Your Questions Answered - Bret and Heather 57th DarkHorse Po...

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**SPEAKERS**

Bret, Heather

**Bret** 00:08

Hey folks, welcome back to the Dark Horse podcast live stream q and a pet extravaganza. We are going to answer your super chat questions. Yes, we are. Yes,

**Heather** 00:21

here we go. Here we go. As has become our tradition, we will start by answering some of the questions that came in, in Episode 56. Before moving on to the ones that came in today, just watched your debate with Dawkins, where would you draw the line on what can and cannot reasonably be considered an extended phenotype? And why?

**Bret** 00:45

Wow, that's a tough question. Yes, I know, why would you draw the line as to what can or cannot be?

**Heather** 00:53

There's no hard and fast line. Yeah,

**Bret** 00:54

I think the thing is, the real question is, what does selection See? And what does selection not see? So this idea of extended phenotype is Dawkins concept that, well, if you take the shallow end, you've got genes that move through time, by organizing molecules into bodies that do things that advance the genes interest, right? nobody finds that controversial, Dawkins point is that bodies organize the world outside them in an analogous analogous way that advanced the genes interest. And so in extreme cases, you know, a beaver will cut down trees that will block a waterway that will create a habitat that causes the beaver to be able to, you know, leave generations of descendants.

**Heather** 01:42

And this is the example this is one of the examples, but maybe the most salient example that he uses in his book of the same name, the extended phenotype. And he has I don't know if he still feels this way, but for decades, I believe he felt that extended phenotype was his biggest and most important contribution. I think he still does, yeah. This is a book from 1981, maybe 82,

**Bret** 02:03

or something like that. In any case, the point then, is where does the analysis become absurd? You know, as a footprint and extended phenotype, right? Presumably not because it's not meaningfully. So could a footprint be an extended phenotype, but of course, could be in a certain context. So the question isn't, where do you stop extending the analysis? The question is, where is the noise so great relative to the signal that selection can't see it and therefore can't operate to refine it? That's the question that we're after. So anyway, there's no obvious place to draw that line. But that's, it's not. It's not about where we want to put the definition. It's about where selection has access to something.

**Heather** 02:52

So this one is a link with a question, why is this allowed to continue? It's very, really long read. Jim, James Lindsay posted on Twitter, what are your thoughts? So it's, it's the essence locked down. skeptics.org. And it I think this is said, yeah. Written by Sebastian freeball, a former parliamentary adviser to the German Bundestag on 17th of November 2020. And he raises a number of concerns in this I have only skimmed it, I don't know if you've had a chance to look at it at all. So we are not in any way I suggest. Yeah, so we are no way suggesting that. We we are not attesting to the veracity here or saying what we feel overall. But there are some things in here there's one quote here we go. Recently, buena stog. President shovel, even spoke about this himself with astonishing openness when he said quote, the Corona, the corona crime. The Corona crisis is a great opportunity. In the crisis, resistance to change is diminished. We can now bring about the economic and financial union that we have so far failed to achieve by political means. yaks. Yeah, yeah, exactly. And so you know, could could someone with completely good and pure intentions have said that? Yes. In the context of other changes that are afoot, is that most generous interpretation, the best one that we should have the most likely act to be accurate one going forward? I don't think so. So I can't really say much more about this. But should we should we be concerned about how states and even larger governments might take advantage of the resistance to change that will happen to people after months and months and months of not being able to do what they are accustomed to being able to do? Yes, yes, we shouldn't

**Bret** 05:00

Yeah, I would say this questions are separable. What is the reasonable thing to do with respect to COVID? And to what use might people put this crisis in which we have a right not to be modified in this way. Now, I'm not saying that there isn't some opportunity in the fact that we have discovered that lots of things that we thought, you know, that are going to work. Yes, not what we once thought it was, and that that might allow us to change things at this point, now that we've discovered that. So there is a benign version of this, but I do have the sense that the massive transfer of wealth that is taking place between, for example, big businesses, which are in a position to withstand COVID, and small businesses, which are not, is something that is going to be leveraged, and to the extent that it is going to be leveraged, it's also going to create skepticism of very reasonable measures that we can and should take to prevent the spread of disease. So anyway, it's a it's a very frightening landscape in which it's very hard to have a conversation about the biology separate from the political context. And I feel like very few are getting it right

**Heather** 06:24

now. And I guess, just one more thing on this. The virus itself is a selective force on humanity. And the different responses to the virus in various places, is a selective force on the populations on which those are being imposed. And some of them are, presumably necessary due to the virus and some of them are, ill advised, and some of them are well intentioned, but badly implemented, but selective forces all and one of the ways that we saw and, you know, I am not, at the moment, going to say whether or not I think it was a conscious and, and imagined well in advance or simply opportunistic, but the fact that the protests after the death of George Floyd that became enduring and became riots in many places happened with the severity that they did, is in no small part, I am certain to lock down fatigue. And so there was a selective force that was being responded to that allowed Black Lives Matter and other organizations to get people to spill into the streets. In Great, far greater numbers than would have been possible, I think, absent. Not the virus, but the responses to the virus, again, some of which were absolutely necessary, and some of which weren't. And I'm not going to go into all the distinctions between those. Yep. Okay, next question. Is, is a lot of things. It came in at the end last time that a high dollar amount, so I'm going to read it, with the caveat that there's a lot of things here. Dr. Mike Eden question, Mark. And can you explain the effect of us money gambled in offshore books on the 2020 election? And why markets haven't settled on the outcome? And how close is Eric to solving the speed of light problem? Please convince Joe Rogan and Jon Stewart to run for 2024?

**Bret** 08:24

Wow, that's a lot. That's a lot. That's a lot of stuff.

**Heather** 08:26

Yeah. I think we respond to one of these. Yeah.

**Bret** 08:31

Dr. Mike Eden is a perplexing phenomenon. I am concerned about not only the implications of what he has to say, which are, I feel it is likely he is incorrect. But it is difficult to spot why, and that has me more interested in the analysis than I would otherwise be. The

**Heather** 08:58

some people don't know what you're talking about.

**Bret** 09:01

I'm trying not to get us kicked off of YouTube. Yep. And so in any case, it is. Somehow we have to figure out how those small number of voices if you can trust I hope that we are among them, can discuss the things that need to be discussed openly without being shouted down by all sides that are trying to sell some sort of politicized version of the truth and we are headed for a catastrophe surrounding the analysis of where we are with respect to COVID. What is reasonable to do what is not reasonable to do what the cost benefit analysis of reasonable measures are, and I should say this is going to get worse with the vaccine. The questions surrounding the vaccine if you think they are simple, you are not understanding the landscape of this vaccine in the world that it is being introduced into. And so anyway, I don't know how we talk about that in a world where the sword of Damocles hangs over every channel, and there is no court in which to appeal and establish that you are in fact behaving reasonably. But we have to figure out a way because I do think a proper analysis is something that you are entitled to, that it will actually materially potentially alter the way you enter intersect these questions. And that, you know, spooking everybody, so we can't talk about it so that you have only the official version to go on is is unfair to you and everybody else. So it's right anyway. Yeah.

**Heather** 10:42

So and we have several vaccine questions coming up, so we'll get back to that. Okay. You are cordially invited once. COVID is it approximately handled level of control to a Dungeons and Dragons game in Minneapolis with a bunch of 30 to 40 year olds, not PC and with good beer? Actually, I'm not sure if he N stands for and But anyway, thank you for the invitation.

**Bret** 11:05

Yes, I'm told that Dungeons and Dragons is where it's at. So I hadn't heard Minneapolis invoked.

