Your Questions Answered - Bret and Heather 35th DarkHorse Po...

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**SPEAKERS**

Bret, Heather

**Bret** 00:14

Hey folks, welcome back to the Dark Horse podcast live stream q&a with more cat Belle as requested. Isn't that right? Fairfax?

**Heather** 00:25

certainly is. Alright, here we go. We are going to start with two questions from last episode. And then move on to the ones from last hour. So by last episode, I meant the one on July 28. With the use of powerful lasers in riots and protests, has any concern been raised in regards to injury to others beyond the federal agents? This was interesting cuz I just I I at least have not heard that raised as an issue. Yeah,

**Bret** 00:55

it is an issue though.

**Heather** 00:56

It is an issue, but I haven't heard anyone talk about it.

**Bret** 00:58

Yeah, lasers are available now to the public that are so powerful that you can actually do significant damage to people. You can disrupt aviation drones, and actually commercial aviation also there. Instances of people shining lasers into the cockpits of planes going overhead and things like that.

**Heather** 01:18

That's been true for a while. Yes, yeah, true for number here.

**Bret** 01:21

I don't know that the lasers have gotten much more powerful in the last few years. But But anyway, there are real dangers here. And the fact is, this is a model for a lot of things, which is we are becoming incapable of dealing with the weapons that are now available at trivial expense. Yes, putting, you're putting these things in the hands of people who are not prepared to deal with the responsibility of it. So it's a little hard to say, I have not heard anybody discuss it beyond the federal agents. But obviously, you can reach an arbitrarily long distance with these things. And people will do it to the extent that they identify targets beyond federal agents. It's only a matter of time.

**Heather** 02:06

Absolutely. Okay, so a second question from the live stream that we did a few days ago. And then we'll get to today's questions. Ghost of live stream past that goes straight. Past Exactly. I will say that the questions that came in today, which I only had time to briefly look at insert are amazing there. It's really good today.

**Bret** 02:27

Are there any stumpers? Probably like I actually am? Yes,

**Heather** 02:30

I expect. So what potential does confirmation bias have in causing science to go down the wrong path? And if something that's foundational is found to be incorrect? How quickly can any given field reliably course correct?

**Bret** 02:44

Great question. Yeah. So I would say we have a built in problem, which is that we have plugged markets into our thinking and sense making apparatus. And they are incompatible. And so what we have is a system in which we basically award the right to fund progress to whatever school of thought we declare to be the most effective at any given moment. And what this means is that when a school of thought is on the rise, it has the ability to kill off its competitors. When it eventually runs into extreme diminishing returns. There's nobody who left who knows how to think any other way. This is an obvious thing that's correctable, yeah, the solution is completely clear. But we see field after field getting stuck as a result of exactly this kind of broken modality. So it's a kind of sorry, going, how quickly can they recover? Depends how long they've been going in the same direction. And I think the problem is, ultimately the pattern we see is, I mean, we see it manifest in a number of things. I think it's plonk who said, science progresses funeral by funeral. And then others have pointed out that it is very frequently outsiders to a field that set new progress in motion because the people inside the field can't figure out what's gone wrong. They're too steeped in the the incorrect school of thought,

**Heather** 04:11

and outsiders can come. You know, we often think of that in terms of outsiders who are already expert in something right, like, x, external people who are the peers otherwise in terms of sort of rank in society. But it's also of course, what what the youth do, it's what is what the people up and coming in a discipline can do when they when they are new to a field, they start looking around and go well, I'm going to poke at that because that doesn't seem to make sense. And this This reminds me of the analogy that you told me a long time ago about your experience in high school when you were fencing. Do you want to, it's an observation that's been made by other people for the context, but this is something you actually experience so

**Bret** 04:52

I had the good fortune of being a absolutely novice fencer in A fencing program that had a guy headed for the Olympics. So he was an excellent fencer. And the thing is, is excellent fencing left an opening for you, if you didn't know what you were doing, because the point is good fencers, they narrow down to those things that actually make sense. And so to well matched fencers, you know, have one kind of battle, but if you're just completely arbitrary, because you're new to it, you don't know what doesn't ultimately make sense. You don't win against a really good fencer, but you do score the occasional point. Yeah. So anyway,

**Heather** 05:35

a newbie is effectively a generalist and unwitting generalist to the specialist and this is part of also the argument for MMA over very highly constrained martial arts. Yeah.

**Bret** 05:45

Yeah. I think it's really an argument for a lot of things that have grasped the public imagination of late like, I must tell you, I have very little patience for Olympic Gymnastics. And now that I have access to all sorts of interesting parkour to look at, you know, it's much harder to compare to parkour performances, because they don't take place against the same obstacles. But if you're, if you're ready to surrender, I mean, in fact,

**Heather** 06:14

if what you're trying to do is judge who is better Yeah, it's it's tougher to control because of what it is. Right? Yeah.

**Bret** 06:20

And so you know, I find the Olympic skating and gymnastics and all this kind of mysterious because people sit there watching something that if they didn't have the commentary of the judges, they wouldn't know what the best performance was, like, you could spot on obvious errors, you know, yeah, but you don't really know what the high quality performance was. Whereas you do know if you're impressed. You know, somebody's running up a wall and doing a backflip. Exactly. But you know, the wall may not be consistent, right? One wall is not like another great padding upon how slippery it is, for example.

**Heather** 06:53

Thus introducing into common parlance it's like comparing walls to walls.

**Bret** 06:57

Wow. Now wondering if that's really gonna get john.

**Heather** 07:02

I hope not. Yeah, that was that was Brett Weinstein. Yes. What was it? Okay. Okay. First question for from this. This previous live stream. Thank you for the incredibly generous donation from Matt. The psychedelic Society of San Francisco is holding bipoc that's kind of was bypassed stand for I know people of color stands for OC is bipoc bi. By last week. What

**Bret** 07:31

does it stand for

**Heather** 07:32

biracial and indigenous, maybe biracial, I probably have this wrong. I'm going to go with biracial so I'm gonna look it up indigenous people of color. I'm gonna start over the psychedelic Society of San Francisco is holding bipoc entheogen integration circles. You mentioned people playing with dangerous ideologies due to the accidental consumption of air got fungus. And now seems people are intentionally consuming entheogens and exploring these ideologies in depth. Any thoughts on this?

**Bret** 08:03

Black indigenous people? I would say, this could be very hopeful if you had something like a decent guide. But if you have psychotics,

**Heather** 08:14

we could we get closer to lead these. Just anybody

**Bret** 08:17

is I mean, I guess Chloe would be you know, the gold standard, but you just need somebody sailing, right? Anybody saying can could could contribute something. But you can't put psychotics in charge of guiding other people through some trip or it's going to just amplify the nonsense. So I guess Look, I

**Heather** 08:38

mean, yeah, I mean, I got that just it sound if this is being led by the standard sort of equity and diversion Equity and Diversity crew think they're going to prompt a lot of bad trips. I mean, that's just that's, that's not going to be a space in which people actually feel like they let their brain their brains wander, and actually explore all the different sensory and physical stuff that's coming out them. Yeah, I

**Bret** 09:03

don't trust them. That doesn't mean I don't trust these people. I don't know. Yeah, who's going to be doing it, but I wouldn't trust the

**Heather** 09:09

psychedelic Society of San Francisco is I think, and long standing and interesting society.

