Bret and Heather 72nd DarkHorse Podcast Livestream\_ Dogs, Fr...

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**SPEAKERS**

Bret, Heather

**Bret** 00:11

Hey folks, welcome to the Dark Horse podcast live stream number II. What number is it? 7272. I use the variable so we could slot 72 in there. It'll be seamless.

**Heather** 00:22

That was a seamless slot on your part. Yes,

**Bret** 00:23

that was was pretty close to seamless. So anyway, we're getting good.

**Heather** 00:28

Yeah. Yeah, is the spring equinox in the Northern Hemisphere?

**Bret** 00:32

In the northern hemisphere,

**Heather** 00:33

it is the fall Equinox in the southern hemisphere.

**Bret** 00:35

So that sounds inequitable. No, no, it's not an equitable.

**Heather** 00:42

No, I don't I don't actually Okay, here's a challenge to all of you critical race theorists out there. Figure out how that's an equitable.

**Bret** 00:51

Well, it's an equitable because spring is dawning. And that is like 16 different kinds of awesome. And the southern hemisphere is actually watching winter dawn, which is, which is Donald fall, that fall skews me. But in any case, Winter is coming for them. And so therefore, that does sound rather unfair. I mean, all right. I'm abandoning this line of reasoning, having driven us into into sophistry for no particularly defensible

**Heather** 01:22

Well, that is, to your defense, that is exactly what the critical race theorists seem to do is drive us into Sava street for no obvious reason, except for what self promotion and being power hungry something. But today, we are actually going to talk a little bit about that we're going to start by talking about springiness and frankness. And then we're going to talk about vaccinations some again, as has become our want. Anything else? Any announcements for the top of the hour?

**Bret** 01:50

Yeah, I'm a little hesitant on this one, because I do not want to give any oxygen to ill intentioned people. But somebody has apparently started a rumor that the Dark Horse podcast has about five episodes left and then it will vanish. And if this is true, we've heard nothing about it, and you would think we'd be the first to know so

**Heather** 02:10

yes, know what we're talking about, then. We're talking about it just to

**Bret** 02:13

kill off the rumor, because apparently,

**Heather** 02:17

well, now that rumor isn't owned by orders of magnitude more people than knew it before. So other announcements are that we are actually going to make more merchandise at some point. And because people seem to appreciate some people seem to appreciate what we were doing back in December in January of this year, we haven't done anything since. But we forgotten most of the ideas that we had. So we have a list including, we were talking to one point about migrating songbirds and how the gonads of male songbirds are quite heavy. And so they literally reabsorb them during migration and regrow a pair upon landing in their mating grounds. And so regrow a pair was proposed as one. One thing that might show up on on shirts for instance, but if you remember anything, as you've heard here that you think would make plausibly decent merchandise. Go ahead and email our moderator, Darkhorse, moderator, Dark Horse belt, moderator, Dark Horse dot moderator@gmail.com with any of those

**Bret** 03:18

two, which to whom we apologize for the huge onslaught of, of suggestions that she is likely to encounter, but there will be

**Heather** 03:26

more of those at the end of the hour. So apologies. Okay, so middle of the episode, Ishmael, though, early on, you're going to as promised last time, say something directly to Iran candy, who did not no surprise, respond to you, you know, he plausibly never didn't know that you had invited him to respond. But that being that as it may, well

**Bret** 03:49

might have lost his opportunity. Good. Let's, let's talk

**Heather** 03:54

just a little bit about spring and frogs first. Okay. So this is as we already talked about the spring equinox, it's usually on the 21st ish, the equinoxes and the solstices of the of March, June, September and December but that can vary because one started even though we expected him and as I don't know, these these is a moment when I watched our decision.

**Heather** 04:23

to, to, to to be my mom, is this spring for us as I speak to you right now, which means that the days are now

**Bret** 04:45

Oh, the days are equidae

**Heather** 04:48

photoperiods. Yeah. So the period of darkness and the period of lightness and even that's not quite right or the same on equinoxes hence, equal equinox. But actually, that's not of course true. Because Because light spreads in the way that darkness doesn't, right? So, at the point that your sunrise and sunset are just making up numbers here, so 66 more light in a 24 hour period than darkness because astronomical Dawn is earlier than astride, I actually remember. I don't remember what the terms are but like it begins to get light aeronautical dawn, maybe I don't remember, gets it begins to get light before the sun is actually over the horizon. And the inverse is true

**Bret** 05:30

at the opposite. It's interesting. It's a holdover effect and there are a lot of these in hold up what you mean by holdover effect I mean that the light holds over past the the sunset and precedes the sunrise. So it's, it's a holdover from day, at least at the end of the day, the phenomenon of day last passed the the terminus

**Heather** 05:55

phenomenon of de extends beyond the borders of when the sun is visible in the sky. I don't know that holdover effect is that useful here I think for me anyway, it's more useful to think of, you know, of light reaching into crevices in the way that dark we're in a place that atmosphere as we have for now. You know, like light reaches into crevices and darkness doesn't unlike say, you know, on the moon, where you've got these sharp, sharp, sharp boundaries between darkness and light,

**Bret** 06:24

yep. Well, I just wanted to point out whether holdover effect is the right time. You know, there are a number of these things like the fact that winter is actually contrary to what most people intuited period in which the days are getting longer, and yet, for a goodly period, it is getting colder rather than warmer. I mean, so that that has to do with the loss of heat from the ground and things like that. But let me ask you something about equinoxes. I feel like you and I practice this stuff. We think a lot about it. We talk about it with our kids. This is one that I have always there is a an element of the explanation, which does not add up to me.

**Heather** 07:05

No, I did. So has there have been moments when I've been thinking a lot about this? And I haven't really in preparation for today. So you may throw me something that I should know and have known but don't know at the moment?

**Bret** 07:16

Well, it's very stupid of me to introduce this into this live conversation. But here we go live fire exercise. The question is the equinoxes are six months apart? And they are three months from the solstices. Yep. Those periods are mathematically precise. What I don't understand is why the point in our orbit at which day and night are equal actually arises three months after the solstice, because Shouldn't it be the case that in our orbit, we will travel at different speeds at the apogee and para G and therefore, shouldn't the point at which our day lengths are even our day and night lengths are even? Shouldn't that point be somewhere else other than three months out from from these two points?

**Heather** 08:13

It's it's path possible. So it seems not to be the case. Right?

**Bret** 08:18

I bet that's that's my assumption is that my thinking is wrong. But I can't figure out why it is.

**Heather** 08:22

Well, it may be that to the degree that we aren't actually traveling at the same speed all the time. The variation is effectively noise rather than we're sort of ramping up. You know, we're getting we're, you know, it seems like, boy, and we're here, we're out of our skis here. But it seems like we should we go

**Bret** 08:40

off stars, he's at this point.

**Heather** 08:43

It seems like we, if anything, if there's anything that you might predict about the speed of the Earth around the Sun, relative to its position and its orbit, it might be going faster, might be going faster as it's closer to the sun gave me

**Bret** 08:55

certainly my expectation faster in a linear sense, faster

**Heather** 08:59

in the linear sense, not in the not in the orbit, not in the daylength sets yet. Right. But, but that seems not to be the case. And I feel I feel certain that I and therefore we're missing something in the analysis of why the speed. Why that wouldn't be happening to the speed like if that were happening, maybe that would mean that the orbit was decaying, and we were more quickly than not going to end up in the sun. I'm not sure. I'm not sure about that.

**Bret** 09:30

So maybe we'll find out from some astute and sophisticated listener or just someone who's recently taken astronomy, right or gastronomy. I mean, I don't think that would help. If they're not hungry, they're able to think more clearly. So

**Heather** 09:44

you tell me you're hungry. No, suggesting that

**Bret** 09:47

if we find somebody who is laser focused on these issues that they are, they're likely to be people who are not also starving,

**Heather** 09:54

I say, I say so. I thought that being spring There's just a paper that was recently published about frog calls. And I worked on frogs as you are well aware. And is true that in the Northern Hemisphere, the spring equinox is a moment around which many people are beginning to hear a lot of frog calls. So there are there are more than 7000 species of frogs worldwide. And there are a lot of ways that frogs hook up a lot of ways for frogs to meet their mating partners, actually, and they do hook up they they do hook up very

**Bret** 10:32

rare frog that has an extended relationship.

**Heather** 10:36

And here's Zach, you can just show my screen for a moment I just I went back into one of the lectures I've given on amphibians over the year. This is various frog reproductive positions. It's called m Plexus and and the male in gray and the female in in white, and they just, they don't have what's called an intermittent organ they don't have a penis or equivalent and so they just have to touch Quakers and they figure out a lot of ways to do it. So that's that's kind of a hookup and sometimes he does hook his his fingers or his toes around around the female and and sometimes Plexus can last for months.

