Bret and Heather 68th DarkHorse Podcast Livestream\_ Drunk Wi...

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**SPEAKERS**

Bret, Heather

**Bret** 00:16

Hey folks, welcome to the 68th Dark Horse podcast live stream I am here as always with Dr. Heather hying. It has been chaos at every scale, we are going to attempt to integrate everything. topics that we have been considering separately have crashed into each other. And so that's going to leave us a little bit of a task for intermingling things. But why don't you set us in motion in the right direction?

**Heather** 00:41

Well, just first a couple of announcements. So on on my Patreon, you could get access to private monthly q&a. And right now is the open the 48 hours open session for people to ask questions which we then sift through and answer on the last Sunday of the month. So if you were thinking about doing that and wanted to be in a position to ask a question, you can go to my Patreon how they're hiring now, and you also had an announcement similar to one that you gave last week,

**Bret** 01:11

yes, we are going to give away another invite to clubhouse clubhouse is taking off in the most remarkable fashion yesterday I stumbled in just to spend a few minutes listening, see what was going on. And who did I find there but Joe Rogan, and when I walked in the room, he immediately called me up on stage and suddenly there I was in real time talking to Joe and Lex Friedman and a number of other folks Tim Dylan who we gently chastised last week so anyway, things are afoot there. And if you would like an invite the moderator Gator is the the go to person and we will give that out at the end.

**Heather** 01:49

All right. Okay, so where we're going today is we are going to talk a little bit about what what Portland where we are Portland, Oregon experienced in this last week, from not just a societal perspective, but an ecological one. And then we are going to discuss, I'm going to want to pick up on something that you and Daniel shoenberger talked about in that excellent conversation, which again, as I recommended last week, I highly recommend that people listen to when I finally did listen to it. And so I want to pick up on something from there about the nature of really excellent education, the nature of good education, and manage your bad education, which is most of what passes for education now. And from there move into talking about the New York Times suggest chiding us, that maybe all of us, not us specifically, but all of us should really abandon some of our critical thinking skills if we want to move forward in the world. And from there, this is where you know, I was thinking along these lines and you were thinking along the lines of effectively a kind of fact checking apocalypse that is coming down the pike at us and then so we're gonna we're gonna mesh these things. Talk about them together. And, and then we'll finish with just a little bit on dung beetles, including just a new a new interesting thing that's going on and dung beetle land which you will

**Bret** 03:10

finish on literal dung beetles. The earlier part will cover a fair number of figurative dung beetles rolling down across the internet and other places,

**Heather** 03:18

metaphorical dung beetles that will end with literal dung beetles, including a video that I took actually in the Amazon 13 months it turns out was 13 months ago today, this video that I found on my phone from when we were at tiburtina in the Ecuadorian Amazon. The last time we went almost anywhere. Fantastic. Fantastic. Yeah. Oh, and I guess one other thing. So as we were about to tell you we were basically incommunicado all week and had to cancel a number of thing conversations we were supposed to be having. But MEGAN MURPHY did post the conversation that she and I had back in January and that's on YouTube now and I made a couple errors in it, which I'm not going to specify here they're they're significant to me but won't be to most people listening who don't care deeply about some of the arcane biological things but I think it's a really good conversation it actually gets at some of this question that we keep on coming back to of like, what does it mean to follow the science what is science and and what therefore should you be doing as you try to navigate the world scientifically? So I do I recommend that conversation on Megan Murphy's YouTube channel

**Bret** 04:23

and that meta conversation is so important you and I got dragged in the direction of the philosophy of science which I don't think either of us regarded as super important until graduate

**Heather** 04:33

school dragged in graduate school,

**Bret** 04:34

dragging graduates school largely by Arnold cluey, your primary mentor, and anyway, I have never regretted a moment we spent learning about it or thinking about it. It's it's amazing how many scientific issues actually come down to some slight nuance nuance of the philosophy of science with which although PhDs are supposed to be philosophers of science, right? It's a Doctor of Philosophy. Most just never bothered to think about it and having never bothered to think about it, they screw up little things. And it's every bit as devastating as the failure to meet even basic assumptions and statistics.

**Heather** 05:12

This is absolutely right. In fact, I once said to a philosopher and a PhD in philosophy, which would seem to be somewhat redundant, but and that when she was dismissing some scientific ways of thinking as being a philosophical, if not downright anti philosophical, and I said, but of course, you know, all site all modern scientists have degrees in philosophy, it's what we are supposed to be doing. She literally laughed at me. And, you know, I was able, I was able to demonstrate that that many of us do. But in fact, it's, it's by far, not all of them. And I think it's part of it is part of why you see people with the credentials, not actually being able to demonstrate that they even know what what science is, and certainly not being able to demonstrate your how you would do it or under what conditions you should in fact, trust a result that you find and under what conditions you shouldn't.

**Bret** 06:06

All right, excellent. So let's, let's get to it.

**Heather** 06:09

Let's get to it. This is the segment we were thinking of calling drunk without power

**Bret** 06:15

drunk without power. You'll see why shortly. Yeah, so we're going to start with the pictures.

**Heather** 06:21

Or actually, yeah, just just a just a tiny bit of description for us. So it turns so we let a week ago today there was there was snow outside there were snow on the ground. And we were saying it's it's pretty rare for Portland, Oregon to have snow on the ground. And we had a series It was either two or three distinct weather events, snow and ice storms that came through the came through Portland and Southwest Washington and a lot of Northwest Oregon. And it wasn't it certainly wasn't the largest weather event that this area has seen, even in living history, even. But it did cause the greatest power outage in Oregon history, actually, in terms of the number of power customers affected. So at one point, more than a third of Portlanders were out of power. And people from a lot of surrounding areas lost power, a lot of people are still out of power. Our power went out mid morning on Valentine's Day, and we just got it back on Thursday. So we were out for four full days. For some of that time, our cell service was also out I literally in order to make sure that we didn't miss something, you know, in order to cancel something that need to be counseled actually to climb a hill to where I could get, you know, cell service from an adjoining tower, because you just everything in our neighborhood was

**Bret** 07:31

without power took out the cell, the cell service because the the towers weren't getting power either. And I'm sure they have some backup, but it didn't last and they would you know, suddenly we were cut off.

**Heather** 07:40

It didn't last Yeah, the cell towers didn't actually fall. But many, many power lines were down actually in the street visible to us multiple different streets within blocks of our home, lots of downed trees and branches. And for me some of what was super interesting, and yet we know this from ecology is how patchy it was. Right? Like there are areas near us that nevertheless power at all. And certainly if you don't live among the trees, you were less likely to lose power unless you were getting power from an area that that did have them because a large part of what happened was trees falling in line. So that's not the only thing that happened.

**Bret** 08:16

Yeah, so let's, you know, for those of you who have not had the the joy of experiencing an ice storm, let's just talk for a moment about what it is and why it happens. I'm thinking about people in Los Angeles who may have only sort of vaguely thought about this

**Heather** 08:29

where we grew up. And until we moved to Michigan, we're somewhat well I guess we both spent times in that time in the Sierra so we were familiar with live streams already. But

**Bret** 08:37

yeah, although ice storms are a special weather condition. It's really a combination of weather conditions where things down here on Earth cool down below freezing, but they're warm enough at the point that the precipitation falls that it doesn't fall as snow it falls as liquid water very close to the freezing point and then upon hitting very cold surfaces, it freezes and accumulates and the thing about it is it's really heavy and so my recollection is that when we lived in Michigan I storms happened they cause damage but in general because powerlines got too heavy, the trees were actually much better adapted to it but because it's fairly rare out here in the Pacific Northwest are trees they don't budget for it because that would be very expensive and reduce their competitive viability.

**Heather** 09:20

So this is and this is actually exactly I think one of the central points here that it's easy for people in places with reliably bad winter weather to mock the regions of the country like Texas right now like Portland this last week like Los Angeles whenever it rains even right for being unprepared and incapable of dealing and it is true that socially society like if you if you don't have experience you're driving in the rain even rain is tough or if you don't have experience driving in the snow and ice even that is difficult for you and and that you know that is just a truth. And so you know as you reported that apparently Portland has three snowplows

**Bret** 10:00

That is what I learned from the Portland subreddit which is you know it

**Heather** 10:03

seems super low except most years it they'd none of them get used right so this this social truth by which humans tend to mock other humans is mirrored by a deeper and much older ecological truth which is that the tree is here the trees not the people but the trees here don't tend to deal with ice buildup on their branches and so whereas in Michigan where ice storms you know some kind of ice storm happened every year and we were just using Michigan because that has happened happens to be where we lived for eight years or something in grad school the trees didn't explode right like they dealt with it and you still had power outages because power lines don't deal well with ice buildup but the trees were better adapted to a situation because it was more common and any place that you get extreme weather events that are not common the organisms there are less likely to be able to deal with it and so we have you know in Portland a particularly ridiculous situation because I think of the repeated freeze thaw cycles was so many so much build up but then you know Texas it's even more out of the ordinary what happened and so you know they're they're dealing with their own kind of hell as a result not of you know them being incompetent and but rather have the entire system including the system absent humans not having this as a regular feature of their lives.

