

Ep 29 Science sort of

Patrick: We have a good banter. If there's something the show needs it's more banter.

Ryan: I know right, more derailments and sidetracking.

Charlie: I've almost opened the page where I can view the trailer.

Music

Announcer: Hello, and welcome to Science sort of.

Ryan: Welcome to Science sort of, Episode 29. The show that gives you things that are science, things that are sort of science, and things that wish they were science. Joining me tonight in his triumphant return is Patrick.

Patrick: Hey.

Ryan: And roving Paleo Pal reporter all the way in the great state of Hawaii, Charlie.

Charlie: Aloha.

Ryan: Today's theme is Stranger in a Strange Land. And tonight we're talking about bending light, hermaphrodite amphibious chicken insects all while learning kung fu. So, suss that one out nerds. First we're going to start the show off as we always do with what are we drinking? So, Patrick?

Patrick: I am drinking a Black Butte Porter from the Deschutes Brewery from the great state of Oregon.

Ryan: I almost had a Deschutes beer tonight.

Charlie: Likewise.

Patrick: I almost had a Kona, Kona Brewing company beer, but I figured Charlie might go for that.

Ryan: Since he's in Hawaii.

Charlie: I did.

Ryan: My beer. My beer is also from Oregon. Because I went, I was at a bar on St. Patty's Day, which we've mentioned last show, and they had this Kells Irish style lager from Rogue Brewery. I saw a bottle of it on somebody's table and that was what I ordered when we got there but they didn't have any cold so I got some different beer instead. So I was craving this Kells Irish style lager from Rogue and went out and picked up a, picked up a bottle for myself.

Patrick: Ah, that sounds pretty good.

Ryan: It is really good. It's probably my, it's probably my second favorite lager. So, Charlie, what are what are you drinking tonight?

Charlie: When I was in Oahu I drank this Maui Brewing Company IPA that was delicious, but I couldn't find it in the small town of Volcano village that I am here but they do have a nice Kona selection. So I have the Kona Pipeline Porter that I think Patrick has had on the show before. But it's pretty great because it's made with Kona coffee.

Patrick: It's delicious. Yes, and I'm glad I went with my Deschutes beer because that is the exact beer I was going to choose otherwise.

Ryan: That would have been pretty funny if you guys were having the same beer. 3000 miles away.

Patrick: Yeah, well, you know, soulmates can't be kept apart by mere distance, right?

Ryan: Are you guys soulmates?

Charlie: Not at all.

Ryan: I didn't know that. Oh.

Charlie: Pretty close.

Ryan: I was gonna say, I kind of feel bad get left out of the, left out of the trio. I guess you'd be a duo if you two were soulmates?

Patrick: Yeah, a trio be down to two.

Charlie: We're both Tauruses, that, I mean, that, astrology is everything, controls everything in life.

Ryan: And nothing.

Patrick: And everything.

Charlie: Maybe nothing. Probably nothing.

Ryan: Speaking of magical thinking that people want to control their lives, Patrick's story comes from us, comes to a straight out of *Harry Potter*. Patrick, you want to introduce what you're gonna be talking about tonight?

Patrick: I was thinking it comes straight out of Star Trek, the Klingon cloaking devices.

Music

Ryan: I'm less well versed in *Star Trek* that I am in *Harry Potter* but I'm working to rectify that. I was watching Star Trek at work today. Probably shouldn't admit that on air but I was working while watching so.

Patrick: Yeah, working for Science sort of.

Ryan: No, no I was I was working for, well, I'm always working for Science sort of.

Charlie: You were multitasking.

Ryan: Exactly. I was printing out flyers while picking forams.

Patrick: Okay, anyways, this this story is, a well, I guess there's there been stories leading up to this. There's lots of people working on trying to make a a cloaking device. Or, working to make fabrics or devices that bend light around whatever object that they want to hide. And, they're pretty interesting, although I don't think any of these work in the in the visible light spectrum.

Ryan: Yeah, that was how I understood it.

Patrick: So you have to have special detectors to see that you can't see whatever it is.

5:05

Ryan: It's invisible take off those goggles.

Charlie: Yeah, exactly.

Patrick: So people have successfully made fabrics or devices that, that can hide things. But up until now that they've only worked in one plane, so basically you have to be standing you have to be looking at something from a specific angle for it to appear invisible. That's a weird phrase. Isn't it appear invisible.

Ryan: Well, otherwise, it's visible.

Patrick: Right. And now, and now this team, let's see, I lost the team name. Oh, no, there's too many people cited in this frickin article.

Ryan: I'm leaving all of this in Patrick.

Patrick: Ergin, Ergin and colleagues. No. Yeah.

Ryan: Tolga Ergin.

Patrick: Ergin.

Ryan: Olgargen.

Patrick: Olgargen.

Charlie: They're at, they're at, at the, like Cal, Cal Tech of Germany or something like that.

Patrick: Yeah, they're in Germany. Anyway, so they they've made this device that you can, you can see, or you can't see the object they're trying to hide for about 30 degrees off that, that central plane where, where you would normally not be able to see it. So, so normally these things, the way I understand it are, are built in such a fashion think of like tubes. And so if you're looking straight into the tube, so think of like a series of subway tubes going off into the distance right in front of you all in a row. And so when you look through those subway tubes, they bend around whatever the object is and show you the light and they bend light from the other side. So you're seeing the light that's coming from the opposite side of the object. So you just see right through it, basically. And so the problem is, you if you go, if you look at it in any other plane, you can sort of see those tubes and see that and also see the object underneath that fabric. And so it no longer appears invisible. But these these guys have built something more like a, I don't know, Ryan, or did you ever have Lincoln Logs?

Ryan: I was a Lego kid.

Patrick: Like, yeah, Lincoln Logs were I guess, before, they were really before my time too.

Ryan: In the days of wood before there were plastics.

Patrick: Right. But you know what they are. Okay, so they're stacked like that. So I guess that light bounces around in this crisscross pattern. And in order to direct light in from the other side of the object and the way that the light bounces, you can actually be you know, at slightly different angles and still get the same effect. So that's how they solved that, that problem. But looks like we're still a ways off from being able to you know, hide a starship.

Ryan: I'm wondering, I'm trying to think of a potential application for something that you only can't see in a 30 degree range.

Charlie: Well, it seems like it'd be great in, in the battlefield, when you're heading towards an enemy. I mean, granted, this doesn't work in visible light, but until the enemy flanks you, you'd be invisible.

Sure. And also, if you're trying to hide something from spy satellites, they probably...

Charlie: Oh, right.

Patrick: Would work pretty well. But, you know, all of these things, we're working towards engineering something that will actually work in real life. And this is just a step forward, Ryan, this isn't the finished product.

Ryan: “‘This is a huge step forward’ comments Vladimir Shalev at Purdue University in West Lafayette.” It's right there in the article.

Patrick: Yeah, that's, he's one of the extra people in there.

Charlie: I live in a studio in SF and sometimes I don't want to feel like I'm watching TV in my bedroom. If I could put this thing in front of my bed, then all of a sudden, my room would look a lot bigger and be all spacious. It'd be an aesthetic thing too. You could hide like your pile of dirty clothes as well.