**Heather** 11:12

This is a particular invite. Oh, I

**Bret** 11:14

know. Yeah.

**Heather** 11:15

But um, you played a little d&d as a kid right a little bit tight but oh, I meant to ask Zach this can you enable closed captioning don't know if it's in your control. It's not perfect but can help this helps me learn love what you bring. I think it's usually on and it got D it got turned off not not by our amazing producer, our 16 year old son Zack, but by the powers that be at YouTube, is that right? sec.

**Heather** 11:45

Okay, so this was a question from last time and a couple I saw a couple of people said that a few videos didn't have closed captioning. We always do turn it on, are interested to hear if it's somehow not working. But But ultimately, we don't have control somehow, even though we should. Okay, first question from last hour. Regarding still life exercises, the purpose so we talked about what still life paintings might be about in Episode 56. I believe. Regarding still life exercises, the purpose is highly analogous to that of tinkering. Take complex forms, for instance, fruit environments, bodies, etc. and simplify them down to more basic heuristic tools that can be easily replicated from memory. In this way, artists learn to internalize their subjects within a visual library comprised of a limited set of principles. Think of it like an artist's alphabet made up of lines, shapes, colors, compositions, etc. This is so beautiful, and I took a fair amount of art, I did a fair amount of even 2d art when I was younger, and that was never said to me, and I never intuited it. And it would have brought a whole new meaning and, frankly, intrigue and excitement. To to those I mean, I feel the same way about now played, I play classical piano for many, many years. And fully a quarter of my practice day, every day, I've only a half an hour of every two hours of practice was scales and arpeggios, and various just, you know, getting what, you know, there's not really muscle memory, but you know, getting the muscle memory in your hands. And you can still make it beautiful, and recognize that you're building the library. But for me as musician, it was never It was never explained to me at all. And I never heard that for 2d art either. I just find this description. Amazing. Yeah, I

**Bret** 13:34

find it amazing, too. But I also had challenges the very model that I presented. So I'm wondering whether it is in fact accurate. What sounds remind

**Heather** 13:41

us what the model that you presented was

**Bret** 13:43

basically that painting a bowl of fruit. Got you, it was basically a skill generate exercise. Now, this model is consistent at that point. But my point was there was actually a bowl of fruit, and that the person was painting it before it rotted. Yeah, that's not inconsistent with this. No, it is because what this person is saying is that they are doing it from memory. And that knowing what a banana looks like, and an orange looks like,

**Heather** 14:11

I don't I don't read that this way at all. Simplifying them down to more basic heuristic tools that can be easily replicated from memory. So you're building a visual library comprised of a limited set of principles?

**Bret** 14:23

Well, I'd be curious, I do read it as from memory, but I agree with you the way it's written, it could mean building that skill from an actual

**Heather** 14:35

certainly anecdotally, the the 2d art that I took, always had the object that you're expected, Deus

**Bret** 14:41

wouldn't be my expectation at drum. Anyway, I'd be curious.

**Heather** 14:46

Alright, we have a few vaccine questions here. One I'm just going to ask I'm going to read all three of them and then I'll go back through individually just so we know what's coming through. mRNA vaccines is messenger RNA vaccines are unknown agents. Very high potential for long term effects specifically focused on reproduction. At cellular and species levels plus Big Pharma is using it says Maureen I think it means Marian which is mice brain cells to culture mRNA vaccines will you take? Next question is please steel man the position of refusing the first iterations of the vaccine from a concerned medical professional who works in the city hospital system whose concerns are heavily echoed. Thank you. And the third vaccine question that we got this hour was it is disturbing that with COVID vaccines, we have no clarity on duration of immunity post vaccination transmissibility, or if any of the vaccines will protect against mutated strands of COVID-19. So

**Bret** 15:41

yeah, I'm not sure what to do with this, because this is a discussion I very much want to have. But again, the sword of Damocles.

**Heather** 15:49

Yeah, right? I wouldn't we did. We did have this discussion a bit. I don't remember it was Episode 56, or Episode 55. We did talk about vaccines, specifically. Yep.

**Bret** 15:59

But the problem is the question of, will you take it and should one take it Yeah, is far more complex than I believe we are allowed to discuss. And I think this is just purely analytical that there is no politics that need to be here or should be here. But that the following thing is almost certain to unfold. There is a conflict between your individual interests and public health, okay. The game theory does not support the public health conclusion, and those who are focused on the public health conclusion, then end up misleading the public about the truth regarding safety, etc, in order that the behavior of people comes closer to matching the public health evaluation. Now, in a world, which looks like we're lying to you, well, it can looks like they're lying to us is when I realized

**Heather** 16:56

that the the the people making their prescriptions about what everyone should be doing right are, are often often end up in a position of lying whether or not they know it,

**Bret** 17:05

yes, they're lying. And, frankly, I don't even think I think many of them are lying for what they feel is a good cause. But that they are not even justified in that escape, because in effect, what we have is a system of perverse incentives, in which they are doing the bidding of an unholy phenomenon in the market. So anyway, I don't want to get caught, I'm not gonna lie, like they do. I also do recognize, though, that discussing the conflict between the individual health and the public health perspective, will result in people biasing towards the individual health perspective, which does have costs it will kill people. And so you know, How the hell can we get to a place where we can properly have this conversation so that we can hold all parties to account for their portion of this disaster and figure out what the proper collective responses to it govern mentally that's what we are supposed to be doing. And the idea that we want to shut down certain people who want to point out, hey, actually, that thing you're talking about is a lie. And you haven't protected people. So you're steering them into that lie is actually steering them into danger. That doesn't have to be there. Right. So anyway, I don't know how we do this.

**Heather** 18:27

Yeah, I don't I don't either. I will say anecdotally that I actually had conversations with two different doctors, medical doctors this week about this, who I was seeing for other reasons. And I, I just asked them, what's, what's it looking like for you in your particular institution? There are two very different institutions, one of them a very big university hospital situation, one of them a small practice. What's the situation for you? When do you think you're going to see it? And are you excited about being able to take it as soon as you can? And I got wildly different responses from these two doctors, both of whom I see and I, you know, I only see doctors who I knew I respect but one of them's just, you know, gung ho excited things that might happen this month, and, you know, ready, ready to move on and ready to get everyone vaccinated absolutely, as soon as possible. And, and she in this case, is, you know, eager to sign up and the other one is not at all convinced that for one thing, that the all the health care professionals should be the first wave of guinea pigs for largely untested vaccines. And this doctor also pointed out that apparently, the elderly populations have not been in any of the clinical trials so far. So we actually have almost no information. We basically have no information on how how older people will be affected by these vaccines. But of course, The people who are at greatest risk of dying from this disease should be first in line or, you know, at the top of the list. If, if it's safe, but we don't know, well,

**Bret** 20:14

hate to say it. We do know it's not safe. We do not know that it does harm. And the distinction has to do with what the amount that we do not know about the vaccine yet and cannot know. Yeah, right. Everything having been done right. And the signs being positive, doesn't tell you that there isn't a long term consequence here that we don't yet know about. So anyway, let's leave it at that and figure some way to have this conversation where we are not placing our entire livelihood in jeopardy over it.

**Heather** 20:45

Yeah. Yeah, so is there anything else? Okay, we'll just we'll leave, we'll leave the vaccine questions there. This is just a comment. We'll be watching while enjoying a cup of joe from my new Dark Horse podcast coffee mug. I'm happy to support your channel. And as always, I'm looking forward to an entertaining and informative show. Thank you. Excellent. This one? Well, this is news to me. What I don't know if it's true. What is the evolutionary effect of the current state of global male population of sunning one's balls? Hint, it increases testosterone and hair growth on one's noggin.