**Bret** 11:27

Yeah in Texas this can happen if three people leave their freezers open on the same afternoon right it's a very rare thing for it to get cold enough to create your

**Heather** 11:36

head Do you in fact ever been in Texas? I haven't been to tech I know I've been there with you but obviously that's

**Bret** 11:41

not true right? No, that's true. He snow most jokes are not true. I don't even strive for it anymore.

**Heather** 11:47

No, I mean obviously that was a joke but like Texas gets cold the way the high desert in California you know it gets cold right and yet not all of it you know cut Texas is gigantic and Gulf Coast is different from you know, up near the up near the borders with the mountain states but but this level of storm was unusual.

**Bret** 12:06

Yeah. But now my joke is just making me look dumb. Oh, I know what you're thinking many of them do is that

**Heather** 12:13

no, no, I was just thinking, should I apologize? No, I'm not sorry.

**Bret** 12:16

Don't apologize. All right. So let's look at some pictures that you want to put up a series just to give people a sense. So all right here we have some ferns and you can see there's a thick coating of ice on them. These are sword ferns. skip ahead one. Okay, here you see you can really get a sense for how much ice is on the plants. This is a Rhododendron. And you know there's a thick, it's like an inch thick coating of ice on each of these leaves. And, you know, that's one thing if it's one branch, which is robust to wind, and this branch is standing up to a reasonably well, but you can imagine scaling that up over an entire tree, how much extra weight the tree is dealing with in this circumstance. And I must say we didn't get terrible wind this time. Sometimes the combination of wind and ice storm happens, you know, it's every five years, maybe eight years, Pacific Northwest, we get such a thing, but that's really devastating too. All right, skip ahead one. All right here you can see again, every branch there's like multiple times the weight of the branch in ice sitting on the surface of the branch, every surface was cold and they all accumulated. Okay, here you can see a close up and I don't know if your screen is good, you can see the crystal informations on the surface of this ice, this is just a branch it must be you know, eight times as heavy as it normally would be. Alright. And again, one more. Here, I spent a lot of time trying to capture a droplet falling off of one of these bits of ice. All right, and then here's what happens is the trees build up the ice, some branch that was within tolerances is suddenly way above tolerances collapses in here, one has landed on a power line and short circuited it and the power everywhere downstream of this is off including the signals. And this was all over the place. There were you know, there were multiple entire trees down in many locations often across the road. And the problem is that the frit the system has become so fragile that in fact the power company initially was reporting very long periods of time in which they expected to repair it and then they pulled all of their estimate estimating altogether right what they realized was that every time they got something they found a problem and they hooked it back up something downstream was short circuited and they would pop that breaker

**Heather** 14:50

there's a branch they didn't realize and another power line that immediately short shorted out right you know number of houses. In fact our power came back on for five minutes the afternoon it went out and And then were plunged into darkness for another three and a half years. In fact,

**Bret** 15:02

it came back early and I believe my exact words or something like all believe it if it lasts more than five minutes, and it's about as long as the last Yeah, went out again. Okay, and then there's one more which is the result of all of this is here. We were in the dark, drunk without power. So with curry powder, apparently well sure I mean you wouldn't want to have a beverage without curry powder and this is the hot curry powder. Yes.

**Heather** 15:28

Yeah, I did have the oppressions to make a giant pot of soup that first night which, which because we have a gas stove, we were able to heat up every night.

**Bret** 15:36

Yep. Yep. All right.

**Heather** 15:40

Cool. Okay, so let us let us move on to our next biggest main topic and we'll start by I'm just gonna actually read some someone Thank you actually wrote a transcript of your and Daniels conversation. And really again, I recommend that that conversation very, very highly. But I was I was taken by several pieces of it. But this one this piece in particular, which happens at the hour and 51 minute mark, in your conversation with Daniel shmotkin Berger. The only this is Daniel talking, the only answer out of the oppression or chaos is the comprehensive education of everyone in the capacity to understand at least three things. They have to increase their first person, second person and third person epidemics. Their third person epidemics is the easiest philosophy of science from a logic, their ability to actually make sense of base reality through appropriate methodology and find appropriate confidence margins. second person is my ability to make sense of your perspective. Can I steal man where you're coming from? Can I inhabit your position? Well, if I'm not oriented to do that, then I'm not going to find the synthesis of a dialectic. I'm going to be arguing for one side of partiality harming something that will actually harm the thing I care about in the long run. And then first person, can I notice my own biases and my own susceptibilities and my own group identity issues and whatever well enough that those aren't the things that run me. Yeah, I'll go read just a little bit more. When I, Daniel, look at the ancient Greek enlightenment, first person was the stoic tradition. Second Person was the Socratic tradition, third person was the Aristotelian tradition, there's a mirror of all those in modernity. We did new cultural enlightenment now where everyone values good sense making about themselves about others about based reality, and good quality dialogue with other people that are also sense making to emerge to a collective consciousness and collective intelligence that is more than our individual intelligence. And so that we have some basis of something that isn't chaos, but that also isn't oppression, because it's emergent more than imposed. So it's cultural enlightenment, or bust as far as I'm concerned. So, you know, as almost everything that you guys talked about, or both of you were like, I want to go 18 places from that, right. And so one of one of the places to go from that is, you know, my sense was this is, as he says, This is exactly what education should be doing most good education must good, but traditional education doesn't actually even attempt the first or the second person empty stomachs, and attempts the third, and sometimes it gets their second, he doesn't use this language Exactly. But I think second, second person epistatic is basically theory of mind. And it's not unique to humans. There you know, there are other organisms that engage in theory of mind but the ability to place yourself in someone else's perspective and really, and really understand that they see things differently than you do is critical to this collective consciousness which of course, we have talked about a lot. And then first first person epidemics is what we have called in our book actually the Laboratory of the self and as educators you know, listening to Daniel I thought, well you know, your, your bread conversation with Daniel our friend. And you know, in the very end of that conversation, he sort of salutes us as educators and was very kind. But I do think that you and I, specifically without ever having categorize it this way, like I really love this categorization, we're trying and frankly usually succeeding and doing all three things in both modeling first, second and third person epidemics for our students and also expecting them to derive the abilities to and engage with each other having found their own first person and second and first person second person and third person epidemics. And you know, it's going to be a little bit different how you engage in the world and as you point out and another point in the conversation as we have talked about deal for decades You know, there's a piece of science that maybe can't be taught I disagree with you a little bit about on this but you know, the the formulation of hypothesis is the black box that you know that that is, is the thing that is not taught when you're teaching the scientific method that sort of just always appears like okay, now you've got hypothesis and now everything downstream as a scientific method, but

**Heather** 19:59

I guess, I would say Have a look By comparison, at what for instance, the diversity, equity and inclusion, so called education is doing it's this pathetic, shallow nightmare of prejudice and insipid thinking. It's anti educational, it imagines it, it abandons third person epidemics claiming that that's, I don't even know white supremacist or bizarre like, who knows what, it never even pretends to engage in second person epidemics like there is no you there is no outsider in this worldview of the the woke, Revolution, the postmodern takeover of the academy and media and everything. And it presumes and I actually made this point when we're talking about white fragility back in June or July, it presumes that the personal lived experience of the person talking is what is true for everyone. It is like the supreme form of narcissism that is anti educational, and it I think it exactly to us Daniels characterization categorization. It takes a single experience and imagines that, you know, the first person epidemics, and sprays it, you know, scattershot across the entire landscape as if it applies to everything. Actually,

**Bret** 21:15

I want to go back to a couple things. One, there's an argument to be made, that it defies the, you know, the personal experience, and negates, you know, the thing about what we call laboratory of the self is that you will never have better information on or you will never even have really high quality information on what it's like to be the next person, like you're the next person to me, you and I spent a ton of time together. And we've spent many, many years together. So I probably know you as well as anybody can. But you know, it's still a step removed, right? But I have very good information on what it's like to be inside my conscious mind. There's lots of stuff I can't access. But in any case to take the the. So the data is very good for self, but it's not a substitute for a dispassionate analysis of the world. The point is, it's actually an interesting source of information that you then want to test against patterns that you can see externalized and

**Heather** 22:17

neither of those is a substitute for the second person, right? actually engaging with another person's mind and hearing when they say things that surprise you, and not immediately saying, You're a bigot, or you're wrong, or try again. But oh, you actually have a fundamentally different understanding of or experience of the world. Let's explore that.