**Bret** 09:15

So it does dovetail with another point that I used to make frequently, which was that there is actually something tremendously disturbing about the fact that in some parts of the world, San Francisco being primary among them, and the agendas are quasi legal, and in other parts of the world,

**Heather** 09:35

like I mean decriminalized not mean like was illegal.

**Bret** 09:39

But my basic point is, look, if the Silicon Valley crowd has access to mushrooms or Iosco or whatever, that's an advantage that is being preserved by the fact that those very same things might be prosecuted in a different neighborhood.

**Heather** 09:54

That's that's a privilege. You know, it's easy to talk about crack versus powder cocaine being Being effectively having racially racially specific profile when sentencing penalties, right, but this idea basically lied to them, right? That's like that's, that's just nasty but obvious, but this sort of right? Actually Do you even have access to this kind of thing you want. And also like, just like I said, like that's gonna prompt a bunch of bad trips to really to unless you're talking about microdosing, you need some serious time and space and the ability to have some control of your surroundings to get anywhere close to guaranteeing that you're not going to have a really terrible time on

**Bret** 10:36

it. Yeah, but I mean, beyond terrible time. The problem is that this is a mind opening drug. And because of that, it can be opened for better or for worse. And what I would say is, I do think everybody needs equal access, which means they need to be decriminalized to the same extent everywhere. And frankly, we're seeing a mind numbing lack of creativity about social problems manifest in this movement. So could they use some shamanistic exploration? Sure, but it can't be just a reinforcement of the wrong ideas that we are all now being forced fed? The disastrous?

**Heather** 11:17

No, I mean, we've talked, I specifically have talked a lot about how I think that most of these people haven't been anywhere they haven't traveled, they haven't actually explored the world. Well, that extends to metaphorical as well, you know, they need to open their doors of perception somehow. And perhaps they can do it within their own brands, perhaps they can do it by traveling the world, perhaps they can do it both ways. But absent any such expansion of their very narrow model of what's right, and what's okay. They're only going to get more ideological,

**Bret** 11:45

yep. Now there is. One thing, again, I think the danger of watching this in the current environment is great, but there's one thing that entheogens will teach you that I think is actually a vital lesson to getting past this, this, this welke nonsense, which is that your perception can absolutely lie to you. Right. So, you know, good advice for people experimenting with entheogens, who don't have prior experience is, you probably want to stay away from the mirror, and you want to stay away from the phone. And that's because it can be very unsettling and encounter on the phone, you're able to do harm if the person on the other end doesn't know what you're up to, and have experienced themselves, somebody who did could handle it, but you're liable not to be able to navigate a phone call and the mirror, you know, watching you know, your face melt. Right? That's not such an easy thing to hammer out away from the rest of you. Right, exactly. On the other hand, wow, how useful is it to have evidence? My what I think is my eyes, just lied to me, because I know that didn't happen. Right? I can verify that the skin is still on my face. Therefore, my eyes are not as reliable as I interpret them to be under normal circumstances. Yeah, that's So

**Heather** 13:15

what you're saying is basically it can be used as a skepticism enhancer.

**Bret** 13:20

If you're paying attention, it will cause you to understand that your your perceptions can be anything up through an outright lie, and one that is not detectable on visual grounds. And so to the extent that we are facing something that seems an awful lot like psychosis, getting people to say, you know, am I having a psychotic break, that would be a step in the right direction, because you might be having something that's a lot like one,

**Heather** 13:45

yeah, Reagan. You both are sanctuary in a sea of madness. Supposedly 99% of all species that ever lived are extinct. does this imply that most species are dead ends, like the dodo? Or that we inflate the statistic by including all ancestral species of descendant species? Both?

**Bret** 14:04

Well, yeah, the latter is trivial. I think it

**Heather** 14:07

is trivial, but it's true. And it's worth you know, it's worth noting that apparently, given what I revealed last hour, you know, many biologists don't seem to understand what the fact that we can't decide on a single species concepts means that the fact that the paleontological species concept, which names species in within lineage, different names, so we are given even just take the example that most people will be familiar with humans, right? We have several Australopithecus species, and then several homo species, some of which are slight branches off of our lineage, but many of which are within our direct lineage, and they all have different names. And that is a way for paleontologists to talk to each other, just to just to know what they're talking about. And it doesn't pretend that those that one didn't become the next, but it's very confusing, especially when You're most of us most non biologists. And in fact, most biologists just have implicit in their brands, what's called the biological species concept, which is that if it can, you know, if two animals can reproduce and make viable offspring, then it's a species. And if they can't, then that's a different species. And that's, you know, that's one of, gosh, hundreds of species concepts, and none will apply to all. But this this paleontological species concept does contribute slightly to the idea that some species are extinct now, just because they've been replaced by new ones with a different name isn't, which isn't a good definition of species?

**Bret** 15:35

Well, it's it worse, worse than the problem with species is the implication of extinction. Because to evolve into something different is not at all extinct. Exactly. Yes. But in any case, here's the thing. So I would say, first of all, if you got rid of that ambiguity, you would still have the same overwhelming pattern. And yes, it does mean that the majority of species are dead ends, which does not mean as much as we think because if so this goes into what I've called explorer modes, and I've taken no end of crap about which is fine, because I will turn out to be right in the end. But the thing is, if you imagine that a clade That is to say a cluster of closely related critters, is actually exploring the various possible ways to be, and that one of those explorations actually results in the discovery of something new, that is not a failure of the clade even though the clade may get edited down to a tiny fraction of the various experiments.

**Heather** 16:28

So it would be great if we had visuals here, but so you had species a, and it radiated into B, and C, and B, and C radiate into D, and E, and F, and G, and all of this and you had species B through Z, all of which were, were descendants of species a, if species B, say ends up going on, and and its descendants do but everything on the other half of the tree goes extinct. That still leaves half of the representatives of of the original most recent common ancestor of those species with representation

**Bret** 17:02

in the world, right. And the other thing that we've said, probably some some

**Heather** 17:06

material in the national tree, dealing with the hands is not good. vermilyea do we have succulents from someone who sent them to us? Who grows them from seeds in Arizona? Thank you.

**Bret** 17:18

But the question is, how do you get into the future, not what you get into the future, as we're very focused on what you are? Yeah, but selection isn't. And so here's the final cherry on top of this whole thing, you and every other living entity that you can point to is the result of a an unbroken three and a half billion year stretch of reproduction that never once failed. Okay? That is to say, generation after generation, for three and a half billion years, your ancestors never once failed to make the jump, even though almost everyone fails to make the jump within a generation or two of existing, and you probably will as well. But the point is, selection is the result of that weird comparison between the odd creature that never once in three and a half billion years ever failed to reproduce, right? And all of the other creatures which were much closer to the normal expectation, which is to say failure within a few generations. So that fact of being in the camp that never once failed, is selection if you squint at it just right, and it explains why this is such a powerful process. What does it say to be in the tiny group have never failed, rather than the massive group of failed says normal, right? It's it means you got all of the stuff that works and even that's not good enough to get you three more generations forward in all probability. So anyway, it's a very interesting odd landscape. That's well worth considering.