**Bret** 21:30

Seems to me, like I know some people are involved in some weird stuff. And I even

**Heather** 21:35

I never had balls, I imagined it might feel good. I think I get burned and

**Bret** 21:40

feel vulnerable. And yes, that that burning thing would that would be a real concern. First of all, I think if you're sending your balls, you probably have too much time on your hands. Maybe we all do at this point.

**Heather** 21:54

But Oh, no. I mean, maybe you have time and privacy help. I hope you have practice if you're sending your balls.

**Bret** 22:01

But I don't understand really what's being asked here the evolutionary effect.

**Heather** 22:06

So I mean, the person has said what he he didn't have to for sale test staff believes or has read, it does. So we don't know. That seems unlikely on the other, you know, increase in testosterone, like, what what's there, it's sperm, which aren't, then you're not then getting a germ, Soma, germline Soma line transfer of information between the sperm that are currently in your testicles and somatic tissue that may or may not be increasing production of testosterone, right? I mean, right?

**Bret** 22:42

I just don't, I don't even know, global male population. But what is the global male? Bobby, how is that different than global population?

**Heather** 22:53

Well, the other half of the population doesn't have balls to sun.

**Bret** 22:57

Right. But the current state of global male population? I don't understand the question. Okay.

**Heather** 23:09

And we don't imagine that this would be true.

**Bret** 23:12

I mean, are they asking about will there be more people? And if so, why is male next to population? If they are asking what is the effect of an increase in the fraction of the global male population that is sending its balls? I would say the fraction is very small, even if we multiply by two by virtue of the number. Oh, but it's people tend to have

**Heather** 23:38

Yep. And just one at a time maybe to reduce the risk. I would say it's also probably lower now than it would be during the northern summer because there are fewer people in the southern hemisphere and anyone trying to sun one's balls in the Northern Hemisphere at the moment is likely to freeze them off instead.

**Bret** 23:55

Oh, yeah. Yeah, absolutely. That's a real risk. Yeah. Yeah,

**Heather** 23:58

I imagine. Sure. Okay, next question. For those doing a science undergraduate degree, what non science subjects would you recommend as electives? I love this question. I mean, most schools are going to constrain you. Right? But and what you take depends whether or not you can learn from what you're taking depends so much more at this point on who's teaching it than on what it's called. Because there's all in practically every field there are Yahoo's as you know, as PhD experts. But you know, any form of art, including music and theatre and such behind my list, philosophy that's well done. But so much, so much of it is badly done. I started out as a literature major, and basically took the reading lists and ran away at the point that it became too postmodern which was a mere Two years later. But, you know, good, good critical reading of literature is extraordinary as well. And, you know, economics is super valuable. I know I'm missing a lot here, I actually have a degree in anthropology, which, when done well is brilliant.

**Bret** 25:19

The problem with econ and anthro, and all these things and literature, the problem is everything is done badly. I would say do something where you pick up a technique that you can take with you, right, something where you're learning to build to construct something, and it's something that you can not drop at the end of the term, but that you can continue doing so that basically you use the environment of school to give you the on ramp to something you would have difficulty accessing on your own, but then continues to pay back for life.

**Heather** 26:00

One thing I took in college that I loved and haven't really had access to was book arts, printmaking, made broadsides for a couple of quarters. And, you know, it's just, you know, actually laying movable type and the, you know, the sort of very meditative, and, you know, you recognize how your brain is flipped around as you're trying to lay this thing and the trays, lay type in the tray so that it will read correctly on print. But you know, that that was one of these classes that I never really thought a lot about in advance sort of happened into it, because where I was, at that point, had a really great printmaking studio. And it was it allowed sort of privacy and meditation and art and I could, you know, create my own prose and poetry that I then laid into type and couldn't really reflect deeply on whether or not my my words were, were good enough to warrant the investment of time of actually learning the type or if or, you know, if Actually, this was just the, you know, ramblings of an 18 year old and didn't warrant it. So it the that sort of activity to, can be surprisingly rewarding, even though it's obviously, you know, the work of a Luddite at some level, you know, no one needs to work with movable type anymore, but it's beautiful, you know, I have a particular fondness for letterpress and the way that it feels, you know, the heavy, the heavy paper and the and the impressions that leaves are unique. You don't get it with standard printing.

**Bret** 27:20

I'm thinking drawing for those of us who don't draw that that's a skill that shows up in all kinds of places. And if you can get somebody to, you know, get you off the foothill, it would be super useful. I wish I had it.

**Heather** 27:36

Yeah. Wonderful. Okay, I've got a Bachelors of Science. I'm not sure exactly what this question means. But we will Intuit we will interpret it as we can. I've got a Bachelor's in science and natural history illustration. And I'm trying to get into a bio Veterinary Science, Bachelors of Science at 23. Is this wise, wanting white nose syndrome? Right away, otherwise best study wildlife diseases. So I think there's just like a missing word or a misspelled word here. But I think I think this is reference to white nose syndrome, which is a fungal infection that many North American bats now have. And it's it's more than decimating many bat populations.

**Bret** 28:20

Yeah. I don't understand why, why, what white knight syndrome is doing in that question,

**Heather** 28:30

right? I I don't either I think what is meant is this person is interested in studying white nose syndrome. Although I may have that exactly wrong. So and, you know, how do I otherwise best study wildlife diseases? You know, I mean, Wildlife, Wildlife, biology, wildlife science. It goes by different names in different schools, but is different from bio veterinary science and math. You know, we need we need veterinarians, but that field has become as pharmaceutically driven as medicine, and even harder to make a living at, I think, because people don't tend to have insurance for their pets. So it's, it doesn't look like a career move that is nearly so rewarding as it used to be unfortunately. Do you have anything more here?

**Bret** 29:29

Nope. I'm still puzzling over I mean, I certainly think Natural History illustration is is important. I don't have anything to add really.

**Heather** 29:41

Imagine we could add a critical thinking class into the high school curriculum. What tools or lessons would you like students to walk away with? Thank you for your very insightful responses to my questions.

**Bret** 29:52

I would say there hesitate to say there is only one skill. But there is one focus, which is the ability to take on an argument so well that you can deliver it, whether or not it matches what you actually believe to be true and sort of steel Manning, whether you're in a scientific context, or philosophical context, or a political context, is the thing that trains your mind for analysis better than anything else, because, you know, you d camp and camp, if that's into these different perspectives, and because each of them has a large framework that goes with it, the ability to activate them, you know, at will, is it makes you mentally nimble.

**Heather** 30:46

So I never had access to and almost certainly would not have chosen to do what you did in high school before you came to the high school where we met in 11th grade. But you want to speak just briefly to you know, we didn't have critical thinking classes, I'm a we both went to help, ultimately the same and earlier, different high school that were, in my estimation, so good at some at so many things. But you specifically learned the skill that you were just talking about in an extracurricular form.