**Bret** 11:15

now. Wait a second. Did you just say that? No. Frogs have a penis?

**Heather** 11:21

Yes. However,

**Bret** 11:23

you see where I'm going with?

**Heather** 11:24

I do you aren't don't go for it. Well,

**Bret** 11:26

I was just going to say isn't there at least one claim? Maybe it's even just one species that I think we have locally here. Am I wrong? Yeah.

**Heather** 11:34

So it's the most basil clade of extinct frogs escaped today with the type genus basil escaped us. It is a it is that common name is tailed frogs. And they are Yes. Here in the Pacific Northwest and endemic the Pacific Northwest. And they it is they're called the tail frogs. It's a tail. It's it's the it's the remnant of, of a tail.

**Bret** 11:56

It is the remnant of a tail that functions as an intermittent organ.

**Heather** 12:01

I didn't look I don't remember for sure. But I think so. Yes. Okay. But I Boy, you know, I'm here talking about frogs. If I know everything about frogs, remember, there's over 7000 species, I don't know all of them. I think Escape is true. I may still be the only species it may. There may be more now. I don't think it may be used as intimate in Oregon, but it's not a very good one. Okay, but that.

**Bret** 12:22

So we are now engaged in escapism, I would say I absolutely. But it's interesting that that it is basil. Because this is a little bit like the familiar example that people will know is the egg laying mammals, the monotremes are basil to the mammal tree. So the point Lapis and the kid knows. So people will be familiar with a characteristic that was part of the early radiation of some clade that persists but was lost quickly, and therefore you only have the few species left, or in this case, escaped us. Maybe it's one, one species, but anyway, yeah, so the exception that I wouldn't say proves the role in this case, but it helps to demonstrate it

**Heather** 13:02

right. So lots and lots of ways for frogs to get it on. And lots you know, and actually, the frogs that I've worked on, sometimes give tremendous parental care to their kids, they, you know, have relationships with real life relationships with their offspring. But almost no temperate species do temperate species, temperate species, referring to the temperate zones, where most viewers probably are, as opposed to the tropics or the or the polar regions, the Arctic and Antarctic. And what, to the degree that people are in the northern temperate zone right now, and it's spring now as of today, and they're hearing these courses of frogs from local ponds. Those are what are called explosive breeding assemblages.

**Bret** 13:48

And don't worry, it's not dangerous,

**Heather** 13:49

I have yet to find an actual frog exploding. So it could be interesting, I'd feel sorry for the frog. But that's not actually what it refers to. It's these frogs who have been depending on where they are and what species hiding out, sometimes buried underground, literally frozen solid for the winter, in order to survive the winter, like lots of crazy adaptations that frogs use to get through a harsh, Northern temperate winter. They are now convening in one place, that is, that is a good site for them to breed in. And these sites tend to be reproductively limiting for them. And so you get lots of spin off and you get lots of species in one place. And they show up in these explosively breeding assemblages, explosive, I think, really just referring to the fact that like, Well, last week, there was no one there and suddenly Oh, my God, it's so loud. I can barely hear myself think it's an explosion of

**Bret** 14:35

frogs. Yeah. So. So question for you. I can think of two reasons that you might have repeated evolutions of explosive breeding and frogs. And I'm wondering is there is one of maybe there's an explanation I haven't thought of, but do we know why this evolves repeatedly. So I would say so my explanation wouldn't be that one, it could be the ephemeral nature of the opportunity. That's probably so to the extent that a pond shows up and is available for a brief time, there might be an optimal moment to breed in it and all of the frogs would have some detector that would tell them in that optimal moment is I'm doubtful of this because not all of the ponds will be ephemeral. Not

**Heather** 15:21

all the ponds are ephemeral. However, the more in the temperate zone you are, the more important the seasonal change will be. to getting it getting it right in terms of like this is the moment when you're laying eggs, because this is the amount of time your eggs are going to take to mature into tadpoles and that your tadpoles will take to metamorphose into frogs. And those frogs have to be of a certain size and gained a certain number of resources before the next winter comes or else they're more likely to die.

**Bret** 15:45

Okay, and watch this. If the pond isn't ephemeral, it is much more likely to have fish in it. And if it has fish in it, it's not so great for frogs, there are frogs that get along with fish to an extent, but when we typically find one of these ponds that has just, you know, 1000s of frogs in it, it tends to be fishless.

**Heather** 16:03

So it's pressed so Oh, I thought I thought you were going to go to, to some degree concentrating all at once in a pot, you know, if if sites without fish are absent, yeah, then it could be a form of predator satiation

**Bret** 16:17

that was gonna be my other hypothesis was that the explosive breeding. So the way predator satiation works for those of you who haven't run into the concept, you have, let's say you've got frogs, and they're predators. The population of predators is small when there are no frogs available to the extent that those are specialists. And then, if all the frogs breed at once, then the population of predators doesn't have an opportunity to rise if all of the frogs read in sequence. So they were available throughout the year, let's say that they were distributed across the year then the bread, the egg creditors would get more and more common, or even the frog predators would get more and more common, and they would rise to carrying capacity whereas if there aren't any frogs available, or eggs available, then the population of the predators drops quite low. And then when there is suddenly a huge abundance of frogs, those small number of predators eat their fill and are done. And the population their population doesn't have a chance to rise to absorb all of the the bounty that is available. So by concentrating it in time, they avoid a lot of the predation that they would otherwise face. I'm guessing that must be the primary explanation for explosive breeding in frogs, it's,

**Heather** 17:29

I would say that that goes in concert with and it will be hard to separate from the fact that in much of the Northern, Southern temperate zone too, there's just less of it. The northern temperate zone the winters winters are very hard on amphibians in particular and you know, all all herps all all reptiles and amphibians in part because they're not endothermic. And so they have to be collecting their heat from external from from the environment and it's hard to do when it's negative 20 out, right. And so they, they have a relatively short period every year when they can actually profit evolutionarily when they can make a living for themselves and breeding with us. And so, there are depending on species or their photoperiod cues or temperature cues, there are cues that prompt them to emerge to you know, return if they were migrating or whatever it is to show up. And that that because it is a short period of time, having a fair level of precision on when the breeding season is is also important. So I think those two things go hand in hand obviously.

**Bret** 18:31

Cool. Well that makes sense. And so yes, we do hear that we actually hear frog sounds like they're ringing in our backyard. Yeah,

**Heather** 18:39

I haven't I haven't looked at it. We just started to hear them and I haven't actually looked up what what they are yet alleged to be obvious. There's just not that many species of frogs here. And we don't have a pond. So I'm not sure if we have some creeks running through below our paradise. Yeah. Okay, so there is an Atlantic article out this month, called this sack if you would show my screen how female frogs tune out useless noisy males? Ouch. Yeah. So I, at the end of this little discussion, I will say what I think about that headline, but the research it's based on is actually quite interesting. And here it is just for a minute. It's published in Current Biology. It's called lung mediated auditory contrast enhancement improves the signal to noise ratio for communication in frogs. And I'm not going to walk us through the graphical abstract, but I kind of love that increasingly This is a thing now that there are graphical abstracts that accompany research papers. Okay, so this paper which came out I think the paper was this month as well basically says that it walks through some of the some of the background that that we just walked through that specifically and they're they're in the upper Midwest of the US, I don't remember. Michigan, Wisconsin, Illinois, something these explosive breeding assembly Judges often have several species in them, in part because these these ponds are limiting. And frogs being frogs. And don't get me started, I'm not going to spend hours talking about all the reasons that frogs display the way they do. But it's basically they use sound frogs use use vocalizations to attract mates, it's the rare frog that uses other indicators, although I have worked on some of them. And and basically, you have distinctions between species based on frequency both both meanings of the word frequency actually like the the Hertz, that the call is at, and also the, you know, the number of calls per unit time. So, you know, maybe six, you know, six rings per second, as opposed to two is one version of frequency as opposed to, I don't even remember what relative hertz frequencies would be. So I'm not going to give examples I'll just be way off. And it turns out this research, basically what looking at particular species Hi, listen area, that's American green tree frogs is the common name are effective, a dampening environment and venerable noise in a particular frequency, so that the individuals and they only looked at females, because it's mostly the females who are listening to who are making choices based on the cause of the males. But presumably, the males are doing this to females can better hear the cause of their own species. And so there's, it's, it's called the Where is it? The cocktail party effect, although I didn't write that down is gonna invoke this. It's the cocktail party effect that like when How do you know you might lean into someone not that anyone's been in a cocktail party recently, but like that, in a noisy environment, if you know that you're trying to hear someone, wouldn't it be useful to be able to tune out all the noise, right. And when you are in a breeding situation with a whole bunch of different species, and this part of the central selection on the species is precisely Ben, to get the calls into a particular frequency range in both senses of the word frequency, then you may be able to basically filter out the noise of the other species. And so as much as I hate that headline that the Atlantic wrote, in this case, the males and the females are able to filter out and I haven't yet told you how, but but these these researchers did actually find the females are able to filter out the males of other species. And they are noisy and they are useless to them, right? It's not males of their own species that they are filtering

**Bret** 22:28

out. It's not a subjective judgment that they are useless. They are right. comedically incompatible,

**Heather** 22:34

comedically incompatible. And you know, the authors of this research paper did not use the word useless. That was a editorial snark, from the Atlantic now, not anything about the original research, which is quite good.