**Bret** 22:36

Right? So in some sense, I think what you and I are going to land on and you know, the weird thing here, you and I entered the public consciousness as evergreen became a an absurdity. And so you and I are constantly battling the fact that actually evergreen the founders of evergreen had something very, very right. Yes, right. And it went off the rails because they didn't get everything right. And nobody fixed the problems. But But the basic point is, there was something absolutely magical about not being stuck in any one of these rounds. And we've seen failures stuck in all of these rounds, we've seen an obsession with dialog that you know, demotes the seminar. Right, there you go. Yeah, we've seen, you know, an obsession with personal experience. And you know, in other places, you know, what, when, as graduate students, we occasionally I remember john VanderMeer brought us into a class of Central American Graduate students in Costa Rica. Yeah. And the culture was very, very different. In fact, it was so deferential, right? And the problem was, well, you can't do science. You know, you can't innovate in science. If you're deferential to ideas that are certainly partially wrong, you have to be in a mode to challenge and so anyway, any one of these,

**Heather** 23:48

but there's a cultural expectation of not challenging the authority figure, which is, as you say, antithetical to actually becoming a scientist,

**Bret** 23:56

right? So in some sense, the end of the discovery is that you need all three of these things in play Yeah, in the dynamic in order to make real useful progress, and anytime you defaulted to one you lose, even defaulting to two you lose. You need all three. And okay, so one thing is the day before Joe Rogan showed up on clubhouse, there was a discussion on clubhouse

**Heather** 24:18

day that shall forever after be known as the day before Joe Rogan showed up.

**Bret** 24:21

Well, here's the thing for anybody who is not paying attention to clubhouse I know this is weird, but you know, Joe Rogan hops in there and suddenly a room goes to 7000 people with three Oh, I

**Heather** 24:34

thought it was maxed at 5000 Well, it was I but then we

**Bret** 24:37

got to 7000 and then while Joe was in the room, the engineers changed it and it became 8000 Okay, all right. But anyway, the point is Joe showing up there just to check it out, is unfortunately a terrible Heisenberg problem where it's like Joe can't check out clubhouse because clubhouse obsesses over him and then it gets spread on Twitter, etc. But But anyway, the thing is, if you go back to the Joe Rogan experience perience right? The Joe Rogan experience does contain all three of these layers. Yes, it does this room that was on clubhouse the day before Joe showed up was his Joe Rogan, a danger to science or words to that effect. And this brought a bunch of us into the room. Joe wasn't there, of course. But Lex Friedman and me and Eric, were in the room trying to explain why Joe Rogan is actually a huge asset to science, and that it is really a misunderstanding of how science works, that causes people to even formulate the question, right? And so that, you know, you can see how it all would play out. But final thing I want to say on your intro there is I know what you're disagreeing with me about with respect to the formulation of hypotheses and whether or not it can be taught. There's like two components, right? There's the once you have an idea of what might be going on a system in a system, how do you make it into a hypothesis that you can teach? Right? The problem, the thing you can't teach is how you traffic in wrong ideas, right? such that you can spot one that is in the category of ideas, but might actually be right

**Heather** 26:08

but so I mean, even we, we should talk a lot a lot a lot about education for the rest of our lives, really because we did never planning to become so become really, I'm just gonna say like extraordinary educators without ever having any of the training. And I think that helped to get maybe because, right, right, and because we both had such totally different educational experiences through all of our schooling. And we're intimately familiar with each other and therefore each other's experiences. We walked in being able to model Okay, you you are a student who doesn't look anything like I've ever experienced before, I still bet you have something to offer. Let's figure it let's let's figure out how to draw that out how to help you realize that you actually have something to offer as opposed to treating me as an antagonist that you're just trying to get get through the class through. So one of the things that I did most of the first weeks of most of my programs was this exercise, actually the john VanderMeer again, so john VanderMeer was one of our graduate student, graduate school professors, who's a near tropical biologist. And we spent a summer he basically created this field course in tropical ecology and, and conservation in Costa Rica, for us and for for other grad students something and then he had an elder grad student who was effectively a TA. So it was like, eight of us. I mean, I could name everyone if I thought about it, but a very small group that he spent, you know, six, seven weeks, touring around all these different places in Costa Rica, which of course became some of the basis for me creating my own study abroad programs later, although I never did it in Costa Rica. He ran us through an exercise that was from the organization for tropical studies, which was the standard bearer of like how you become a tropical ecologist, you go and take one of these four week classes, and they just didn't happen to have any the year that we were interested in doing this. So he created this for us. And what the exercise is, as you know, is the professor takes each of the students out to someplace in nature, with just a pen and paper, hope, really, hopefully nothing else and, and parks them out of, out of view, certainly, hopefully, out of sight of any other human being and says, I'll be back for you in two hours, don't move Unless, you know, your life depends on it. And just sit and be and watch and listen. And, and, you know, and use all of your senses, you know, depending on where you are taste is, you know, sometimes off the table appropriately, but and then at some point, that your brain has quieted down enough to stop telling you how very bored it is and how very much you want to get on the phone or you know, get some Skittles or you know, whatever it is that you are, you know, just too antsy to sit and just be start noticing what is going on around you and start writing down questions. And it's just it just questions. And and then after two hours comes back, go back and and then the next part of the exercise I think he did with us right away. But this is something that I did with almost all of my students. And you know, I had 25 or 50, depending. And, you know, I did this, I did this in Panama. I did I think we did it in Ecuador. I did it in the scablands of Eastern Washington I did in the sand ones, I did it in a number of places. And the so far all we've heard is, you know, students come back hopefully with some questions, hopefully as many as 20. But whatever that they have had about things that they are observing that are happening outside of their own brain. So you know, questions about why am I so bored or you know, like, less interested in those for this perspective. And then group up the students in small groups and say, look at each of these questions and figure out which ones you're most interested in trying to figure out and pose hypotheses and figure out what the predictions would be that follow. From those hypotheses, and then we're going to get back together and you'll make these posters, I'm going to put them all around the room. And we're going to go through each group and talk about at least one or two of these hypotheses and the predictions that follow them from each of the initial observations. And it is so amazingly revealing about just so many aspects of science, you know, how, you know, for someone, I would often do this either the afternoon the same day or the next day. But for people who had literally never considered some observation or some hypothesis before, how fiercely wedded they became to that thing, how just adamant they were that this has to be the truth, like, wow, you didn't even think of this 24 hours ago, and just recognize how fiercely wedded you are to this now, okay. Also take a look at these predictions that you have that follow from this hypothesis. No, they don't. Or they also would follow from your alternative hypothesis, therefore, they're not predictions of one or the other. They're predictions of both therefore, they can't help you discriminate between the hypotheses.

**Heather** 30:59

How many? How many giant questions that you simply can't answer at that level scientifically, had to be teased apart into smaller bits, that is not apparent until you've actually done this exercise. So, you know, this, this was the little bit by which I mean, almost every quarter that I taught, was trying to teach people how to begin to formulate, you know, observation, pattern recognition, hypothesis generation prediction generation.

**Bret** 31:27

Yep, I definitely see it as a hugely valuable exercise the degree to which students who don't grok what a hypothesis is, are always left groping for how you go about formulating it. Now, sometimes they happen on to a method, but it's very often not some method we've conveyed the point is well think about it. Right? What might explain the thing you're seeing? And the answer is, well, your brain is a black box, and either it can figure out how to do that trick, or it can't. And if I you know, what I did? I showed them, I just modeled it, right? Yeah, the point is, I don't know that I ever taught a student to do it. But the point is, by modeling what you're trying to get to, then some of them find their own method for doing it. But again,

**Heather** 32:13

it doesn't mean modeling is a kind of teaching. I mean, I guess that's that's the distinction I'm making that when you say you can't teach this I think boy education looks a lot of ways that I wouldn't have thought it did 20 years ago, this

**Bret** 32:23

is exactly the point I'm making. I'm not saying you can't mentor it, right, but you can't teach it right there's not an exercise I made the distinction. Well, all right, I mean, I'm quite convinced of it based on my interactions with my mentors who I think did it very differently than I do and the best mentors knew it and so the point was they cultivated they were good sounding boards but they didn't you know, they never set about trying to you know, give me a method or show me how to how to accomplish that thing. But anyway, let's let's table that for the moment and move on.

