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MBS ([00:00](#)):

Our inability to think long term is encapsulated in a system we barely notice. It's in the way that we write the year 2023. Implicit in that number is that when we come to 9,999, I'm not sure how you'd say that. 9999, there's nowhere left to go. It's the end of time. We're done. We've programmed into our life that we can't go beyond. We can't imagine beyond 8,000 or so years into the future. 8,000 years, that's nothing. That's the tiniest of blips, definitely for a geological age, but even just for a species. I mean, tortoises have been around, can you guess? For 200 million years. Platypus one of my favorite Australian creatures. They've been around for 110 million years. What is 8,000 years in all of that? I'm a member of an organization called The Long Now and as well as building a clock in the US desert, which is designed to keep time non-mechanically for 10,000 years.



[\(01:14\)](#):

They also write the date with an extra digit. So in long now time, we are in O2023. Again, I'm not totally sure how to say that. Maybe that's why it hasn't really caught on, but I love the idea we're in O2023. They've expanded our now from a 10,000-year span of which we're already used up 2000 to one. That is a hundred thousand years. That act feels like metaphorically, at least a moment of me lifting my eyes to the horizon to remember the journey ahead. I get to stop staring a few feet ahead of me, eyes fixed to the path. I mean, there's plenty to think about this day, this week, this month, but when I look to the horizon, I remember there's a bigger game afoot.

[\(02:08\)](#):

Welcome to Two Pages with MBS, the podcast with brilliant people. Read the best two pages from a favorite book, A book that has moved them, a book that has shaped them. Peter Brandon is a Boston Celtics fan. That's fine. I like the Celtics as well. He's also a placental mammal. Now to explain that unusual intro in part, at least Peter is an author and a science journalist who contributes to the Atlantic, the New York Times, the Washington Post, and others as well. Now, Peter has always loved science, but it was almost a road not taken.

Peter [\(02:43\)](#):

I went to college and I was really interested in science, but I probably shouldn't share this story, but my brother had gone to the same college before me and I always thought he had a better analytical mind than I did, and he got something like an F in organic chemistry. So that scared me off, and instead I took the easy way out and was an English major because I figured I like reading literature.

MBS [\(03:02\)](#):

Now as someone who studied literature myself, this was clearly the right decision, but Peter was wooed back to science. I guess when you're fascinated with dinosaurs and you love exploring nature and you love playing in the ocean,



well that is competition versus Shakespeare and James Joyce and Tony Morrison. However, he may have gone to science, but the influence of literature continues not just because he became a journalist, although I do believe that to become a good writer, you have to be a good reader. But really you see it in his understanding of stories and of time.

Peter ([03:39](#)):

Climate science is often presented as if it's just this thing that happens on computer models and it's all in the future. And I learned that there is this sort of half the story was how the earth's responded in its past to climate change. So that really got me, I went down that wormhole 10 years ago and I haven't come out of it.

MBS ([03:54](#)):

I discovered Peter through his book, the Ends of the World, which is about the five biggest mass extinctions on our planet. Now, before we hit record, you said a phrase that kind of summed the book up and grabbed my attention on an old enough planet, everything has happened before.

Peter ([04:14](#)):

I spent a couple years hanging out with paleontologists who were sort of detectives on the crime scenes of the worst things that had ever happened, and they're trying to put the pieces together of what went wrong in these apocalypses that happened tens of millions of years ago. And the punchline sort of was that if some of the same levers were pulling today were pulled in these old events only instead of power plants and tailpipes, the CO2 was coming out of these once in a hundred million year volcanic events.

MBS ([04:40](#)):

In weaving together the story of how these events happened with the science of why they happened. There's a way Peter has become mission driven in his



work. You understand the past, you tell stories of the past so you can preserve the future.

Peter ([04:58](#)):

I'd always seen these salt ponds near the oceans is just very, very beautiful natural habitats and learning that in the last half century, 90% of the yield grass has disappeared and from pollution and stuff. This is very gloomy stuff, but yeah, unless you are aware of what you're looking at, you can go around the world sort of blind to what's been lost. And so yeah, part of my, I guess, project is to sort of illuminate to people this is what we've already done. But I would say in a more optimistic realm, the book is kind of catastrophic and apocalyptic, but it also demonstrates that this is maybe the most interesting or exciting time to be alive because we still have it. We're not as bad as the asteroid that wiped out the dinosaurs, yet we still have time to rate the ship, and it all depends on how we act sort of in the next few decades could have this long geological legacy.