22:44

It was croak bait. Oh,

**Heather** 22:47

yes, yes. Yeah. Right crook bait. Okay, good. So from the results of this paper, so there are also a lot of unique things about frogs, including, they actually have an additional, they have an additional tympanum effectively, so they can hear at a greater range of frequencies than other tetrapods, which is say all the other vertebrates that came onto land like us, or like our ancestors dead. And they also have connections between parts of their bodies that we don't have. And so their lungs are actually Yes, being used as as gas exchange organs. But also it turns out as dampening filters, so here's just a quote from the results. inflated lungs created a knotch filter, that reduced tympanic sensitivity in a select range of sound frequencies from 1400 to 2200 hertz between the spectral peaks of the call. So again, long reps out there, they're basically they've got these these Well, the other thing that's interesting here, and I didn't, I can't I didn't have time to go back and really check this out. But originally, like lungs is a modification of swim bladders like we are lungs. tetrapod lungs, originally existed in fishy fish as swim bladders to help mod modulate buoyancy in the water column. And only at the point we came on to land and you know, some of the early Starcraft two regions lopen fish, like lungfish extent forms that we have now like lungfish and coelacanths. Started to modify that swim bladder, which was no longer needed for buoyancy in the water column because they weren't spending time in the water column anymore as a organism as an organ for gas exchange. And so here we have,

**Bret** 24:30

which explains why it is such a god awful design. I mean, so how is it a god awful design? Okay, you make an organism, right? That has incredibly organism and organ, no one organism that has incredibly high needs for gas exchange, right? You make an endo therm that's burning tons and tons of organic molecules to release energy for heat and movement and all of this. And so the throughput of gases is the requirements are very high. High, and then you do it in a blind sack in which everything that comes in has to go back out and you couldn't possibly load the thing with enough musculature to be able to inject water. If you were to fill those sacks with water. You have to go your whole life and never fill those sacks with water because there's no one doing it right. Even hanging them upside down doesn't really work.

**Heather** 25:19

Yeah, well, so, you know, early tetrapods not enter therms, of course, and amphibians actually have multiple organs of gas exchange, they breathe through their skin as well they breathe the they're basically when you if you just, if you spend time just looking at frogs, you'll see that their throats are always kind of pulsing. And that's actually gas exchange, they're actually breathing by doing that they're not pulling it in through their mouth, they're actually doing gas exchange, through the skin under their throat. But both the separate evolutions of endo thermae, in tetrapods, birds and mammals have have figured out different ways to basically help out the lungs. Yeah. So birds have accessory lungs in various places little like little places of gas exchange. And then we mammals have a diaphragm, right? So we have you know, we have this thing that was just a transfer septum separating our guts, from our, our plural in our pericardial, cavities, north. posterior to that, and that transverse septum, anterior to that sorry, yes. And that became muscular eyes. And now we call it the diaphragm. And it basically it helps us pull breath, but it doesn't, it can't help us get water out of our lungs

**Bret** 26:31

in order to make it efficient for you know, basically, every breath you're going to, you know, take in in your lifetime, it can't be effective for the rare case in which your lungs have filled with liquid. But you know, it all makes sense. If you think about the fishy fish, as you put it, the fishy fish do gas exchange in a much more elegant way than we do, right? Where the, the oxygenated water passes through in one direction, there's no need to eject it from a sack, right? Right. It just passes through in one

**Heather** 27:03

well, the the exactly the water passes through the places of get the capillaries which are the places of gas exchange are in the gills and and the oxygen gets pulled out. And then you know, and the water then continues back.

**Bret** 27:16

So it's a natural flow rather than pulling in the stuff and pushing it back out, which then creates this problem where you have a tube in which basically there's an amount of exchange you're not doing, you know, if you think about a snorkel that was 10 feet long, and the fact that your lungs wouldn't be able to get enough exchange at the tip because you just be constantly breathing back in the same depleted right air. So yeah, it's a bad it's a bad design that we're stuck with. Because initially it was a, you know, a cool hack to a creature that, you know, for which it was a sufficient addition. Right, but we're now we're now struck with the start with the consequences there

**Heather** 27:52

are, gosh, one of the favorite lectures I used to give was on the origin of tetrapods. And just, you know, I asked students in the beginning, you have to have to sort of walk them through some of some of the fossil evidence and just be like, okay, now you're on land. Think about every, every system that needs to be fixed or react or changed or modified in some way. And I'm like, I'm, I'm not even going to say the answer here. Maybe I'll come back and another or if we're going to do this, I'll pose that at the beginning of an episode and come back to it near the end, so that people actually have some time to think about it. But it's not just breathing. It's why a lot, right. It's not just, oh my god, I was breathing water. And now I have to breathe air I have you know, I have to do gas exchange in which the medium that I'm pulling the gas out of was liquid, and now it's gas. There's a whole lot else going on that has to be solved as you move from your medium being aqueous as opposed to gas. Yes.

**Bret** 28:39

I'm looking forward to us having that conversation at some point, in part, because in the time since you must recently delivered that lecture. I'm sure tetrapods have come a long way. Oh, no doubt, we will learn all of the developments that have occurred in that clay

**Heather** 28:52

over a mobile group and parts that we managed to make progress.

**Bret** 28:56

Yes, we won't pretend that we make

**Heather** 28:59

we move ourselves relative to landscapes at any rate. Yeah. So basically, the, the upshot for me of this of this piece of research, which which I love that frogs are doing this, I think this is such a great, such a great yo Cluj. It's like a use of an organ they already have on board. They yobit they basically like the head shape or the technology for noise cancelling headphones. So they've got noise cancelling lungs?

**Bret** 29:26

Yeah, I think is they lack the stick to itiveness. But for noise cancelling headphones? Yes.

**Heather** 29:32

No, no, no, I don't think so. I think you know, you don't have noise cancelling lungs? Do you know, I don't think you do.

**Bret** 29:38

Well, actually, I was wondering about that. So let me let me understand the explanation. Yeah, they inflate their lungs and I'm having the sense that what this does is it just kind of puts tension on everything. And if you imagine the tympanic suddenly has more attention on it. It's not going to transmit certain frequencies. Is that what's going on?

**Heather** 29:53

I would have to look I can't find the paper now. I think it's a little bit more complicated than that. And it's, it's pretty in depth. Wow, that's not at all what I'm looking for. Yeah, I'm not gonna answer that question because it's it's just there's there's too much here that I might get wrong too deeply buried.

**Bret** 30:13

Yeah. So I just want to before we leave this topic, I just want to point out the interesting activities. The interesting. And now I guess, phenomena that we have that we can tell in ours is done at the computational level, right?

**Heather** 30:31

So you can tell that what, of course, is not the computational the

**Bret** 30:33

analogous process. So if you imagine, imagine, you know, the situation you and I have been in where we're in, let's say, a tropical forest. And there's a noise that one of us has detected somewhere in and you know, tropical forests are very noisy places, there's a lot of stuff going on. And the process of saying, Okay, do you hear that? No, well, it's kind of a high pitch like, you know, getting somebody to tune in to those frequencies. And what this implies is that your ear was picking those things up all along. Yeah. But that your mind was throwing out the data. Because of course, if you were processing all of the stuff going on, you'd be overwhelmed by it. And so you throw out most of the data, except for the things that are relevant to you, when somebody can call your attention to somebody and say, shift this thing from category irrelevant to category irrelevant, right, then suddenly, your conscious mind hears it. So that's definitely done at the level of you know, I hesitate to say computer algorithms, but I'm mind games. Yet mind phenomena. Yes, cognitive phenomenon.

**Heather** 31:39

So I do have a correction. And again, I'm not going to get into all the particulars, I did not have time to fully familiarize myself with this article. But if you can show my screen here for a second sec, here is figure two from this article, in which they're showing the amplitude that is detectable when the lungs are inflated, their higher versus deflated. So it's when it's the it's the lungs, the frogs are deflating their lungs to get the to get the dampening of the noise. It's not when they're inflated, but rather when they're deflated, that they get the effect.

**Bret** 32:19

Okay, the lungs are deflated, and that dampens the noise. So maybe it is the similar mechanism to what I was proposing but the opposite direction, like loosening the tension on a drum? Possibly, possibly, Yeah, all right, but I mean, I guess it depends which frequency they're looking for.

