Paul Rosolie

All the beautiful people.

Lex Fridman

How has your view of your own mortality evolved over your interaction with the jungle? How often do you think about your death?

Paul Rosolie

Well, I don't anymore because I've come to believe that there is a benevolent God, spirit, creator taking care of us. And I don't think about my own death. We have a little bit of time here and we clearly know nothing about what we're doing here. And it seems like we just have to do the best we can. And so it doesn't scare me. I've come close to dying a lot of times and I just don't think... You don't want to have a bad death. First of all, you don't want to be a statistic. You don't want to find out. You don't want to try out a... Be the first to try out a new product and oops, it crushed you. That's a terrible way to go, or the people that used to... In the Gold Rush, they were using mercury and they were all getting... Or lead. It was lead poisoning. And it's like, oh, a few million people died that way. And it's like, you want a good death. You want to staring down the eyes of a tiger or hanging off the edge of a cliff, saving somebody's... Something, something worthy. Warrior's death.

Lex Fridman

Riding a 16-foot black caiman just -

Paul Rosolie

Boots on, screaming. Yeah. That would be fun. That'd be a good one.

Lex Fridman

A lot of people say that you carry the spirit of Steve Irwin in your heart, in the way you carry yourself in this world. I mean, that guy was full of joy.

Paul Rosolie

If I have a percentage of Steve Irwin, I would be honored. But that guy... I think there's only one Steve. I think that he occupied his own strata of just shining light. Everything was positive, enthusiasm, love and happiness, and save the animals and do better and let's make it fun. And that was so infectious that it sort of transcended his TV show. It transcended his conservation work. It transcended business and entrepreneurship. It just through sheer magnetism and enthusiasm, I mean, everyone knew who Steve was. Everyone loved Steve. We still all love Steve. And so it's just amazing what one spirit can do. So if anybody makes that comparison, I get really uncomfortable because to me, Steve Irwin is just the G.O.A.T. And so I'm okay with that.

Lex Fridman

Well, I at least agree with that comparison. Having spent time with you, there's just an eternal flame of joy and adventure too. Just pulling you. A dark question, but do you think you might meet the same end, giving your life in some way to something you love?

Paul Rosolie

That is a dark question, but I think most likely, I'll get whacked by loggers. I think that loggers or gold miners will take me out. I don't picture myself going from animals, but...

Lex Fridman

That would be heartbreaking too.

Paul Rosolie

Yeah, it would. But yeah, at the same time though, the Kurt Cobain value of that, if I died doing what I love to protect the river, it'd be worth so much more. A lot... We'd get the 30 million if I died tomorrow for sure. So we've already talked about this with my friends. I'm like, if I get whacked, do the foundation, make the documentary, protect the river, protect the heartbeats. Call it The Heartbeats, Jungle Keepers, The Heartbeats. Be ready for it because these things do happen. People get pissed if you get in their way. And as many happy people whose lives were changing, there's also going to be some jealous, shitty, upset people who are mad that they can't make prostitutes out of young girls and keep destroying the planet. And so they might just erase you. Me.

Lex Fridman

Well, I hope you... Like a Clint Eastwood character, just impossible to kill. I like how you squinted your eyes. On cue. Who do you think will play you in a movie?

Paul Rosolie

God, somebody with the right nose. Somebody who can live up to this [inaudible 03:54:15]. Yeah.

Lex Fridman

Alright. Italian?

Paul Rosolie

Yeah.

Lex Fridman

It's funny. Do you think of yourself as Italian or human, American?

Paul Rosolie

That's the thing. My life has been the United Nations of whatever. To me, that's the other thing. You go back to society and everyone's obsessed with race. To me, I'm like, look, leopards have black babies and yellow babies, one mother. They're all leopards. And I'm so color-blind and race blind and everything else. I've lived in India. My friends are Peruvian, my family, we got Italian, Filipino, just everything. And so I'm so immersed in it that I find it very jarring and disconcerting, how much time we spend talking about different religions and just the differences in humans. I'm like, dude, we're talking about whether or not our ecosystems are going to be able to provide for us. We're talking about nuclear. What we're talking about this some pretty serious shit on the table. And we're over here arguing over shades of gray of... It's so trivial and that drives me crazy. And as does the outrage where it's like, no, you have to care. I've been criticized for not caring enough about that. And I'm like, who cares what the hell I am? Who gives a shit what the hell? I'm a human. We're all human. It's not that easy. But it's kind of fun sometimes. And we're at a better time. And when you think about the Middle Ages, even if you were a king, you still didn't have it that good. You didn't have pineapples in the winter. You didn't even know what the fuck a pineapple was. We have pineapples whenever we want them. We can fly on planes to other countries.

