Recall This Book 98

Horton Cosmic Zoom (EF, JP)

February, 2023

John Plotz:
From Brandeis University, welcome to *Recall this Book* where star anthropologist Elizabeth Ferry, Hello Elizabeth and me, not so star science fiction scholar John Plotz invite scholars and writers from different disciplines to make sense of contemporary issues, problems and events. So today we welcome Zack Horton, associate professor of literature and director of the vibrant media lab at University of Pittsburgh. He's also, hold on to your hat, a game designer, a filmmaker and a camera designer. So as much as I want to hear about that set of vocations, we did in fact invite him today to talk about his new book from University of Chicago Press, *The Cosmic Zoom Scale: Knowledge and Mediation*. Zack Hello! Welcome!

Zack Horton:
Thank you so much. Happy to be here.

John Plotz:
Well, we're so happy to have you. Okay, so Zach, this dizzying book begins with the bravura description of a movie that I completely loved as a kid. I think I saw it at the air and Space Museum, the powers of 10 by Charles and Ray aims. and that you might remember Elizabeth, you and I have talked about it before actually begins with a view of two people enjoying a picnic and then it zooms up in a way to show their surroundings all the way up into space. And then it zooms back in for a close up on the hand of the picnic are ending up as I remember it at least at the atomic level. So, Zach, your book uses the comic cosmic zoom as a starting point to develop a cross disciplinary theory of and this is your phrase scale as mediated difference. And there are reviewers who have loved the book have put their figure on a couple of key questions. The question of scale quote as a matter of shape as well as size or quality as much as quantity. And also they have praised it as a theoretical insight into how humans might have handled different, have handled differences in scale and might do so differently. So, so a normative dimension

as well as descriptive dimension and that both of us have tons of questions of scale in our own work that we've grappled with. So it's exciting to come to them you know, via your book and I have a whole aside here about naturalism and why I think naturalism is a problem of scale, but I'm not gonna ask that rather are usually our first step when we invite someone in is to invite them to tell us about their books, key claims or its key discoveries and then let the discussion flow from there. So, may I hand over to you

Zach Horton

Great sounds good. The biggest problems of the 20th first century, right, which I would say, our climate change, resource, scarcity, the transformation of public and private life by algorithmic processes and the rise of neo fascist populism, right? List those at least some of the largest challenges of the moving in the 21st century. They're all problems of scale, right? And I and the book argues that to solve any of these, let alone the sort of dimensions between them, we need a high level of scale literacy. And then one of the one of my key discoveries when researching this book is that in my opinion at least our scale literacy as a society is shockingly low. The reason we tend to think that larger scale means more abstract is because of course we're so scale bound, which is to say we were so bound to certain perceptual scales of the human that when we try to when we try to contemplate or represent some way other scales that diverge from the meso-scale of the human sensory. We tend to do that through the human sensory and we tend to have a hard time actually exiting our own scale. And so what we do is we schematically represent those other scales and then of course they actually do take on the characteristic of abstraction because we're mediating them in ways that that render them more abstract. But I think that this is more it's partly a technological limitation, but it's more so we have amazing technology for resolving other scales. It's more of a conceptual limitation right? That we're so used to thinking of the large scale for instance, as you know, something you might conceptually at least shot on graph paper. Right? You mark out the sort of large these abstract processes, but of course our meso-scale is equally process based and larger and smaller scales are equally detailed and concrete if we only if we only approach them that way.

John Plotz:

One thread that runs through your book and I haven't formulated in a couple of different ways, but I think because I'm an English professor, I'll put it in

terms of epistemology versus ontology, like the question of scale as the thing that we do, like we apply, you know, an X where one inch equals whatever is the one factor that's scale as an epistemological human operation versus scale as well, I guess absolutely the wrong word, but kind of encoded in the universe and maybe the way that size is a property. And I feel like you're not looking to solve that problem, you're trying to describe what it means, that both of those are germane paradigms for scale. So, can you say more about that?