MBS ([06:00](#)):

How do you strike the balance if indeed this is even the right language between optimism and pessimism? You've used both of those words so far in this conversation and I'm wondering how you walk in the world with both of those teams.

Peter ([06:16](#)):

Yeah, well, I think something of a coping mechanism is I've heard people say that my book is pretty funny, which I think was no, there is a lot of gallows humor in it, which is kind of, maybe that's just me dealing with the, I don't know, cognitive dissonance or something. But I don't know. I think I'm maybe to a fault good at compartmentalizing sort of just interest in the science with what it actually means.



(06:41):

I'm interested in climate and earth science more from a scientific perspective that we are running this incredibly unprecedented chemistry experiment on the planet, and there's still a lot of uncertainty how it's going to end up. And also, I mean the geological stuff, I think it sort of scratches, you learn about these planets that are so different than our own that it almost, for me scratches the same it as science fiction. And I was always into science fiction and learning that the rock under your foot was once to the bottom of the ocean and was patrolled by crazy sea monsters. Yeah, so I think that was another reason why I get really interested in that particular side of the story too.

MBS (07:20):

Well, I had the same sense of, this is extraordinary. Whilst reading your book, I mean just before we started recording, I was looking at the picture again of the Dak and Traps and just how there was enough volcanic activity to cover the entire United States to what, the depth of 600 meters or something ridiculous.

Peter (07:38):

600 feet. And there's another volcanic event I talk about in the book, it's inside, the remnants of it today are in Siberia. They're these vast plateaus of basalt and it was all erupted out of the ground around 252 million years ago, caused the worst mass extinction in earth history, but it erupted enough lava to cover the lower 48 United States, a kilometer deep, that one. So yeah, I mean these things are-

MBS (08:04):

So there's just a lot of lava going on there.

Peter (08:07):

For it, right? Yeah.



MBS ([08:09](#)):

Hey, what book did you choose to read for us?

Peter ([08:12](#)):

So I chose Teaching a Stone to Talk by Annie Dillard.

MBS ([08:17](#)):

I haven't heard of this book. How did it come into your life?

Peter ([08:22](#)):

I had been recommended, she wrote a book called Pilgrim at Tinker Creek, which won the Pulitzer Prize. I remember the seventies at some point, and it had been recommended to me a bunch. And one time I was sitting in a bookstore, I think I was waiting for a train or something and I had an hour to kill and a few people had recommended it to me and I saw it on the shelf and I just pulled it off the shelf and I started reading it and I was just totally blown away by her language and her approach to writing. She's not a science writer and I wouldn't even really call her a, I guess she's in some way, she's a nature writer, but she just writes in this ecstatic style. Yeah, I read so much sort of dull academic prose that sometimes I worry that sort of my ability to write or think about things and capture that original sort of flame of curiosity that I have about the subject can sort of be dulled when you get too in the weeds and read and I return, you

MBS ([09:17](#)):

Don't want to be covered by a kilometer of scientific academic bassell prose, which is a heavy load.

Peter ([09:25](#)):

So sometimes I will return to her writing sort of to, I love that because she's just on fire with cosmic awe and everything she writes, and so this is a book of



essays and they're all good. There's one at the beginning about seeing a solar eclipse, which is just one of my favorite pieces of writing ever. But I chose a different section because it talks about geology and rocks and stuff, and it is more kind of overlaps with the things that my writing covers for the most part.

MBS ([09:54](#)):

That's brilliant. It's like great setup.

Peter ([09:56](#)):

Yeah, so she's talking about how species that get separated by geography or animals that get separated by geography can become new species. This is like a well-known phenomenon in evolutionary biology, and she's on the Galapagos Islands when she writes this. So should I just start right now?

MBS ([10:18](#)):

I think you should plunge on in. All right. It's a better place just out on the Galapagos Islands.

Peter ([10:22](#)):

And you can tell-

MBS ([10:23](#)):

A blue footed booby.

Peter ([10:25](#)):

Yeah. But again, her writing is very strange and it's not just straightforward prose. Sometimes it's, it almost reads like poetry, but it's written on the page in paragraph, so it's pretty interesting.