**Heather** 33:01

Alright, so if good education but not great education does successfully engage in third person epidemics in which it tries to provide a way through philosophy of science and logic and analysis to understand the world and engage in sense making of the world if not of yourself or of the other people in in it. Compare that that good education to this, which our producer and 16 year old son, Zachary pointed me to yesterday in the New York Times op ed pages so my screen is not why is it so slow? We I don't know what's going on there. Hopefully it comes up because I can't read it otherwise. Oh, here we go. Okay, so the opinion from February 18 op ed page, don't go down the rabbit hole of critical thinking as we're taught to do it isn't helping in the fight against misinformation. Oh boy. So as it turns out, you know, this starts as this kind of banal, not surprising, not, I shouldn't be controversial suggestion that actually every time you run into something on on the internet that you think might not be true, you don't actually need to spend 15 minutes chasing it down like you are not obliged to spend 15 minutes chasing down every single thing that you run into in the internet. Boy, if you need to hear that advice from the New York Times, you've probably got a deeper problem. But it gets this up it gets crazy. Here. First, we have four simple principles which you know at first glance, they seem reasonable when applied appropriately refining the practice and this is, he says we suggested modeling the process after the way professional fact checkers assessment information. We've refined the practice into four simple principles stop, investigate the source, find better coverage, trace claims, quotes and media to the original context, otherwise known as sift for the initial letters of the four points, stop, investigate, find and trace Mr. Caulfield. So now I'm going to just read a couple of paragraphs here from from three paragraphs from this op ed. Mr. Caulfield walked me through the process using an Instagram post from Robert F. Kennedy Jr, a prominent anti vaccine activist, falsely alleging a link between the human papilloma virus vaccine and cancer. Quote, if this is not a claim, or if I have a depth of understanding, but I want to stop for a second and before going further, just investigate the source Mr. Caulfield said, he copied Mr. Kennedy's name in the Instagram post and popped it into Google. Look how fast this is. He told me he counted the seconds out loud. In 15 seconds, he navigated to Wikipedia and scroll to the introductory section of the page highlighting with this cursor at the last sentence, which reads that Mr. Kennedy is an anti vaccine activist and a conspiracy theorist is Robert F. Kennedy Jr. The best unbiased source and information about a vaccine I'd argue No, and that's good enough to know we should probably just move on. He said. He probe deeper into the method to find better coverage by copying the main claiming Mr. Kennedy's posts and pasting that into Google search. The first two results came from genres fonts, presses fact check website, and the National Institutes of Health is quick searches showed a pattern and here it is, quote, Mr. Candy's claims were outside the consensus assigned, they were motivated by something other than science. I'm just gonna read that again. Yes. You know, Mr. Kennedy's claims were outside the consensus, a sign they were motivated by something other than science. I think someone doesn't know what science is, you

**Bret** 36:45

could say I rest my case. At the point someone has said something like that out loud, you know, just how far they are from an understanding of how science works. What's its might be,

**Heather** 36:55

don't dig deep. People ever just trust the authorities. And whenever anything doesn't match the consensus, you know that they're not using science?

**Bret** 37:05

Well, I would even point out there's something even weirder in this, which is that the fact that they check is not the question about HPV, the fact they check is whether or not rotation and smear endure is a reliable source as if that's a factual assessment. Right?

**Heather** 37:23

And you know, and the very article introduces him by calling him, you know, a conspiracy theorist and the anti vaccine guy, right? And, yeah, like, it's a totally separate question as to what his positions actually are in vaccines and how nuanced they are or are not the fact that we are being informed of the conclusion as we are, then we are told how to come to that conclusion. And the way that we are told to come to that conclusion is deeply, deeply flawed and suggests a misunderstanding of how it is that our understanding of reality advances. The if you're outside of the consensus, you must not be understanding or dealing with science. No, actually, it's the opposite.

**Bret** 38:09

Yes. In fact, what you are really being told is that we will do the job of deciding what is true, and we will deliver it to you in a packaged form. And you just simply have to check whether it's on the science approved list or not. When I mean, this is wrong in so many different ways. First of all, you'll get this kind of claim from people who, in theory have gone through graduate school and gotten an advanced degree in science, right? Those people should know better, right? They've seen the politics on the inside, they understand not only that wrong, ideas can get a foothold. They understand that things like the replication crisis emerge, and that those results that were replicable were wrong to begin with, right? For all of the years that people claimed that they were based on reliable science, there was a hidden flaw that had to do with the way the statistics were deployed that told us what was right and what was wrong.

**Heather** 39:09

And as Daniel says repeatedly in your conversation with him, as we have said before, as well, even if the methods were right, when those methods are applied to the wrong question, you won't get the right answers.

**Bret** 39:22

The methods have to be right, they have to be applied carefully. The people who apply them have to be willing to sacrifice their own career well being in the interest of finding the truth, which is not a common characteristic for people. And it's not a characteristic that science programs now select for. They select for people who are ruthlessly interested in advancing their own careers, which is antithetical to the, the instinct that that is necessary. So the number of ways that the established consensus conclusion can be wrong is indefinitely large and we are living in an era where those conclude prisoners are increasingly rotten. And to at this same moment be dealing with the question of whether or not there is a responsible way to check whether something is true. It involves seeing whether the person who said it is in some way defective. And at the point you discover they're defective. They're obviously wrong, right? That's not a method. I recognize. That's, that's a, that's a mind virus right there. Yep. All right. So

**Bret** 40:32

this leads us to many other places are we where you wanted to go with that lead away? Okay. So I want to point us to what I think in the last week or so has been has become clear as the next attack vector against reason against enlightenment values against liberalism against all sorts of things that longtime listeners to this podcast will be well familiar with. And it's hard to know where to start with this. But I want to point out something about the very special nature of 00 is a special number, it has always been a special number, it has unique properties, mathematically speaking, is strange enough that although it's hard for us moderns to grok what this means, and I still don't know that I do grok what this mean, the Greeks didn't even have the concept of 00. The Maya did, right. It's one of the ways in which they actually did the Greeks, they're in many ways, parallel to the Greeks for the New World, much less known to us, because almost none of what they accomplished, survived in textual form. But nonetheless, having a concept of zero gives a civilization a huge edge. Zero is mathematically special. But it is also special with respect to the battle to control narratives for political purposes. And I'm going to claim actually borrowing somewhat from Arnold loogies. file cabinet, which is at the entrance to his office and had a note on it. That said, it's about power and limited resources, stupid. And this never needed any explanation, because those who stopped to notice at all understood what he was getting at, which was that this is the the reason that humans get involved in conflict. And I'm going to claim that this is true with respect to the conflict over not only what the correct narrative is, but what the allowable tools are, for it to progress, right, we are being sold an absolutely authoritarian version in which the only kind of truth is the Aristotelian or the personal, right, the middle layer is not allowed to even exist. And so my point about zero is this. In a world in which the scientific consensus is going to be synchronized to something wrong, right? It is necessary that there be no universities in which another perspective can survive, right? The difference between a universe in which one university is able to do something else, any university in which no universities are able to do something else is all the difference in the world. Because if you pick a university at random, and you free it from the forces, that that dictate what the consensus is, and what is allowed to be considered, then that university will win. Because what the other universities have done is they have signed up for basically methanol, right, they've signed up for a brain killer, something that will not allow them to think clearly. And if everybody's on board with that, then that could, in theory be stable. Now, of course, if all American universities sign up for brain poison, then of course, that will put the universities of countries that don't subscribe to the same beliefs ahead. So we are in fact, opening the door to for example, China taking over the special position that the West has held by virtue of the West self sabotaging. But okay, so you've got this question of zero, if one university opt out, and somehow figures out how to stay alive, then that will be the place that people send their kids, if they want their kids actually to learn how to think that place will therefore produce graduates that are higher quality, the products that they produce will be more innovative, more robust, everything will provide advantage to the product of the products and I mean, the people that come from that university, so it has to be zero. In order to win the battle, it has to be zero. Now, what I want to connect this to, is it the same principle applies to social media, right? If they're going to control the narrative on social media, by dictating what is misinformation and what is factual and then having people thrown off for spreading what they call misinformation, then it has to be all of the social media platforms because if it wasn't, we would all end up finding the one platform in which this wasn't happening. Right?