Zack Horton:

Absolutely, yes, this is a this is actually really important, this is one of the fundamental arguments in the book and actually something I think is really important for having a robust understanding of what scale is. And I came to this through the, you know, through the years of research, I came to realize that in in most discourses you the this this concept of skills collapse in one direction or the other. We either believe that scale is purely a human construct and this tends to be the case in the humanities, for instance. We tend to think of scales of pure construct because obviously any scale, you know, is defined by rhetorical practices, right? Discursively defined. So we know that well, if you have a, let's say a domestic scale, we've defined that domestic scale, right? We've created this idea of whatever a household and certain relationships that fall within and right, we've defined what falls within and what falls without and thereby created a milieu boundaries familiar. So in some ways that seems obviously true and that leads many humanists to feel that scale itself is purely, you know, I mean it may or may not be useful as a concept, but it's certainly constructed by humans. On the other hand, in the in the natural sciences for instance, scale is not a construct. In fact scale has been scalar difference, which is to say that processes have different rules of behavior act differently, present themselves differently on to logically at different scales has been one of the fundamental advances in physics in the last 100to 200 years, basically. The quantum mechanical revolution was all about these discoveries like these discoveries that scale matters. and the old clockwork universe of Isaac Newton is wrong, fundamentally wrong. Like plant the, you know, the anecdotal like apple dropping from a tree and the planets moving in the, in the in space do don't act the same way. All scales do not have the same rules for physical behavior and in fact they have radically different rules and we know that in other domains like quantum mechanics, we it's what we know versus what we actually incorporated our perception

and experience is of course there's they're at odds, right? And so we still treat the world as if it's Newtonian, even though we know that it is. And so in some ways we have a lot to learn about scalar difference that we haven't yet, you know, assimilated into our knowledge perhaps. So this question you asked John between the epistemology versus ontology, you know, where you fall, disciplinary really tends to, tends to determine where you, how you answer that question. And I really felt strongly as I, as I look at both sides of this, that it's a mistake to collapse to either side because both have to be true.

John Plotz:

I like the point you make about sort of the I don't know the indexicaliity of science or the necessity of attending to sort of a reality of a world out there, but can I sort of flip the question around and ask about the historicity of the meso-scale as the normative scale by which we make sense of the universe. And I guess by that, I sort of mean in the era of the Anthropocene like that is in an era where we've seen human beings fucking everything up for every species I guess. The Anthropocene centrism of the last few 100 years sort of comes to the fore. That is like man is the measure of all things as a paradigm. One of the paradigms that we use to understand modernity. So I guess it's just a question for you whether you think historically about that meso-scale like that is does it seem just like innately human that humans would be the ground and the kind of zero unit for scaling or is it more specifically something that I don't know. I don't want to point the finger at Descartes or anybody in particular. But is it particular to the last few 100 years of enlightenment thinking that humans get that priority and scaling?

Zack Horton:

Okay, well I guess my answer would be that yeah, we absolutely can point the finger at Descartes and other enlightenment thinkers or at least making the problem worse. I won't say that that that's its origin. I mean certainly we carry around media with us right, innately biologically we have we have particular ocular properties in our in our eyes and optic nerves and we have certain senses and of course different species have different senses and their sense of scale is different accordingly. But you kind of have to start somewhere. And so I do think it's natural and there is a kind of innate need to start with some kind of base scale, right? Some kind of meso-scale for the perceiving apparatus, whether it's biological or technological. So I guess we can be we can be a little generous in that regard that you have to start somewhere if