**Heather** 32:39

Okay. And, and just, you know, a reminder of the Atlantic's headline before we move from this topic, they saw that headline was how female frogs tune out useless, noisy males. And I would say that I first saw that before I'd read either the Atlantic article or, or this paper I thought, What the hell are they doing that? Okay, actually, the males that are being tuned out, are noisy, yes. And useless to the females who are tuning them out because they're the wrong species. But I will say that the use of the word useless there is just unnecessary, fashionable at the moment, snark against males, in this case, male frogs, and the more the Atlantic does this, the more likely they're going to become useless to a lot of

**Bret** 33:25

us wait, but in many frog species, the term task toxic masculinity would apply by virtue of compounds in the skin that,

**Heather** 33:36

however, yes, however, in those species that I'm aware of, in which the frogs, in fact do have alkaloids or other toxins in their skin, that's a lot of them. There's no sexual dimorphism with the credit toxicity. So it's equal levels of toxic masculinity and toxic femininity, which are in fact identical, and therefore it's toxic. Frog infinity.

**Bret** 33:59

Well, right, but that doesn't mean that we can't hold the male frogs to a different standard, just because they're not right.

**Heather** 34:07

I'm sure the Atlantic. Yes, I'm sure the Atlantic would. Okay. On that note, that seems like a natural segue. Do you talk about Ebro candy? Well, of

**Bret** 34:14

course it does. Alright, so what I had promised to do here was to deliver. What I am going to argue is a compelling logical proof that anti racism, the framework offered by Ephraim Kennedy and several of his books is false. I'm going to argue that the implication of the obviousness of its falseness is that it is in fact sophistry, and that its purpose is to drive us all into behaving as even candy would have us behave. Thereby. It's a kind of manipulation. So what is the proof? Well, the proof involves a phenomenon that I think many of us are aware of with respect to dogs. So the central claim of anti racism is that there is no such thing as not racist that everything is Either racist by virtue of its action in a system that is racist or anti racist by virtue of it's opposing that phenomenon. And then there's no place that we could hope to stand. So in effect, we can extrapolate this to there's no colorblind society that in fact, society must be color aware, because there's no not racist way for society to be structured. So what's the proof? The proof is this. Have you ever met a racist dog? Yes, Yeah, me too. Racist dogs are phenomenon and I'm going to hypothesize why racist dogs exist. Nothing I'm going to say depends on this hypothesis being correct.

**Heather** 35:42

Some number of people may be screaming right now what do you mean a racist dog never been a racist? Are we talking about

**Bret** 35:46

well, racist dog is a dog that responds with aggression and maybe fear differentially based on the race of the people it encounters and

**Heather** 35:56

you know, not not against different colors of dogs, but about rabbits, different colors of people. Exactly.

**Bret** 36:01

that other thing may or may not exist to me, but but let's just say that, certainly, growing up, it was commonly discussed that some people's dogs had problems with people from certain races, right, they might respond badly to black people, or Latinos. And what I understand what I imagine that this reflects is that people have fears or stereotypical responses differentially based on race, you know, that they do that is, arguably racism, but it is at least in that same neighborhood. And because dogs are very tightly tuned into their owners needs and desires and all of this, the dogs pick up the racism, or its antecedent that exists in their owners, and then embarrassed their owners by reacting to people who have done nothing other than have a particular phenotypic marker. So all right, racist dogs exist, right? by some mechanism, maybe that one? Here's the question, though. A lot of dogs don't do this. Our dog doesn't do this, right? Are those dogs anti racist? No. My claim is there may be anti racist dogs, you could at least in principle is proof of concept. You could create an anti racist dog, if you can train it to recognize bankers in the act of redlining or something like that a dog could bark in some way right? So in principle, there could be an anti racist dog but what they're most definitely

**Heather** 37:34

so the definition of anti racist here then is working to reduce historical oppression by making the situation in the moment unequal, so as to end up with equity. Is that the working definition of anti racism Okay,

**Bret** 37:53

any principle, that's obviously a ridiculous example I've come up with, but the point is, you know, redlining bankers, redlining bankers is going to be tough to train a dog to spot that but you know, it could happen and so were you to do that you would have an anti racist dog, so let's, you know, give candy, his do an anti racist dog is conceivable. But what we have is a lot of dogs who don't respond differentially based on the race of anybody, they're not paying attention to that characteristic. And what that establishes is that a framework in which we define not racist out of existence is inherently false, not racist is a category that can exist in a context where racism does exist also. And so my point to you, Dr. Candy is your framework is bad, we can demonstrate that using a familiar example from dogs there are not racist dogs, even though they could be racist and in principle could be anti racist. And therefore, it is upon you you can either point out what is incorrect about this proof you can ignore it, which is what I expect you to do, thereby suggesting that maybe there's something to this proof or you can when I say one was was at the challenge it you can accept it, you can challenge it, which I would love for you to do. Or you can ignore it, which is what I expect. But for the rest of us,

**Heather** 39:20

I suspect that one form of pushback will be in the form that we have become unfortunately all too familiar with in evolutionary biology, which is that's not people it's not relevant.

**Bret** 39:35

Right But see, that's the glory of this proof is that if the idea is this argument is logically sound, that is to say Candy's argument is logically sound but only resident to human then Okay, let's hear the argument about why that is. And you know, if I had, you know, if I had argued that there are not racist typewriters, you could accuse me of dragging us into a realm. You No, that was irrelevant. You could accuse me of sophistry. But my point is because racist dogs are a real phenomenon. It is a proper analogy, right? racist dogs. Let's put it this way racist dogs are phenomenon. Anti racist dogs are plausible, and not racist dogs are common. And my point is going to be amongst humans, racists exist, anti racist exists and not racists exist. And he is defining them out of existence. And he's

**Heather** 40:29

finding the third category not racist out of existence, which, frankly, in modern times, is I believe, most

**Bret** 40:36

of us. Right. And it is the very definition of sophistry, right. The point is, it's a hard argument to field which doesn't make it true, right. In other words, the counter argument is difficult to articulate. But that doesn't make it right. And my point is that actually this matters, it's not just some guy deployed a bad argument, it's that that argument actually has a moral imperative that it drags along with it, which is it is your obligation to do what I eat from Kennedy say, because of course you want to be anti racist, because what are your other options? racist? Right, right. So the point is, that is that is manipulative sophistry, and it needs to end we need to recognize not racist is not only a real category, but in fact, I would argue, it is the only long term basis on which society can properly function, right reasons, right? We have to shoot for a colorblind society and defining it as not a possibility and therefore, to the extent that you are not willing to sign up for some formulation, you're a racist. That's nonsense.

**Heather** 41:36

And it was Martin Luther King's dream, of course, yeah,

**Bret** 41:39

because he was a wise man. Yeah.

**Heather** 41:41

So I guess just just a little aside, relevant to that before we move into talking about vaccinations, but I think I think the widespread embrace of Candy's formulation of anti racism and Robyn D'Angelo, his formulation of white fragility demonstrates that the left of which we are a part of become a deeply gullible people. And it's gullibility is a feature of being a follower right of being and it makes you prey to authoritarians Of course and once you are prey to authoritarians, you are probably more likely to accept authoritarianism when it shows up on your doorstep because it sort of feels like it's what you're doing anyway and isn't working well for me. We're not for everyone. The thoughts are easier to swallow if you're gullible to begin with so things like only white people can be racist and all of them are or believe all women all the time under all circumstances or trust the science right these are these are insanities like these made these there's no way that anyone should be able to say any of those little little sound bites with a straight face and mean it without irony and yet we have a lot a lot of people who and you know, and now policy a lot of policy being made on the basis that these these truisms which which point actually to a not a dumb populace, but a gullible populace. Ours are spreading and you know, I'm not saying there's not increasingly plenty of dem wintery to go around to but I think it's the gullibility that is that is really getting to me this week. Right? So in that, in light of that,

**Bret** 43:25

yep. Before we go on, I just want to say that that is my hope in delivering what is in essence, a three line proof Yes, that it is so succinct, that those who don't know what to say there is no not racism, there's only racism and anti racism, Which side are you on? Has the thing right? It's, it's sufficiently small, yeah, that you could put it on a card. And the point is actually, I know that's not true. And before you tell me the next thing, right, that I have to do in order not to be over with the racists, I'm going to tell you that that formulation is nonsense. That's my hope is that increasingly, we will be able to take the things about which people are bullied into acceptance the gullibility that you're pointing to and provide a very a very simple method for diffusing that that trap

**Heather** 44:17

well i feel like i don't i don't yet see it and it's totally simple form you know in terms of the three line proof the sound bites etc but you know having a stack of these cards like actually you know, this is something that that could be valuable to people that you know, having a stack of cards it's like you know, racist short definition anti racist short definition not racist short definition. This is in the the field of possibilities like this isn't the solution set option three is at I'm taking door number three. Here you go. You're telling me if I'm not anti racism or racist, no, take this. Are we done? Like, like, that's the argument right there and a lot of people find themselves utterly hamstrung when faced with this garbage. Well, and and you know, so to some degree, what you've proposed and what we're doing sort of thinking out loud and talking it through is, is serving, I think one of the things that we think it's doing and that we're hearing from people that it's doing is helping to give people the language that they can use when confronted with a situation but also having something very short and that then can be handed to someone else they can have and come back and be like, oh, oh, not racist. Right?