**Bret** 31:18

Yeah, I did speech and debate. And there was a way in which speech and debate was terrific. training for thinking about just about anything, there was also a way in which it was, you know, it's a, it's an amoral weapon. And I have the sense that a lot of people who did speech and debate, you know, speech in debate are two different things. It's really debate that the problem arises with. And it's not all debate, there's different kinds of debates. So Oxford debate is the sort of ruthless teams of two who do battle with each other, as opposed to Lincoln Douglas debate, which is individuals and is gentler. And the problem is, it's very useful to learn the skills of, of Oxford debate. But among the skills, were at an argument, you could make an argument that was persuasive, while being wrong, even though you knew it was wrong, as long as the people you were making the argument against couldn't spot it, or articulate what was wrong with it right. Now, on the one hand, that's good mental training. On the other hand, in the context of a high school speech tournament, fine. In the context of people who will go on to inhabit other roles. There's only really one role where you want that to exist, I guess, which is the law, but even there, you know, it, it. It's a frightening, it's a frightening tool. And so anyway,

**Heather** 33:00

you know, it's a moral at best, as you said, Yeah. But anyway,

**Bret** 33:03

it's good training for the mind, but I wish it came along with something I don't even know what it would be. Because the problem is that the activity incentivizes whatever works, right. And that's not a good, you know, that's not a good model, if you're trying to build a whole person who knows what they can get away with, but shouldn't, right. So anyway, yes, there's part of the answer in speech and debate. But it's also a problem waiting to happen in the in the wrong hands. It's very dangerous. And most people's hands with the wrong hands in high school does nothing about teaching you anything that would be useful in restraining that force.

**Heather** 33:50

35 minutes. Okay, we'll get two more here. And then we'll move to this hour, less questions, might there be an evolutionary benefit to remaining technologically primitive, some recent reports indicate the Amish growing as a percentage of the US population, albeit slowly? Well, I had not heard that. I'm curious if it's, if it's true,

**Bret** 34:10

we didn't, we didn't end up doing it. But before we wrote our book, I had in mind a chapter, which was going to start as an essay called all the are the Amish. Right? Right. And this is long before there would have been any evidence that they are right by virtue of their population growing. But the basic question is, if you recognize what technology will do, if you just keep pursuing it, then is there a point at which you stop arbitrarily and voluntarily? And you know, what is the consequence of that? And there are two ways to be right, really, you can be right that you should step off the treadmill somewhere because if you keep going, it'll kill you. Right? Or you can be right about the particular place that you can take technology and then bail out right And so they can be right about one and not the other.

**Heather** 35:05

But not the other, not the one.

**Bret** 35:07

Or they can be right about neither. No. I

**Heather** 35:09

mean, you can't you can't know where to step off but not know to step off.

**Bret** 35:12

Yeah, that's true. That's true. So anyway, yes, I think there's a way in which they're No, they're clearly right. We are hurting ourselves so terribly, you know, with new technologies that have complex consequences that make us unhealthy and all kinds of ways. And, you know, it is unclear yet whether we will figure out a way to rein that in

**Heather** 35:34

there, they're living the kind of response globally, that we suggest for many particular instances that come with the words precautionary principle or Chesterton's, Chesterton's fence. Right. these are these are exactly the principles that I presume, without formalizing it in any sort of Amish homes are, are what this, you know, and your Luddite is another another of these terms that describes you know, what? No, this this does, this looks this looks like we're going to go over a waterfall. So we're gonna pull out now.

**Bret** 36:09

Yeah, I think also, one has to imagine that at the point this decision was made, it was contemporary, right? And so no more, you know, at the point, you have a phone, and you've got a buggy, but you don't have a motorcar, right? saying, well, we're done with this. And then it becomes more and more anachronistic. Yeah. So it raises, it raises those questions. But I would also say that there is a kind of, there's clearly a kind of wisdom associated with the choice because the rum Springer tradition, which I assume is arose early recognizes that it is not a slam dunk, right. And that basically, if you forbid, the young to engage the modern world, the modern world will be irresistible. And if you build in the encounter with the modern world, and you give time to live as a modern and then you come back or you don't

**Heather** 37:07

so rubbish Bringer being something like you didn't define it. So I'll, I'll try. But I may have the details wrong. Something like every Amish child at the point that they are, I don't remember 17 1819 something is allowed to take a year out of outside of the Amish community and go live among the moderns. And then at the end of the year, and I may have the details wrong. They they either come back or they don't but if they don't, after some prescribed amount of time, they don't retain the ability to come back 510 20 years later on the door closes not after a week or a month after a considerable amount of time. But it will close Yeah. And I think you know how, how incredible to to trudge it to be in such a constrained community and to trust your children with

**Bret** 38:01

Yeah, now if we have the details right I would imagine that our show is actually pretty popular in many Amish communities.

**Heather** 38:09

Contact us maybe maybe someone entrepreneur will

**Bret** 38:12

send us a Super Chat postcard. Wow.

**Heather** 38:19

Oh, this next one is just a recommendation for a guest please consider inviting British evolutionary biochemist and writer Nick lane from UCL for a discussion about aging. He has written at length about its evolution and the influence of the hayflick limit telomeres and the role of mitochondria and oxygenic stress on aging All right. All right, we will add that too. Oh and here's just one more suggestion. Please consider inviting this weekend virology host I should know how to pronounce his name I've listened to a few of them but Vincent rats in yellow to discuss COVID vaccines Thank you kindly Alright, I'm super chat messages from this hour. evolutionarily, why is skin color color a blend of both parents whereas eye color is not. Does eye color have to be sneaky to avoid social judgment? Or is it because eye color impacts survival less than skin color? This is echo asking the question and it's it's terrific. So you know she goes right to the ultimate level rather than sticking with the approximate level like well you know, I call her as you know simple men DeLeon genetics and and i think i think the as I'd never I'd never asked the question before I never considered it. But I think this is it because I call our impact survival less than skin color is is likely to be at right that to parents with skin that works the environment in which they conceived you. a blend of those skin colors should work well on the environment into which you are born. Whereas eye color has it aside from totally pigment, pigment less eyes. Eye Color has very little to say about survival, I would say certainly in terms of sun exposure and burning.

**Bret** 40:18

Yeah, I think I would put it a little bit differently. And I would say there is a an advantage. And the advantage may not be to the individual. In fact, it probably isn't. But there's a lineage level advantage to having variation in skin color that can be modified based on exposure. Because basically, we know that melanin in the skin is sunscreen, and that the need for it is something that varies with environmental conditions that change over space, either latitude, or altitude, or clothing or various other things. And so basically, why do you have a trade, many gene trade when it comes to skin color and a men delian trait when it comes to eye color? Maybe because there is value in selection, basically pushing skin towards darkness or lightness, depending upon where your population finds itself. And the fodder to do that has to do with lots of genes rather than a small number in which you would have a discrete distinction between populations.

**Heather** 41:33

Yeah, I think both of those things are likely to be true, yeah, that having a blend of your parents skin colors, will be a good match for the environment in which they both exist, and you were conceived and born and being multigenic presumably facilitates the ability of skin to change with sun exposure.

**Bret** 41:54

Yep, good.

**Heather** 41:58

Will cloth masks now be germ preservers, if they're stored in cold cars will serve as transmission be more likely with germs kept alive through winter this way? So this question, I think, emerges from the observation that people are keeping masks in their cars, you know, and never take them out. And in some places, actually don't even take them out. To wear them. They just live in the car, and then they will put them on if they absolutely have to, if they're if they're required to. Which, you know, we we think that cold is going to preserve the virus. And doesn't this effectively create an additional additional problem in terms of effectively storing the virus for activation?

**Bret** 42:48

Well, a couple things. One, I think we have learned and somebody took me to task for my use of the term fomite. And in fact, I looked it up to make sure that I didn't have it wrong. And I did have it slightly wrong. The fomite is the surface itself rather than the particle transmitted on the surface. Oh,

**Heather** 43:05

is that right? Yep.

**Bret** 43:06

I hope I now have it right.

**Heather** 43:09

I'm gonna look it up.