you're going to perceive scale, but then there needs to be a medial process. and that medial process can take many different forms and you can and of course it can take many negative what I would think of as negative forms of mastery of domination etcetera, right? And humanity's been has a pretty poor track record of using its trans scalar techniques, not necessarily in generative ways, but I do think it's much worse, becomes much worse with European enlightenment thinking right? That with that tradition you do suddenly have a more explicit concept of, as you said, man, is the measure of all things right? And the kind of the project of imperialism, the project of a kind of domination of both the natural world and colonialism in relation to humans that's really enabled right by historically, by a certain understanding of other scales as a as there being a kind of hierarchy, right? That the human scale somehow exists at that in a central point or a hierarchy, there's also of course there's a there's a Christian tradition of this this this scale the ladder like in Latin scale a scale comes from scale which is the latter. And we have this idea of the chain of being. Which places humans in a particular place in relation to you know, God and celestial and then the demons, you know? And so it's older than the enlightenment, but the enlightenment really invigorates that that concept of the human ethics center. It's so interesting because I was also thinking when I was reading about timescales. And one that comes to mind is that one of the clock, the sort of geological time clock where humans like start at like 11:58 that seems to be doing the opposite in the sense that it's rendering human scale as miniscule. I mean I agree with that, but I would also say that, you know, there's it's like the skills, the sword of Damocles and it definitely it's like you you've got this idea that that the, you know, oh well human time frames are so short and compared to the history, the universe or human existence on earth is so small, especially in relation to the universe. And I think these are I mean these are generative, these are important discoveries, but they're not they're also not new discoveries. You have you know in in Cicero for instance, I talked about this a little bit in the book, the *Dream of Scorpio*. And this is a passage in the *Republic* from you know, 50 BCE somewhere around there which is all about this vision. It's a dream vision of floating off the earth and entering into the cosmos and realizing that every all of human activity is actually so minuscule in relation to the larger cosmos and larger time span. And in fact the Roman empire seemingly, you know, almost global kind of covering the known world seemingly so large and so important and so historic. You know, everything is actually totally insignificant when viewed from a different scalar perspective. Right?

Elizabeth Ferry

Okay, I see that. I think I might say that with the development of geology as a discipline, the sort of intensity of that point of view is definitely takes off. So in the same way in which you might say that, okay, there's this sort of meso-scale for a long time and there's a certain kind of bodily reality to that or something. But the enlightenment intensifies it or amplifies it or activates it. Maybe you could say is it if you wanted, but the I think you could say the same thing about, about the earth sciences and time or I guess I'm asking what you think.

Zack Horton:

Yeah, I completely agree geology in some ways is one of the central and scale animating knowledge disciplines of our time. Right? And has been actually for at least since the 19th century. And you know before that geology, these long time frames were you know, thought of as cyclical in a Tony in geology for instance, and you could have large scales but things didn't change ultimately. Right? And so I think there is an extra component that modern geology produces, which is a linearity, which is to say that that know things don't always return things don't always equal lies, right? And that's really important of course, to understanding the Anthropocene, which is which is really about an out of process that that exponentially scales, right? And you have to understand tipping points and the idea that that that the future won't look anything like the past. And I think that that is a very that is very modern concept. And I agree with you that a lot of that comes from geology.

John Plotz:

So this is a totally fascinating discussion, partly because I think we're talking about the like, immediate consequences of shifting paradigms, but also the kind of unintended ramifications consequences of them as well. So the capacity to visualize things differently Elizabeth an example you give of geology, but then the capacity also for science to act as a sort of technological tool of the human to have an impact that actually collapses scales rather than extending them, like rather than giving a vision of the sort of infinite extension of scale in either direction. The notion of natural resources is like basically how do we make millions of years of like organic life on earth into a reservoir for fossil capitalism as people sometimes call it? So I think that that sort of continuing in that spirit of doubleness I guess I have a question. How do we think about the era of scientific thinking in terms of putting the culture face to face with vast, distended scale when we compare it to like earlier theological

or philosophical texts that also ask you to entertain the problem of vast. So like I really loved your point Zack about Calvino being a great scalar storyteller. I totally agree. I teach cosmic comics for exactly that reason, but it made me think, well isn't the bible scalar storytelling as well, you know, it's not just consider *Leviathan*. It's like, you know, coming to grab, coming to grasp your own puny nous compared to these distended magnitudes of something else? And I guess in a way, so the question is that does that does that fit into your account of the scalar? Or would you say, oh no that's not scale. Like we needed science before we can think about things scalarly, what you're just talking what you're talking about something else instead?