**Bret** 45:00

Now if it is happening everywhere, what will happen is somebody will say, Hey, I'll start the platform where you can say anything you want. Okay, now you've just invented parlour. And the attack vector is clear. The attack vector is okay. parlor is where the bad people are. And so we at Amazon and Apple and Google are positioned to shut down the network of bad people, you know. So the, the concern is that clubhouse is different, right? Because clubhouse actually invented a new way instead of duplicating Twitter. What clubhouse did was it invented a new way of interacting. Now there's nothing truly new about it. It's just people talking to each other. But the point is, because it was novel, and useful and different. All sorts of people ended up there, you can't very well accuse it of being the place where the bad people gather, because the bad people may be there, but they're there with all sorts of people who, you know, are well within Twitter's good graces. So the point is, this now has to be attacked one way or the other. Right? Somehow the place where conversations are taking place that can't go on Twitter, because Twitter has been effective at shaping the narrative and is increasingly aggressive. And so, of course, the New York Times, you know, said out loud this last week exactly the thing that is supposed to be said only quietly within within certain rooms, and they suggested that clubhouse was a place where unfettered conversations were taking place. Now that is an amazing, an amazing misstep on their part acknowledging that at some level, there's something troubling about people freely exchanging ideas

**Heather** 46:47

well, so I pulled up their tweet. Wait. So this is this is their tweet about it unfettered conversations are taking place on clubhouse, an invitation only app that lets people gather an audio chat chat rooms, the platform has exploded in popularity, despite grappling with concerns over harassment, misinformation and privacy. And you know, you can get they got seriously ratioed here and they got five times as many comments as they do likes on this thing, although a lot of retweets as well. I don't know how many quote tweets, but I just, I just searched when I was looking for their article, I searched on the New York Times page for the word unfettered. And one of the things I found was December 23 2011, unfettered was the word of the day at the New York Times, and their definition is simply not bound by shackles and chains. So I this that strikes me as as free of connotation, actually. And if anything, it has a positive connotation, so I don't think I don't think I focus on this word. I mean as possible they've edited the article originally like I don't know what all is gone behind the scenes, The New York Times. But I'm not sure what the hubbub is about this

**Bret** 48:01

world. The hubbub is very well deserved. For one thing. The report came from somebody who's been traveling on clubhouse and has been, you know, a tattletale, nanny hall monitor type. So, the point is in this context, yes, maybe in 2011, unfettered was a word without such connotations. But at the moment, this has everything to do with an intense fervor for regulating speech. And my point would be, free speech is effectively a synonym for unfettered conversation. They are supposed to mean the identical thing. And Zach, could you bring up the the governmental news release that I sent you? So, unfortunately, can you make it bigger? Okay, so this is the House Committee on Energy and Commerce, which has once again summoned the CEOs of tech platforms to answer for what it calls the misinformation and disinformation plaguing online platforms, right. So this has a very definite valence to it. And I want to put this in a new context. Here we have the government, castigating and interrogating CEOs of platforms that do have the ability to censor because they are not covered by the First Amendment because they are private, whether that should be or shouldn't be, we can discuss and should discuss. But the fact is, for the moment, they have the ability to censor their terms of service are absolutely opaque, unfollow liable, and therefore you can be tossed off at will which has happened to me of course. But I would argue that this here with the House Committee, in the hands of the blue team, putting forth this This news release in which it creates the impression that misinformation and disinformation are plaguing online platforms. Now I'm not saying that there is not a tremendous amount of misinformation and disinformation on online platforms as there is, you know, discussed in every restaurant in you know the world this information is a part of human communication. But what they are doing is they are effectively using something that I will call the Five Eyes Gambit. The Five Eyes are five nations that conspired to subvert constitutional protections. The five nations are the US, Canada, UK, New Zealand and Australia, I believe. And the idea was in the US, there are strict prohibitions against spying on us citizens. But those prohibitions don't apply, for example, to the Brits, they can spy on USS. And so to the extent that these countries wanted to spy on their own citizens, they could basically unionize spy on each other's citizens and exchange the information. Voila, no more constitutional protections. Right. So what's going on here? spying circle jerk. It's a spying circle jerk. Okay, so what's going on here? The government, right? And it'd be pretty hard to deny that the House Committee on Energy and Commerce is not part of the government, the government is forbidden to regulate speech. So what's it going to do? It is going to threaten these online platforms and get them to regulate speech, right? Is that a violation of the First Amendment? semantically, it is very specifically a violation of the First Amendment. Is it exempt because of the one step removed? nature of it? Right, I think it you know, that's the the argument that's going to be made. But the real point is the even the title of the article that you quoted,

**Bret** 51:55

simply assumes a fight against misinformation. Right? Right. It never stops to engage the question of why it is that speech is protected the way it is, in spite of the fact that there is lots of misinformation contained in speech inherently so right. Why did the founders protect abhorrent speech, they did so because the net value of keeping speech free in spite of abhorrent speech is positive remains positive. This is something we all understood until yesterday to use Douglas Murray's formulation. And so we are about to lose this because everybody does understand that misinformation spreads online and that bad things happen as a result of it, right. But if that's all you focus on, then you think, Well, great, let's just shut down the misinformation. But what we don't do is ever get to the question of what is a fact? There are certain facts you can check, right? But the number of things that would be claimed to be factual that are not actually factual, the number of places where something that would have been claimed to be factual is forced to be reversed on the basis that people doggedly point out the evidence that it was not indeed true. You're going to shut down that mechanism. In other words, this is the end of thought. This is the beginning of here's your predigested narrative. Now take

**Heather** 53:16

it's certainly the end of public thought. And it sends all of the not quite fitting into established ideological framework thought underground, into private. And that means there at the moment with COVID lockdowns, there's gonna be a lot less of it. But that will drive underground both the necessary important actually discovering of reality that will help us survive and to you know, the next century thought from happening, and it will also drive the actual hateful fringe disgusting thought underground out of you such that when it explodes onto the scene later, you know, everyone's gonna act surprise, like you did this to us. Like we, what is language, actually, if not a place and a way to explore things that some of which are true, some of which aren't, and many of which we don't yet know this this is the point the idea that we it is just such hubris it is there's such an arrogance to this perspective, that we already know everything about what is true and right and just and you can trust us to just keep your frail fragile brains away from all the stuff that we already know isn't true and is dangerous. Like that is not if any society that did that went extinct quickly. That's what happened.

**Bret** 54:39

Yep. You absolutely can't do this. And I just you know, we could go on literally we could go on for days coming up with examples of things that if you allow the fact checkers to decide what we can discuss with each other, will be frozen in place and we will never actually make the jump to what turns out to be true in the end and I would point out just you know, Example Kary mullis, the inventor of PCR won a Nobel Prize for PCR, PCR being one of the most powerful techniques in molecular biology. Right? He had doubts that HIV caused AIDS. These were not preposterous delusional doubts. Now he was wrong, I believe he was factually wrong. But the point is, you had a super genius, right? Somebody who brought a tremendous amount of value to the world who could not falsify in his mind, the idea that HIV and AIDS might be two distinct phenomena that co travel enough that we can fool ourselves into believing one is causal of the other. Now, do you want to do the same thing to him that they're doing to Bobby Kennedy, Jr. You know, is Kary mullis, you know, a crazed, unreliable scientific source because he holds a belief that is, in fact, potentially dangerous, you need to protect yourself from HIV if you don't want to get AIDS. And so, you know, there's no denying that if this is indeed a wrong hypothesis of his that it has potential consequences for human life and limb. But the point is, now we have to take the package that is Kary mullis, rather than say, oh, you're not entitled to think, because you sometimes do it wrong. Well, guess what? We all sometimes do it wrong,

**Heather** 56:20

notorious HIV AIDS denier, Kary mullis. Right.

**Bret** 56:23

Right, exactly. And then the other thing is that I'm just stunned by the fact that we are having this discussion about stamping out misinformation at the same time that we are having this unusual discussion about the lab leak origin hypothesis for COVID-19, which is the rare case where, in fact, an idea that many wanted to stamp out, you know, a year ago, doesn't die. And we are in fact, you know, managing to convince people that it is a viable hypothesis, which it clearly is. So, you know, again, do you want to stop that conversation? Because frankly, if you'd stopped that conversation, we'd all still believe it was pangolins. And we now know it wasn't pangolins and you know, that's normal, hypothesizing that it was pangolins on the basis of some evidence as a totally normal phenomenon, discovering that that actually doesn't make sense in light of the fact that for example, penguins don't normally get coronaviruses and the Coronavirus doesn't the Coronavirus that we have COVID 19. SARS Coby to doesn't infect them effectively, right that those things have to update our model. And the point is, if you think that the model is just something you get in a software update, and it's fully packaged, and the facts are what they are, and we can just shut down, you know, all of the messiness that is outside of the established consensus. Well, you don't have the first thing you don't have the first bit of knowledge about how we got here. The magic of civilization involves the messiness. That's why the First Amendment looks the way it does, and it's why it has to apply in one way or another to the tech platforms.

**Heather** 57:55

Absolutely. So I don't have it to show but also this week, I believe, the Wikipedia entry for the lab like hypothesis was actually taken down, right? It was fact checked out of existence by what turns out to be a small band of motivated activists. Okay, so you, you, I guess, had this poll pulled up.