**Bret** 43:10

In any case, here's the point, I think we know,

**Heather** 43:14

an inanimate object or substance that is capable of transmitting infectious organisms from one individual to another. There it is. Yeah. So I

**Bret** 43:21

think that fomite transfer is not especially common with COVID-19, or SARS. COVID. Yeah. And therefore, the fact that you will preserve the virus in your car, potentially on a mask doesn't increase the tendency to be transmitted by a surface. And therefore, if the tendency wasn't very high, yes, this will increase the duration over which it could happen. But it might, you know, I mean, a mask. If you have COVID, then your mask will have COVID. And it could last on there longer, but you're not going to infect you. So will somebody else be more likely to be infected? Because the period of time over which your mask is infectious goes up? Yes. Arguably not very high. I wouldn't think the other thing I want to know though, and this goes sort of into the biology of SARS, kobie. Two, but I believe that the nature of the the viral capsule here is not that it is membrane based, and therefore I wonder whether a freezing might you know, freezing below some level would damage it? Probably not, but it could and be. The other thing about the cars is that you're going to get oscillations, you're going to warm your car up. It's going to be good and toasty as you're driving around, then it's going to cool off then it's going to warm up that kind of thing tends to be very hard on something like a microorganism.

**Heather** 44:58

Yeah, the car isn't just called unless you're Never ever and if you ever drive it, you heat it right up,

**Bret** 45:02

right? The chances that somebody could get infected getting in your car after it sat in the driveway for three days, is probably higher in the winter. But the warm cool cycles are probably protective, if anything.

**Heather** 45:17

Yeah, that's good if I hadn't hadn't occurred to me. That's right. I so admire your equanimity and integrity coupled with your incisive brilliance to what do you each attribute this unusual confluence of virtues? Well, thank you.

**Bret** 45:31

Yeah, hard question. And, yeah, it is. Well, I will say this, the many of the rare useful characteristics in life are rare, because the thing that would cause you to discover that they work is not common, the conditions in which it is revealed that this is a valuable thing. So to take one example, the experience of publicly advocating for a an analytical perspective, and then coming to understand that something about it was wrong. And finding the strength of character to say that it was wrong publicly, is all necessary before you discover what happens downstream of that, right? What you get is, oh, it's great to have a voice that does that, that actually goes back and fixes the thing that they said that was wrong. And so you actually, paradoxically, you don't like discovering that you were wrong, and knowing that you have to say things publicly. But once you do it, you realize, Oh, actually, it reinforces something that's even more important and being right about the particular point. Now, it would be easy to learn the wrong lesson there. And it would be easy to think, oh, being round is not that bad. Yeah, just go correct it later. And the problem is, if you're doing that too often, then people discount what you say. Because although they realize you have the integrity to correct it, it means that you're not doing a very good job of quality control on the front end. So anyway, the point is, that whole landscape of what happens when you're wrong, based on what you do about it, then it's hard to find the first few times and then once you found it, it's like, oh, you just get good at trying not to be wrong, and when you're wrong, doing the right thing about it. So anyway, I guess my point would be unusual developmental experiences that reward and weird stuff. Definitely, this question has an answer. It's that

**Heather** 47:27

you want to provide any specificity as to what the weird stuff was that was rewarded for you. You just said unusual developmental experiences that rewarding that reward weird stuff, or you just want to leave it at that?

**Bret** 47:42

Yeah, I mean, I do. Yeah, I can't, I can't parse it. Maybe given some thought I could come

**Heather** 47:49

up. Yeah, I mean, I could come up with things for you, but maybe I won't

**Bret** 47:54

do what you think is right. Well,

**Heather** 47:57

I mean, I think there are a number of things we've already talked about, you know, debate for instance. And you had a grandfather who took up apparently risky experiences like skiing and climbing Mount Whitney with you, you know, in the 60s in his 60s, rather not the 60s you weren't born variant and and yet he had a reputation for extreme caution. And almost for you know, it was for you know, lacking courage and yet safety net safety net, right. And he, you know, he, he was both extremely careful and cautious and, and driven to explore and to take risks that seemed worthwhile, and you got to spend a lot of time with him. And you know, that just even even just those two things together, and there are of course, many more, I think in your case, you were also extraordinarily informed by school and you having no fondness for one another whatsoever. And, and, you know, I, I had a completely different trajectory, with also some, you know, inputs from, you know, very, you know, rigorous scientifically engineering impacted people, and also at the same time, some very artistic influences. And the combination of having spent time with literature and lots of different kinds of arts and, and, and both of us got to travel some, for the most part my travel was was domestic as a child, but not entirely and just being able to see different ways that people did things and interpreted what they did as, as as young people was extraordinary. I think I think something that was super important was we met when we were 16, actually in 11th grade. became friends very quickly. And it quickly became clear to me that you had showed up in my awesome school because you've been booted from your former school, you had been invited to leave. And you were brilliant. And I thought, I think I thought I don't remember thinking this but I badge and I thought, Boy, I thought, boys who got booted from fancy schools were slackers who really weren't doing much. And that was obviously 100% clear from the beginning that that's not who you were. And I don't know, if you thought about me, who was an A student all the way down, I kind of thought a students were boring, generic rule followers who just like to the comfort of authority, which was never who I was either. So we got to be friends. Very quickly, you know, we didn't we didn't get together romantically for for several years. But could without ever saying it to one another, I think just recognize similarly interested in open questions minds, who had had wildly different developmental experiences in terms of being rewarded by a structure in my case, and being almost completely punished by the same structures in your case.

**Bret** 51:13

Yeah, I think there's a lot, there's a lot there. And, you know, you were a paradox, because you Yeah, because on the one hand, you were very good at the exact stuff I was not good at, right, the school stuff. On the other hand, you were very unconventional already. And I think, you know, it took me years to understand exactly how that had happened, but has a lot to do with you having, you know, tomboy kind of instincts toward the world, your dad, having been a very unusual guy, you know, in some ways, he was a very traditional man's man. But, you know, I think, upon discovering that he had a daughter who, you know, shared his sort of desire for adventure, and that competition world Yeah, was perfectly happy to mentor you in a way that he probably didn't expect he would be mentoring a daughter. And so anyway, yeah. When when we met it, you know, it was an issue of like trying to resolve that paradox. I will say that the school I got kicked out of was an all boys school, and I entered that all boys school at exactly the wrong developmental seventh grade. It's in seventh grade, where I hadn't really gotten comfortable with the idea of girls, and then suddenly, they didn't exist in my universe. And so I developed a kind of fear of them. That was pretty profound.

**Heather** 52:43

And then it didn't show

**Bret** 52:44

when we met. Well, it didn't show but I mean, it didn't show specifically because you were unusual. So it was, you know, so anyway, that, that broke through the, the fear that I had of girls, because it somehow didn't apply to you. But anyway, I'm glad that all happened. Yeah. All right. All right.

**Heather** 53:10

I've told my nurse sister in law about the lab like hypothesis, and she looked at me like I was crazy. Why are healthcare professionals brainwashed?

**Bret** 53:19

Yeah, I think that's a good answer this question. Oh, yeah. I mean, it's not a hopeful question. But there's, there's a reason. And it has to do with the fact that so much in the area of medicine involves falseness that is generated that needs to be there in order to do the work. And therefore, you get used to the thing that makes those decisions so that the maximum amount of medical good happens, telling you what the conclusion is, and to the you know, if you go into that scenario with the kind of mind that says, really, do we know that they have the data on that, you know, right, if you're doing that, you'll drive yourself insane. And so I think the environment kind of selects for somebody did the work that came to the conclusion, it's my job to take that conclusion and go wield it well. And then at the point, you get to something like, you know, COVID, lab leak, vaccine safety, all of these things. And the point is you have you have loons, questioning all of it, you have responsible people questioning all of it. Nobody can be terribly sure of a lot of the things that you would need to be absolutely sure you have to do the analysis very well. So there's noise in everybody's analysis, that basically you got a choice between well, somebody has done that work and here's the conclusion and it's, you know, what? laboratory you think this came from, you know, no, this came from nature, it came from bats, right? So that conclusion has been fed down the line with a bunch of sort of standard, overly simplified medical stuff. And well like that, I think, yeah, being in medicine requires a certain amount of not questioning everything.