Zack Horton:

Great, great question. I would emphasize the long history of scalar thinking. So I would I would agree with you and I don't think we need modern science to start talking about scale. I think modern science inflicts ontology a little differently. And that has really important resonances and really important implications for how we think about the cosmos and the cosmos has scaled and having scalar articulations or joints in certain ways, but it definitely does not herald the beginning of scalar thinking that that greatly predates it. And indeed, I would say, yeah, sure, the bible is a scalar is a scalar text most definitely. And it's making, you know, it's making arguments about not only the nature of reality and what the nature of the cosmos, but relational arguments about what, what, you know, prescriptive arguments about what our as humans, what our relationship to those other scales should be. Right? I mean, it's, you know, it's really, you were to diagram the sort of scales of the bible. You know, you have these different heavenly and hellish domains, right? And there's this and then there's the earthly domain and what's the scale of God. Right? I mean, that's actually kind of a open or ongoing question throughout the bible, right? Is God a similar to a human scale, right. Is God of being with emotions and that you interact with or is God the universe? All right. And so that's actually mean. And of course the different authors of the bible don't necessarily agree on the answer to that question. So it becomes a kind of interesting ongoing question not only in the bible but of course throughout the Middle Ages and, you know, theology, you know, theology throughout those throughout the year. So, it's a great question. I mean, we we've been grappling with these questions for a long time and I guess one thing we can say, hey, we have come up with different answers over time, in terms of the nature of different scales, but I would also, I would, you know,

then the next question or the meta question is have we also changed our notion of scale itself or we just characterizing particular scales in different ways. I'm not sure that that our concept of the scale has radically changed. I think that we've done more, we've done more work with scale, which is to say we've stabilized more scales, we put them into the greater conversations. And, I don't, it's not just a question of disciplinary knowledge, it's also a question of technology because technological advances have given us access to or we've given us the ability to resolve many more scales than we than we used to be able to do. And so there's there is a conceptual question of how we stabilize scales, but that often mapped onto, or there is a dialogue with the our means of technologically stabilizing certain scales. Then, you know, the invention of the microscope is so monumental in the history of scalar thinking because all of a sudden it's not the it invents the micro scale. We had conceptions of Homunculi and you know, and angels and all sorts of things that existed at that scale conceptually for us. But now we could actually resolve technologically new entities. And that's an example of a of a scale being stabilized culturally in order to then enable discovery encounters what I call trans scalar encounters. Right? And suddenly these little creatures appear and it blows our minds, it changes our conception of the cosmos because all these little things we didn't know existed now pop into existence. We discovered that they did.

John Plotz:

You remind me that there's a golden age story, I don't think it's by Arthur C Clarke, maybe it's by like Shockley or something in which they discover, you know, they create a better electron microscope that goes three orders of magnitude closer and they look at a pin and they see a whole bunch of angels dancing on the top of it!

Zack Horton:

Absolutely, yeah, I love that. I mean in some ways the subatomic level, you know, quirks, they're amazing entities. They are angelic like entities there as at least there as weird as angels. Right. I mean, works are almost inconceivable. And, you know, you mentioned the powers of 10 Amazing film, which actually anchors the kind of middle of my book. Right. I kind of work up to things that preceded that and then things that succeeded it. and it stands as this monumental influence on scalar thinking and in many ways, I sort of break it down and have many problems with it. But I too, when I was a I first