Ryan: That's true. And they've also got those, have you ever seen those screens that you can put on your laptop that, that basically make it some people can't see what you're doing on your laptop.

Patrick: Right.

Ryan: Unless they're standing like right behind you.

Patrick: Right.

Ryan: You could make this on your laptop, so that people couldn't see like, what YouTube videos you're watching.

Patrick: Or the secret documents you're working on.

Ryan: Well, I'm normally working on secret documents, which is why I don't let people stand behind me. Just as a general rule.

Patrick: Right.

Charlie: Watching Star Trek.

Ryan: So all right, this...

Patrick: I guess, I guess we've worn that out.

Ryan: Yeah.

Patrick: I thought there'd be more, more banter. But perhaps that's a straightforward article.

Ryan: They did this in the James Bond movie, kind of...

Patrick: Sort of you mean?

Ryan: Sort of, yeah.

Charlie: Sort of.

Patrick: What did they do?

10:00

Ryan: He had a car that had tiny cameras on the exterior in all directions. And it basically would record whatever was directly in front of each of the cameras and then project that image on the opposite side of the car. So when you looked at the car, you were seeing a projection of what the cameras were recording on the other side of the car, so it looked invisible.

Charlie: Yeah, I've seen like military designs for suits like that, where you're covered with video cameras and also covered with LCD screens.

Ryan: Right, right.

Charlie: But, but it makes it have more of like a predator effect where you can still see something shimmery and strange, but at least it works in the visible.

Patrick: Right. That's, that's a plus.

Ryan: Well, this works in infrared, right? That was with the the type of light they were using.

Patrick: Yeah, I guess you could use it to hide...

Ryan: I mean, that's what SWAT teams use when they're looking at a building getting ready to storm it. So, you know, if you're, if you're holding hostages inside the bank and the SWAT team is trying to figure out how large a force you have. If you had, you know, half your guys wearing this invisibility cloak that couldn't be seen on infrared the SWAT team would come in half as prepared to fight you guys.

Patrick: It could perhaps, divert heat seeking missiles as well.

Ryan: I don't know if that would work. Mm hmm. Would that work?

Patrick: I don't know. I don't know.

Ryan: Because you'd still be giving off heat?

Patrick: Yeah, that's true.

Ryan: Nice try Patrick.

Charlie: Stick to the chafe.

Ryan: But you're still, you still have, you still have heat seeking missiles to worry about.

Patrick: Ahheh. Always. Bane of my existence.

Ryan: Right.

Patrick: Well, speaking of improving your fighting techniques...

Ryan: Oh, really? I was gonna say speaking of things I wish I could see.

Patrick: That, that could be any of the three stories I don't know where you're going with that one Ryan, you're going to have to lead us on.

Ryan: Oh, that's true. I was thinking see, like a movie.

Charlie: Oh, okay. So that we were both headed the same place.

Ryan: Yeah, yeah.

Patrick: Alright.

Music

Announcer: Hey, y'all, its Trailer Trash Talk.

Ryan: I want you to know that in my everyday conversation, I've started using podcast style transitions. I was talking to somebody, and I was like, well speaking of, like, I had, I had a specific topic in mind I wanted to talk to this person about but I was making small talk first. So I literally took the small talk I'm like, "Well speaking of such and such, let me ask you about such and such."

Patrick: Hmmm, that must be a marketable skill somewhere.

Ryan: I guess, I don't know. Transition artist?

Patrick: I don't think we're quite there yet.

Ryan: Arteeest.

Patrick: That might be a lofty title at this point.

Ryan: I don't know. I think lofty... go ahead, Charlie.

Charlie: Nevermind.

Ryan: It's gonna be the show where Charlie just says nevermind.

Patrick: Nevermind. Again and again and again.

Charlie: I just feel like I'm three seconds behind the conversation the whole time so I'll just...

Patrick: Kid day karate.

Ryan: Yeah, let's do Trailer trash Talk. Y'all.

Patrick: Yous guys.

Ryan: Yeah, do a New Jersey accent for this one.

Patrick: I hadn't intended to, no, I think I would do a lousy one.

Ryan: Like, Daniel-son.

Patrick: I think, I used to do better accents. They've deteriorated in my old age. I think I must not here as well as I used to or something, I don't know.

Ryan: Or you don't expose yourself to different cultures. Enough.

Patrick: Maybe? Well, I think, actually, I think exposing yourself to different cultures hurts, I think.

Ryan: Really?

Patrick: When you have, if you only know one, say person from Jersey, you just imitate them. If you know lots of people from Jersey, it's hard to put together, what is the essence of a Jersey accent.

Ryan: Hmmmm.

Patrick: Does that makes sense? You, you go from doing just to get...

Ryan: It makes sense, I don't know if I agree. But the point is, Danielson had to move from Jersey to California just as Dre...

Patrick: Dre? Is his name is really Dre?

Ryan: His name is really Drey, has to move them from Detroit to China.

Patrick: Hmmmm.

Ryan: Which is the premise of the remake of *The Karate Kid* starring Jaden Smith and Jackie Chan.

Charlie: Wait, what race is the new Karate Kid?

15:00

Ryan: That's its

most my son,

Patrick: African American.

Charlie: Awesome.

Patrick: Or, African American-Chinese.

Ryan: How's he Chinese?

Patrick: He's living in China.

Ryan: Well, but he doesn't make him racially Chinese.

Patrick: Well...

Ryan: Is, Charlie is Charlie native Hawaiian now?

Patrick: No, but he's not living there, he's just vacationing.

Ryan: For a month.

Patrick: If you were born in Mexico and you live in America, you're Mexican American.

Ryan: Yeah. But you're also probably Latino.

Patrick: Okay, so what, you're talking about ethnicity versus race.

Ryan: I don't want to talk about *Karate Kid*. I don't wanna...

Charlie: He's an Earthling...

Ryan: Yeah, we're all Earthlings.

Patrick: All right. Uh, so I was pretty down on this. When I first watched, well actually, I didn't watch it. I just saw that it was being a remake and I saw that it was Jayden Smith and I was, I was nonplussed for the most part but I decided to watch it anyways, ah, this week. And then subsequently suggested it for Trailer Trash Talk. Um, you know it's not going to be it's not going to win any Oscars. I think it's going to accomplish the same thing the first one accomplished which is lots of 12 year old boys are going to sign up for karate lessons after this, after seeing this movie.

Ryan: Let's hope.

Patrick: That's what America needs.

Ryan: Yep, I don't know. I, so I was thorough, this week with Trailer Trash Talk. I went back and watched the original *Karate Kid* trailer.

Patrick: Oh, I thought you're gonna say them original *Karate Kid* movie.

Ryan: No, no, I don't think I could handle that.

Patrick: I thought, I thought have done anyways. Don't you do that every week Ryan?

Ryan: While I'm checking my Sasquatch Google Alert. I just sit around and watch *The Karate Kid*. Play with my transformers. No, I'm I watched the original trailer.