**Heather** 55:15

On exercising differently indoors I recommend check me out Katie Bowman's nutritious movement work based in Washington love to see a conversation between y'all. I'm not familiar, we'll put it we'll put it on the list. risky hypothesis, BLM and trans are allied to their reliance on postmodern thought trans, especially with actual transition is a triumph of narrative of reality, a fundamental proof that post modernism works. Yeah, no, I, I think that's right. And I do think that the trans people who we have known who are really truly trans, do not pretend that that sex isn't real, and that they have actually transitioned into becoming the opposite sex. So you know, the, the triumph of narrative of a reality that accompanies many modern transitions is this weird modern instantiate instantiation. That is indeed postmodern, but it's not inherently what feel what being gender dysphoric is about?

**Bret** 56:25

Yeah, I would add this is, seems to me in the same neighborhood as as what I've been arguing about the online environment, that, in fact, the postmodern rules are not far off of legitimate rules in an online discussion space. In other words, if I come into an online discussion space, and I say I'm a woman, then a, there is no reason for which you cannot treat me as one. There is no justification for your failing to treat me as one, right? If I come into that space, then at some level, if I say I'm a woman, you should go with that. And the problem is, this logic only goes so far. It does not extend to a bathroom to a prison to sports that are segregated by sex. And so anyway, my my sense is that the correct rules for how to deal with people online are simplified because the online environment is already bottlenecks to a very limited kind of interaction. And that it is when you attempt to take those rules and impose them on the outside world that you run into all of the paradox and you drive people crazy, because if you're saying a man can become a woman, because he says so. And I'm a biologist, do I hold my biologist tongue? Or do I point out that you've just said something that doesn't make sense, right? I'm stuck. And so you're feeling as well. Now we've worked this out online, right? We just, if somebody says they're a woman, they're a woman? Well, what part of you doesn't get that that's the right thing to do.

**Heather** 57:59

And the truth may be, you know, what, the stakes were lower, and it wasn't worth anyone's time. Also, because you'll throw a mob at them? Well,

**Bret** 58:07

I think the thing is, it's 100% social and not physical online. So therefore, that simplified environment being one where the only important consideration, you know, mind you, we could figure out stuff for which you wouldn't be the only consideration but in a discussion forum, the only real consideration, you know, how do you even know who you're interacting with online? Somebody says they're female, you're going to how do I know you're really female? It's like, you know, we're talking about geology when I say I'm female, I'm female, right? So Well,

**Heather** 58:42

I mean, I obviously you can be gamed and yeah, we've right we've talked about at the moment, you know, in the past, if social media had existed 100 years ago, a woman might be pretending to be a man just to have voice Yeah, and right now a man might be pretending to be a woman to get voice in certain in certain sub sects on social media. And so you can you can game the the norms of the moment and and that, that doesn't help anyone but the individual gaming it? To what degree does it hurt the wider population less so than a physical space? But still potentially harms? Yeah, I'm not the integrity of it.

**Bret** 59:24

I do think you can you can push things and find examples where it's not true. I'm just saying an informal space online. The postmodern is actually it's a it's a an environment with no physics. And so yeah, because it's an environment with no physics. You can kind of set the rules and to the extent that the rules might be common courtesy rules, then Okay, problem solved. And that's my sense is that it is the false PR you know, it's like it's like Burning Man, right? Burning Man to some people. They think it proves We can have some sort of utopian non economic interaction with each other where people are good and artistic and generative. And there's no conflict and you people really think they claim not to and then you push on and and turns out, they do believe it and they don't realize, you know what, Burning Man would be a whole different movie if the food stopped coming in to the desert, because I think it's gonna grow there. And you know, so yeah. Anyway, like that.

**Heather** 1:00:28

Yeah. Or, yeah, bring in, bring in everything you got, and I lived there for a year, as opposed to a week or whatever,

**Bret** 1:00:35

right? Whatever it is that imposes conservation laws is going to cause a whole different scenario to unfold, which doesn't mean you couldn't build a civilization that would do many of the things that Bernie man does, but you can't just wish it into existence. Yeah.

**Heather** 1:00:51

an hour. Okay, let's get through, I don't know, four or five more. Okay. speculative question. What do you suspect the role of psychedelics played in our evolution and development? We've talked about psychedelics a few, a few places. Almost. No, many, many cultures have some form of psychotropics, psychedelics hallucinogen. Cynthia gins, pick your pick your word,

**Bret** 1:01:18

or behavior that triggers these things, or we have sweat

**Heather** 1:01:21

lodges and such ecstatic dancing for for days on end. Yeah, so the pursuit of status and psychedelics is more than adjacent to that is, I think, probably universal in cultures. And has well looked like, Do you have something to say?

**Bret** 1:01:45

I got things to say, Okay. Go for it. Oh, I'm, all I was gonna say is, riffing off of what you were getting at. It's so common in various cultures that we have to assume that this is something that human beings regularly discover, and that they engage when they have when a culture has availed itself of the power to do this. Sometimes it's limited to one group within a culture or shamanistic class. But basically, it's a it's a hack, where you can access parts of the product of your subconscious mind, you can put your conscious mind in touch with it. And that's a very generative thing that at some level, it's like turning up the the mutation rate on a genetic system, you're turning up the equivalent of the mutation rate or the porousness of a boundary within the consciousness system. And it results in you know,

**Heather** 1:02:45

yes, that's like that the expanded enhances the porousness of the boundary of some consciousness system, it may increase individual consciousness, but also increase the ability for actual exchange across interpersonal boundaries. Absolutely.

**Bret** 1:03:00

And you know, there are lots of such hacks, leaving a notebook by the side of your bed and writing down the content of your dreams is a hack, right? You're wired, an interesting point about this at some point, but you're wired to forget the content of your dreams. Right? Now, you're not wired to forget the content of every dream, but you're wired to forget the content of most of them. And so you can hack that system by taking the little period of time in which your memory of the dream evaporates, and using it to write down enough of the dream that you can recover something meaningful from it. That's a hack and psychedelics and other behaviors that cause those hallucinations do the same, same kind of trick just gaining access to something that is ordinarily outside the scope of what you can can contact?

**Heather** 1:03:48

Yeah. So with regard to what role they may have played long term, it's impossible to know they don't you know, they leave no trace in the archaeological record as far as I know. I don't know of any suggested trace in the archaeological record, but it is it is there for mirror untestable arm waving to propose something like psychedelics may have been part of what the expansion of the prefrontal frontal lobe was about. We can't possibly know well, they

**Bret** 1:04:23

leave some record, what kind for example, the mazatec people and salvia. salvia is a plant only known if I got this right, only known for mazatec Gardens.

**Heather** 1:04:45

So salvia is a giant genus you're talking about the particular salvia

**Bret** 1:04:49

salvia divin observing the hallucinogenic one, okay. Yes, the street name is salvia As you're having the finer Sage yeah diviner, sage. salvia divinorum is only known from this plant grown by the mazatec. And that tells you that basically you have a speciation event, whatever its nearest relative is in the mints. This Mint is now exclusively a cult of arts like it's like a domestic goat. You know, there are goats in the world, but it's, it only exists in the context of people. And

**Heather** 1:05:34

so anyway, but you're not recommending smoking goats.