**Heather** 18:53

Yeah, tremendously fun to play around. And this is just a recommendation. I don't recognize it. But I'll read the comment regarding psychopathy and politics. Have you read political poner ology. The original manuscript went into the furnace minutes before a secret police raid in communist Poland. sounds fascinating. Neither of us are familiar with it.

**Bret** 19:14

Presumably a copy was preserved. Yeah. I'm interested to read this.

**Heather** 19:21

Yeah. And the next one is also a comment. I just listened to the Billie Holiday. Just listen to Billie Holiday singing. God bless the child who's got his own game theory. 101.

**Bret** 19:33

Yeah, be easier if it was God blessed the child had got his own, or who's got his

**Heather** 19:39

own? Isn't I mean, it's not the implication of the song.

**Bret** 19:42

Well, it could be taken. Yeah. As the Matthew effect. In other words, the child that that has got his own is going to be blessed by God going forward, which is also likely true. Yeah, but anyway, interesting question. I would have to go back and listen to the lyrics specifically. But my guess is it is. It is the latter interpretation and not the format of

**Heather** 20:11

the dismissal of racism as evil seems like a missed opportunity to discuss the recognition of differences both historically and presently. How do you teach kids this awareness of differences within evolutionary framing?

**Bret** 20:22

We did, this is exactly what we did in our classes, we did not pretend that these things didn't exist, we don't pretend that the histories were other than they were. And everybody brought whatever experiences and history they had with them, but we discuss them openly. And you know, too little is made of the covenants, both formal and informal, that we had in our classes to one of the interesting so

**Heather** 20:48

that word needs defining that a lot of what happened at evergreen was in religious language, which is maybe telling Yeah, but we were required to have formal covenants with our students that we wrote. And that established what their obligations to us were, what our obligations to them were, what to do in case of grievance etc. And then they had to sign them or, you know, implicitly agree to them if they stayed in the program.

**Bret** 21:11

And they could this was required by evergreen, it was required by evergreen for every program. Most of the ones that I saw, and every time you talk with somebody who anytime you talk with somebody, you had to co fashion a covenant. So you got to see the covenants that they typically use, they saw yours and you combine them. And everyone that I saw short of hours, I thought read like an End User License Agreement, that these things just became uninteresting. And people sign them not understanding what the purpose was or anything

**Heather** 21:44

he was bureaucrat he is there was there was there was such an opportunity there. And most people didn't take

**Bret** 21:48

it right. But we did, we took our covenants seriously. And in fact, my covenant began to have a warning on it that said, This is not an End User License Agreement. Yeah, I did actually explicitly put that in the End User License Agreement is designed for you not to read it, and to sign away your rights. This is designed for you specifically to read it and understand what situation you're walking into. Right? So you have that you may not know, right? But my point was in those documents, we included stuff about how specifically you were to walk something back if you screwed up if you offended, somebody wasn't going to be nobody was going to be canceled. But you had the right to, to say I didn't mean what it sounded like I met up Oh, cat is now deleted something kidding. Thank you, but you had the right to take it back to apologize how you do that just wrong. not okay. But anyway, the the mechanisms for dealing with offense without causing a catastrophe were built into the structures that we were using. Yes, the point.

**Heather** 22:58

And we're gonna say anything specific about awareness of differences. I mean, I guess we did that in the classroom, rather than in the covenant such that, you know, I, in some of my types of programs, I would say in the preamble, basically, both of us had so many students who wanted to get into programs that we were trying to scare people away so that we were left with the ones who

**Bret** 23:20

were just trying to scare the people away, who were most likely to Yeah, we were trying to disrupt, we wanted the

**Heather** 23:24

most anti fragile students, the ones who may, maybe they had no background at all, even in an upper division science program, that was totally fine. But if they were going to require a certain kind of thing that they'd always had before in school, or require that they had their hands held, while if they're, if their feelings were hurt, then that was that was much tougher to have in the classroom, right? So I would say I guess it was in my animal behavior programs, which some version of which we then taught together in our final study abroad program. We're going to be talking about difficult things like the evolutionary underpinnings of genocide, and rape, and we're not going to justify any of that. But if even getting near those topics is going to make you so uncomfortable that you can't conceive of a scientific discussion on such topics, you should probably find someplace else to go. And, you know, to their credit, I had some students who were like, Oh, that is gonna make me nervous, but I'm gonna stick around and see what that looks like. Yep. And that those were often the most the bravest, ultimately, and the ones who weren't the most. So I

**Bret** 24:29

have a an anecdote I'm Be very careful to protect the young woman in question. But yeah, I had a student in my first or second year teaching who had been violently attacked on a study abroad program attacked by locals, not people on the trip. She had been raped and I warned her about the topics in the class, and very much Her credit, her sense was no I, I have, I have to hear what you have to say. And then she actually did a project and wrote a paper on the exact topic of the evolutionary meaning of rape, which is not an easy topic for any of us to deal with. And I was just so deeply impressed with her courage and her ability to actually carry it off to understand and you know, it was clearly something she needed to do to heal, but it wasn't, you know, he didn't tell herself some story that she wanted to hear in front of the full strength. And, anyway,

**Heather** 25:36

and did you do you think that it was healing for her?

**Bret** 25:38

I have no question about it. Yeah, no question about it. In fact, we talked about it, you know, that's another thing that evergreen did well was,

**Heather** 25:45

he spent a lot of time with students, when a lot of time in small groups around campfires, the

**Bret** 25:49

end of the program, you sit down with them, and you have a conversation one on one? Yeah. So I know exactly what she thought. And it was, it was exactly what you would have hoped. And it is exactly the opposite message of this sort of trigger warning, safe space. You know, keep every wound open, because it's your most valuable feature. It was the opposite of that. And anyway, so with

**Heather** 26:16

with your program, and by introducing her to what you taught her and by giving her a forum to write that you allowed her to move her wound into becoming a scar

**Bret** 26:25

scar. Yeah. And I I have no doubt that it was a major contributor to her quality of life going forward. Anyway, if she's out there, she knows who she is. I admire Yeah, I'm thinking of you.

**Heather** 26:42

It's amazing. Seeing a sign in front of a church in New Hampshire, denial feeds racism. I am looking for a concise rebuttal to this. It seems like a kind of Kafka trap. It does seem like a trap that seems very much like a Kafka trap. And that's the thing about Kafka traps is they defy rebuttal. That is exactly what they do. That is the only thing that they do.

**Bret** 27:07

Well, in this case, there is certainly a true interpretation of that statement.