**Bret** 58:18

So this is there was for a brief time a COVID-19 lab leak hypothesis, notice the phrasing, not loudly theory lab leak hypothesis page, that very responsibly chronicled the evidence for the lab leak hypothesis. And it was taken down as a result of an incessant and very powerful campaign by a small number of people. Behind the scenes. There is some evidence that that campaign involved, what would be called a water army, a water army being a Chinese phenomenon in which people are hired to make social media posts that sway opinion. So this is a known phenomenon. And there is,

**Heather** 59:06

I mean, I assume that happens all the time. I've never heard the term water army before.

**Bret** 59:10

I think it does happen all the time. And I think water army applies specifically to the Chinese version of it, which has been large scale, you know, the Chinese have taken a very aggressive stance with respect to what is tolerated on the internet. And there is a battle over various platforms in which Chinese people exchange information under the radar. But in any case,

**Heather** 59:33

I guess I'm sorry. One thing that I do not understand about this conversation is it's you know, I think I said this on on the last episode you don't like it's easy to try to smear those of us who are talking about it as if it's because we're anti Chinese, you know, assign a phobic. And I think actually, if this does turn out to have been a leak, as a result of Ghana function research in at this lab in Wuhan, That points the finger in, if you go back just a little bit more more at American science and scientists and the NIH and such that it does to China. And not to say that, you know, China, if this is true, would not have been involved in a cover up in all of this. But the idea that this is, this would make China look bad, they would look, it would make a lot of our ologists look bad. And the whole program of gain of function research and serial passaging look bad. And potentially, it would reveal to us the downstream effects of the moratorium that the Obama administration put in place precisely because of the risks of this research. And the mistake presumably that it was for the Trump administration to raise the moratorium like, you know, it just it makes a whole lot of people look bad. And I don't feel like China is really special now list. Well,

**Bret** 1:00:54

it's becoming special because it is behaving in an obstructionist fashion with respect to the investigation of the SIBO. But

**Heather** 1:01:00

the who I mean, the who's giving them complete coverage, right?

**Bret** 1:01:03

I agree. This does not start out. In fact,

**Heather** 1:01:05

I've got, I've got a piece of an interview here to share as you wanted me to, okay, on that topic.

**Bret** 1:01:10

Well, let's, let's finish this out, though. So we've got, let's, let's take your challenge here. And just notice in a world in which we are going to decide that scientific consensus is the arbiter of what is a fact. Then let's map the lab leak hypothesis question onto it. And note the very dangerous circumstance we find ourselves in either SARS covi. Two is an escapee from the lab. Or it isn't. If it is an escapee for our, from the lab in Wuhan, then it suggests something about the danger of escapes that you can effectively crash the world economy and, you know, kill millions of people by accident, because, you know, maybe you were doing what you thought was honorable research. But that research, you know, the cost benefit analysis wasn't what you thought it was. Either That's true. Or it did come from nature. If it came from nature, these things can potentially hop out at any time, and crash the world economy and kill millions of people, etc, etc. And so the point is, either the implication is either, we shouldn't have been doing this research, because the danger is way too big, or we could have been doing it sooner and bigger, and more labs and all of that stuff. So my point is the

**Heather** 1:02:33

decision not just a conflict of interest, it's like, you know, thrive or die. It's not just like, continue to eke out a fragile existence, or go down screaming, it's like, you're going to either become the most important types of researchers in the world, or you are going to be recognized as having done the research that helped spur the world into a global pandemic, and economic collapse. Those who

**Bret** 1:02:57

created this research program, and this was an international effort, those who created it, are either the heroes or the villains of this story. Yeah, right. And the idea that we are now going to fight that out on the basis of, well, if it's a consensus, and it's in Wikipedia, then it's a fact and everything else can't be discussed on social media. Well, what's going on? You know, at Wikipedia, well, you when you look behind the scenes, you have people openly discussing the best tactics for sustaining the attack, that is to say, you know, berating people to the point that they ultimately give up as being discussed as a tactic in the editing part of Wikipedia. So the point is this, this doesn't have anything to do with facts. This has to do with people who want that, that entry down for their own reasons, whatever they may be shaping what the world takes to be a factual reference. Now, the fact is, I use Wikipedia all the time. It does the certain kinds of things that you can, you know, go in there, you know, if you want to look up, you know, the chemical constituents of a particular, you know, molecule is a pretty good chance you can find it in there. And the chances that that's subject to some sort of political wrangling are pretty low, right? But there are other things on which there's a lot at stake and what you just can't rely on it as a factual reference. And there's no mechanism and we're stuck with what we call misinformation. And the thing that scares me most of all, is that the ratio of misinformation to high quality heterodox information is probably 1000. To one on a good day, right? The high quality heterodox information is buried in a sea of garbage. And if you get people to focus on the sea of garbage, and you say, wouldn't you like to be free of this? 1000 pieces of bad information? Wouldn't the world be better off without them? Well, maybe it would be but you can't get rid of them without getting rid of the secret sauce, which is the one on 1000 pieces that you absolutely need to chase down and doesn't have the defense of, Hey, this is a fact and we all agree on it.

**Heather** 1:04:56

Right? All right, shall we?

**Bret** 1:05:01

I think we're there.

**Heather** 1:05:02

Well, we're not there. We're going to talk or you wanted me to share this thing from science. From February 14, politics was always in the room who mission chief reflects on China trips, he can COVID-19 origin. So this is an interview by, by science, one of the two most important scientific journals in the world with the mission leader, Peter, Ben and Barak, who we haven't heard as much from because Peter Dasha was sort of the I don't know self appointed other Lee appointed spokesperson, mostly. But let us just go to a few of these questions. Here we go. Question at Friday's press conference in Geneva. tedros seem to contradict you by saying that with respect to the origins of SARS curvy to quote, all hypotheses are on the table. Was it a mistake to call the law lab origin hypothesis extremely unlikely. embark answer's no. We first developed a pathway of all the possible ways the virus could be introduced into the human population in late 2019. a lab accident is one hypothesis. Another is the direct introduction from an animal host and others are different versions of intermediary hosts. For each hypothesis, we tried to put facts on the table, look what we had in terms of arguments and then make an assessment of each. It was already a big step to have Chinese colleagues assess and evaluate such a hypothesis based on what we had on the table, which was not much. Yes, lab accidents do happen around the world. They have happened in the past. The fact that several laboratories of relevance are in and around Wuhan and are working with Coronavirus is another fact. Beyond that we didn't have much in terms of looking at that hypothesis as a likely option. So like asterisk? Yes, you did. But okay, let's go back into the interview for a moment. Question. And but what led you to use the extremely unlikely level? Did you learn anything that made it less likely? Answer again, embarc speaking, we should not put too much focus on the wording. We were looking at different options. At some point, we were thinking, should we use a ranking with one being the most unlikely five the most likely? Or should we use colors? Or should we find another scale? We ended up with a five phrase scale extremely unlikely, unlikely possible, likely and very likely. It's more an illustration of where these hypotheses are to help us organize our planning a future studies question, but my question is whether you learned anything new in China, now that you've been there? Do you have more reason to say it's extremely unlikely than before? translation answer my damn question, dude. Answer. Again, embark Yes, we had long meetings with the staff of the wuan Institute of virology and three other laboratories and we came to the state phase. They talked about these claims openly, we discussed what did you do over the past year to dismiss this claim? What did you yourself develop in terms of argumentations? Did you do audits yourself? Did you look at your records Did you test your staff, and they explained how they worked and what kind of audit system they had. They had retrospectively tested serum from their staff, they tested samples from early 2019. And from 2020, there were a lot of discussions that we could not have had, if we had not traveled to Wuhan, we also did not have evidence provided by outsiders to support any of the claims out there that could potentially have tipped the balance. What we saw discussed gave us much more confidence in our assessment, the consensus was that this is an unlikely scenario. We also had difficulties designing future studies to look into laboratory claims within our joint group because if you want to explore such a hypothesis, further, you need a different mechanism. You need to do a formal audit. And that's far beyond what our team is mandated to do or has the tools or capabilities to do. So that was also a reason why we could not start moving forward in our next series of studies into that direction. But the fact that the hypothesis is listed or assessed as extremely unlikely, is not the same as if it had been listed or assessed as impossible. We're not closing the door.

**Bret** 1:08:40

We're not closing the door, because it's swollen and we can't get it to close.

**Heather** 1:08:45

Oh my god.

**Bret** 1:08:46

Yeah. I mean, it's it's really it's like it's

**Heather** 1:08:48

like a sorry, but like, we looked at a number of different schemes. And you know, probably wouldn't be upset with us if we just said it was purple, instead of a highly unlikely like, you know, we thought about using language and we thought about using colors and we thought about using like, just because we landed on this scheme doesn't really mean anything. And we thought about it does. You're talking about thought about

**Bret** 1:09:05

having a guy with a uniform stand there and say nothing to see here. folks go on home.