Patrick: Okay.

Ryan: This trailer is way better, that's not a good trailer. As someone, I kind of feel like, I mean, I, you know, I know I made that joke about us being artists before but I kind of feel like I now have somewhat of a critical eye when it comes towards trailers.

Patrick: We should.

Charlie: That's great.

Ryan: I watch them a lot. You know, I'd say two or three times a week I hop on Apple trailers and just see what's out and watch a few and not all of them...

Patrick: Yeah, the thing is we watch a lot more than we actually talk about, it's painful.

Ryan: Yeah, cuz you have to research.

Patrick: Yeah.

Charlie: You can but that skill on your resume.

Ryan: Trailer critique.

Charlie: Trailer aficionado.

Patrick: I like artist.

Ryan: I don't make trailers, I just I just review them.

Patrick: Critical trailer artist.

Ryan: There we go. Um, so, so I watched the original *Karate Kid* trailer. And this is a way better trailer and might actually be a better movie. We'll see. But I'm kind of down with this. I...

Patrick: Well, yeah, I mean, as much as I can, I can be with you know, a 12 year old boy and Jackie Chan as the leads of the...

Ryan: I have, I have no problem with either of those things.

Patrick: What kills me is on the, on the message boards on IMDb under, under *The Karate Kid 2010*, here, so here are some of the titles of these posts: "Beyond pathetic", "Karate Kid vs. kung fu kid", "Bleep this remake", "Boycott this film", "Stick to the original", "Wax on wax off, paint a fence", "Karate in China? Karate is Japanese". So, yeah, people, people in general are not happy about this remake, as far as I can tell.

Charlie: People in general are not happy.

Ryan: People in the, people in general on the internet, aren't happy. It has nothing to do with *The Karate Kid* remake.

Patrick: But that was basically my attitude before I watched the trailer though. This is, this trailer actually does a pretty good job of you know, making people see life in its, its way. It's like the invisibility cloak from, it directs all the light positively.

Ryan: Karate in China? Karate is Japanese. Jackie Chan calls it kung fu the entire trailer.

Patrick: It is called *The Karate Kid*.

Ryan: Yeah it's because they needed the title for the remake.

Charlie: It amazes me that someone's, someone's mood is affected and if not ruined by watching a trailer. Not happy with it.

Ryan: I'm excited by this trailer.

Patrick: Ah, there's a couple of things I'm not, I'm not sure about. Like I feel like a, you know some of the scenes that were so memorable in the first one are him doing the chores that are actually teaching him the, the moves. you know, or the technique. So him painting the fence, him waxing on waxing off as that post alluded to. But as far as I can tell, in this trailer, the only thing Jackie Chan has him do is like take a jacket on and off three or four times and then he's got the move down. There's no like painting the fence all day long.

20:03

Ryan: There's gonna be a training montage and I'm already excited for it.

Patrick: Well, that was what the original *Karate Kid* managed to avoid, the training montage.

Ryan: Okay, well, maybe the trailer is the training montage. I like a good training montage. What's wrong with a training montage?

Patrick: I don't know. When I lived in, when I lived in Austin, there was, there were these great theaters called the ah, the Alamo Drafthouse. And they would have various events. And one, one event that they had was a montage of montages. It was like, it was like an hour show of just montages.

Ryan: I am there.

Patrick: You would have loved that theater, Ryan, that would you would have been, you would have basically moved in.

Ryan: I think I'll be in Austin in May. So I'll probably go and check it out.

Charlie: I like the distillation and deconstruction of a training montage in *Kill Bill 2*.

Patrick: Remind me. I remember there being a training montage...

Charlie: When she's, when she's training with Pai Mei, carrying, carrying the water up the staircase over and over again and punching, punching the post over and over and over again till her knuckles bleed.

Patrick: Right. Yes, I remember that. Why is that, why is that a deep, why is that deconstructing...

Charlie: A training montage is taking the piss and a ironic way. I enjoy it.

Patrick: I see. So it can't be *Rocky*. It has to be.

Charlie: Well, no *Rocky* is okay, because that's old.

Patrick: Okay. You can't, you can't get away with doing a real training montage anymore. That's your point, right?

Charlie: Yeah, it's got to.

Patrick: ...ironically. Yeah. Well, that's why I, that's why I said *The Karate Kid 2010* needs needs some chores because I, the training montage just isn't gonna cut it.

Ryan: He takes him to a monastery. I'm sure there'll be some chores to do there.

Patrick: I like that same with the cobra.

Ryan: Yeah, that was cool. Learning, learning cobra style.

Patrick: Yeah. It is gonna be cool.

Ryan: I know. Like, I mean, I think of it...

Patrick: Even as a 30 year old I'm going to enjoy this movie.

Ryan: Like, I have a feeling if you and I go see this movie together we're going to be punching each other on the way out of the theater and doing kicks and stuff.

Patrick: Yeah, it's gonna be *Fight Club* for for the tweens.

Charlie: I feel sorry for the people sitting in front of you guys during this, during this show. Their seats are gonna be rocked.

Ryan: Patrick, you didn't read the most relevant forum posts on IMDB to our discussion. So, according to DragonDenim, he says "this is the worst trailer I have ever seen. What kind of douche bag would pay to see this?" This kind of douche bag DragonDenim.

Patrick: I guess.

Ryan: Oh boy.

Patrick: I don't know what kind am I?

Ryan: The science kind.

Patrick: The science kind.

Ryan: The science douchebags. That would be a great theme for a show.

Patrick: Science douchebags. I gotta disagree with you there.

Ryan: Yeah. But in theory.

Patrick: Everything in theory.

Ryan: Communism works in theory. Hey, and it's China. Wow, I brought that back around even I thought I would.

Patrick: All right. Well, well, yeah, last thoughts before we thumbs up, thumbs down this thing.

Ryan: I like the song. And I think for the first time I might just straight up use the song from the trailer as the transitional song out of Trailer Trash Talk. So...

Patrick: Excellent. Well, let's keep it a secret then.

Ryan: So if you like the song that's coming up in a minute or two. You'll like this trailer. Maybe? I was embarrassed, I was embarrassed to find out that I liked it when I looked up what it was. Keep people in suspense...

Patrick: I can't believe you didn't know what it was already.

Ryan: I didn't know what it was. And then I looked it up and I was like, Oh, I can't believe I like that. But I do. It'll be good song to go running to.

Patrick: Okay, perfect. All right. Well, I think it's evident by our discussion already. I'm going to go ahead and thumbs up this this trailer.

Ryan: Ditto.

Patrick: And if I could buy stock in some sort of karate teaching dojo franchise I would. Because everyone's gonna sign up for karate lessons after they see this movie. That's...

Charlie: The front fist way with Danny McBride.

Patrick: The front fist way. That's it. That's a classic.

Charlie: I'm still gonna thumbs up it even though I can't hear you guys.

Ryan: That's what you get for being our roving reporter out in Hawaii. It's like the new shows whenever they have the satellite uplink. And they always say, and now to Charlie out the field, Charlie, what do you got for us? And there's always this pause, the awkward pause.