**Heather** 27:13

Okay, so a concise rebuttal may involve for steel Manning,

**Bret** 27:17

right. Okay. What are there? Well, in the case that there is racism, denial of it does preserve it, right? Sure. Collective denial of it even worse. That however does

**Heather** 27:29

it needs, it needs a preamble where racism exists, denial makes it stronger,

**Bret** 27:33

right. But the denial that there is racism software, does not imply that it exists, which is exactly what happened at evergreen is now happening in public, which is not to say that there is no racism. But you know, the allegation that there is white supremacy rampant at evergreen? No, not white supremacy, right? You could have ignorance. But no, this was a community that was very eager to make sure that these properties didn't exist there. So doesn't mean it wasn't inept. But white supremacy is the wrong diagnosis.

**Heather** 28:07

But I think I mean, I think you actually came up with the answer here, or we did together, looking for a concise rebuttal to this. Well, where racism exists, denial makes it stronger. But denying that racism exists does not prove the existence of racism.

**Bret** 28:22

Nor is it racism as we were.

**Heather** 28:25

That's that's also true, there's a lot more that you can be said, but in terms of like two sentences, like we deal with that now, okay, you gave me three words you sign on a church or whatever it was, I'm going to give you two sentences, my chair is gonna squeak and see, you know, see what happens next?

**Bret** 28:43

Well, I don't know why you're so eager to make this concise response short, I just seems like we could tack stuff onto it and certainly turn it into something.

**Heather** 28:52

Yes. Here we see, you know, one of one of the other things about evergreen was we had like three hour blocks to do lectures at and they were meandering, and they were wonderful. You know, that sounds awful. If you've been in almost any lecture, how can you expect people to keep their butts in seats for that long, it's terrible. But these were very much back and forth interactive explorations, and so we're used to having rather a lot more time, yes. And also having actual people to interact with besides ourselves. Okay, next question. Thank you for hours of incredibly valuable discussion. Have you considered talking to Preet Bharara would love to hear a conversation between you to keep up the good work? PSM an IT dev with 10 years of experience here to help if needed you know, this is I don't either, so this is another one. I just don't even know who it is. Please comment on the evolved implications for the industry of CIA is project paperclip, and its cover up of Nazi recruits post World War Two infiltration into key positions into the US and scientific the US scientific and intelligence operations in aerospace, pharma and media.

**Bret** 30:00

Yeah, yeah. I don't know what industry of Yeah, I don't mean No, but I do know it's not project paperclip its Operation Paperclip. Yes. Which was about bringing Germans who were tainted by their connection to the Nazis into American industry and other things.

**Heather** 30:23

Just post World War Two. Yeah. And basically you we we grabbed those who are ideologically tainted and perhaps we're actually bad in this regard and made the made American science stronger by virtue of having stolen their brains from Germany.

**Bret** 30:42

Yep. And I remember from youth a tom Lehrer song about Verner von Braun. That's right. Yeah. Who had claimed that once the rockets were up, who cares where they come down? That's not mine Department said Verner von Brown, but But anyway, yeah,

**Heather** 30:59

the evolved

**Bret** 31:00

implications, though, evolved implicate? Well, the evolved implications are that there is murky game theory under all of this stuff. And the question is, do you are you going to bash the conclusions in neurobiology, for example, that were discovered as a result of people getting parts of their head blown off? And us discovering there for what controlled? What, just because people getting their heads blood blown off is grotesque. So anyway, I don't know what there is to say except that

**Heather** 31:37

well, one, one thing that might be implied in the question, which we would just disagree with, I'm not I'm not sure it's in this question. But one thing that I see is a possible implication here is that those Nazi Germans who were pulled into us science and therefore and thereafter became part of us society. And I don't know, actually, but probably dinner married and had kids here, would they be more likely to make Nazis? Not genetically, there was no reason to expect that, you know, Nazi ism is, is genetic. But culturally, would those ideas have potentially had had greater reach here, because there were actual people who held on to those beliefs in Germany? Maybe although I would expect that being in the US among lots of people who were so thrilled at the end of the war, and the end of Nazi ism, would have helped tamp down those beliefs.

**Bret** 32:33

So I'm going to now I know what I think in response to this question.

**Heather** 32:37

I'm not sure that that's, that's one read on this question. I'm not sure that's the intention. Let's say

**Bret** 32:42

that that's the read. Here's what I would say, there's a great difference between rehabilitating somebody who actually did advance the ball of Nazi ism, because their knowledge is valuable, right? That is dangerous precisely because in bringing whatever expertise they have, you're also dragging a broken ideology that's manifestly dangerous. On the other hand, there's a question about how many people were carried along inside of Germany, in spite of their sense that this wasn't right. And so we faced the same thing in this modern context where it's very difficult to distinguish between people who earnestly believe this nonsense and people who claim to believe it and then rationalize themselves into advancing it, because in their social milieu, there's no other way to do anything. And so I feel certain without knowing a great deal about the particular individuals involved in Operation Paperclip, that it will have been a mixed bag, we will have done it in both cases. And so there will be cases in which, you know, like Konrad Lorenz, who we've talked about here, briefly, who was a member of the Nazi Party later went on to regret it. And did actually advance the ball within evolutionary biology. That seems a case where we're perfectly justified in accepting somebody who did wrong things. But you know, he wasn't a murderer. He understood the error of his ways, regretted them. And then there will be other cases in which we have accepted somebody because we allowed the value, the utility of what they knew to outweigh the horror of what they believe. And probably that's the line that one should draw.

**Heather** 34:26

We've got 10 more questions that are, I think, really good in this stream alone, before we switch so let's try to get through these. Please comment on your belief in the possibility of performing something of performing something into being, for example, can certain behavior that is enacted over and over create certain permanent attitudinal or belief states enactment leading to an empathic state, for instance,

**Bret** 34:52

I feel certain that if we chase this down far enough, we will know for sure that it is possible. Yeah. That

**Heather** 35:01

Not I mean, there are certain things that can't be performed into being right. But

**Bret** 35:09

But let's put it this way to the extent that something is belief based, you can start out not believing it and espousing it, and then you can end up believing it. And so I think that's a demonstration of the principle, right? Yeah,

**Heather** 35:22

I guess I feel like there's lots of easy examples. You know, practice makes perfect is true for many, many things. And then there's some examples where you can't operate or just won't be but I'm, we're more interested in all that middle ground where some people would disbelieve it. And I think we would both tend to be less skeptical than sum as to its possibility. But I'd like I'm not coming up right now with some of those murky middle examples where there might be real disagreement.

**Bret** 35:52

Yeah, I mean, I guess return maybe I'm not sure sure what the question means. But it seems to me that you can't do anything about factual reality unless that the fact in question is one of belief. But that belief can transform a landscape. And oh, actually, you know what? Here's the example. The Rwandan genocide, based on a conflict between Hutus and Tutsis. And these two groups, as I understand it, were not real lineages. They were assigned based on phenotypic characteristics, which may or may not have indicated something about lineage, but certainly did not do it in any precise way. In other words, people with certain characteristics were assigned to, to Hutu, for example,

**Heather** 36:43

and there was no reality within the culture within like myth or cultural belief in advance of the assigning,

**Bret** 36:51

I believe that is correct, that this was actually in some sense, it was top down a top down, you've got a star and you don't it was star bellied sneetches. And it resulted obviously in a political murder, and then a genocide. So I wonder if that's not the ultimate example of wild? Yeah.