**Bret** 45:27

Right. So I think this this is an important thing that we should all be doing we should all be generating these succinct responses and I think actually we've done it before because you know, be hard pressed to figure out whether we were actually first on this but we are one of our live streams responded to the claim that the protests the summer were mostly peaceful by pointing out that you know, that so was the Kennedy assassination and World War Two mostly peaceful if you're going to, you know, count the number of times it was mostly peaceful. Yeah. Right, which then caught on and so the point is mostly peaceful, died a spectacular death as a claim, because so many people realized, actually, that doesn't mean a goddamn thing, does it? Right, mostly peaceful, is is is sophistry, it's it's there

**Heather** 46:20

events tend to define errors. And they tend to define movements that like the rare events of the things that start and stop big moments,

**Bret** 46:28

right. So we should, you know, generate these things. And in this case, you know, dogs are like people, they can be racist. That said, most of them are not, why is that not true of people get candy?

**Heather** 46:43

Yes, good. So I just wanted to share a few details from this a class action complaint in the state of California against state agencies in California, who are using CRT are using critical race theory. And this was sent to us by one of one of our viewers, which I'm, I am grateful. Let's see, I want to read you can show my show my screen here sec. I'm going to read a couple paragraphs and and then a couple more after that. So this is just this is from October 13 2020. So just a few months ago, just to set us up here. This class action seeks to eliminate discriminatory policies and customs and California state agencies that institutionalized racial preferences in connection with recruiting, hiring other conditions of employment, and which overtly treat people as racial categories rather than individuals. defendants, Wade crowfoot, and Charlton Bonham collectively, the defendants who were Acting Secretary for the California Natural Resources Agency and director for the California Department, Department of Fish and Wildlife respectively, have implemented policies and customs that are steeped in critical race theory, a branch of postmodern academic theory, which promotes invidious race discrimination. So just just a pause here for a moment, the California Department of Wildlife and the Natural Resources Agency there, this is now in places where, you know, even many of us who have been well aware of this would have thought like these agencies should have been most immune for the longest right like this is these are actually agencies that are doing that are that are dealing with real things out there in the world that aren't social constructs. Later in the piece, the complaint specifies first crowfoot and the speakers engaged in the selection bias of isolated incidents as proof of systemic racism. So they're doing this little sleight of hand where they say, there's a thing that happened, therefore, everything is racist, and systemic racism is everywhere. And second, crowfoot and the speakers then argue that any disparate outcomes in society must be the result of white supremacy. Again, slight you know, it's it feels like a similar point, but it's a little bit different that any disparate outcomes like anytime you've got differential outcomes, the only possible hypothesis to explain that is white supremacy. So this is anti logic, anti science, anti everything go into frankly. And then just one more section that I want to read from here. I can find it okay. Zack even show my screen again, if you like, on page 12, paragraphs 4748. And I will I will post this in the show notes. The substance of the program follows so this is with regard to a program that one of the defendants has used in his agency with with his employees. The substance of the program follows a similar pattern. Bonham and his guests conclude without any evidence that the reason they do not see people at recreating in proportion to their population is entirely due to white racism, and that they would implement quotas and state agencies to assure racial equity in who chooses to use California as outdoor spaces. The conversation begins with the conjectural claim that black people do not frequent California's outdoor spaces in proportion to their population, due to white supremacy, and quote generational trauma bottom discusses the idea that quote, bad things happening in the woods and quote, approximately 100 years ago in the Jim Crow South has led black individuals today to believe that quote, being around trees is unsafe. Oh,

**Bret** 50:15

my goodness, my goodness, yes. And in fact, we have. So, again, sophistry, and really that is the central concept. So much of this, so many of these claims are transparently nonsense. You know, we have been talking about the obvious sophistry in the idea that if there is a discrepancy in the number of people relative to their representation of the population, that that must inherently be the result of a bias. We've been talking about that explicitly since the demore. memo, right? Where demorest point was effectively Yes, it could be that but that's not the only explanation that would generate the pattern. It's obviously Drew, it should take any room of four smart people approximately three minutes to establish this to a fare thee well, and yet years down the road, we are still talking about,

**Heather** 51:03

are we not scientists? Right? Are we

**Bret** 51:05

not capable? I mean, even if you can't think of the proof yourself, right? Just simply having heard at once ought to reveal Oh, yeah, there are other things that can cause the pattern, therefore, it does not necessarily imply it right. So you know, the question is, why is this stuff so sticky? In these cases? Yeah, we have talked on this program, extensively about the fact that differential use of for example, bike paths or nature areas does not and in fact, cannot plausibly be the result of white supremacy, right? Nobody's keeping anybody out of the bike lane. So the point is, if you go and you measure who passes you in the bike lane, and it turns out that there's a racial disparity, it may be the result of something, it may be the result of what neighborhood different races live in, and therefore, how pleasant it is to bike or how safe or something like that, but it cannot be that the bike lane itself has any bias,

**Heather** 52:02

right. And, you know, historically, I can put together an argument, historically, as you know, after the Civil War, and black people were moving north, that they would have been more likely to choose urban centers. And we in fact, know that this did happen, and why because people in urban areas, who had less exposure to people who looked different from them might have been more likely to cause to bring grief to the black people. And so people migrating out of the enslaved South might well have chosen to be in cities. And so at this point, there may be generations within black American families of city life and far less exposure to to some of this other stuff. And that doesn't mean again, that nature is racist, or that the choices that those people were making. were, you know, that there was anything wrong with them, even though they may well have been making those choices, in part due to an understanding that I think was probably correct, that it would be safer to move to say Chicago in 1880 as a black person than to southern New farmland Illinois,

**Bret** 53:12

probably let's put it this way there are dozens of impacts right? It may be a matter of, you know, where there was likely to be work and how easy it is to commute and there are dozens of things that may indeed be the result of past racism and past white supremacy and a problem is that people want to import some pattern that is differential that may in fact have something to do with racism that may have existed 100 200 years ago and they want to say therefore it means that that racism exists today which then results in them leveling an accusation at people you are definitely racist because you're white, right? That is not a logical conclusion from the bias No matter how much racism played into the original discrepancy that we now see manifests and so how much better would the conversation be if we were actually talking about how these past patterns that yes indeed were rooted in racism have impacts that carry through today without it functioning through the bias of people? Right which isn't to say bias people don't exist but it is to say you cannot do this Kennedy thing where you just simply assert oh well if you're not actively anti racist by this you know list of criteria here then we know what you are right you're part of the problem No, that's not the way it works.

**Heather** 54:31

And yet, and yet he can well he can so there is there is a question that I still do not have a good grasp on beyond the sort of like the left is ever more gullible like why has it been so widely accepted? Why is it getting so much traction? Why is there a frickin class action lawsuit in California against the directors of the these agencies whose presumably raison d'etre is about protecting the land I mean, like this, this is the last place Where CRT belongs. And here it is. And I'm grateful to the people who have initiated this class action lawsuit. But this is this is one, one example in a sea of many. And of all of those examples of people actually saying I've had enough, I'm pushing back, this is ridiculous. Those reflect a tiny minority of the actual situations where no one is yet publicly pushing back. So they don't know how to they're disempowered, like whatever it is. Well, let's try

**Bret** 55:27

to answer that question. Because I think it's hard to say what precisely the answer is, but in a general sense, it's fairly clear. And I must say, I've been frustrated by the degree to which people focus on what they call canceled culture, right? I feel like there are a lot of things that are relevant to our circumstance, free speech, questions, canceled culture, etc. But the focus on them is wrong. And really, I think the answer to the question you pose is that the reason that people have fallen prey to these obvious, sophistry constructions, or Sophos constructions is that there is a penalty there is the equivalent of online Brownshirts. And their purpose is to beat the crap out of you if you show an instinct towards rejecting these things, or questioning them, or deploying logic where they don't want it deployed. And so, in essence, what we're seeing is not that people are endogenously so gullible, it's that in the context of a threat, if you show signs of skepticism, what happens is people stop doing that. And what it looks like is Yeah, people are accepting this obvious nonsense. And the fact is, look, come on, How hard would it be to sell the population on the idea that there is no sexual binary? It would be almost impossible if there weren't a threat attached to it, right? Everybody knows this, because it's so central to all of our lives. Yeah, perspective,

**Heather** 56:55

every single human who has ever lived knows

**Bret** 56:58

right to be everybody knows this. Right? Yeah.