MBS ([10:34](#)):

Yeah. Fantastic.



Peter ([10:43](#)):

Geography is life's limiting factor. Speciation, life itself is ultimately a matter of warm and cool currents, rich and bare soils, deserts and forests, fresh and salt waters, delta and jungles and plains species arise in isolation. A plaster cast is as intricate as its mold. Life is a gloss on geography, and if you dig your fists into the earth and crumble geography, you strike geology. Climate is the wind of the mineral Earth's Ron Jeweler tilt and orbit modified by local geological conditions. The Pacific Ocean, the Negev desert, and the rainforest in Brazil are all local geological conditions. So were the slow cart pools and splashing trout riffs of any backyard creek. It is all, God help us, a matter of rocks, the rocks shape life like hands around swelling dough in Virginia, the salamanders vary from mountain ridge to mountain ridge. So do the fiddle tunes the old men play.

([11:34](#)):

All this is because it is hard to move from mountain to mountain. These are not merely anomalous details. This is what life is all about. Salamanders, fiddle tunes you and me and things. The split and burr of it all the fizz into particulars, no mountains and one salamander, one fiddle tune would be a lesser world. No continents, no fiddlers. The earth without form is void. The mountains are times machines in effect. They roll out protoplasm like printers rollers, pressing out news. Well, life is already part of landscape, a limiting factor in space. Life too shapes life, geology's, rocks and climate have already become Brazil's rainforest, yielding shocking bright birds to say that all life is an interconnected membrane, a weft of linkages like chain mail is truism. But in this case too, the Galapagos Islands afford a clear picture. On Santa Cruz Island. For instance, the Saddleback Carapaces of tortoises enable them to stretch high and reach the succulent pads of prickly pear cactus.

([12:28](#)):

But the prickly pear cactus on that island and on other tortoise islands have evolved the tree-like habit. Those lower pads get harder to come by. Without



limiting factors, the two populations could stretch right into the stratosphere. Sava, it goes on everywhere, tit-for-tat action and reaction triggers and inhibitors ascending in a spiral like spitting butterflies. Within life, we are pushing each other around how many animal forms have evolved just so because there are, for instance, trees, we pass nitrogen around and vital gases, we feed a nest, plucking this and that, and planting seeds, the protoplasm responds, nudged in nudging, bearing the news and the rocks themselves shall be moved.

[\(13:04\)](#):

The rocks themselves are not pure necessity given vast, complex molds around which the rest of us swirl. They heat to their own necessities, to stirrings and pricking from within and without. The mountains are no more fixed than the stars. Granite, for example, contains much oxygen and is relatively light. It floats when granite forms under the Earth's crust. Great chunks of it bob up, I read somewhere, like dumplings. The continents themselves are beautiful pea green boats, the Galapagos Archipelago as a whole is surfing toward Ecuador. South America is sliding towards the Galapagos. North America two is sailing westward. We're on floating islands, shaky ground. So the rocks shape life, and then life shapes life and the rocks are moving. The completed picture needs one more element. Life shapes the rocks.

[\(13:52\)](#):

I figured I'd stop there. She goes into how life actually does change the composition and form of rocks, and so.

MBS [\(14:00\)](#):

She is such a great writer. Holy cow.

Peter [\(14:02\)](#):

Yeah. Occasionally I'll do very pale impressions of her when I'm writing, but I, she's just, she's incredible.



MBS ([14:10](#)):

As a writer as well as a reader, there are people who you read and you go, I wonder if one day I could write a sentence or two like that? Because oh my goodness, that's fantastic. What is it about that that kind of gets you going because that's magical.

Peter ([14:27](#)):

I think it's that she put into words something that I've had trouble putting into words, which is that there's geology and there's life and there's the atmosphere in the oceans, but that it's all part of sort of a contiguous whole, and they all are interacting with each other and forming each other. And it is just this, I don't know. What I write about is how geological things have affected life and how life has driven geology, and she just puts it into a poetry that I have not been able to in my own writing and ties the threads together for me that are really interesting. Even the part about how on different sides of the mountains in the Appalachia there, there's different species of salamander. I'm actually hoping to write a story soon where there's people that go out and study how tectonics drive speciation and things in the American Southeast with different fishes live on different sides of the mountains and things.