Charlie: Mmmhmmm, yeah.

Ryan: You're like why is it Charlie saying anything?

25:00

Patrick: Hold a, hold a finger to his ear...

Ryan: Right.

Patrick: ...and wait for an awkward...

Ryan: Yeah. Yeah. Thanks, Patrick. Now back to you in the studio.

Charlie: It's gonna be a hit out here I think. There's a lot of strip malls and a lot of dojos in the strip malls.

Ryan: Nice. So they're going to promote it.

Charlie: They'll milk it, yeah.

Ryan: Well speaking of weird things going on in Hawaii.

Patrick: Ooh yeah.

Charlie: Oh yeah.

Music

Ryan: The reason, so Charlie is actually in Hawaii on assignment for Science sort of. We're not sure why we sent the physicist to cover the biology story, that was probably an oversight on our part. But Patrick, I had stuff to do. So Charlie, you, you found out something about an aquatic insect of some kind.

Charlie: Not only that. An aquatic invasion, these are some insects that are amphibious in their larvae stage. They can live and eat indefinitely, either above or underwater.

Ryan: Okay.

Charlie: And this is the first insect species that's ever been discovered that, to have this capability. And so it turns out that there's these, there's 12 different species of caterpillars that can do this. And this is interesting, because, well, I should

mention, this is a Proceedings of the *National Academy of Science* article by Daniel Rubinoff at the University of Hawaii, Kauai. And this is interesting because they did some genetic sequencing of these 12 different species and found that there's three separate, three separate genetic lines and that they're completely separated by fully terrestrial lines, meaning that the caterpillar can only live above ground. So what this, what this is saying is that these three different lines evolved independently. And so this is...

Ryan: Right.

Charlie: ...this is something that can that can happen on Hawaii, supposedly. And they think that this is only evolved in the last 6.8 million years. And this is 6.8 million years ago is even before the island of Kauai existed. And so these, these insects are taking advantage of this very wet and dry ever changing cycle on the islands of Hawaii by evolving this pretty incredible trait.

Patrick: Yeah, that's pretty cool. So what's cool is they can, you know, you think that the trick is really being able to breathe in both places. So they breathe like normal insects breathe when they're above water using book lungs. And then they just diffuse oxygen through their skin when they're underwater, and they can do either apparently with equal, equal... what's the word I'm looking for?

Ryan: Proficiency?

Patrick: Proficiency, that's a good one.

Charlie: They tend to live in a fast flowing streams. And so these waters are highly oxygenated. And so they can...

Patrick: Right.

Charlie: Yeah, they.... straight out of the water.

Ryan: So they are taking the easy way route is what you're saying.

Patrick: Right.

Charlie: Yeah, they're total cheaters.

Patrick: Yeah.

Ryan: Lazy.

Patrick: I mean, hell, I could probably breathe in a fast flowing stream.

Ryan: That's what I was thinking. I mean, I scuba dive. So you said that the tough thing is breathing on both land and underwater, which I can do with a tank, but they can feed on both land and water, which is something I can't do.

Patrick: You probably could if you packed your lunch.

Ryan: Underwater? Gross. Remember those cuttlefish snacks we ate when Sora was on the show?

Patrick: Yeah.

Ryan: Yeah, I don't want to eat that.

Charlie: Yeah, I hate, I hate when I buy a soggy sandwich. Like...

Ryan: Right, soggy sandwiches are the worst.

Charlie: ...the bottom slice of bread, the bottom slice of bread is all soggy and if you ate underwater, your whole sandwich would be soggy.

Ryan: I know, so. That's what impressed me more is that they can find food and both environments. But there are lots of, there are lots of insects that have larva that do live in the water.

Charlie: Right, yeah, so like in the streams of Oregon, there's these mayflies that spend like a year as this as a creepy thing underwater and then they turn into to adult flies that last about a month. Coincidentally, in May,

Ryan: They last the month of May.

Charlie: Yeah.

Ryan: As May flies. But there's also insects that have fully terrestrial larva larval stages too.

Patrick: Yes.

Ryan: Like the regular caterpillar. So this is just this is The first time that something's been both.

30:01

Patrick: Yeah, it can go either way.

Charlie: Yeah, this thing, this thing doesn't care. He's perfectly happy, he or she is perfectly happy under or above the water.

Ryan: That's pretty cool. And they're lep, that's all from the order and lepidoptera.

Patrick: That's basically just butterflies and moths.

Ryan: Uh, I don't think moths, are moths lepidopterans?

Patrick: I believe...

Charlie: Yeah, they are, they are.

Ryan: Okay. I thought they might be something else. Oh, they are okay. That means, so that means scalewing...

Charlie: Lepidoptera, which includes moths and butterflies and contains more than....

Ryan: Ah, there you are.

Charlie: 150,000 species.

Ryan: That's a lot of species.

Charlie: Mmmhhmm. That's entomology.

Ryan: Yeah, entomologists, way more species than they need. They are hogging all the species.

Charlie: Etymology which those people are dealing with way too many words.

Ryan: True. As are the entomologists.

Charlie: And epistemologists, they have to deal with both words and insects and everything else that we could possibly know.

Ryan: You want to tell, I don't, do you want to give a good definition of epistemology because I'm not even sure I can define it.

Charlie: The study of knowledge.

Ryan: Oh, that was easy.

Patrick: Basically the study of science sort of.

Ryan: The study of science sort of and all things that we spew out.

Patrick: Science and sort of.

Ryan: 100% knowledge. It may be science, and it may be sort of, but it's all knowledge.

Patrick: Until, so until you can upload your brain to the internet. This is the best it's getting, this is as good as it gets.

Ryan: And I plan to.

Patrick: I know you do.

Ryan: I mean, this is, this is step one for me is having as much of myself on the internet as possible.

Charlie: But reading this article, I didn't even know that Kauai didn't exist 7 million years ago. That's crazy.

Ryan: Wait, which island did you say you're on Charles?

Patrick: He's on the...

Charlie: I'm on the Big Island and it's being made as we speak.

Ryan: Yeah, you should get out of the way.

Charlie: I'm on the rim of that volcano right now.

Ryan: How's that working out for you?

Charlie: Smoke vents that smell like sulfur. And there's...

Ryan: Be careful up there.

Charlie: There's a quote by Mark Twain next to one of them that said, "This area smells of sulfur, but it isn't unpleasant to a sinner". And I felt bad because it wasn't too terribly unpleasant to me.

Ryan: Well, we've already, we've already mentioned the Mark Twain quote, it might not have been on air, but "You go to heaven for the..." or, "Heaven for the climate, hell for the company".

Charlie: Yeah.

Ryan: And there'll be a live Science sort of, sort of recording in hell in about 200 years.

Charlie: Wow, you're living a long time.

Ryan: Well, that's I mean, that's actually I probably won't be on that show, it'll just be you two. I will still be up here.

Patrick: Doing what?

Ryan: Well, I don't know, being an internet wraith, having my consciousness dispersed on the intertubes.

Charlie: Multitasking.