**Heather** 37:13

Amazing. You really 2020 question, family member asked how the organization will decide that x and y are center right and center left, I had a response, but like your input, thanks.

**Bret** 37:25

I think we're gonna have to just do it. And I think in most cases, it doesn't, it's not controversial, I did have a back channel conversation with somebody who we were and are looking at as somebody who could potentially inhabit one of those spaces. And I asked him, where he would place himself. And we had a very good discussion based on an ad turned out. It wasn't simple in his case, that there are actually arguments to be made both ways. But that probably from the perspective of most voters, he would be right of center. And so anyway, if you come down to something that is divided such that is very near the middle of actually matters less. But in this case,

**Heather** 38:14

but the but the optics are such that you want to have someone who appears to be more in the blue side and someone else who appears to be more on the right side, given the whole premise of unity 2020?

**Bret** 38:25

Well, I don't think it's so much a question of optics, I think it's a question of assurance, that the thing that causes people to accept that some plan like this might work, is the idea that it doesn't run the risk that their values will not be represented in the room where decisions are made. So if the room where decisions are made is the White House and the team that's making those decisions. What I want to know, as a voter is, is there somebody in that room who gets what motivates me, right? Because then I No, I'm not going to be shut out of the discussion, which is now the common experience. So somebody who's very much in the center is hearing people by their side, and so your values are still understood in the room. So I think it's protected enough.

**Heather** 39:09

Yeah. Next question. Seems our culture has messed up sexuality so badly that it's hard to know where to begin. How should children be educated about it? earlier? Later, both.

**Bret** 39:22

We're going to begin with sexuality Look, it's not a new answer, but dinner dinner. You gave me that look. Bedroom eyes either. Yeah.

**Heather** 39:37

So what I was going to say, we have we've written a fair bit in our in our book, which will be out next year about how we might fix some of the ways that culture our modern culture is screwed up our understanding of sex and gender and sexuality, but we specifically didn't and also about childhood, but we have not explicitly talked about how children should be educate about it. And I don't have a I don't have a ready a ready answer on this, I think we we talked with our children early about almost everything without being graphic about anything. And almost, I think everything that I've heard either of them say about what they heard in school has been nonsense. And, you know, I would have expected from, I don't even know that I remember any sex ed in school. But my sort of model of what sex ed is, is it's banal and uninteresting, and just, you know, leaves you not really knowing anything except a few things about the mechanics. And instead, what we've heard from our kids in late elementary and middle school, which they're now beyond, was actual, just wrong, just wrong stuff. In including, including the chromosomes exist on a continuum and such.

**Bret** 41:00

So I would say a couple things, one, based on what we've seen, you have to alert them to the fact that they are going to hear garbage, and that they not only have license to absent themselves from it, even if not vocally. In other words, they may have to nod their heads and answer the questions on examine school as if x but that you, it's your duty as a parent to alert them that there is a bunch of modern pseudo sophistication that they will be probably forced to pretend they agree with. As children, it cannot be expected that they will fight that battle at their place. It is potentially dangerous in a family context, to absent yourself from this nonsense, because it will expose you to accusations of bigotry, and worse. But you don't really have any choice because you're dealing with one of the central birthrights that we have, right, which is a healthy sexuality. And just the same way, a molester interrupts healthy sexuality, and has no right to do so your school doesn't have any right, to disrupt your child's understanding of what's going on with them, no matter what its objectives are. So you have to prepare them for the lies, you have to tell them the truth, as best you understand it. You know, give them a sense that sexuality is a a strange and interesting landscape in which things are not narrow and simple. It's not very tail stuff. So they shouldn't feel that they are off just because it is not something anybody's explained to them in a way that leads them to anticipate it correctly. But in some sense, your job as a parent, is to fight the nonsense wherever it comes from, even when it's the state, maybe especially when it is a state. Oh, and the final thing is maybe top of the list is you should give your kids a really healthy warning about pornography. Because the following fact is true. Historically speaking, people have in general learned about sex by observing it, right, because people lived in very close quarters. And so it was observable, children pretended to be asleep when their parents had sex, and they learned what sex was actually like, which means that they are sensitive to messages about what sex is like. And because pornography is motivated by market forces, it is therefore inherently prone to extremes. Why? Because you've got a bunch of pornographers trying to get your money. And the only way to get your money is to stand out. So extreme sex is the norm in porn, which then causes a young mind that can't calibrate this stuff, to think that the extreme stuff is the norm, and then it craves that thing. So what I would say is, you don't need to be detailed and graphic about it with your kids. But you do need to say, look, there are certain things out there that are poison. And porn, though it may appeal to you is poison because it is motivated by people who are interested in getting you to pay, right it will misinform your sexual mind and you can stay away from it, which is not a critique of sexual content. erotica is a very different phenomenon. But anyway, I would say a good healthy warning about porn is a requirement in order for your kids to avoid the pernicious market based garbage.

**Heather** 44:43

Yeah, there are places that the market doesn't belong. Here. We're science. This second words, sex courts. I will say that we talked a little bit about that in the book and I speak to that issue specifically in a article coming up in Nautilus as well. But it's not about neither in the book nor in my article, do we? Is it about how to talk to children about it? But But yes, speaking very clearly and explicitly about the dangers of, of porn once they're old enough to potentially be running into it, which may be very, very early at this point. For tech CEOs were grilled by Congress on Wednesday. Do you have any thoughts? negative impacts ranged from political manipulation, media and corporate or more aggressive millennials living life through sound bites, mental health issues accelerated is breakup the right solution. So I would I knew this happened, but I have not. I have not seen the testimony. So I would need to know more. But before I really weighed in on whether or not breakup was the right solution

**Bret** 45:47

breakup might be part of it. But it's not the whole thing. Certainly, it's not the whole thing. monopolistic power is a problem, because what it does is it means that the dysfunction is concentrated in these overwhelmingly powerful entities. And if you broke them up, it would be divided up more finely, and you'd have more choice to go to places that were less pernicious and all Yes. However, I would say the real point is that we do not have an understanding of our own rights and needs relative to an online universe, that the legacy code from our Constitution, for example, just simply does not prepare us for a private public square with algorithms running in the background that decide whether or not you are to be shadow banned, or who knows what. So what we need is an understanding of what the obligations are for a healthy conversation to take place online, and what the structures would need to be in order to make sure that that continues.

**Heather** 46:42

David Cho on Rogen described living with the Hudson people in Africa, one of the last hunter gatherer groups, can you elaborate about the hodza? As in their culture? And I, I would maybe like to come back to this. We've both read a fair bit about them, but I don't I can't do much at the top of your head

**Bret** 47:00

right? off the top my head, they'll get some wrong. Exactly, exactly. Yeah.

**Heather** 47:04

A deer attacked BLM protesters in New Jersey. Is there biological evidence to suggest that deer are racist? How do you recommend they check their privilege and implicit bias? Is this retaliation for the whiteness of hunting? Yes, this is the I was laughing at earlier.