discovered that film when I was a kid and I was playing at a science museum. And it was mesmerizing and it's partly the mesmerization that I that I decided to sort of deconstructing the book. Right? And think about, well, wait a minute, what what's the sort of political argument, what's the sort of ideological argument the films making and why does it give us one sense aesthetically and actually a different sense, consent conceptually. Right. So that was one of my questions, but one which I can jump back to. But the in the making of that film, one of the things I discovered through archival research, you know, is that there were huge ideological battles going on between the filmmakers, you know, within the team. And that's one of the sort of fascinating things is you see scalar politics and scalar conceptions play out in the production of any explicitly scalar media, which is why cosmic zooms are so fascinating if you sort of dig down and tease them apart, that there's this sort of things that have to be collapsed in order to produce something like a smooth zoom. and in that case, there was a big argument about quarks. and some members of the team wanted to depict quirks and some members thought, well, quirks are weird and I don't really like quarks like do they really exist? And in the in the mid to late seventies, quirks were fairly new discovery. so maybe there was still a little bit of, you know, a place to try to claim they might not exist. so it's funny how those kind of politics play out, right? Some members of the team thought Adams were really the scale central, that's the most important scale in the universe, is the at the atomic, and so we should construct the film to demonstrate that. And other people thought, no, the human is still the most is the most important scale. So we should, we should construct the film to suit that, and then, you know, and then the question of cork sort of, you know, well, but isn't that the smallest scale we know of, shouldn't we depict that entity, but how do you depict a quark? Because quarks are so weird right? They're not really particles and they're sort of so how do you how do you even conceptualize and understand a quark? But it doesn't it's only one third of it anyway, so in the end the film's a little bit of a muddle and if you really, you know, you really look at it closely, you realize, well there's parts of this that are really pulling in the direction of atoms. There's other parts that visually don't map onto the narration for instance and are really visually the human is the center of the film, even though narratively the atom is the center and quarks get this kind of weird half treatment. So you know, it's not neutral. This question of which of these scales is important or salient to us. Right? It's actually political. All scalar media is political. Just like all politics is scalar. In the 50s and the early 1950s, Kiss took this idea. He wanted to explore this concept of scale in the cosmos and understanding the relationship between

human perception and scale and sociocracy this political idea of this consensus based in some ways based on that kind of Quaker model. Right? The idea of sociocracy was that that yes, you could have a consensus, a representative consensus based government. So it would be representative different. You'd have different governing bodies that would elect through consensus a representative and those representatives would come together. So it's not it's not a direct consensus rights, representative consensus, but you would then have a those bodies would come together with representatives and they would have to reach a consensus to make any decision and when they did it then they would send representatives to larger and then what's interesting about this particular political structure is that it's meant to scale, it could scale, it can scale infinitely right? It's you and it and it relates both up and down, it goes up and down the scalar ladder both directions so that you have very, very local politics, very local political entities. There are consensus spaces, but then you have these regional ones and then you have these, you know, larger regions and you and it actually is meant to culminate in a global council. that then is answerable to all the lower levels, Right? So it's really kind of remarkable and it's thinking about some and this of course comes out of World War Two and it comes out of a desire to prevent this kind of global conflict that just transpired, right? what yes, realized that for this to work, you can't just create this structure that for this political structure to work. You have to have a cultural structure that is highly scale literate, right? You actually have to have people who know how to think at different scales, who can conceptualize the entire world at the same time, that they can conceptualize the dynamics of the of the direct local. So the politics requires a culture that doesn't yet exist and that's what towards the end of Beatrice and cases lives. They started to realize that the project should shift and that instead of politics with a capital P they there's a groundwork needed to be laid for this. And they started to wonder what kind of cultural groundwork could be laid for a scale, aware of politics. And as they thought about it, case in particular had this idea of trying to think of forms of media that would help people understand that would articulate scales together at the same time that it represented scalar difference at the different levels. And this is a tricky thing and this is of course what I this is what I advocate for as well in the book right, is how can we create cultural forms and political forms? and aesthetic forms that do both that that articulate scales together in relation to each other without collapsing the difference between the scales so that we actually approach scale through difference rather than through homogeneity. And yet don't just focus on the local right to go back to something you asked earlier