Ryan: I already multitask way too much.

Patrick Well speaking of being at home in two worlds... or is that not a good one?

Ryan: They never are good. They're just functional.

Charlie: What are we moving on to next?

Ryan: How about out of the, well let's see. So Charlie is in the fire because he's next to a volcano. So out of the fire and back into the frying pan.

Patrick: Okay.

Ryan: Cuz, cuz sometimes you fry chicken.

Charlie: Speaking of chickens between worlds, speaking of animals between worlds, I don't know...

Ryan: There you go.

Patrick: Yeah. How about another kind of amphibian.

Ryan: An empty, sexual being.

Charlie: Speaking of chicocks...

Music

Ryan: Okay, so enough beating around the chicken bush. There is a story that came out in the March 10th issue of *Nature* by Michael Clinton of the University of Edinburgh that basically solved the mystery of half-sexed chicken which probably doesn't sound like it makes a lot of sense, I'll explicate...

Patrick: This probably gonna have to be the art.

Ryan: I was thinking about that, um, and I'll definitely link to this story. If not, you know have this as the art.

35:00

But basically about one in every 10,000 Chickens is what's called gynandromorphic. So gyn for female, andro for male, and morphic for shape. Which basically means that it is half male, half female, and it's split right down the middle. So if you see a picture of this chicken, it literally has a line in the feathers. You can see where one half is female and one half is male. It's, it's wild.

Patrick: Yeah, and they picked a breed that is, you know, sexually...

Charlie: Yeah, this picture looks, totally shocked. Like, I don't believe it.

Ryan: Well believe it.

Patrick: Here's the science.

Ryan: Here's the science. So when it comes to sex, gender based sex, not reproductive sex, there's there's a couple different strategies that animals use to determine what sex the offspring is going to be. Humans, as most people probably know are what's called genetic sex determination, where the genes of your embryo determine what sex it is going to be. And the hormones come into play based on those genes and help finish the job. So female humans have two X chromosomes and male humans have an X and a Y chromosome. But you probably also heard in nature documentaries, that some animals have temperature based sex determination, like most reptiles, I believe. Crocodiles, alligators, turtles, things like

that. So you've seen how the distance that they bury their eggs in the sand from the shore or something like that makes a big impact in the sex of the clutch because, you know, the distance they are from the shore, that affects the temperature and the temperature is what affects the sex. Did I get most of that right. Patrick or...

Patrick: Yeah...

Charlie: Thermal diffusion.

Ryan: Right. So birds, as far as we understood, were genetic sex determination. But instead of having an X and a Y chromosome, they have a z, ah, z and w chromosome.

Patrick: Right.

Ryan: And so a male bird is zz. And a female bird is zw. But then you have this weird mystery where literally half the cells on one side of this animal were zz male, and the other half of the body was zw, female.

Patrick: Which they never really explain.

Ryan: Right.

Patrick: Which to me, that's the really amazing part of this whole thing.

Ryan: Yes. But...

Patrick: Is lining a path, lining up your male cells on half the, if you, if you happen to have both kinds of cells, lining half of them up on, on one side of the body and the other half on the opposite sex side of the body.

Charlie: It almost seems like right when the zygote split, one of them was the zw and one was zz, and then they just ran away from there.

Patrick: Yeah, that's basically, I was, so I did a little more research on this. Read Wikipedia. And ah...

Ryan: Don't give away the secrets to the show.

Patrick: Gy, gynandromorph...

Ryan: If the Paleo Posse knows about Wikipedia it will just stop listening and research everything themselves.

Patrick: So...

Charlie: You have...

Patrick: Asexual gynandromorphy where half your body is one thing and half your body's the other, if it doesn't happen, if it happens, it takes it starts taking place when you have something like 8 to 12 cells in your body. So it has to start, so basically I think what you were saying Charles is probably right. Like it, it, half go one way, half go the other. There can be mosaic gynandromorphy and things like butterflies, lobsters, spiders, sometimes show this. Butterflies are especially famous for it because they, they'll be sexually dimorphic colors and the mosaic gynandromorphs will have wings of, you know, blotched, sections of the wings will be either male or female. But they want be split down the middle the way these chickens are.

Charlie: Crazy.

Patrick: Yeah. Well, they got, they go on to, I guess the point of this article really was that in humans, you can basically overcome xx or xy cells by basically overdosing them with hormones or releasing hormones at the right time in development. And then the cells will develop either as male or female, depending upon the hormone you release. But that doesn't really happen in birds. You can make, you know, the half male, chicken look all male if you give the other cells the right hormone, but if you stop giving them that hormone, they just go back to to being half female. Whereas if you took a mammal early in development, and you gave it the right shot of hormones, those cells would go on to develop as whatever hormone you gave them. And scientists thought that was the way most, I guess, most prokarya, well, most life that has two sexes worked. Was that hormones were directing this, were directing what sex you are going to become, but they're starting

to backpedal and think that no, actually your, the genetics of the cells are actually, in most cases, probably what's determining what sex you are. And hormones just happens to be how it works in mammals.

40:26

Ryan: Which is why males have nipples.

Patrick: Ummmm...

Ryan: Because you start off in utero development as female but when the right hormones are released at the right time you develop all your male parts, but the nipples are already there.

Patrick: Naturally.

Ryan: You sound skeptical...

Charlie: It would look weird otherwise.

Ryan: You think it looks weird, you only think that it would look weird because you're used to looking at your nipples. You're probably looking at your nipples right now, Charlie.

Charlie: You saying I'm stuck in, stuck in a lens or something? This is the only world known and so I can't think outside of it.

Ryan: Yes. I'm saying your your nipple centric.

Charlie: Fair enough.

Ryan: One of the other really cool things this article mentioned, it's not really relevant to the discussion but platypus...

Patrick: Right.

Ryan: 10 sex chromosomes.

Charlie: Yeah, that was crazy.

Ryan: What is going on there? So apparently a male platypus is x y x y x y x y x y.

Charlie: I don't trust the I didn't trust them beforehand, and I really don't.

Ryan: See, whenever you bring the platypus into a discussion, scientists get skeptical because the platypus just doesn't make sense. Male platypus don't have nipples. You know why? Because female platypus don't have nipples. There are no nipples and on the platypus, anywhere to be found. Did you know that Charlie, did I just blow your physics mind?

Charlie: What are they good for? Get rid of them?

Ryan: You're not our Karl Pilkington. We've already got a Karl Pilkington. Yeah. But duckbill platypus just sweat milk through the chest hair. And yes, you're right to think that's gross.

Patrick: Well, mammary glands are modified sweat glands.

Patrick: Yeah, but people don't like to think about them that way.

Charlie: We might have to do a whole show on the platypus.

Ryan: Agreed.

Charlie: That is the Science sort of of animals.

Ryan: Yeah, well, the naked mole rat is kind of the science sort of of animals.

Charlie: Oh, yeah, that's true.

Ryan: But, but I feel like they're, they have a lot in common with duckbill platypus.

Patrick: We're just getting started. We should do a whole weird animal show.