**Heather** 57:01

So that's interesting. And I do think that the timing of the rise of of so called kancil culture, and I say so called not because I don't believe in that, but just because as you say, you know, I don't I don't think it's an expansive enough term. But you know, it, we began to see this really happening at evergreen in sort of, you know, beginning like 2013 2014. That's exactly the moment that like john hight and Greg lukianoff talk about and currently at the American mind as things beginning to change on college campuses. And so I do think that your answer you know, I know I've talked about a perfect storm having to do with three things and actually heightened look Yon I've talked about a couple of these things as well. But you know, what you're pointing to basically is the increasing ubiquity of social media allowed for pylons, such that you can increase the gullibility of people in real time because they're afraid of the virtual pylons. But then the other piece of the perfect storm include the widespread drugging of the children, excuse me, with with anti anxiety, anti psychotic, anti depressants, and then exogenous hormones, and you know, all of these things, and then a parenting style that, that doesn't allow children to take risks and explore who they are. But the social media thing is what really what really was happening in exactly that that moment. But I don't think it goes back far enough. So what we what that doesn't explain is why we wouldn't when we were in college, in the late 80s, early 90s, we saw, we saw this postmodernism, and we push back against it. And it looked in fact, I found my I think it was my senior thesis I wrote into the beginning, like I'm seeing some of this, some of this Nadeau nutsy nutty stuff in the literature, and it's fringe and I don't think it'll go anywhere. But I do think it bears mentioning that this is one way that people are thinking about my thesis was on actually how, how it is that in non human primates, females establish friendships and what those friendships look like. And it to some degree, also how testosterone is mitigating those relationships. And there was already some of this like social constructionist stuff in in that because anthropology got taken over pretty early. And I then really thought that even though we saw little glimmers of it in grad school, and we laughed about it, and pushed back against it in little ways, that there was no way that it would grow. And that it would become so all powerful. I didn't I did not predict as much even though we saw it and we push back against particular instantiations that we ran into. I did not see the last several years coming.

**Bret** 59:52

Well, so I want to make this into a model because I agree I didn't see it coming like this, right. We knew the danger of it, but I I would never have predicted the absurdity of some of the things that are now accepted as self evident. But so there's a question about what context you exist in my claim is going to be is that when people start to espouse obviously nonsensical beliefs as if they were self evident, there will be an analogue to brown shirts. Right, that the point is the two things are not separate. So to the extent that you walk into a context where people are saying crazy things, where's the enforcement mechanism? Well, in an anthropology in a cultural anthropology department in the 90s, the enforcement mechanism is, you're not welcome in this department. Unless you agree to these things, we have the ability not to admit you, and we have the ability toss you out on your ear, if you if we miss you on the first pass, and then it turns out that you're a skeptic.

**Heather** 1:00:51

The numbers are so small that all it took was one social constructionist postmodernist post structuralist and a department to potentially fairly quickly change the culture of the department.

**Bret** 1:01:00

Right. And the point is, the department is built to be exclusive. And so excluding people is not hard. Well,

**Heather** 1:01:07

but my point is, departments were busy excluding nonsense, until suddenly they were excluding everything but the nonsense, right? So like that, that requires an explanation of when that what that flip is?

**Bret** 1:01:16

Well, I would argue, we see in a million different contexts, some sort of institution, public or private, that gets taken over by somebody who knows how to play office politics and transitions

**Heather** 1:01:30

to my earlier point that it because because departments tend to be small in terms of number of faculty, all it really takes is one person who's who's got this as their mission. And they can affect change in a way that they never could and a larger, you know, they'd be drowned out, they're just there'd be there'd be too diluted, right? diluted, in addition to being diluted in a larger population.

**Bret** 1:01:52

So in the case of the, the what we heard in anthropology departments in the 90s, that thing then made it into the wider world. And so the point that we have for foremost in our minds as well, for that to have happened, we now need an enforcement mechanism that mirrors what takes place in an academic department. That explains the wider context. Yep. And so my point would be okay, what is that in this context? It's largely the unperson thing that can happen to you online. If you show a certain kind of skepticism and as proof of concept, the intermediate thing, remember back when evergreen was supposed to be an anomaly, and it wasn't going to it didn't matter. It was just college kids overreacting. Well, I was just looking at Benjamin Boyce's most recent is 23rd episode of his evergreen documentary that's prolific. Yeah, and amazing, polar, realistic and amazing. And I think as a result, almost entirely of his work. This is in some ways, the most thoroughly documented historical event, at least, you know, that I've encountered, right the level of minute by minute that he's captured is incredible. But you know, he uses in this most recent video, he juxtaposes people saying things with a video of them, same people doing things in a different context. And so one of the things he has is Jamil who was paid by the college to help rewrite the activists, this is essentially the lead activists, the one who organized the kidnapping of administrators and apparently sent people to my classroom to protest me and all of that. After invoking privately on his Facebook page, the idea that it would be great to have white people face witch hunts. But anyway, this guy was hired by the college to help rewrite the Student Code of Conduct which he had violated later this summer following. And Benjamin points to this video there's a video clip of him and his click walking around like he's flipping a baseball bat. And that's very, you know, Clockwork Orange. craziness, right? But the point is, okay. People are saying crazy stuff on this campus. Where are the brown shirts? Oh, right. caught on video. So that's the question is every time you have people claiming to believe things that no sound no reasonable person could possibly believe there will be an enforcement mechanism. And you may not have put the two together, but that's what's going on.

**Heather** 1:04:19

Yeah. Okay.

**Bret** 1:04:21

That's good. Right? punishment mechanism.

**Heather** 1:04:23

Enforcement a punishment mechanism? Yeah. Okay. Much, much more to be explored there. But that's good. Okay, we wanted we're already at over an hour here. But we wanted to talk a little bit again, as we have several times about vaccinations, right? Yeah. So you listen to some of the video and I read these papers and you read some of the papers too, but I don't know how to pronounce this guy's name.

**Bret** 1:04:48

I'm thinking it's Garrett. Vanden Bosch,

**Heather** 1:04:52

okay. This is an independent neurologist and vaccine expert, who is also what is his critical Include he's formerly employed at GAVI, I don't know what GAVI is the bill and the Bill and Melinda Gates Foundation. So these are we've got three papers, all of which he, he's, he's just written and posted on his LinkedIn page. And he's also got a few YouTube interviews out now. And, and he is basically trying to raise the alarm about the risk of mass vaccination of the sort of vaccines that we've got now, during a pandemic, being he is arguing likely to actually cause COVID-19 to become a much worse problem than it already is, and in fact, become a global nightmare. The likes of which we've never seen. That's that's his statement. That's it. That's his position. And

**Bret** 1:05:46

he does. He does say, I think he alludes to the fact that he has a manuscript that covers this, that he is putting through proper channels, but he says we don't have time, which is why I'm posting it in this way. Yeah.

**Heather** 1:05:58

And so we really just, you know, truth, truth in advertising here. A friend of mine sent me one of these papers a couple days ago, actually on my Patreon, and said, Can you please can you tell me what your what to think of this, and I spent a little bit of time with it. And I will say that one of these three papers, the one that I was sent First, the one data, so there's a march 13 Of March 17, and a march 6, and the march 6, one, and I'll post these all, on, on the show notes as well, the march 6, one is, is weird, it's tough to get through. And it makes a bunch of claims that seem bizarre. And I quit I it was, it was hard to hard to parse, but the later papers and you know, we're still talking about just within a few days of now are very much more clear. And he's also given a ton of references, which I have not had time to look through the vast majority of them yet. But the basic the basic framework is, we are not thinking about this evolutionarily. And the the refusal to do so risks a whole lot of humanity. and use that as a as a as a base claim is a perfect match. For what we've been saying from the beginning, that we that we need to think about what this virus will do, how it will change. Understanding, therefore its origins, affects what we can imagine it will be able to do quickly if it came directly from either a primary secondary host, or if it experienced a gain of function research and serial passaging in a lab and therefore, is already sort of pre adapted as of a year plus ago to human hosts. These are not merely academic questions, they actually potentially affect human health. And and and he brings that into the vaccine framework specifically,

**Bret** 1:07:48

yeah, I will say I found these papers, challenging. And there were a couple places where I wondered if we were tripping over a language. If you were he. He used terms that I think actually aren't the right terms, but that there was an argument. So I will say I don't find anything. I don't find that this is like the Judy milkovich situation where there were claims that were made that were simple enough to falsify that it just red flags all over the place. In this case, I don't have that

**Heather** 1:08:24

or those two doctors at a current county early, you know, last last spring, who were making a lot of claims that just were easily falsifiable. Yep. This this is not that this is

**Bret** 1:08:34

not that. And so at the basic level, and I think your summary is right to the basic argument here. So there are specific arguments, which I'll try to make clearer in a second. But the basic argument that we are not thinking evolutionarily about what we're doing and we are blindly stumbling into this landscape, we are intervening in a way that could make things worse and not better, is accurate. And I definitely think, you know, we are long overdue to be having an evolutionary conversation about this virus and our approach to it. Interestingly, I do not find in what I've read here, an analogue for the argument that you and I have made, that we are that these vaccines are so narrowly targeted, that instead of using a complete virus, by using the spike protein, as a single target that that these these vaccines are very narrowly focused and that that is going to create a concentrated evolutionary pressure. So

**Heather** 1:09:34

yeah, I wish I thought I had seen that in here somewhere, but I don't I don't see it now. But and but so that's that's a particular argument that we have made.