Elizabeth right that that that we need to we need to be able to think the global we need to be able to think larger than the globe, we need to think the cosmic but we also need to be able to think the microscopic. And the problem has always been that when we switch scales we find a way to represent a different scale, we end up collapsing the other scales into that or the new scale we collapse into the dynamics of a previous base scale. And this is so widespread, we just do this constantly, almost in most of our, you know, train scaler encounters. So how can we, the problem I I'm trying to articulate is very similar to that one that the book particulate in the mid-fifties. And his answer was to create this book at least as a starting point, as a starting point. Created this book called cosmic view. And each page shows a different, you know, image of centered on the same thing, which is the school, the courtyard of the school, the bird plants and then it zooms out and then zooms in, but zoom is not quite the right word because what it does is as you turn each page, it jumps. and the subtitle of the book is 40 jumps blanking on the full subtitle. Anyway, it's about jumps and not zooms, which is interesting. and important because it's articulating the difference and it only takes in the text, it takes pains to articulate the difference between each one of these scales at the same time that they are related right, and things that you can't see it one scale but are present on some level, then become resolved at a later scale or things that were resolved at an earlier scale disappear or their larger context is revealed at later scales. The sort of interplay is very sophisticated and the reason is that this isn't just an aesthetic experiment. There's an entire sort of politics of the future at stake here. Right? So this book is really important and very carefully crafted over many years. And then that does indeed become an animated film called *Cosmic View* in the sixties, in the late 60s, this book gets picked up by a number of people and suddenly becomes rediscovered and seems really important. And what's one of the groups is the Ray and Charles Eames who create this film called Rough Sketch, which is which is Nominally an adaptation of that book, but becomes this huge, contentious endeavor and they collapse a lot of the differences of the book and then that gets refined into the famous film by them in the 70s, powers of 10.

John Plotz:

This is a great moment to return to a *Recall this Book* tradition, which is we each name a book or some other object potentially that might pertain to the conversation we had today. So Zach, do you have you have a recall a book for us?

Zack Horton:

Sure. I mean, first I would recommend to anyone *Cosmic View*, the book we just talked about. So it's kind of a cheat. So I'll give you another one as well. But that book, *Cosmic View* like *Kiss Boca* is out of print., but it was popular at various times in history and it's readily available and so I can't I think it's such an amazing book, such an amazing project that gets turned into some other you know, it gets remediated later in different ways that I think that I find less generative even though they've been highly influential. So going back to that book I think is completely worthwhile is *Endeavor*, Stewart brand reviewed it in the you know, I think the 1969 whole earth catalog and called it you know a mind blow and suggested that this is the sort of one of the essential books that one has to read to sort of understand the cosmos that I think was part of part, you know, part of it's in the rediscovery process.

John Plotz:

But I just say I'm really glad you mentioned Stewart Brand because I was trying to slip in a reference to Vince Brown's new film about the Blue Marble photograph in which I discovered for the first time, maybe other people knew this. That Stewart brand is more or less responsible for convincing Nasa to set up the situation in which taking that you know blue marble photograph of earth seen from space seems like the logical way to bring awareness of the earth.

Zack Horton:

As you know this whole campaign in 1965 and with buttons that he would pass out employees of NASA, why haven't we seen a picture of the whole earth yet? and write that actually pushed Nasa to be thinking lesson, you know, to think to do something other than just science based, right? Instead of just the scientific questions that it got them to think a little bit culturally about how significant, you know, representation at those skills might be. And of course Brand was right. But so, so anyway, the other Recallable book, a far more obscure one, even more obscure, I should say, than cosmic view is I'll go with *Micromegas*, which is a novella by Voltaire. Right? So it's from the mid 18th century. I think I only briefly discussed it in the book and maybe I'm even confusing and I discussed it in some other article that isn't in the book, but micro mega is one of these kind of proto-science fiction stories. It's about two enormous beings. There are, you know, hundreds of thousands of miles large