Ryan: Oh, I've got articles ready in the can. The only other thing I want to mention for this article, because a lot of times, you know, just like people sometimes comment on the music and say like, you know, we actually had a comment this week on on the Twitter's that complimented us on the music on last episode, which, you know, again, we've mentioned before that we actually do put thought into that, and so thank you. It was Davean, Davean? Yeah. Daniel, Danielle. It is Danielle.

Patrick: Danielleson.

Ryan: Danielleson. So, thanks. I personally also put more thought than I probably ought to in my beer. And just for the Science sort of trivia buff, the reason I went, well, another reason I went with my Kells Irish style lager is not just the leftover St. Patty's day even though I did really want one. But it's also because the likelihood of getting a gynandromorphic chicken is about one in 10,000.

Patrick: You lost me somewhere.

Charlie: Yeah, what's the, and the likelihood of getting that beer is more than 10,000, 10,000 were made? What?

Ryan: One, one in every 10,000 4-leaf, or, clovers has four leaves.

Charlie: Ah, so...

Ryan: So I went with the Irish beer.

Patrick: It's all coming together now.

Charlie: ... circuitous.

Ryan: So, so years from now, when we're in a pub quiz of some kind, and the question is why was Ryan drinking a Kells Irish Lager in Episode 29 and you say because one in 10,000 birds is gynandromorphic, you'll get a point.

Charlie: What if you say Ryan's brain operates in a perverse manner?

Ryan: That would probably also qualify for some points? I would think. Do you guys know why four leaf clovers are considered good luck?

Patrick: Ah, because only one in 10,000 clovers is four leaves?

Ryan: Yeah, but I mean...

Charlie: It looks like a Celtic knot.

Ryan: No. No. Well, maybe that's where the Celtic knock came from but um, the thinking is that clover like if you're, if you're looking for a place to settle and start your farm and build your house and things like that, and you come across a field of clovers, that's not a bad place to settle down. So if you found a four leaf clover, chances are you were surrounded by at least you know 9999 other clovers, so you're probably in a field of clover. So if you stopped in that spot and started your town or your farm or whatever you would have good luck because you were just stopping in a place that was good fertile soil. For growing all this clovers in the first place.

45:07

Charlie: A well fed aquifer.

Ryan: Exactly. So how about that?

Charlie: So where does the four leaf clover come in? Seems like a three leaf clover is just as lucky by that criteria.

Ryan: Well, the thinking is, if you found a four leaf clover, you're probably surrounded by a crap load of clovers.

Charlie: Oh, okay.

Patrick: Ahhh, would be, yeah, that's, probably, yeah, I mean, yes, there's, more likely, I guess. I don't know. We'll have some stats wizards on in the future. We got some lined up.

Ryan: Okay. Agreed. And then we'll, I'll bring this back up.

Patrick: Okay.

Ryan: So that's the mystery of the gynandromorphic chicken, I guess, solved, or, at least pondered.

Patrick: Yeah, not even solved. It only makes me more curious. I'm like, okay, so, so why is half a chicken zz and the other half is ew. That's what I want to know.

Ryan: Cuz some people are, and chickens, are just weird.

Patrick: Not, not good enough. I'm gonna have to know, more, more science.

Ryan: I heard about this woman who, who had some weird disease and they were like testing her genetics versus her kids. And they found out that her kids weren't her kids. Even though she'd given birth to them and conceived them.

Patrick: Hmmm.

Ryan: And it turned out she was a genetic chimera and that she had like, had some weird, had one of those incidences where the twin and you re readjust the twin but it was like a fraternal twin. It wasn't a maternal twin, right? It wasn't an identical twin. So she actually had two sets of DNA.

Patrick: Yeah.

Ryan: So her, her kids had a set of DNA and it wasn't her original DNA. It was weird. So she was a genetic, the term is chimera, just like the mythical beast.

Patrick: And the ah, crap I screwed this one up in that episode too. Not the elasma brain but the chondrichthian.

Ryan: What about him?

Patrick: Also called the chimera.

Ryan: Oh, also called... the rat, the rat fish.

Patrick: The rat fish.

Ryan: Charlie and I were looking at some some weird fish last week.

Charlie: Yeah, they're croc fish. I don't know what the real name was. That's what I call them because they had the mouth of a crocodile but the body of a fish or the body of a...

Ryan: And the sea dragons.

Patrick: Were they gar?

Ryan: Yeah, they probably were gar. And the upside down jellyfish.

Charlie: They had big old muscley fins.

Ryan: They did, they, are they sarcopterygians, Patrick. Do you know?

Patrick: Garfish? No.

Ryan: Yeah, okay. They had a coelacanth.

Patrick: Oh, that's cool.

Ryan: Not a live one. I thought it might have been alive.

Patrick: Is this at the Academy of Sciences?

Ryan: Yes. Charlie and I went on a field trip after recording last week to the aquarium together. It was cute.

Charlie: We saw some sea dragons.

Ryan: We did. The sea dragons are awesome. Speaking of load fin fish. Let's do the Paleo POW segment.

Patrick: All right.

Music

Ryan: Because all of our listeners are lobefin fish.

Patrick: That's true. Well, we, presumably, I don't know.

Ryan: I mean, we probably have some, you know, cat and dog listeners, but I doubt we have many fish listeners. I bet most of our listeners evolved from a sarcopterygian.

Patrick: That's probably correct.

Ryan: Yeah.

Patrick: Well, no. Yeah. And are sarcopterygians.

Ryan: If you want to look at it like that.

Patrick: Geeks, that's what you're advocating.

Ryan: Fair enough. You beat me my own game Wheatley but that means you get to go first.

Patrick: Okay. Well my Paleo POW segment is kind of convoluted. We have a...

Ryan: This show is convoluted.

Patrick: ...a long, a long term listener, who I'll refer to as Sam. And Sam wanted us to, Sam actually set up a Science sort of NCAA March Madness bracket with the New York Times. And we sort of dropped the ball on this, but the fact is that the, the

bracket, the teams come out and the game starts so quickly, it's hard to actually get a bracket filled out in time. But anyways, so the, the official Science sort of NCAA 2010 March Madness bracket contains three people. Sam, myself and Ryan.

Ryan: Hello.

Patrick: And currently, I'm leading the group. Sam is second and Ryan is third.

50:01

And if you if you want to compare us to the entire population of people who filled out a bracket with the New York Times, I'm currently 76th.

Ryan: That's not bad.

Patrick: No. Sam is 10,169. And we that's, that's, out of approximately 40,000 people. And the reason we know it's out of approximately 40,000 people is because Ryan is ranked 39,947.

Ryan: Hell yeah. All right. So listen, this is the veritable definition of a day late and \$1 short. I had the dubious distinction of logging into this website the day after the brackets were due. So they gave me an account but they just wouldn't let me pick a bracket. So I, I'm kind of just stuck with no choices.

Patrick: However, I, I think my day in the sun is going to be short lived because I picked Kansas to win it all. And Kansas is out of the tournament at this point.

Ryan: Ouch, ouch.

Charlie: Ohhhhh.