**Heather** 1:09:10

Don't look bad. Look, don't look at the man behind the curtain. Yeah, there's infinite numbers of versions of like, what are you doing? You're not compelling. This is not a compelling interview. Now

**Bret** 1:09:21

interestingly, let us compare this Hey, Zack, you want to put up the I sent you a paper. This is not a peer reviewed paper, but it takes the form of a manuscript, and it is by authors who actually have advanced A. So this is Latham and Wilson Wilson. And this paper is basically an analysis of how likely it is that China that there is a natural origin intermediate to be found, which was a large part of the discussion that we did last week and they attempt to quantify the chances and actually this analysis, although I'm going to argue that it is flawed, I think it is flawed in a way that the natural scientific process would cause their estimate to be refined. But the analysis centers on some very interesting and important pieces of evidence, one of them being phylogenetic and the other geographic, right. And the point is the point of the analysis is that if you look at the chances of patient zero showing up in Wu Han, and the chances that the Coronavirus that becomes a pandemic is a beta Coronavirus from this particular group that is to say from the same group, as generated SARS Cove one the initial SARS, that the chances they calculate the chance if you scroll down here, Zach, scroll down to near the end of the article.

**Bret** 1:11:01

Keep going slow down to two turns, scroll back up a little bit. Well, I can't quite find it, but they calculate the

**Bret** 1:11:22

they calculate the number if you combine the like, oh, there it is. One in 630 that it will be in Wuhan and one in 28, that it will be a close relative of the original SARS and they calculate the combined number at one in 17,640. Now I think their number is probably off by an order of magnitude. But you know, it is nonetheless an impressive degree. And you know, at some point, I wouldn't mind talking with the authors of this about how I would alter their methodology to make it more robust. But the point is the the likelihood calculation is so far away that they actually conclude if you can go back to it in the next paragraph.

**Bret** 1:12:18

Okay, scroll down just a little bit. Okay, here, there the last sentence of the next paragraph says a lab escape should at this point be the default hypothesis was which people who listened last week will remember was one of the arguments that we made that which is that effectively because there is substantial evidence for a laboratory leak. And because there is not evidence of a natural intermediate that in fact lab League has the status of the null hypothesis at this point. In other words, it is possible it came from nature, but that puts the burden on those who would argue that to find the intermediate and absent that intermediate, the one plausible intermediate that we have is the laboratory.

**Heather** 1:13:02

Yeah, I'm actually so I don't I'm not familiar with this paper. This is the first time I've seen it, but I'm liking what I see here. Actually, the first part of that paragraph you just read the last sentence from the criticism will doubtless be made that the geographic and the phylogenetic evidence described here are circumstantial, mere coincidences. But critiquing evidence is circumstantial, is based on a common logical misconception that circumstantial evidence represents a special category of evidence. As the philosopher David Hume first argued, all evidence of causation is composed of coincidences, all an observer can do is to add up the coincidence is totally surmise, at the threshold of reasonable doubt has been surpassed. conclusions are always provisional. But in the absence of evidence to the contrary, anyone open to persuasion at this point, to conclude the probability of 17,640 to one far exceeds that threshold? a lab escape should this point be the default hypothesis. Now I see there that they've alighted a key part of the scientific process in their description there. I like that. If you have the hypothesis before you find the coordinator, we have talked about this with regard to correlation and causation, right? Like correlation does not imply causation unless you predicted it in advance, right? And so they're they're sort of approached from from human centric as opposed to more like bacon, Francis Bacon centric, which is, you know, our sort of original approach. they converge, I think, right? And so they land as well, on this conclusion. This is what the default should be

**Bret** 1:14:25

and default hypothesis the so this makes so many of the right points because for one thing, people who've been with these live streams since the beginning will remember the very early period, as we were trying to sort out what we were learning about Coronavirus, and the field. All of the fields involved in this discussion had moved into a mode where because there wasn't time for normal peer review, you couldn't wait a year for your paper to go through that process. We were just working from the stuff on the archives right now. The stuff on the archives

**Heather** 1:14:56

is the preprint service archive was the name of One of the progressive preprint

**Bret** 1:15:01

servers which are not yet peer reviewed, basically, it's a place to lodge papers to take the right form, but haven't been through that process. But it made for a very vibrant discussion in which many more people had access to the tools, it was messy, there was lots of wrong stuff there. Right. So it didn't have the kind of quality control that comes from peer review. But the quality control that comes from peer review is anything but a hedge against bad information making into the literature, there's tons of bad

**Heather** 1:15:29

and, and increasingly, as we've talked about before, here, peer review, access these latter day fact checkers, where they're motivated to, you know, to a particular kind of research type of conclusion, people in particular that they want to have published, etc.

**Bret** 1:15:43

Right. Now, what I would point out is that this paper, which as far as I know, is not peer reviewed, it takes the form of a peer reviewed paper, but it's published in a source that doesn't peer review, I think it is, logically evaluatable. I have concerns about the way it was done. And one of the conclusions is interesting. So these people advanced a hypothesis earlier that the intermediate was the one of the miners in the the eunan mind from which samples were taken. And they have a, a model in which the lungs of that miner basically served as a serial passage experiment. I don't think this can be the case, but it is a viable,

**Heather** 1:16:27

one of the miners who died, or what

**Bret** 1:16:31

I actually don't think it matters, I don't think we know what we don't have is any evidence that those miners transmitted the virus to anybody. So if it you know, if it is a lab, so their their idea is it's a lab leak, and that the sample was transmitted to the lab from which it leaked, but the sample was enhanced in the lungs of these minors through a natural evolutionary process. I don't believe that this can be the case. Well, for a number of reasons. One, I believe that the selection a I don't believe that there's enough room for that selection to have taken place in a single individual. But there are

**Heather** 1:17:08

and this is part of why I asked you and one of the ones who as I understood it, I thought that there were only a handful of people who got it and they all died six three. Okay, so you know, this would this seems more plausible to me if it's the look from the logs of one of the miners who survived and therefore it may have had more, basically more generations in which to, in which to evolve within the lungs of that minor.

**Bret** 1:17:32

Yeah, I agree. Although if we're talking about SARS, COVID to, you know, then we're talking about something that the immune system does get wise to and you know, ultimately wins that battle. So anyway, we can talk about I agree that if you lived there was a longer period of time potentially, for that evolution take place, but I don't believe a single miners lungs are going to be enough. I remain to be convinced of whether that's true. But here's the other problem is that there are two factors. In the the amazing capacity of SARS COBie two at the point it shows up and hits the ground running in Wuhan. Right. It's very good at invading tissues, and it's very good at getting between individuals, and all of the selection in the minors lungs, would have been in favor of invading tissues, it would not be super well adapted,

**Heather** 1:18:24

as far as we know, didn't go between tissues either. Didn't go between individuals didn't go between tissues, that

**Bret** 1:18:30

would certainly be an interesting question. I don't think we know that that's true, because they died of what was called I don't think it was even called viral pneumonia was understood to be an ammonia, we now know it was a viral pneumonia. But it would be very interesting to know, you know what a full necropsy would would have revealed about what other tissues were affected? Yeah, there's a lot that could be settled if we had those samples, which I believe we just simply don't, and they might actually exist in somebody's freezer somewhere, which is another reason that we need to answer this, this question, right? But nonetheless, these authors say they do exactly the right thing. They lay out all of their work, right? That work can be evaluated, I believe that they are off by something like a factor of 10, which still leaves a very impressive you know, 1760 to one burden, which is way there or indication of direction, which is you know, I've only gone I've said I think it's 90% or above that's well above that. But in any case, the natural process can now unfold here, outside of those who would fetter the conversation, right? We can. Yeah, darn those Federer's.

**Heather** 1:19:46

I always liked how he played well,

**Bret** 1:19:47

I mean, he's gifted but but nonetheless, he's not a he's not a hero free speech. Sorry, Roger. That was uncalled for on my part. As far as I know, you might be The era of free speech and I'm just not not aware of it. But in any case, we can now have the discussion and say, Look, here's how I would modify your methods so that your approximation of the chances of this having happened by random would be more accurate. Might be I'm wrong, we'll find out, you know, might be they're wrong, they adjust their number, we could get a better number. But the point is, it's still a pretty impressive the analysis itself, you know, how you numero ties it? Is that a word? No, no? Okay, I propose numeric ties, that comes a word but

**Heather** 1:20:32

but okay, how do you? How

**Bret** 1:20:34

do you quantify it? It's an open question. But the analysis itself is, I believe, logically robust, and very persuasive. And it suggests the burden of proof therefore, you know, we don't see

**Heather** 1:20:49

any sign errors you think the size of the of the estimate is off,

**Bret** 1:20:55

I think the size of the estimate is off. But the point is, it's the estimate is so profound that even at a 10th of their strength, it's still overwhelming. And then I think the question about you know, they say there are four lab league hypotheses, it is very likely that they're their estimate on the strength of that likelihood is that it is one of these and their point is we have advanced one, it could be any of the four or another but it's likely to be in that quadrant and not a natural origin. And that is certainly an excellent place to have a high quality scientific discussion.