**Bret** 47:20

Yes. No, maybe? Definitely. And we should talk about that further in a while. I

**Heather** 47:28

mean, why do you think they took that elk statue down in Portland? I was just getting there. All right. But yeah, it's definitely the retaliation for the whiteness of hunting. Yeah. Obviously, all the first hunters were not white, because all the first people were not white. And we were hunting long before we're humans. And so, boy, I like the question. It's ridiculous. Yeah, points out how ridiculous things are. Yep. What is the best way to start learning evolutionary biology for a newbie? Are there good books or online courses, lectures? Anything else you'd suggest for me to get started? I think we listed some books a couple a couple times ago, I have some Dawkins books. And I don't I don't have a we've thought about doing an online course on we aren't at this point. But

**Bret** 48:16

yeah, I mean, at some level, you can teach yourself, and especially with resources, you know, we pointed out several Dawkins books that are good,

**Heather** 48:27

The Selfish Gene ancestors tail climbing mountain improbable. Yeah, climbing mountain, probably top

**Bret** 48:31

three. But anyway, if you can get that under your belt, and then you know, one of the things I used to do in class was, we would take a nature documentary, often, Attenborough are the best, they have the fewest errors in them. evolutionarily, he's quite good on this front. But we would take one of the documentaries, and we would go through it, and anybody in the room could shout pause anytime they wanted. And, you know, it could take three days to get through one of these three weeks. Why? Like, yeah, it could be, could be either. Yeah. But the point is, you would go through and just extrapolate from what you were hearing. First of all, you would test it against your model. Are they saying something wrong? Because you know, that sounds unlikely. But anyway, you could do this, and we would have these great discussions about each of the segments, and I see no reason that you and a few friends.

**Heather** 49:21

Well, it's it's tough, though, if you don't have a fact check in the room in the form of you or me, or, you know, we did this with Bob drivers. Yeah, like it's tough. I imagine that would be very tough to know, when you were going down some path that didn't make sense if there's no one in the room who knows any better than you do yet, about how you know what a falsifiable prediction sounds like,

**Bret** 49:42

well, you need some grounding, which is why I suggested starting with those books, but I have the sense that it's a little bit like learning to play tennis by going out on the court and volleying which is to say you're not going to know that you'd have it right. And it's not to say that you won't learn the occasional bad habit. But if you do it and you like it a you're gonna tune into evolutionary stuff. And you will begin to get a sense for.

**Heather** 50:07

Yeah, it's it's tough though. I mean, at the Attenborough documentaries are really the only ones like it is alarming how much just bad thinking and untrue things are in almost every nature documentary like just put aside the fact that almost all of the footage is, is of extremely rare but true things and sort of made to look like it's happening all the time, or worst case scenario, but are all too common just fabricated just not what it appears. But even if the footage you're looking at is real, it's rare. The the narrative that goes over it in almost every nature documentary out there is often so bad. And they'll just slip in untrue things with with true things and bad thinking with good thinking such that, you know, I'm not I'm not surprised that most people don't know how to do the logic, because this is you know, nature documentaries is what a lot of us grow up on. And if you've never had someone say, any sense, look at that. And this is what I did this very rarely, but you did this a lot in your classes. And this is exactly what you were doing is you're retraining people's brains to start questioning. Even those things when they're setting a nice sonorous voice are actually not true.

**Bret** 51:19

Yeah, right. Yes, so. Yeah. All of that. I think if it can work, it won't be perfect. But it's a skill and it's learnable. On your own to an extent.

**Heather** 51:34

Yeah. Okay, two more questions here. And then we'll go to the next live stream. Are you too familiar with the book why fish don't exist by Lulu Miller. It traces the life of 19th, early 20th century biologist David Starr Jordan and explores some of the great mysteries of life and meaning worth checking out. So I will say, I have not read the book, but I listened to her on I think it was radiolab. And it drove me crazy. She's so clearly misunderstood basic evolutionary principles. Like you know, some of the very the title of the book why fish don't exist, she really thinks that fish don't exist, because we call things not fish that are fish. Like the presence of the existence of mammals suggests that fish don't exist.

**Bret** 52:18

And basically, because we would have to be fished and fish don't exist.

**Heather** 52:22

Yeah. And yeah, I could see you doing that in a way that was kind of okay. But she it seemed super ideological, and really driven to too much like so much critique of evolutionary biology isn't she's not you know, she's she's not, she's not super woke. It's not that kind of critique. But, but at least in this interview, I was yelling at her while I was in the car driving listen to this podcast. So the fact that someone who's listening to us says, Oh, actually, this book makes sense. You know, it might be it might be worth reading, doing a book review? Well, I must have been listening to this this year or last. And if she was interviewing about it's, it's new, it's a new book.

**Bret** 53:06

It is possible that she is in fact responding to our insistence that we are fish. And that this is kind of a way I know, like, so.

**Heather** 53:14

No, it's it's it's not mean, how long do you mean,

**Bret** 53:19

if the fact of mammals means that fish don't exist? That's the that's an inversion of our take on it, which is that mammals are fish.

**Heather** 53:27

Yeah. But that's not what this book is. Okay. No, and it's not as there's no way it's a response to anything going on in our sphere. But anyway, it's you know, it's sort of a historical biography that that Bay may have more value than I thought, given this, given this recommendation, but what I heard from the author did not lend confidence. One more question, but also, did you want to say anything about this, the this person who my college needs your help to stand up to the SJW I joined your Patreon to join the Google Hangout, you want to say something publicly to this person?

**Bret** 54:07

Yeah. Somebody has asked they've joined Patreon, in order to get in on the discussion tomorrow morning. And they may have joined it too late to get the link to the discussion, but I will give them the link and anybody who signs up late I will get the link. Maybe I'll just resend the link tonight to everybody who's all the all the patrons on that level? Yep. All right.

**Heather** 54:27

Okay, final question from this and then we'll skip to the next one. does work culture equal toxic femininity, the manipulative overuse of the victim card might be the same thing as a woman crying to get out of a speeding ticket emphases on safe spaces and language policing, the same thing as the archetypal consuming overprotective mother. Unless I'm not sure about that last one. But the but the framing i think is quite interesting and it fits with it being a female dominated movement and it does not reflect the best of femaleness at all

**Bret** 55:04

i think i think that's the important thing is that toxic femininity is not synonymous with femininity any more than toxic masculinity is synonymous with masculinity and so it may be

**Heather** 55:17

just exactly the point that I made in my essay of that name for Colette

**Bret** 55:21

Yes So in any case I do think that there might be something to the idea that the particular dysfunction we are seeing leans more towards the toxic feminine and the toxic masculine but the toxic is the problem

**Heather** 55:33

yeah although I mean frankly the the people who are more prone to violence it's sort of you know it's it's we're now getting you know, maybe the stuff that happens in the workplace is more toxic femininity style garbage and the place the violence in the streets is more toxic masculinity style garbage and it's just it's toxic either way and neither of us really love this you know, toxic ex framing but you know, men are more likely to use physical force and women are more likely to use emotional coercion to get what they want when they're aggrieved and you know, not reflecting the best of what they could be doing.