Patrick: So I think this is as high as I'm going to climb. But 76 isn't bad, right?

Ryan: No, not at all. I'd be I'd be happy if we were number 76 on the Science and Medicine podcasts on iTunes.

Patrick: Sometimes we are.

Ryan: I think we're at 83 right now. But yeah, well, I guess this is a preview for March Madness 2011 when Science sort of is on top of it and creates an actual bracket and gets the Paleo Posse involved, is that right? Is that what you're promising right now live on air. Patrick.

Patrick: The thing is, we'd have to really get on it ahead of time because you have to fill these things out. You have to, you only get about two days before the teams are out. Yeah.

Ryan: And that's what you're promising to do is what you're saying.

Patrick: Yeah, sure.

Ryan: So you promise to get it set up and inform the listeners in time.

Patrick: All right. I'm just setting myself up for hate mail in a year but fine, I promise.

Ryan: Hate mail is better than an empty inbox Patrick.

Patrick: Says you.

Ryan: Indeed I do. So speaking of hate mail, Charlie, what do you have for us.

Charlie: Ah, mine comes from Angela B or Angel Labbel.

Charlie: I'm guessing it's Miss Angela B. She writes "Science and beer, what else could you ask for? I love this well edited and charming podcast, podcast. These guys had me as soon as I heard them ask, what are you drinking? I love how accessible they make the science. I also appreciate that they can spend 30 minutes talking about how R2D2 couldn't possibly fly in decrying those terrible, terrible prequels. And yes, Han Solo did fire first. Don't change anything guys. Podcasts that don't have personality include friendly banter are not worth listening to."

Patrick: Ahhaa. Kind words.

Ryan: Well said. You know what I'd like to ask Angela, what are you drinking? How you doing? Cuz I like what you have to say about the show.

Patrick: What are you guys up to?

Ryan: You going back to Jersey there on us Patrick?

Charlie: And we just went from charming and well edited to creepy and poorly edited.

Ryan: If it's poorly edited, it must have been a show I didn't do. I'm an editing master at this point.

Patrick: Yes.

Ryan: I can see an um in the spectrograph. I can see Patrick fidgeting with his mic. I can see it all. It's like, it's like, when the, in the matrix when he's staring at the numbers. He's like, yeah, I don't even see the numbers anymore. I just see blonde, redhead, brunette. It's the same way. It's just I see Patrick's laugh, Charlie, sigh.

Charlie: So you have synesthesia, you can look at waveforms and hear it.

Ryan: I can't hear it. I just know what's being said.

Patrick: Okay.

Ryan: Like I will I'll kind of not be paying attention while I'm editing. I'll, you know, I'll have the show playing on the editing program, I'll be playing cards or something on my other screen. And I'll hear something, I'll hear something that I want to edit and I'll hit pause and then I'll look over and I'll know, just looking at it, like I'm pretty sure this is what I want to edit out. And I'll double check it, you know, listening to it, but normally I can just see where the problem is and take care of it. Not actually gonna go back and listen.

Patrick: Do you have a Paleo POW this week? Ryan? Are you just gonna...

Charlie: His Paleo POW is himself.

Ryan: I'm just saying I was worried it might be a short show so I wanted to riff a little bit, sorry.

Patrick: Okay.

Ryan: Oh, boy. Okay. You guys ready for this?

Patrick: I, no, I can't guarantee that I am but I'm...

Ryan: Okay.

Patrick: I'm willing to listen to what you have to say.

Ryan: Okay, well, it's not from me. It's from it's from Josiah in Rochester. Wait, it says Rochester, MN. Is that Minnesota.

Patrick: I guess so.

Ryan: Okay. "I just listened to Episode 16. And I was thinking about exothermic and endothermic intellectual creatures. I looked back on episode 2 and came across the problem about zombies. They would have to be endothermic if they were to confiscate their prey at night, but they do it all in cold blood. They could be exothermic and get their heat from the electric light in the malls. By the way I cannot legally drinks beer so I drink black coffee and ate deformed pretzels while listening, keep the intellectual phenomena of science and goodwill towards men."

55:11

Patrick: Hmm.

Ryan: So he's asking, basically our thoughts on the thermo regulatory capabilities of zombies.

Charlie: We think, we have a thinker on our hands here. This guy sounds pretty bright.

Patrick: Um, well, they do tend to move slower than the average human.

Ryan: Right. But as, I mean, I always assumed that was just from muscle degradation. I didn't think that was necessarily from their thermal regulation, could be I guess.

Patrick: Right. Yeah...

Charlie: They do operate packs, though. So maybe when they're all clustered together to preserve their warmth.

Ryan: What's called, what's that, what's that one? There's this type of, that type of thermi has a word.

Patrick: I don't know, it's essentially, I mean, it's akin to gigantathermi except, each bunch ball together...

Charlie: Co-thermi.

Ryan: There's - for it.

Charlie: Codependathermi.

Patrick: ... thermi.

Ryan: Yeah, something like that. That's possible, I guess. But are they? I mean, the question is, but that only works, so the huddling type of, type of endothermy only works when you're all producing at least some heat, right?

Patrick: Yeah. Well, if you're, I mean, just moving muscles, you know, you get hot when you move. So just running...

Ryan: Yeah, you do.

Patrick: And so do lizards, like will do push ups to get warm in the morning. So, just doing activity will, you know, causes your metabolism to raise and that produces heat. So if you're all moving around together, that that might work. If you're traveling impacts.

Ryan: Kleptothermy is the title.

Patrick: Okay.

Ryan: Snakes do it too. And ah, elephant seals and tuataras apparently we're talking about tuataras earlier.

Patrick: So that'll do, that's totally plausible.

Ryan: And termites, termites have kleptothermy. So alright, so kleptothermy, which makes sense. And so and they're probably since they're eating brains and flesh, they're probably getting some of their heat, like a lot of animals get preformed water in their food, they're probably getting preformed heat in their food.

Patrick: Yeah, I mean, you know, you the last thing you want to do, if you go for a run is drink a hot cup of coffee, you know, you don't...

Ryan: I normally drink coffee before I run.

Patrick: That's fine. You want...

Ryan: Studies have shown that caffeine helps reduce lactic acid buildup after vigorous exercise. So, you know.

Patrick: You exercise vigorously.

Ryan: Every day. I'm just trying to bring the science Patrick. Just trying to let people know that if they're going to do something vigorous so maybe have a cup of coffee first, cigarette afterwards. Maybe a couple of drinks. I don't know.

Patrick: Somewhere in there drink a, drink an Irish coffee.

Ryan: There you go. Irish love their coffee.

Patrick: Yeah, I don't know if those counteract the effects or not. Probably. Probably don't want to exercise. I'm sure I don't want to exercise vigorously after drinking an Irish coffee.

Ryan: I don't know. You don't think being a little little tipsy would help with your exercising. Just I think it would make you worry less about overdoing it and hurting yourself. So you would probably exercise harder.

Patrick: Yeah. Or Not at all.

Ryan: Or Not at all.

Patrick: I tend to be like, yeah, I'll get up. I'll get up early tomorrow and do it.