**Heather** 1:21:29

All right, well, given that it's two o'clock here already now we still need to talk about dung beetles. Maybe we should move on. Yep. Okay. Zachary Well, you're showing a video we can talk over it right because there's no sound really in the video or you can mute it I mean, there's sound of rustling

**Bret** 1:21:51

that could be interesting jungle noises I

**Heather** 1:21:53

yeah, I think there's not Yeah, so this video is one I just took with my iPhone at tip a teeny in the far in the far western Amazon in Ecuador. Like I said 13 months ago when you and I were there for two and a half weeks working on our book and exploring and just generally being being tropical biologists. And you know, you see this thing that is familiar to people who know nature documentaries of this beetle who has rolled up a nice perfectly spherical ball of poop and is backing it up and i think that's that's it I had a number of these by just sent Zach a 32nd video so dung beetles are almost worldwide. Interestingly, they you know, the scarabs like that one that are often really brilliantly colored, or, I don't know if they're pantropical. But they're certainly near tropical. They don't i don't think that really brightly colored dung beetles tend to get into the temperate zone so much. Like mangroves and sidewinders, which we discussed in Episode 66. They are not just widespread, but convergent. So this this habit of finding poop and rolling into balls and rolling it or funneling et or tunneling or whatever, for personal use, did not evolve just once and adaptively radiate out into into the world. But this was convergently arrived upon solution to the problem of how to get resources and also what are we going to do with all this poop that we found by a number of different lineages of beetles so that that alone is sort of interesting, right? Like I didn't, I hadn't thought too much about dung beetles. Although every time I did a study abroad program, there were a few students who wanted to do one of their one day one or two day field exercises on the ecology of dung beetles, which would allow them of course to drop trousers and poop in the rain forest and wait for the dung beetles to arrive. That's the easy way that's that's that's the easy way. And, and they are they really are ubiquitous enough and driven enough by the smell of fresh excrement that you can reliably get dung beetles to come to fresh poop in at least in the near tropics. And

**Bret** 1:24:06

in fact, I'll just point out there's an excellent book called tropical nature, it's right there. Tropical nature here, which has the proposal in it for this experiment. In other words, it proposes that if you're going to work in the tropics that you you do take a poop in the woods and then step back and watch what happens because things happen fast in tropical forests. Yeah,

**Heather** 1:24:37

right. Well, so this book, which is the subtitle of which is life and death in the rain forests of Central and South America, was always something I signed before we went on study abroad. And so you know, they, I think I think you would come upon this if you were trying to figure out what you might do for a day or two, long project and the rain forest and you've come to recognize that actually, monkeys are probably Because they move around all the time and you have to put them to sleep and then get up before they get up if you want any chance of finding them the next day for instance whereas if all you have to do is is Pope and wait for an easier project and but but you know this book is is extraordinary but science this week the reason that I want to say anything about dung beetles right now is not because I was thinking about them otherwise but science this week has this article it's not it's not a research article it's a news article titled humbled dung beetles may be ideal DNA detectors for animal surveys and so I'm not not gonna read anything from it that's that's that's really all all right there and the idea is that a lot of what some types of biologists are doing sort of you know, as an especially conservation biologists is trying to establish who's where like what species are in a particular area by doing these surveys and there's a lot of you know, you can do audio surveys and your listen and you can you know, most most you know, you can do you know, transects and you know, you could do camera traps and you know, lay cameras in fact at tip a teeny Diego mascara, who had been the, the director of tip a teeny and is now I think the Director of Research had one of the most extensive camera trap studies I've ever, ever seen and maybe has been done to date in, in a tropical field situation. And he caught Yeah, there's like five species of cats. And why what is it 10 or 10 or 12 species of monkeys, he wasn't mostly seeing the monkeys because these were down low. But, you know, just an incredible number of, you know, charismatic megafauna that otherwise weren't being seen that he was finding with these with these game cameras, camera traps. But really rare stuff is really hard to find. And we would like to know what what's out there. And one way to do it is being proposed is well, is these dung beetles often are specifically collecting mammalian dung, and the DNA of the mammals who shut out that dung remains viable as fragments of you know, identifiable fragments of DNA from that species for apparently 48 hours after the dung beetle takes it in. And so you have to sacrifice the beetle to get the DNA, but it is being proposed and has just begun to be.

**Bret** 1:27:33

So they're not talking about using the dung balls themselves to get the DNA.

**Heather** 1:27:37

No, they're talking about using the stomach contents of the beetles. Now why why not use the dung balls themselves? Yeah, I don't know. It's not even explored here.

**Bret** 1:27:46

Yeah, probably because they're gonna use light traps to get the beetles and they're not going to be able to finding the beetles is not going to be all that easy either. It's going to be very labor intensive, but putting up a UV light will

**Heather** 1:27:58

well no actually so you just landed on it. Basically just as I said, what my landed on just as you know, our students and my students who were interested in looking at dung beetle ecology, in part because you can get them to come to you. Yeah, they're not going to use light drops, they're going to you know, they're going to shoot in the woods. Really, they're

**Bret** 1:28:18

going to file that and they're great. Well,

**Heather** 1:28:21

you know, it's been it's at least implied in this little science news article.

**Bret** 1:28:26

Interesting. Oh, okay. Well, that's that's fascinating. So no doubt so

**Heather** 1:28:31

you're finding dung beetles with balls, his dung balls is somewhat easy to do and in at least in your tropical forest, and I've seen them in Madagascar too, but you know, I've never spent really any time in the other tropical forests of the world but you can reliably every single time attract dung beetles with fresh poop

**Bret** 1:28:53

Yeah, just yep that's true they'll find the not using light right okay well I would advise that use light traps or at least say that that's we're gonna they're gonna do in their grant application but the

**Heather** 1:29:05

but I mean I think in part the whole like the whole reason that this is useful is oh my god any day we want we can go and get dung beetles and and you know light traps you kill a lot of other insects you attract a lot of stuff you don't want Yeah, it's like and you don't i don't even know to what degree dung beetles particularly come to light traps

**Bret** 1:29:26

I'm trying to remember I've certainly been around enough light traps I believe they are actually relatively frequent.

**Heather** 1:29:33

But I haven't seen i don't i don't know that I've seen dung beetles have scarabs for some giant Yep, category.

**Bret** 1:29:39

Well, anyway, I don't know. To draw the circle a little closer here though. Kary mullis invents PCR no doubt the technique that they will use to amplify the little pieces of DNA from the dung beetles. And so anyway, that technique is now everywhere, including COVID tests.

**Heather** 1:29:56

Indeed, indeed. All right. I think we've reached the end. We have begun to show the picture that we'll use in the thumbnail at the end, but maybe we showed it early on. Yeah,

**Bret** 1:30:10

I think it's gonna end up being one of those nice pictures

**Heather** 1:30:13

or Yeah, or drunk with that power drunk without power. Yeah, that one. Yeah. All right. So we are going to take for those of you watching a 15 minute break and come back with a live q&a ask your questions in Super Chat now or in the next hour and we'll get to as many of them as we can. For those of you listening, we will be back at the same time next week and hopefully so we did not weren't able to pull it out the conversation that you had with someone who showed me needless until it comes out this last week because of our power outage. But hopefully, you've now got to banked Yeah, um, so at least one of those is going to come out hopefully between now and next Saturday. Please consider joining us at my Patreon for Dark Horse membership right now is the question asking period is open and not tomorrow, but next Sunday. We'll have that to our private q&a. One little blip of last month's private q&a is of is Brett talking about his first hatched child, the crocodile, which I think I say on air, I wouldn't do this to you if it was going out to YouTube and said you joined Brett on his Patreon. For conversations every month. We've got merchandise available at store dot Darkhorse podcast.org. And we should have some new stuff up soon hopefully. Email our moderator Darkhorse at mitre@gmail.com with logistical questions and boy there's probably other stuff but check them out. Yep.

**Bret** 1:31:47

That's That's it. We will I guess have the winner of the clubhouse invite. By the top of the next hour. Dr. Rola Gator will be doing the choosing and you can tell him whether you want your name announced as the winner or kept secret. All right. Thanks, everyone. We'll see it in 15 minutes. Get outside