**Bret** 1:09:43

So he makes analogous argument. Yes. So my think my thinking is either it's in here and I don't see it, or it's not in here and it belongs in the same discussion. There's a

**Heather** 1:09:54

whole category of possibilities, the deserve to have consideration and It feels like he's got a few possibilities. And they're not always totally teased apart carefully. But he's proposing a few things, right? Yeah, he's proposing, for instance, that mass vaccination during a time of pandemic puts puts humanity at risk. Because if you if you vaccinate when there's not when you're when those who are recently vaccinated, tell me if you think I've got this, right. If you vaccinate, if you get vaccinated, when you are unlikely to run into the wild type pathogen out there in the world, your body will have time to create immunity to it when you do run into it. But during a pandemic, you're likely to run into the thing that you've just been vaccinated against, before you actually have immunity to it. And this may basically produce a an ability for the virus to to adapt and become immune itself to adapt a wave from vaccine.

**Bret** 1:10:59

It's not that you don't have immunity to it, because presumably, whatever level of immunity you don't have you have before the vaccination, his point is that there is a stage after you have been vaccinated the first time and before you have been vaccinated the second time and had the period in which for your immune system to become specifically targeted, that you are effectively weakly immune. And that weak immunity, therefore selects for the invisibility of the virus to the vaccine. And so this is in many ways analogous to the thing that you and I are talking about, which is the narrow focus of our vaccines. Now, it may be that they can only be narrowly focused, it may be that there's nothing else in this virus that actually is accessible to the immune system. And therefore, it may be that there's, you know, that there is no consequence to what you and I have worried about. But I'd like to know that that's true, rather than just it's something we assume. Yeah. But so he seems to be making two points. One is that the partial immunity that people get from this vaccine on the way to being immunized, assuming they're effective, right, is an evolutionary pressure, that these vaccines do not appear to be good at preventing people from transmitting viruses that they've already been infected with. I'd like to know if that's the case. I know that this has been suspected,

**Heather** 1:12:25

suspected, but he I saw that claim here to him, there's no reference like i don't i don't know this to be try

**Bret** 1:12:30

it. But let's say it is true. His point is that what we're effectively doing is creating what is to on unfortunately, is the same word I just use, in effect, like running a gain of function, experiment with humanity by creating a concentrated evolutionary pressure for the invisibility. And he imagines that very disastrous things could be the result of this, which I don't think are certain, but are plausible as far as I can. Yes. So

**Heather** 1:12:58

I agree. He also argues, and I, again, I think you may be able to add clarity to this, because I wasn't sure exactly what his argument was he or you something like, given the older people, given that COVID absent the regime of vaccination has affected older people more and more seriously, as everyone on the planet knows at this point, therefore, older people are being vaccinated first, which would appear to be the appropriate move. But that leaves a situation in which the way that the virus another way the virus may evolve in response to this, if there is basically and I'm adding this here, but especially if there's a slow if you know, if the goal is to get everyone vaccinated, if there's a slow rollout, and then and the virus can't get purchase on increasing numbers of the older population that is going to evolve precisely to become more likely to infect younger people. And he argues, I believe, in one of these papers, that because we also have at the same time, children who have been pretty isolated for a long time, and who are now about to go back into schools, that this may create sort of a perfect petri dish situation. Well, I don't let me let me clarify by this.

**Bret** 1:14:20

Let me clarify his argument, just so we know at least what we're talking about. Okay. So he makes two arguments. The first one related to what we've already talked about, is that our behavior deploying what he says are prophylactic vaccines in the midst of a pandemic. So his his point is, and he makes very clear he's not an anti vaxxer. He's very pro Vax. But his point is, look, if you were to deploy these vaccines in advance of a pathogen arriving somewhere, it might be very effective at ratcheting up the immune response so that the virus would not get a purchase on the population, if you do it in the context of a pandemic. already in motion, his point is what you're doing is you are confronting a virus, which has the capacity to evolve with a concentrated selection pressure with a selection pressure. And his point is it cannot help but push this virus into an arms race, which I think is right. And that's consistent with what you and I have said. And that that arms race is very likely to have these other consequences, which is where this point about young people versus old people comes up. Just one

**Heather** 1:15:25

point of order, though, you said that he says, and I see it in the papers, too. He calls it prophylactic vaccine. I that seems redundant to me. Vaccines are inherently prophylactic prophylaxis being about prevention, right, rather than retreating of symptoms. It's an

**Bret** 1:15:38

individual versus population level question. When he says a prophylactic vaccine, he's talking about the population level. And for an individual Yes, it's prophylactic either way. So

**Heather** 1:15:47

you think that his argument there is that the vaccine itself is designed to be prophylactic at a population level, and it is being used in a situation where the population has already been so widely exposed and continues to be exposed, that it is not being deployed in a way that is consistent with prophylaxis, right?

**Bret** 1:16:03

It the so and there is a very powerful evolutionary argument here, which is, it is the arms race that creates the ferocious enemy, right. And so you do not want to invite an arms race, you cannot win. And in this case, the point is, we're making this move, because we don't have another, right. And so we're making a move that we shouldn't make, because what it's going to do is turn our enemy much more dangerous than it is. Yeah, and I'm not saying that that's true. I think there are ways in which this could be false. But it is not obvious to me that it is false, right? And I in fact, the arms race, part of it is almost certain to be true. So the second part of the argument, and there is one part of this that may be well known, but I don't know it. And so I'm cautious about it. But his point is that actually by keeping young people away from each other, and society, that we are weakening their what's called innate immunity, so and he deploys a model that I think is quite valuable the way B puts it basically, that we start out with innate immunity, that is to say, an immune system in our lives in our lives in neonates, right, that doesn't have to generate novel insights. So when we get sick with something like the flu, we've never seen it before it gets past our defenses, and then we build an immunity to it. And then we build a memory of that immunity. Right? So that is adaptive immunity. That's actually one of the most marvelous evolutionary stories there is. It's an evolution that takes place in your lifetime inside your body between yourselves. So young people have the innate immunity, but it is not programmed with the adaptive component, which result which results from encounters with things in the world.

**Heather** 1:17:43

We expect our adaptive immunity to get better over time,

**Bret** 1:17:45

right? And so the model he deploys is, over time, as you as you age, your innate immunity weakens, you get more vulnerable, but your adaptive immunity grows better, because it has seen the things in your environment for the most part, it comes wise, right, it becomes wise. Exactly. And so the point is older people are feeble, with respect to their ability to keep stuff out, but they're better with respect to being able to fight stuff that their immune system is aware of. Now, the part of this that I think is insecure, and it may be that it as well

**Heather** 1:18:17

now, the part of his argument that you think is insecure, I mean, my it's right there to the left of the

**Bret** 1:18:25

my understanding of this is all kind of old, because came from, of course that involve that textbook. But in any case, the the argument he makes is that the innate immunity, and he uses a bad analogy, but if we can correct it, I think what he means to say is that the innate immunity is in some sense, like a muscle that to the extent that your innate immunity is not encountering things in the wild, it stands down and it atrophies. And so by isolating young people, that we would be reducing their capacity to fend off you know, why are young people immune to this? It's not because their immune systems are aware of COVID it's because their immune systems are good at generally dealing with stuff and preventing it from getting in yourself.

**Heather** 1:19:11

They don't have adaptive immunity, they do have very strong innate immunity. This does raise the question of why so many pathogens are so much more likely to attack young people. But to generalize further, what you're saying by analogy to muscles is what he is saying. The argument is that innate immunity is anti fragile, right that it becomes it becomes better with insult it becomes better with pressures against it.