**Bret** 1:05:37

Smoked goat can be good. It's different. Yes, it is different. But anyway, the point is that's leaving a record because what you've got is you don't have fossils. Awesome. Yep. But you have the product, you know, you have the descendants of the most recent common ancestor of

**Heather** 1:05:54

and you maybe could, I mean, you could do an attempt at molecular clock to assess the speciation event the time since this was since this split from its most recent, or from its sister taxon. We don't know what it is, I don't know if the work has been done. And of course, it's different in plants and animals to do that kind of work. So Well, actually, it's so I just pulled up Wikipedia. So who knows but botanist have not determined whether salvia divinorum is a cultivation or a hybrid because native plants reproduce vegetatively and rarely produce viable seed. So either either way, really, it's Well, yeah,

**Bret** 1:06:39

I mean, either way, it's leaving the record of some kind of an event that we don't have a direct record of.

**Heather** 1:06:46

Yes, yes. Okay. Back to Super Chat questions. Where I appear to have Oh, my goodness, I think that was the question I did. We just answered that. And now it's blank. The hallucinogenic question is now blank. A little bit. I don't know what this is this next one. Hey, Breton. Heather, do you have thoughts on alpha fold to?

**Bret** 1:07:11

What is that? I have no idea. I'm no, no, we don't. I'm going to assume it's a movie. And my sense is, it was poorly cast.

**Heather** 1:07:21

Hi, guys. I just saw America. And I noticed an increasing trend in media to promote witchcraft, especially its relation with feminism here in the US. Oh, yeah. Why are we witnessing this return to paganism?

**Bret** 1:07:35

Because life is too easy. And so people have foolish ways of looking at the world do better than we would expect them to. I don't know. I mean, we've seen it here too. We saw the New York Times in its front page section with a apparently serious article on a self described which there is something I think it's you know,

**Heather** 1:07:59

yeah, I'm really edgy. It's edgy. I think it's imagine I mean, I you know, I have I did have one student who was quite seriously a Wiccan who I, who I was close with, and I understood it to be a tradition that that particular person and their mother if I remember correctly, you're really found community and, and meaning and this was a really good evolutionary biology student who you know, was not was not woowoo but I don't love this language identified as Wiccan. Yep. So you know, I'm not saying that this is always the case, but I do I do have the sense that because witchcraft is is female and we are now in this mode of agitating all that is female and finding the traditional ways of being female that we have to love that with that comes this really uninvestigated. Oh, well, women are doing it, let's, let's, let's celebrate it. So like, Okay, why are we talking? Why? Why is everyone always talking about astrology now, and witchcraft and astrology is not specifically female. And I'll just leave a little teaser here that actually astrology could be done right? With that, I think we've actually talked about it here before, but I'm just not going to go there now. But it never is, you know, in the modern environment, but I feel like witchcraft is just like a thing that is so distinctly female that people are latching on to it as, Oh, I see, we're celebrating women. Like now you're celebrating something that's kind of daft. What are you doing?

**Bret** 1:09:37

Now? I agree. And you know, as with the case of astrology, you could encode patterns that are real in a form that was non literal, and, you know, build community around it. Yeah,

**Heather** 1:09:54

maybe we mean, we're some to the degree that witches have existed in history. I just don't know anything about the history of witchcraft. But might some of them have been ethnobotanist? Like the actual, you know, cures of their neighborhoods who really understood the local plants and fungus that could could actually help people? I bet there were a bit this was some of your sort of female wisdom of of health and an environment that was then wrapped up in in witchcraft, but, you know, modern, modern instantiations of this that involve sitting around in people's, you know, Eastside Manhattan apartments and claiming to be witches, not so much. Yeah. Which is what that New York Times article was about. And yeah, I remember,

**Bret** 1:10:36

I remember correctly. Okay.

**Heather** 1:10:39

Three, two more. Brett, I'm a kiwi, where we have public health care. And I've also lived in the UK with National Health Service, the waiting times and bureaucracy also kill people. a bias towards public rather than individuals also kills people.

**Bret** 1:10:57

Oh, true. You get a trade off. And you know, what you want as a proper, dispassionate, dispassionate net analysis, which we are never allowed to have, because one side or the other is always punishing you for pointing out the awkward tree. Does that go any other direction? Yeah, I've had it, we got to find a way to have these discussions, because pretending that there is not a discussion to be had is very unpleasant at the very least. Yeah. And dangerous.

**Heather** 1:11:28

Okay, two more, because one is just a comment. That was also from the first hour that I didn't get to, can we just agree that these labels are problematic? With regard to our discussion of the far right, far left stuff? Why not look at the only two that matter adults versus children? The group identity game is childish?

**Bret** 1:11:49

Yeah, no, I'm not convinced that you know, in fact, I will say, I have forgotten the name of the second author on the the high quality analysis. And as I said, Anna, Anna Zaitsev. And Anna sites of sites in one of the places that I was looking into her work, the political compass, describing it as

**Heather** 1:12:15

is this so this wasn't coming up before is this is her. This is her medium piece. Yeah. Scroll back if you just want to show this. Oh, yeah. No. Yeah, there it

**Bret** 1:12:28

is. Political compass, moral foundations, Jonathan Hite. So anyway, I think the point is let political compass ain't perfect. But yeah, it's a whole lot better than a one dimensional analysis. Right now. I've argued somewhere else. I can't remember where it was, but I just ran into it. That the political compass is still flatland, right? It's two dimensional, but it's flatland. And that there's a z dimension. And of course, the question is, how many dimensions? Could you add and be more productive than you are destructive. But in any case, there are useful labels. And we have to remember that every time we create a label, it has a upside and a downside. And we want labels that pay their freight and then some, but we want never to forget that each time you draw one of these distinctions, you're going to have arbitrary stuff at the boundary. So anyway, you know, yes, adult versus children is a useful one very hard to operationalize. Yeah. Because it's not a matter of age anymore, really. But yes.

**Heather** 1:13:35

Okay, one more and next week, we will start with this question about the great reset. That came in very late here. Okay. Our final question for today is Hey, guys, what's the word on deep minds? protein folding breakthrough? Yes, I'm wondering Is that what alpha fold two was about? Yeah,

**Bret** 1:13:53

I'm thinking it was Yeah, I thought so at the time, but I wasn't sure.

**Heather** 1:13:59

different person. terrifying. I find it terrifying.

**Bret** 1:14:05

I wouldn't say that I first of all,

**Heather** 1:14:07

we need we, I you need to say what this

**Bret** 1:14:11

is okay. There has been a long running. So there's a long running problem in biology, which is that genes encode proteins, proteins are long strings of amino acids. Those strings of amino acids don't do anything. What happens is they collapse into machines that do things and we're talking about literal machine like entities, you know,

**Heather** 1:14:34

nucleotide basis.

**Bret** 1:14:39

What are we talking about?

**Heather** 1:14:40

Now? The genes aren't made of amino acids.