MBS ([15:27](#)):

You need to line each different section with a different fiddle song as well to kind of pay homage to her around that.

Peter ([15:39](#)):

Yeah. Well, that's another thing. I love that she draws sort of human story into it too, because especially in stuff I've been working on recently, I'm really trying to bring down the walls between human history and natural history and show that we're sort of part of this, the same thing. And so she does a good job of that there.



MBS ([16:02](#)):

Peter, how do you stay connected to your sense of, or an adventure as part of I, the work you do feels like it has access to the world, and every job there's a way that it kind of gets shut down because of the details and the technicalities. I'm wondering how you keep reconnecting to the thing that brought you to this work in the first place.

Peter ([16:28](#)):

Well, it's reading stuff like that, but also getting out in nature, I suppose. I'm in Colorado now, and it's very difficult not to be overwhelmed with, oh, if you drive a half an hour in any direction outside of Boulder, you'll be in some stark landscape that sort of forces you to be quiet and think about it and recognize that it's not all about you.

MBS ([16:58](#)):

Yeah.

Peter ([16:58](#)):

I guess that the natural world sort of carries on its rhythms. So I don't know. It's something that I feel like I'm diligent about trying to stay. I think my writing is at its best when I'm kind of connecting with that feeling. So it's something that even in a professional sense, it's important for me to cultivate. So I try to, I'm not... Yeah.

MBS ([17:23](#)):

Yeah, I'm curious because I try and do the same myself, and I'm like, I don't always succeed as, sometimes I just get trapped. I look at my inbox and I'm like, you know, there's some interesting stuff in there, but there's a lot of stuff that's less interesting than you might think.



Peter ([17:40](#)):

Yeah, no, I've been that way in the last few weeks. I've been in this beautiful, natural environment and mostly just looking at my computer the whole time, and I'm starting to get real antsy about getting out again.

MBS ([17:53](#)):

One of the things that really struck me about your book, the Ends of the World, was just, again, a reminder of how poor I am at understanding time and how I remember Bill Bryson and his wonderful book, A Short History of Nearly Everything as a way of understanding geological time. It's like stretch your arms out and if that's the span of time the earth has been around humanity is what's a fingernail clipping if that. So I just wonder if you think there's any point in, and this is a weird question, so if it, there may not be an answer to this, Peter, but how do you sit with the vastness of time and is it even worth it to have a meaningful active life? Because our lives are so, because we're mayflower, I mean, we're not even mayflowers in terms of the geological age of the world.

Peter ([19:04](#)):

It's a hard question to answer, and I don't have a good radio made answer, but I think it's just a category error or something when we start asking those questions or when you start thinking about how the universe going to end someday. So what does it matter in your own? Yeah, what does your own life matter? We were evolved to live a few decades and care about the people around us and try to have as rich and I don't know, meaningful life as we can. And that's really our task. And it's awe inspiring that we're part of this bigger story, but I think there's a way to think about it that does not inspire nihilism. But something more humility that there's been a lot of ages of life and a lot of life forms, and they've all had their chance on this planet, and what a incredible gift it is that we do have these few decades on this kind of miraculous place. So yeah.



MBS ([20:00](#)):

Yes.

Peter ([20:00](#)):

If anything, it's worth celebrating.

MBS ([20:03](#)):

I mean, honestly, as much as I read your book and I'm like, oh my goodness, it's just so precarious. It's all so, life is so precarious. It's just the stuff happens and then suddenly the ocean loses its oxygen. The volcanoes go on for several million years and asteroid happens, but it's also extraordinary that life somehow keeps going. Okay, I'll give it another shot. Let's do a reboot and start again.

Peter ([20:27](#)):

Yeah, I've said that I could just have easily pitched my book as not about the mass extinctions, but about the huge radiations afterwards, which are almost as, I mean, they're just as impressive that within a few million years, the world is totally populated with a brand new resplendent of characters. So I mean, that is just as inspiring as the catastrophes are depressing, I guess.

MBS ([20:56](#)):

Where do you find your ideas for your next stories? The next things you write about mean, what pulls you forward?