from another planet. And they're going on a kind of tour through the, through the universe. And at some point they end up on earth visiting earth and they're so large that when they walk across the earth and they only get like knee deep into the oceans, you know, that's how large they are. And it's a really hilarious, and fun book because it's about the encounter of the Earth from this radically different perspective, which is exactly what scalar translator thinking should be and it's amazing actually that we get this in this, in the era in which the centrality of the human is being shored up by so many other thinkers and so, you know, Voltaire uses this to skewer human pretensions of being, you know, central or vastly important in the grand scheme of things. And these two big creatures at first think the earth is devoid of life, there's just no life on this planet. They don't see they can't resolve anything. And this fundamental aspect of resolution that I talked about so much in the book is really in this, in this story and finally they think they see a little speck of something and they look at it really closely and it's a whale, it's like, you know, the largest species on the planet. And they see it as this tiny little speck and then they get out and they created like a makeshift magnifying glass and finally they see a boat containing little specks that are humans and they can't communicate at first they have to create these kind of technological apparatuses to somehow translate sound between different scales. And they finally find a way late in the book to communicate with these little humans, which they think can't possibly be intelligent because they're too small to be intelligent, right? But it turns out they find that humans do have some, you know, at least rudimentary intelligence. And they converse and the humans explain their loftiest philosophies to these creatures and the creatures, you know, laugh, laugh at them, you know, And oh, so the cosmos was created for humans. And that's so funny that they like upset the whole earth by laughing so hard.

John Plotz:

So Zack you've made me reformulate. I was actually going to recommend Cixin Liu's *Three Body Problem* because he talks about the problem of scale at the end as the problem that defines science fiction. But actually *Micromegas* really makes me think of this Mark Twain piece which was unpublished in his lifetime called *3000 Years Among the Microbes*. So you're nodding your head. So you probably know it, but it's just I think the subtitle is the anecdote of a microbe found in the ear of the tramp Lewitsky. And it's, you know, it but it's, you know, it's just a sort of it's a bit of a squib. I mean it's not, it's probably

shorter than *Micromegas* but it's but it the notion of it is that no matter what scale your society maybe, and this is a microbe sized scale. It has this same set of idiotic wars and problems with monarchy, problems with the distribution of power if monarchy is overthrown. And it really fits into the idea that I floated early but never really got to. Which is that Naturalism is fascinated with the problem of scale because the idea is here comes the new boss, same as the old boss. Like whatever size your operating at, there's a per durable logic of the universe that is going to be the same regardless. And I really appreciate Zack, one thing I really like about your book is challenging that notion of scalability, Which I think for naturalism becomes a kind of operative logic that you can show the sort of ironclad law of how every narrative will unfold, whether it be a microbe narrative or human narrative. But the Twain version of that, the 3000 years among the microbes is I don't know. It's funny naturalism. People don't believe that there's such a thing as funny naturalism, but that, that that's actually it's the, it's the comic iteration of wherever you go, it's going to be the same damn corner in pork. That's what Twain calls it. All right. fantastic. Well with that we should say Zack, this has been a real pleasure. Thank you so much for taking the time to beam in.

Zack Horton:

Thank you. This is, this has been a great conversation.

John Plotz:

Yeah, totally. And if you enjoyed this conversation, dear listeners, we encourage you to check out the *Recall this Book* archives at our website. Thank you all for listening and hope to talk with you again soon *Recall this Book* was founded by Elizabeth Ferry and me, John Plotz. It is sponsored by BRANDEIS and the Mandel Humanity Center. Sound editing us by Naomi Cohen website design and social media by Miranda Peery of the English department. We're eager to hear your comments, criticisms and thoughts. If you like what you hear, please subscribe, rate and review us on Apple podcast or wherever you get your podcasts from all of us here at R.T.B. Thanks for listening.