**Bret** 1:19:38

Right? And so anyway, I want to know there's there's an there problem is that there are two arguments that overlap. So George Carlin had a very famous routine in which he argued that he didn't get sick because he had swim in the Hudson. Right? But anyway, so

**Heather** 1:19:55

the point oh, what doesn't kill you makes you stronger argument, right? And

**Bret** 1:19:58

the point is, we know that This will have some some reality over an adaptive immunity space that can affect the challenges caused your immunity to learn about things in the environment. The argument that it's happening on the innate immunity may be true, but I want to see the evidence that it is

**Heather** 1:20:13

yeah, this was exactly one of the places I hung up to, like I don't I don't know about this claim. And

**Bret** 1:20:19

but, but anyway, the consequence of all of this is his point is we are creating a, what he is arguing is effectively a perfect storm in which we are setting up an arms race with the virus where the virus will mutate away into invisibility to the immune system. So we will educate the immune system, basically, like putting up a wanted poster in the post office that alerts the immune system to who it's looking for, the enemy will disguise itself and be able to, to move in without being spotted. And that that will then result in it honing in on young people who have not been exposed, and are therefore vulnerable. And basically, they would be a reservoir of potential potential victims of the virus and that this could create a catastrophe. So I think where I come out on this is, this argument definitely needs to be heard. What I don't want and what we are forced to effectively by the way that we are dealing with this pandemic, is, I don't want either people with perverse incentives to tell us why this isn't true. Right? What I want is people who are immune to pressure, right and aware of various different relevant aspects of this, to be able to have a conversation in which they determine it, because effectively what he's arguing is that we should pull these vaccines, right, that we are in fact going to destroy herd immunity, which would grow right row with huge costs, right, we are going to destroy the herd immunity that we've already inadvertently invested so heavily in and create effectively a novel and much worse, much more effective pandemic. Now, that is a plausible argument. Is it a true argument? I can see ways in which it could be I can also see reasons that it might not be Yeah, but the discussion is where you would find that out, you need people who are sophisticated about the evolutionary stuff to have, you know, a candid conversation with each other about what would the effect of this be if X, Y or Z? And I have very little doubt, we're not going to get that discussion?

**Heather** 1:22:44

Yeah, no, I agree. So I, boy, I don't know where that leaves us. I think, you know, I'm, I'm glad that this that he's out there, saying what he's saying. And I would like the conversations between people who are interested in truth, and who do not have perverse incentives to be happening. And instead, there's it just seems like there's a rapid fire exchange of Is this true? Is this true? Is this true? And no, it couldn't be? Because it doesn't suit my worldview? responses?

**Bret** 1:23:21

Well, I would say, I see that. But I also think that, you know, the most frustrating aspect is, why are people dealing with this as if they are not intervening in a complex system? Right, this is something that you and I have been saying consistently, which is, you're dealing with the most complex of complex systems, you're talking about intervening in immunity, where you have, you know, evolutionary phenomenon on the part of the immune system, evolutionary phenomena on the part of the viruses and interactions. So you know, one of the things I don't think he does say anywhere in what I've seen is, where is the visibility for this virus, right, to the extent that we create pressure to not look like what we already know, it looks like and that causes variants to emerge that are more or less invisible to the immune system. Well, that can be a permanent arms race, we can keep chasing the virus and keep reinforcing the immune system and that is likely to have costs I don't know what they are. Or it could be that the immune says that the virus finds a hole in the immune system and the holes in the immune system. People who have watched our live streams before will remember discussions of self versus non self recognition that our system basically recognizes anything organic, that doesn't match molecules we ourselves produce, right, that's an amazing magic trick of development. That basically is the basis of the the adaptive immune response. However, because our systems Have to not respond to self. Right? In order for this magic trick to work, that means that to the extent that we push a virus into looking more like us at a molecular level, it becomes invisible in a way that we can't chase it. And so what role this has to play in something like autoimmunity, if a virus becomes molecularly, similar enough to something that you create yourself that the immune system can't see it, then the immune system either pursues it and attacks your tissues, or doesn't pursue it, and it escapes. And so anyway, you're sick one way or the other. Right. And so the question, you know, we've been talking about autoimmunity is one of the things that it ought to be on people's radar, you know, cancer ought to be on people's radar, auto immunity ought to be on people's radar, these are general failure modes that arise from the fact that this complex system is predicated on certain kinds of assumptions. And if you push one way, you're going to end up here, you're going to end up there, you're gonna end up there, you know, get out immunity, you got cancer, you got destruction of tissue and aging, right? These are all failure modes, and we're pushing on them as if, you know, we know what we're doing. And the fact is no, it's very early in the discovery of all of the biological phenomena in question. We're not experts. Yeah. Yeah, yeah. On that light,

**Heather** 1:26:17

that light note, well, I actually found someone tagged me and a very useful rubric on on Twitter. This is Jerome Lily's worth. Nope. I'm just gonna read his, he said, I can't with a perfect system that they should have advertised. So he's he's found a thing from getting to the university saying when you're outside, you have to be in a mask at all times. He says, I came up with a perfect system, they should have advertised you only need to do two of the following. wear a mask, be six feet away from people be outside. Two of three. Two of three, yep, two or three. And that's again, I like I love the sport simplicity, right? And it because so much of what are being handled handed right now are these simple rubrics that actually, that don't, that don't describe the nuance that we need to have. Much like I love the idea of the cards that you can hand out to people saying actually, there's three options. It's not racist, and anti racist is racist, anti racist, not racist. Here you go, you can think on this later. But also, you know, here you go. Do two of these three things, pick pick two? Yeah, I mean, if you if you really want to, I suppose you can do three, but pick two. And like, specifically, at the policy level, wear a mask, be six feet apart from people and six feet, of course, it's a somewhat arbitrary number, but, you know, be physically distanced, be outside, you don't need to do all three at the same time. You just don't.

**Bret** 1:27:51

I agree. But I think built into this is there is reason you should not want to do all three, right? In some sense, the policy that we're being delivered is like, Well, why don't why wouldn't you do everything you can, right? And the answer is, you know, when you're buying a car, you do not think, Well, I'd like to be as safe as possible, therefore, I'm going to buy a tank, right? Because you understand that actually, as safe as possible comes with all kinds of costs. You don't want to pay Yeah, right? Like, you know, many gallons to the mile. Right? Right? So we recognize, hey, there are costs, what I'd like to be is very safe, right? I don't want to be as safe as possible, because, you know, a highway wouldn't work clogged with, right, with tanks. So the answer is you should, we are all taking on risks. We were all taking risks. And there's a sweet spot. And you know, and the fact is, the funny thing is you and I, we took our kids skiing this week. And the rubric on the slopes is very much this when you're in line, you pull up your mask, right? Because you're not socially distanced, you are outside so you're probably pretty safe just by virtue of being outside. But the point is, when you're forced into close contact, you pull up your masks and then when you're not in close contact, you don't need it. And What benefits do you get for not having your mask up? Other times you're making vitamin D or interacting like a normal human being and therefore your social relationships are normal and better and so anyway, yes, I like that rubric quite a

**Heather** 1:29:25

bit. And actually, that's that's a good place to show the thumbnail picture for this week because it was going to be precisely from from Wednesday, the beautiful day here in Portland and also beautiful on the mountain Mount Hood. You know, perfect spring skiing a little bit slushy. But

**Bret** 1:29:43

actually amazing the the runs were so long that you had kind of slightly icy conditions at the very top and by the timer at the bottom. It was a little wet and slushy and yeah, experienced everything on the way down.

**Heather** 1:29:54

Yeah, go down a ski climb.

**Bret** 1:29:56

Ski climb. Exactly.

**Heather** 1:29:57

Yeah. All right. Are we there?

**Bret** 1:30:00

I think we might be.

**Heather** 1:30:01

Okay. Well, we will be taking a 15 minute break, and then be back with our live q&a as we do every time for those of you watching and listening, answering questions that you have posed during Super Chat. And we're coming up on one year of live streams, actually just a few days from now. So I was thinking about putting together a list of just all the books I've read from in the last year for people and also, again, sorry, sorry, our wonderful moderator, Darkhorse moderator@gmail.com. If, if people have favorite moments from the live streams, I'd be interested to know what they are, and perhaps put together a list of you if you have a moment, and you know what live stream it came from. We'd be potentially interested in hearing those. You can also ask the mod things like how do I pose a question? And once the private q&a and such an answer to that question was the private q&a, you get access to that at my Patreon, and every the last Sunday of every month from 11am to 1pm. Pacific we do its private q&a with a much smaller audience who were able to actually look at the chat. And right now, at the $11 and up level, we have the question, the question asking period is open. So like with Super Chat, we never get through all the questions, but we're able to spend considerable time on some questions and if you joined now, you can ask ask a question and

**Bret** 1:31:25

we get to interact with people in the chat who often introduce things that are worth talking about.

**Heather** 1:31:32

That's right. And Brett has conversations at his Patreon every month as well. Yeah, maybe that's you know, there's there's the clips channel, please subscribe to this channel and the clips channel and join us at our Patreon we do very much appreciate the support. And maybe maybe that is it. I will say again, you know, love the people in your life who you should be loving and eat good food and get outside

**Bret** 1:32:02

and get outside. Yeah, and if you're listening to this, come check out the Q and A's on YouTube. Alright, you while everyone