Peter ([21:05](#)):

Well, the research process for writing the book was going to all these conferences and going on all these field trips with all these scientists and just through that. And I did a fellowship at University of Colorado as well where I was able to audit a bunch of classes and just sort of follow my curiosity, but just you accumulate over years of just going out there and speaking with people in the field and going on trips, sort of all these side story ideas and things. For the



first book, I ended up sending them something like 30,000 pages more than they wanted, and they made me cut it. And it was actually a good thing because I could tell that a lot of it was kind of just interesting digressions that I didn't have the heart to cut, but I ended up being able to use those as other stories.

MBS ([21:57](#)):

Write one book, get 10 stories for free.

Peter ([22:00](#)):

Absolutely. Yeah. And there are these programs for journalists where they, fellowships where they introduce you to scientists, and I've had experiences where I spend one week learning from scientists and I'll have story ideas for the next year or so.

MBS ([22:15](#)):

What do you hope we as your audience understand or understand better? What do you want us to get that we don't yet get?

Peter ([22:26](#)):

I think you kind of touched on it just now, which is the precarity. I think we kind of take this planet for granted, and we take the conditions that are salutary for life as a given, and studying earth history shows you just what a miracle this place is. I mean, studying astronomy does that, too. Every new exoplanet they find, they say, "Oh," and then they do run a few more. They analyze it-

MBS ([23:00](#)):

But not at Earth-like.

Peter ([23:02](#)):

Yeah, right. Yeah. Oh, it has no atmosphere and it's bombarded by solar flares every day. And at this place, there's a recent story where William Shatner got a



chance to go up to space, and he came back somewhat depressed because he said something like, there's nothing up there and the earth is it, basically. And as a kid, I was obsessed with space, like most kids are on Star Wars and finding life on other planets, and the more I study earth, the more I have come to realize just what an incredible cosmic luck we've had and how precious this place is. So I think that is something that I try to convey to people that they might not understand, and that I'm writing a second book.

[\(23:54\)](#):

It's similar in scope and subject matter of the first, but it is really how we hear about carbon dioxide in the news as this random industrial byproduct that just happens to come out of smokestacks. And the book I'm working on now is really about how it's kind of fundamental to how the planet works, is the behavior of carbon dioxide on this planet. It's movement through the rocks and the oceans, the atmosphere, and through life. It's what makes earth, earth. That's why you don't really want to mess with it too much, is that it's behavior on this planet is the thing that makes the earth, the earth. That's another thing.

MBS [\(24:34\)](#):

So if you add several parts per million to it, there's a chance that earth stops being the earth that we know?

Peter [\(24:44\)](#):

I mean, we could push ourselves into a climate state. It hasn't been in millions of years. But yeah, I mean it, CO₂ is miraculous. It keeps the planet warm. If you have a little bit enough of it's such a strange amount. It's only 300 parts per million, which is such a little amount, but it's not zero. If it was zero, we might be in a situation where the oceans are covered in ice and there wouldn't be any life on it. And if you go up only a few hundred parts per million, so not that much at all. The last time that was the case, there were crocodiles at the Arctic circle. So we have this really narrow kind of aperture that we have navigating for a few



thousand years that has allowed all of agriculture and civilization to spread up, and we're potentially pushing ourselves into this state that we haven't been in a millions of years.

MBS ([25:40](#)):

There are so many things like that I barely even know about, but it reminds me of the trace minerals that we have in our own body. It's a tiny, tiny bit of, I'm not even sure, you probably know better than me, but-

Peter ([25:57](#)):

Yeah. Manganese and stuff.

MBS ([26:02](#)):

Magnesium and you're like, nobody'll be quite clear why you got 0.0003% of your body is magnesium, but don't have it and you don't work.

Peter ([26:10](#)):

Yeah. Yeah. Well, there's some interesting ideas about that, especially with the really weird parts of the periodic table that we still require in sort of the enzymatic centers of really important fundamental parts of our cell that might be a legacy of the origin of life, which some people argue started at the bottom of the ocean where there was this heavy metal rich stuff that life figured out a way how to metabolize and come into being. So it might be this legacy of 4 billion years ago at the bottom of the ocean.