**Bret** 56:07

Yeah, but even the violence here is masculine in a way but the point is, what is it pointed out and how did it get pointed out that in other words, it's sort of a decimate the inconvenient right. So anyway, I I'm unsure but there is something there is something to this all right.

**Heather** 56:29

Where are the remaining Okay, here we go. Did you draw a line here sec. Yes. Okay, here we go. And you're out exactly an hour. Okay, well, we'll get through a few of these from this our female here when I get sick my libido skyrockets. This makes sense to me from males last chance to spread seed but not in females. Is my brain confused? Or is there an evolutionary reason? I don't see. Because I think it depends it really depends on what kind of sick you are Yeah, right. Like there's just there's a lot of ways to be sick and if it's just sick across the board then that doesn't like there's no way to put an evolutionary explanation to that because they're too many different ways to be sick what that means but you know, if it you know, if it's if it is, if it's an STI, it could be the the pathogen doing its bidding and trying to get you to spread it. If it even if it's, you know, something, respiratory or gut, it can be the pathogen doing its bidding and trying to get you to spread it.

**Bret** 57:35

That's a fair point. Yeah, really anything that is spread by close contact. But the question I have is, is this a common pattern? Yeah,

**Heather** 57:43

I had never occurred to me. experience it never occurred to me or heard anyone say it? Yeah. But yeah, beyond the is it? Is this the pathogen doing its bidding? I don't I agree with the person asking the question. That is sort of a dandelion strategy doesn't apply to females. It only applies to males. Yeah. dandelions strategy being upon being picked spread your seed, he might have a last chance to reproduce after all. Next one from the militant moderate, who supplied that UMD poem that I read on air a time or two ago, he says seems I assume he seems my unity poem was appreciated. I also specialize in writing song parodies. Can you think of a song you'd like to hear rewritten for the project? Please, not American Pie it's ever done. Also shout out to new disk discourses. Yeah. So new discourses is Jim's book oceans. I think it's just him. Maybe it's Peter two. I think it's just James James Lindsay's project. It's great. Yeah, let us think on that. Unless you have something aside, I was hoping

**Bret** 58:50

it would come to me, but I don't have it. But I do have a feeling that there's room for this. Oh,

**Heather** 58:54

absolutely. It could be great. It'd be totally great. Zach, would you highlight that's it's number 46. In the spreadsheet. primate sperm release through asphyxia, tissue mechanism or adaptation. So low ranking males can impregnate females before being strangled away from them by dominant males. Question mark. how widespread is this in the animal realm?

**Bret** 59:21

That's a plausible hypothesis.

**Heather** 59:23

I couldn't make you or you could make sense of what I read. I couldn't make sense of the words. Yep. Yeah.

**Bret** 59:28

The question is, I think motivated by the fact of auto erotic asphyxiation and what it means about primates and that it probably does mean something about last ditch efforts that reproduction that happen

**Heather** 59:43

not related to the first two questions ago.

**Bret** 59:45

Exactly. So I would say you don't need to go all the way to its males, ejaculating as they're being forced away from females that they're copulating with, although that obviously makes sense. But base The idea that anything that threatens the life of an individual who is engaged in sex if that individual is male, obviously there's an evolutionary win if reproduction is successful, so yep, basically you don't need you don't need the scenario to be nearly as specific as the one you're drawing though that one works.

**Heather** 1:00:20

Okay. Here we have a quote from Jerry Garcia. Constantly choosing the lesser of two evils is still choosing evil. Didn't know he had said that. Yeah, that's rather apropos for the most recent unity 2020 animation,

**Bret** 1:00:34

the most recent unity 20 animation, which you can find as my most recent tweet, and you could retweet it yourself or whatever you want to do, but anyway, it'd be cool to spread it around.

**Heather** 1:00:48

Is Elon Musk deploying a similar strategy to Trump's in his efforts to elevate discussion about the pyramids? Bob nice Musk is talking about the pyramids. What's he saying about the pyramids? Oh,

**Bret** 1:00:57

did I catch a straight we did he's alleged to build the pyramids were alien and God. You know, he's having a rough time and he needs

**Heather** 1:01:09

he sees he's going full shaman. And sometimes shamans are really wrong.

**Bret** 1:01:13

Yeah. Wrong. really wrong. Right?

**Heather** 1:01:17

Yeah. There's i said, i, this is news to me. But if that's what he's claiming,

**Bret** 1:01:21

I wish I looked at it in passing, because I think I took it to be fiction, but

**Heather** 1:01:29

you'd ever dealt with him. So I don't think we can address the actual question without knowing exactly what he's done.

**Bret** 1:01:35

Right? Yep. Now there was an amazing display at the University of Michigan museum about the

**Heather** 1:01:41

Museum of zoology. No,

**Bret** 1:01:43

it was the rufen Museum. museum. So ology. So this is this is our

**Heather** 1:01:47

alma mater?

**Bret** 1:01:48

Well, it was the entire museum had a display about how the pyramids came to be, in spite of the various mysteries, which include the fact that there's no quarry from which the stones could have been taken, nor a plausible mechanism for their transportation. And this display, argued very compellingly, I thought, I mean, very compellingly that this was Nile sediment that was cast in place, which would seem,

**Heather** 1:02:15

you know, that's in my head. And maybe it's because I saw that display. And that's just what I understand to

**Bret** 1:02:19

be here. But so I don't know whether that has become the standard interpretation or that interpretation has been falsified in some way, in which case, I would want to check whether the falsification was right, or whether we have thrown out the right explanation because it answered so many questions.

**Heather** 1:02:33

Yeah, I'll sediment cast in place,

**Bret** 1:02:35

right? Yeah. Carry it up one bucket at a time later to

**Heather** 1:02:38

tear it up without the water. I think it would have to have been Oh, I know, it would have to be lighter, because it would although all the water would eventually evaporate out. Yeah. Cast. Yeah. What about the role of disgust as a psychometric factor and conservatism? I heard this and jbP lecture. Yeah, I think that there are a number of these sort of big five and other cycle personality traits that are traceable to people love to the child versus right. And disgust is a I think, just maybe a more frequent emotion that is reported as being experienced by people who identify as conservatives. I don't know what more to say about that. Nope. Yeah. Favorite nature documentaries. Question mark. This came in before we started talking about nature documentaries. Yeah, I think so basically, anything by Attenborough. And there are some other good ones out there. But Attenborough has, I don't know how he came to, but he just understands more about evolution that Oh, yeah. than anyone else who is doing these things and, and now has a team. I don't he's probably not doing that anymore. He's still alive. Yes. But he clearly has a team around him. And they consult with people who actually know what a compelling evolutionary story is, and whether or not it's falsifiable, and what isn't. And they don't tend he doesn't you don't tend to see in Attenborough documentaries. Truly bad evolutionary stories. Yep. That by which I mean unfalsifiable. Some ID, some ID now COVID tests are performed outdoors. Is it possible that swabbing your nose while standing in the sun could harm the test results? Yes, yeah, absolutely. I didn't. I didn't know that. I didn't know that. There were some of them were being performed outdoors. But absolutely, you

**Bret** 1:04:33

would want to do it under some sort of undercover detective. Yeah, thing. Absolutely. I mean, even then, it's so sensitive to UV that bouncing around. Yeah, yeah,

**Heather** 1:04:43

we're gonna. We'll talk more about COVID Next time, but there's just there's so much trouble with the tests.