Ryan: You won't though.

Patrick: Exactly.

Ryan: Cool. I like that kleptothermy theory, though. I think we're onto something there.

Patrick: We can get Ben to model that.

Ryan: Did you guys here he's uh, he's volunteering with like kindergarteners to help teach them statistics or modeling or something like that. But he's basically going to put them all in a gym and making them pretend to be zombies and it just sounds like a disaster waiting to happen, but I can't wait to see the results... posted, posted on the Facebooks.

Patrick: Yeah... it's in Canada it'll be fine.

Ryan: Because they'll freeze, because that's the other thing about zombies is that you can freeze a zombie solid.

Patrick: You can freeze anything solid.

Ryan: Well, I'm saying you can freeze a zombie, you can freeze a zombie, like zombies freeze at zero degrees Celsius is what I'm saying. This is a fact.

Patrick: Well, humans freeze at zero degrees Celsius.

Ryan: No, they don't because we produce our own heat.

Patrick: Right, but a dead human...

Ryan: Well, a zombie is a dead human.

Patrick: Well, okay, so what's the big surprise then?

Ryan: I'm saying, they can't be endothermic if they freeze at zero degrees Celsius.

Patrick: Okay.

Ryan: That's all I'm saying.

Patrick: Okay, that's good observation.

Ryan: Apparently not. I got a bunch of flack for it.

Patrick: I just didn't understand where you were, what exactly you were saying.

Ryan: I am, I am terrified, if you ever have to review one of my papers. I just feel like I'm gonna get ripped to shreds.

1:00:04

Patrick: It happens.

Ryan: Yeah, it's true. You could be the third reviewer. I feel like we've lost Charlie, somewhere along the way.

Patrick: It's probably time to wrap this, this.

Ryan: Comeback, Charlie!

Patrick: Shut this mother down.

Charlie: I'm back, I'm just...

Ryan: Maybe, maybe zombies drink coffee?

Charlie: Is there a higher biomass of cold blooded animals in the tropics than the subtropics? And in temperate regions? It doesn't seem like there are any cold blooded animals.

Patrick: I'm not sure we call it, are you asking if there's if there's more ectothermic animals in the tropics than in temperate places?

Charlie: Yeah, because it seems like there isn't any, there aren't really any zombies in the tropics. They always occur in, in temperate climates.

Patrick: I think he's saying that, like you don't see very many zombies, in, say, Siberia. They tend to take place in, zombies are generally warmer areas.

Ryan: Right because the tropics, they would, they would decompose too quickly and fall apart. But in the Arctic, they would freeze solid and be non functional. So they have to kind of be in the temperate regions. Charlie: It's a homeostasis of sorts.

Ryan: It is, which is, we're all about the things that are sort of science.

Charlie: All right, let's wrap it up.

Ryan: Charlie, you're always, you're always so ready to quit.

Charlie: I'm not ready to quit, I just, I'm a good, a good, I have a good eye for this. I know what makes a good succinct, pithy, cogent show that's enjoyable to listen to, but doesn't run on too long. I don't overstay my welcome.

Ryan: Well, let's see wrapping it up per Charlie's orders. Where can people go if they want to find out more about the show, Patrick?

Patrick: www.sciencesortof.com is a good place to start.

Ryan: Where else can they go Charlie?

Charlie: Facebook.

Ryan: And they can just Science sort of and join our fan page where there's all kinds of fun discussion. There was a discussion that happened on the Facebook page completely independent of any of us saying anything.

Patrick: That was excellent wasn't it.

Ryan: That was awesome. And it was a good discussion. It was, it was ah, actual legitimate, like somebody asked a question for the show, and the Paleo Posse stepped up and answered it for us. And that, other than the fact that you're stealing content out of our mouths, that is the kind of thing we like to see. So thanks for that. That was awesome. You can also follow us on Twitter, play along with the twitterings at twitter.com/sciencesortof and voicemail. We need them. That's, that's at 312 paleo pals or 312-725-3672. And you can call and leave a voicemail. Give us your name, where you're calling from try to keep it about 30 seconds, ask us a question. If you're gonna ask a ask us a question, Charlie had a good idea last week where he said, say at the beginning of your voicemail "This is a question" and that way we won't listen to it beforehand. We'll, play it live on air and you can you can stump us.

Charlie: Exactly.

Patrick: Or watch us surf to Wikipedia. Or, listen, listen to us surf to Wikipedia.

Ryan: That'd be the point of the show is that we wouldn't be allowed to do that.

Patrick: Okay.

Ryan: Which actually this probably a good time to announce an upcoming episode we'd like to do if people are interested is a, a all quiz, the Paleo Pals show. So if you have questions for us that you would like to try and stump us with, send those to quizmaster@sciencesortof.com. It's an email account set up specifically for the quiz show. And it is not accessible by any of the three of us only by the mysterious quiz master who will be announced live on air. And also you know, if you want to

call him leave a voicemail, do it that way. Just say this is a question and we won't listen to it beforehand. And so in a couple of weeks we'll have that, that show. It'll just be an all questions show and you can try and make us look more foolish than usual.

Patrick: So is that quizmaster just together, all one word?

Ryan: All one word so qi, quizmaster@sciencesortof.com. But if you'd like to email us a question that we're allowed to see, you can do that at...

Patrick: paleopals@sciencesortof.com.

Ryan: And...

Patrick: Or any of our names in front of sciencesortof.com, like Patrick@sciencesortof.com.

Charlie: Charlie@sciencesortof.com.

Ryan: Ryan@sciencesortof.com. And I am Ryan, and you've been listening to Science sort of, thanks for listening. Tune in next week for more science. And this is the part where I was thinking, guys, so I'm going to say tune in for more science, and you both go sort of, and then that's how we'll end. So ready, I'll do it again. Thanks for listening. This has been science sort of catch us next week for more science...

Charlie and Patrick: Sort of.

Ryan: Perfect.

Patrick: Wow, I'm gonna have to host one so I can make you say something silly at the end.

Ryan: Come on, We needed a good sign-off line for 29 episodes.

Patrick: Did we? Do we need one?

Ryan: I think so.

Announcer: Thanks for listening to Science sort of. Our show notes are available at sciencesortof.com which will have links to all the stories we talked about today. You can follow us on twitter@twitter.com/sciencesortof. You can get in touch with us at paleopals@sciencesortof.com or on our Facebook fan page. A great way you can support the show is by subscribing to our feed on iTunes and writing a review so other people have a better chance of finding the show. And if you have a friend you think might be interested, tell them to give us a try. That's all for this week. Thanks for listening and see you next time on Science sort of.

Music

Charlie: I was just trolling the comments of the hermaphroditic or, what is it? Gynandromorphic chicken...?

Ryan: Yeah.

Charlie: In the comment section. Some, somebody posted, Big Ed man posted. He goes "I got a joke for you. What determines the sex of a chicken? It's, it's CROWmosome." Spelled with C-R-O-W. I like that. Patrick: All right.

Charlie: Let's let's take this episode out back and shoot it.