MBS ([26:48](#)):

What else? I mean, I love that you're writing about carbon dioxide and how it is just this extraordinary tiny bit in the atmosphere, but it makes all the difference, a tiny nudge one way or the other way, and life doesn't work. What else have you discovered in your time where you're like, what's the right word here? This is a digression. I remember real reading Bill Bryson's book, which I really love, and



going, look, here's the thing about tectonic plates. Not only they kind of cool that we have that, also her work on green things skipping across the ocean, and it allows you to have different salamanders and different valleys because of the way tectonic plates work.

[\(27:37\)](#):

But he said, "Look, if you didn't have tectonic plates over the millions and years and billions of years that the earth has been around, it would just get worn down flat. Which means that at a bare minimum, it would be an planet entirely covered by water because there'd just be no land bits." So there might be life, but there wouldn't be podcasts, or at least not this type of podcast. And it's just like these random things that just make it likely that that life exists. And I'm wondering if there's other things you've uncovered where you're just going, that just is just a random thing that is somehow essential to life on earth.

Peter [\(28:16\)](#):

Well, tectonic is actually a really good one because there might not be really any life at all if it wasn't for the ongoing churn of plate tectonics. Yeah. And now people looking at for life on other planets are starting to realize that how good we have it here and that plate tectonics might be really kind of important for having a habitable world, which yeah, you would never suspect it. Think, oh, it moves the continents around and makes mountains and stuff, but what does that have to do with life? One thing it does is there's this idea that it does regulate the climate over billions of years is the erosion of you get mountains pushed up into the sky and they get eroded down. And in that erosion and weathering by weather, you draw down CO₂ right on long time scales.

[\(29:08\)](#):

So volcanoes are already always putting CO₂ open in the air, and if there was no weathering of rocks, then it would just keep building up and it would get incredibly hot, and it might be too hot for-



MBS ([29:19](#)):

Right, us to have this podcast.

Peter ([29:23](#)):

And yeah, there's also the continual uplift. And erosion delivers nutrients like phosphorus out to the ocean and all life needs phosphorus. There's an idea that for a billion years of earth history, there wasn't much life on the planet because tectonics were all jammed up and there just wasn't very much phosphorus getting delivered to the seas. And then at the beginning of animal life, it kind of kicks in a high gear again and suddenly of all this life and animal life takes off. And so-

MBS ([29:57](#)):

Love this stuff. Miraculous to me, like with I'm not spiritual or I'm an atheist, but miracle is still the right word to describe. I think this kind of extraordinary system that somehow makes life happen.

([30:18](#)):

I started this interview talking about long time, deep time, how to go beyond 10,000 years new. A previous guest on the podcast, Roman Krznaric, talked about being a good ancestor. And for him that was a smaller span, much smaller, just seven generations out. A future guest, somebody I've already talked to, but we haven't released the episode yet, is Zita Cobb. And she talked to me about a hundred-year plan for the communities that she is looking to strengthen and seed and help flourish across Canada and the world. She talked about how do you optimize for the next generation?

([30:58](#)):

But along with all of that, all of which is essential, that ability to think longer term than we do at the moment, there is a line in this conversation with Peter, which made me go still, here it is. Unless you are aware of what you are looking at, you can go around the world blind to what's being lost. I suddenly remember



growing up as a kid in Canberra, summers meant amongst all other things, butterflies stuttering their way through the back garden. I don't see those anymore. I'm not sure what that means. I'm not sure where they've gone or what's happened. I've just realized I don't see those anymore. This world is precarious and beautiful. It is an extraordinary planet. We are lucky to be alive. Perhaps we only start to being able to think about our future in an expansive way when we remember what was and what is not anymore. What do you notice might be missing?

[\(32:05\)](#):

If this conversation caught your fancy? I've got a couple of others from the two pages back catalog to recommend Roman Krznaric, who I just talked about. Our conversation was called Hope for Tomorrow. He's Australian philosopher based in the UK, write all sorts of great books, and I really loved his new one. And Azima Za, who has a terrific newsletter talking about the power of exponential, and he is really kind of one of the leading thinkers or journalists about probing the future. And that conversation was called What Technology Promises. If you want more, Peter, he is, as he says, hanging in there on Twitter @peterbrannen1. So that's one, the number. P-E-T-E-R-B-R-A-N-N-E-N, number one, and his website is simply peterbrannen.com. Thank you for listening to the podcast. Thank you for loving it. Thank you for sharing it. Thank you for reviewing it. That just leads me to say you're awesome and you're doing great.