**Bret** 1:14:44

No, the genes aren't, but they encode the strings of amino acids which collapse into machines which do stuff, okay. The problem is that there are an indefinitely large number of confirmations that these strings of amino acids could collapse into and if they collapse into All of them, they wouldn't work. In fact, they would never work. But they don't collapse into all of them, they collapse into forms that do things. And in fact, these forms are sensitive to things like the temperature. So one of the reasons that a small fever can actually you know, a fever of five or six degrees Fahrenheit can be lethal is that your enzymes only have the proper conformation to do their job at that temperature. And so as you change the pH, or change the temperature, the positive charge here that sticks to the negative charge there, if you put in too much energy, it breaks and so the enzyme doesn't work. So in any case,

**Heather** 1:15:34

well, and also I mean that that that folding structure, you know, the technical term being denatured, it just starts to come undone right at temperature. And so the denaturing of a protein means that nothing on the surface of that protein looks the same as it does when it's in its normal range,

**Bret** 1:15:50

right. But you know, you could have two different creatures, you could have a creature whose normal temperature was one or two Fahrenheit and other creature for Richard was 98, right. And the enzyme for the one at 98, won't work at 92. And vice versa. So denatured is one way to say it, but the point is outside of a narrow range for an endothermic, no, for a homeo therm. The rain for viable temperatures for that enzyme will be relatively narrow. And anything outside of it, we're changing pH will cause the parts of the string of amino acids that bond to some other part through these hydrogen bonds will change and any change in the outside structure will initially decrease the effectiveness of the enzyme, and then eventually make it not effective at all. So anyway, the point is how these things fold up into some structure that is reliable and does the job is a very long standing very difficult problem, like 50 years, we've been aware of this problem and made not that much progress.

**Heather** 1:17:00

Figuring out the list of amino acids in the order they're in is, is child's play by comparison.

**Bret** 1:17:06

Right? Right, we can get the sequence, but then the point is, okay, if I show you a sequence, what's it going to turn into smart guy? Like? Well, we generally don't know. So it's the primary structure is the string, tertiary structure is the confirmation and then quarternary structure as you add multiple proteins together,

**Heather** 1:17:24

it's secondary data. I don't remember. Oh, it's beta sheets, and Oh, yeah. So So sugar level of folding? Yeah. So secondary, and tertiary are both folding.

**Bret** 1:17:33

Yeah. But anyway, there's been this long standing contest to try to spur progress in this field, which is we give you a sequence, you tell us how it's gonna fold up. And this year, huge progress was made by deep mind, which is Google's artificial intelligence platform. And basically, the idea was that somehow DeepMind has, has come close to solving the protein folding problem if the date if the result holds up. And we don't know that it will, because frankly, it's not a published paper. So we can't really look at it, we can see, you know, here's the sequence they were given. Here's the prediction. And here's what the actual confirmation of the thing looks like. But it's not like we have a full analysis to look at. But it looks incredibly promising. Now, the interesting part of it, I think, is I think it implies that the problem is simpler than we think which it almost has to be, because for evolution to successfully navigate the that's how

**Heather** 1:18:33

you evade terrifying.

**Bret** 1:18:36

Kind of, yeah, kind of. But so if you imagine that in order, you know, the thing that we say, in biology, which you and I have been ranting about for a long time, we say, Oh, you have genes. Mutations happen all the time. Most of them are bad, some of them don't have any effect, every so often, just by random a gene happens to get changed in a way that increases the blah, blah, blah, blah, blah. And suddenly, you have ostriches, right? And the answer is actually, that's too weak a process to create these marvelous little machines. What's more, these marvelous little machines, altering them slightly by this mechanism doesn't change, you know, one kind of amphibian into another. And so there's a whole bunch of the story that doesn't quite add up, and it's missing. And, you know, I'm firmly committed to the idea that what's missing is Darwinian to I'm not arguing that this is a challenge to Darwinism in any serious way. I think we need more and better Darwinism. But nonetheless, if it is true, so the Explorer mode thing that I keep getting in trouble for explorer mode, things suggest that selection will, will very quickly discover mechanisms to search design space more efficiently than it could appear random, right? That's not a mystical claim. That's not a designer that selection cheats by figuring out

**Heather** 1:19:56

you will have heuristics. Yeah, exactly. That's that's what you're arguing right?

**Bret** 1:19:59

Now the reason that comes up here is because chances are and I don't know that we know because the way these deep learning algorithms figure out how to solve a problem doesn't necessarily tell you what they've discovered, right? What I suspect has happened is the deep learning algorithm has latched on to the product of the heuristics and started to go backwards into the point is, to the extent that there are patterns or themes, and the folded up proteins, that would be the result of a heuristic that searches only here and here, not all the intervening space, that deep mind will be in a better position to spot that thing. And that ultimately, it will tell us what we didn't know about the way design spaces searched. Right? So in some sense, I think this is potentially really interesting. That's amazing.

**Heather** 1:20:46

That's Yeah, that's that, that doesn't sound as terrifying. And it put me in mind of this isn't, I don't I don't think I can exactly go full circle on this. But it put me in mind of the heuristics that we are familiar with from systematics from from how it is that we infer deep history how it is that we build evolutionary trees and, and deduce who is most closely related to whom. Because once you've got more than, you know, a few taxa with a few characters each, you basically can't, you can't search all of the possible tree topologies in any reasonable amount of time, even with the computing power that we have now. And so you have to, you know, basically different software, different phylogenic systematic software is going to be using different heuristics and heuristics are generally, generally not public. And so you don't you pick a piece of software. And yes, you plug in different assumptions, and hopefully as few as possible, and you end up with a set of most likely trees given your particular data set. But in that case, you don't have anything to compare it to like maybe you compare it over here using this data set, and over here using this data set, and maybe with a couple of different pieces of software. But because we don't have time travel, we can't actually go back and know for sure what the history of relationships is. Whereas with this, you actually have the empirical answer, like what does the thing look like when it's folded? What does the protein actually look like? Let's see if DeepMind got it, right. Oh, they did. And so fast, right? Did I don't know what deep minds pronouns are?

**Bret** 1:22:20

That's a good question. I wonder. Yeah. I'm just I'm started stopped in my tracks.

**Heather** 1:22:29

Well, I was stopped my drugs by calling it a vase. Oh,

**Bret** 1:22:31

yeah. All right. Yeah, so anyway, yeah, I look, there's all sorts of reasons to be terrified about the amount of power that we are gaining. And the fact that we will almost certainly screw up the application of the technology that results. But from the point of view of having a total head scratcher with respect to how proteins are going to fold up versus having some window into the heuristics, I'd say this one we should be real careful with it but could be awesome to discover what we didn't know And my guess is there's going to be a kind of a Eureka sort of a moment and yeah, once we figure out what the mind did,

**Heather** 1:23:13

okay, well I hope I hope you're right it's rare that I'm more pessimistic than you Yes. Let's Let's hope you're right here. Yeah. All right. All right. I think that is it for today. Wow. Right? Yep. So consider going to store Dark Horse podcast.org or either of our Patreon is where you will get a further discount off of store stuff if if you want gret has a conversation with his Patreon tomorrow for people at the highest patron level

**Bret** 1:23:47

evolutionary discussion which I'm looking forward to should be great from 10

**Heather** 1:23:51

to noon pacific time. You can access the discord server at other patriarchs. What else are we supposed to say? I don't know maybe maybe that's it. Maybe try to enjoy your December here in the Pacific Northwest we've got maybe maybe another hour or two before it starts raining it will be raining until April. Terrible Yeah. Yeah, well, you know what you you two days in a row. No, one day you bite down to the river and then up to this peak. All in one ride the half of it in the dark yesterday. Right? Which is a which is a vertical gain. 15 foot climb. was good. Nice good weather. It can be cold but clear. Yeah, yeah. Yeah. So all right. To do that, go outside. Yeah,

**Bret** 1:24:40

go outside. Alright, we will see you next week. Be well, everyone.