Lex Fridman

By the way, let's clarify, we, you mean a large fraction of the world? I mentioned to you, one of the biggest things I've noticed when I immigrated from the Soviet Union to the United States is how plentiful bananas and pineapples were. The fruit section, the produce section of the... Didn't have to wait in line at the grocery store, could just eat as many bananas and pineapples, and cherries, and watermelon as you want. That's not everybody has that.

Paul Rosolie

No, that's true. Not everybody has that, but -

Lex Fridman

But everybody could be that king. No.

Paul Rosolie

But a growing number of people today -

Lex Fridman

Can feast on pineapple.

Paul Rosolie

- can feast on pineapple and have toasters and new distracting apps all the way until the grave.

Lex Fridman

That's the thing that I also noticed is I don't think so much about politics when I'm here, or -

Paul Rosolie

We haven't even talked about it. We haven't.

Lex Fridman

Do you want to talk about the stupid differences between humans? Except to just laugh at the absurdity of it on occasion.

Paul Rosolie

We've been too busy trying to survive glaciers and jungles and avalanches and all kinds of shit.

Lex Fridman

Do you think nature is brutal as Werner Herzog showed it? Or is it beautiful?

Paul Rosolie

I think the brutality of nature is the chaos, and I think that we are the only ones in it that are capable of organizing in the direction of order and light. So yes, there are going to be hyenas tearing each other apart. Yes, there's going to be war-torn nations and poor starving children, but we as humans, have the power to work towards something more organized than that.

Lex Fridman

So there is a force within nature that's always searching for order, for good.

Paul Rosolie

It's kind of a unifying theory if you think about it. I mean, all of the chaos of history and the wars and the chaos of nature. Through technology and organization, there's so many people, more people today than ever before, I think, who are so concerned, who realize that the incredible power, like what Jane Goodall says about how you can affect the people around you. How you can do good in the world, how you can change the narrative of conservation from one of loss and darkness to one of innovation and light. We can do incredible things. We are the masters as humans. And I think that we're on the cusp of

understanding the true potential of that. I just think that more than ever, people have harnessed this ability to do good in the world and be proud of it and just change the darkness into something else.

Lex Fridman

When you have lived here and taken in the ways of the Amazon jungle, how have your views of God... You mentioned, how have your views of God change? Who is God?

Paul Rosolie

I've come to believe that, again, back to that Christ wasn't a Christian, Muhammad wasn't a Muslim, and Buddha wasn't a Buddhist. That the game game is love and compassion and the universe is chaotic and dangerous and nature is chaotic and dangerous. But if this is some sort of a biological video game that our reality, that the test is, can we be good? And we go through it every day. Can you be good to your parent? Can you be good to your partner? Can you be good to your coworkers? It's so difficult and we see how people can cheat and steal and hurt and destroy. And the incredible impact that it has on the world, the returning exponential impact that one act of kindness, one act of good can do. And so I see nature as God. I see the religions as different cultural manifestations of the same truth, the same creative force. Maybe me and you have the same beliefs, and your aliens are my angels.

Lex Fridman

Well, thank you for being one of the humans trying to do good in this world, and thank you for bringing me along for some adventure and I believe more adventure awaits.

Paul Rosolie

Thank you for being enough of a psychopath to actually just sign on to come into the Amazon rainforest in a suit. And a year ago when you told me that you were going to do this, I truly didn't believe you. So for being a man of your word and for the incredible work you do to connect humans, and to create dialogue, and to do good in the world and for all the adventures that we've had, thank you so much.

Lex Fridman

Thank you, brother.

Paul Rosolie

Lex, thanks man.

Lex Fridman

Thanks for listening to this conversation with Paul Rosolie. To support this podcast, please check out our sponsors in the description. And now, let me leave you with some words from Joseph Campbell. The big question is whether you are going to be able to say a hearty yes to your adventure. Thank you for listening and hope to see you next time.