**Bret** 1:04:49

Yep.

**Heather** 1:04:53

Have you considered having a chat with Judy mikovits given the parallels between her story and your experience, my steel Amir's Nope, now we talk We talked about the pandemic video back. I don't even know when it would have been sometime in the 10s. Sometime between Episode 10 and probably 16. And, and which one it was then but go back there and

**Bret** 1:05:15

there's a lot of misinformation in it so much so that I just don't trust the source. Yep.

**Heather** 1:05:22

Let's do three more. Two more. I can't there's a bunch. catches, there's more screentime. That doesn't count as well. Yes, he does, but not if he's gonna show us but to you guys. That wasn't nice. Okay, two more here. Thoughts on the novelty? Do you have thoughts on the novelty of today's tech monopolies versus possibly outdated antitrust structures is hyper scalability and novelty that can be mistaken for trust or anti competitive behavior of the past. So there's presumably to this this Wednesday?

**Bret** 1:05:58

Yeah. Yeah, there is clearly a parallel, the parallel is clearly limited. There's clearly upside, you know, we're in a novel landscape. And so in some sense, creating a monopoly can create a de facto standard where a standard may need to exist. So it's not like there isn't a positive outgrowth. But the hazard to us is also so clearly massive, that, you know, we have to figure out how to rescue the part that is useful. From the part that is devastating.

**Heather** 1:06:33

One more question. Can you please speak about blood types? Why do we have them? How did they evolve? Why would o be more resistant to COVID-19? Love the podcast? Thanks for all you do from South Carolina. You want to do two minutes on blood types? Are

**Bret** 1:06:45

you prepared to I mean, we can talk a little bit about how they work. Yeah,

**Heather** 1:06:48

that's that's about all Yeah. Struggling with my chair today.

**Bret** 1:06:54

All right, so red blood cells have so an antigen is a molecular signature, and your cells have antigen sticking off of them. That is to say, a distribution of positive and negative charges in space that is unique. There are two no three that are found on the surface of human red blood cells. One of them is called a one of them is called B. And the other one is called the Rh factor or rhesus factor. A and B exists at the same place in the genome. So that you can because you have two chromosomes, you can have an A and the absence of a code, you can have a B in the absence of a code, you can have an A and a B, or you can have both absences, which will give you an O blood type. But basically, the blood types are described based on the presence of an antigen. So if you have an A, B, or an Rh factor, that's a presence. And you get Oh, when you have a total absence of all of those, well, no, you for an absence of the A and B factor and Rh is categorized separately. And so these things create,

**Heather** 1:08:13

and where's rH? Like, where does it it's not? It's somehow in a different part of the genome, is that all our does it? Is it a fixed or different part of the cell as well,

**Bret** 1:08:21

not really, they're all over the surface, and it's just a different locus.

**Heather** 1:08:26

So you can you can be, you can have the A antigen, or the B antigen, or both of them or neither. And you can have the Rh antigen or neither, yep. And if you have, for instance, the B antigen and not the Rh, your B negative route would be your blood type,

**Bret** 1:08:39

positive and negative about the Rh factor, right? And so there's a rule, the presence of an antigen triggers the immune system, the immune system is designed to recognize that which is not self. So that is to say your immune system will react to something as foreign if you yourself, don't make the antigen and question. So if you have a B positive blood, you carry every antigen, what that means is you can take blood from anybody because no matter what antigens they have, you will regard it as self since you produce all of those things. If you have a negative blood, then you're a universal donor, but you can only take blood from another own negative person because any antigen will trigger your immune system to reject the blood.

**Heather** 1:09:25

If you if you get a negative blood, which has only one antigen that you don't have a your your body will say that's not self respond, create antibodies to to reject it to

**Bret** 1:09:38

want to literally fight the tissue and kill it, which is very dangerous to have happening in your bloodstream. The rejection of transplanted tissues that are not blood is much more complex. So in some sense, this entire Abo rejection donor complex is about the simplicity of the antigens found on red blood cells, in the case of something like liver, you're talking about a much more complex set of antigen. So you that you need a very good match at something called the major histocompatibility complex, which is why you need to go through lots of donors rather than there just being a liver bank where you can go get one that's a match for you. So now I know that there are very different distributions of probabilities for antigens for purebred human populations. What I don't know is what the ancestral state was, in other words, are some of these blood types limited to some populations? And only in recent times with human mixing, have these things spread between them? Or were they always somewhat mixed? But the prevalence is different between populations that don't

**Heather** 1:10:46

I suspect a good analysis has been done, but I also don't know. And the only one, the only sort of map that I can pull up in my head right now is that Native American populations, meaning the the descendants of the original Burundians in both North America and South America are more likely to be Oh, maybe. And I don't know that there's actually an Rh factor specificity there. But I know it's Oh, that Native Americans are much less likely to be a B or A B.

**Bret** 1:11:13

Yeah, I would love to know what the ancestral state was. Yeah, it was pure video at the point of the Corinthians having descended into the Americas

**Heather** 1:11:20

or not. Yeah. So but then the final part of this question, and then we'll we'll end for today is why would o be more resistant to COVID-19? Especially let me just like, add something to the question. For me, like we don't know the answer, especially in light of it's not that a B and A B are more susceptible to COVID. But if I remember correctly, it's a that is specifically more susceptible. And then B and A B, blood types are kind of neutral, kind of in the middle. So it's not that like not having antigens on your blood versus having antigens makes you susceptible or not. It's it's very specific one that makes you more susceptible, versus having none that makes you more resistant or less susceptible.

**Bret** 1:12:04

Yeah, I don't know. I think the thing The first thing I would like to know, in order to answer the question, there is reason to think that red blood cells probably do not get infected. That is to say even a virus gets into red blood cells that it cannot reproduce itself. But that is not dead certain. So because they're a nuclear Yeah, so red blood cells in males have no nucleus. But the coronaviruses do not integrate into the nuclear genome. And so it is possible that they have ribosomal components that would allow a virus to replicate itself, even though it has no nucleus. And I would like to know whether that happens or doesn't it's something we should we should be able to look that up. In which case, it would almost certainly have to do with the difference in ability to enter a red blood cell based on the antigens on its surface. But anyway, I guess we'll have to return to it after we know.

**Heather** 1:13:06

Yeah. Interesting question. Yep. I think we're done. All right. So probably we'll be back on Tuesday. Yep. Join our Patreon so if you want more you want access to the discord etc. One more shout out to

**Bret** 1:13:26

UMD Yep, unity. 2020 is going to have its first campfire this week, hopefully early based on technical considerations. So come visit our Twitter account. The hashtag app unity 2020 will also likely get you that announcement. You can sign up for our Twitter accounts. And anyway we will get word out but please join us for that campfire. It should be great. Alright everyone, thanks so much.