

We are as Gods

Cold Open Mammoth

STEWART

What do you have?

WOMAN

Mammoth

GEORGE

Oh.

STEWART

Wow.

GEORGE

Tusk in here?

STEWART

Beautifully preserved specimen.

GEORGE

Do you think those are a part of it? That's pretty good. That's useful for us.

GEORGE

Alright

STEWART

The main event.

WOMAN

Mammoths trunk.

GEORGE

Woah yeah you can see it. So we would like to help you get DNA sequenced. DNA, ok.

GIRL

We finally got some hair.

STEWART

This is not an ancient artifact. Using DNA, we can bring back extinct species. So This is the once in the future mammoth we're looking at. It has been gone for a while and with any luck they are on the way back.

Title Sequence—who is Stewart Brand?

MAN 1:02:10:00

Stewart is a lot like the great American P.T. Barnum

MAN

Stewart is the intellectual Johnny Appleseed of the counterculture

MAN

Stewart might be the zellic or maybe the Da Vinci of Cyber culture.

MAN

It's actually a little bit eerie how often Stewart has been at the right place at the right time

ARCHIVAL MAN

...like an invisible string.

MAN

And by the time all the rest of us get there, he's gone on to something else more interesting

MAN

Stewart has this remarkable Forrest Gump superpower to sense where the frontiers are and then be there.

MAN

He's like Kilroy; he shows up in the background in every important thing that is going on.

MOUNTAIN GIRL

He could see into the future that this technology was going to be a huge part of American culture.

HOST

We welcome Mr. Stewart Brand...

MAN

it's not so much that he's ahead of it. He's actually creating the future.

MAN

Steve Jobs, not surprisingly, was fascinated by Stewart.

STEVE JOBS

When I was young, the whole earth catalog was one of the Bibles of my generation. It was created by a fellow named Stewart Brand. It was sorta like google in paperback form 35 years before google came along.

BRIAN ENO

So many of the ideas that you may find vital, either originate with Stewart Brand, or were really articulated by him,

MAN

Ideas that seem at the edge of believability, from the environmental movement to the technological movement, to genetics.

HUNTER

Stew loves being the technophile with the answer but technologies tend to break people apart.

BRIAN

Stewart is an evangelical optimist which may be quite dangerous. He's famous for saying, we are as gods, so we might as well get good at it.

TITLE

“WE ARE AS GODS”

Cabin, Early Days & Co-Ev

STEWART, Intv 1:04:46:00

My own progress through life has been to try stuff early on when there aren't rules against it yet, so you get to be part of a new thing in the world. I didn't sit down in life to have a trajectory. It is a pretty interesting way to have a life because you get to be surprised a lot.

STEWART, Intv

I was born, I'm told, I don't remember it, in Rockford, Illinois. We were a Midwestern family. My Father was a civil engineer out of MIT. And I got from him respect for that kind of problem solving that engineers love to do. I took after my mother in the sense that she was mad for books. I know my mother was instilling values, caring about wildlife. This is kind of where I grew up. And I'm back in this cottage 63 years basically, after I left at the age of 16, This is where all the fun stuff was. I got to be a free range kid.

MIKE BRAND Intv

I remember Stewart as a kid who was really interested in animals and would get into mischief that way fairly often.

STEWART Intv

I was very much in cahoots with wildlife, like the chipmunks, and the squirrels. I had an opossum named Frank, I had a wonderful raccoon named Oscar. There was a feral cat and he became my friend. And when we left out the road, the cat chased the car all the way out to the highway. Gulp.

MIKE BRAND Intv

Stewart was already smart. And he went off to Stanford.

STEWART Intv

I've been a conservationist all my life and I was trained as a biologist back in the fifties. At Stanford, I went in the direction of ecology and evolution.

PAUL EHRLICH ARCHIVAL

We have an extremely serious world demographic situation. Famine and plague and thermonuclear war and who knows which one or what combination will come...

PAUL, Intv

I'm Paul Ehrlich, president of the Center for Conservation Biology at Stanford University. And notorious Doomsayer. Doom.

STEWART BRAND Intv

Paul Ehrlich was my advisor for the field work that I was doing.

PAUL

Stewart was one of the brightest students I ever had in the biology department working as I recall, on tarantulas.

STEWART, Intv

And so I would go on a full moon night and put up a cot and just watch what tarantulas do all night. What I learned is that in any ecosystem, species are evolving in relation to

other species who are evolving right back at them. And if you apply it to extinction that's a new kind of problem for humanity.

PAUL

Let's put it this way. If you have a very complex, evolving planet on which your life absolutely depends. Taking pieces out of it random is, by definition, a bad idea.

HUNTER, Intv

We have the power to destroy life on this planet, which we unfortunately are going about at warp speed. And we are now looking at the extinction of species at a rate faster than when the dinosaurs went extinct.

De-Extinction Mission, Chestnut Tree & Passenger Pigeon

STEWART, Intv

The American Chestnut is one of the prime examples of a species that is so consequential in terms of the whole ecosystem, that if that species is gone, the whole ecosystem has changed. One quarter of all the trees in the eastern forests of the United States, used to be American chestnut trees. Around 1905 this fungus came in apparently from Asia, killed the trees, and they were all gone within about 20 years. It was huge. It's called the red wood of the east. It was an enormously loved species in North America. It put down these incredibly sweet nuts in vast quantities every year. And it fed a lot of humans and a whole lot of animals depended on that food source. And when that food source went away, the animals went away.

STEWART

Hi sweeties, there they are. Oh god.

STEWART, Intv

The passenger pigeon was once one of the wonders of North America, visitors from Europe were wowed by Niagara Falls. But there were even more wowed by these incredibly large and beautiful flocks of passenger pigeons streaming overhead for days at 60 miles an hour. Their Forest burned, they ran out of forest as well as being hunted to death. My mother grew up in the living memory of what it was like to have the most abundant animal in America disappear in a period of about three decades and she said when the last one died in 1914, it broke America's heart. But that's a tragedy that can be unwritten, you can actually go back to the end of the play and say that's not the end of the play. Because we didn't kill their DNA. Using a closely related living species, we can edit the missing genes into the living species, and basically recreate the extinct species

and we're moving in the direction of bringing back passenger pigeons and woolly mammoths. I started to get a sense for where it was going from George Church at Harvard, one of the leading geniuses in biotech.

MAN

George church, a world leading geneticist, whose DNA harbors genes for genius.

STEWART, Intv

He's totally adored by the media.

STEPHEN COLBERT

Um, George church everyone. Bring back the woolly mammoth. Can we get one?

GEORGE CHURCH

Yeah.

NEIL DEGRASSE TYSON

Tonight's topic is De-extinction. Oh my gosh. De-extinction..

NEIL

George, what's the next creature that's going to crawl out of your lab?

GEORGE

So one that's that's already crawling out...are um..

NEIL

I was just joking. Okay, so you have a real answer to that question.

NEIL

When you're creating new species, have you really thought it through? Because if you haven't, then you're dangerous.

GEORGE

I'm definitely dangerous.

NEIL

Got that, that that answers that.

Church Lab & Mammoth

GEORGE

This is the room where we did all the pig cloning. That where we were eliminating viruses from

their genome.

STEWART
Why its own room?

GEORGE
What?

STEWART
Why is its own room it's...is it clean?

GEORGE
Wells It's very clean. I tend not to go into these rooms because most human cells we use are from my body. And many of them are transformed with potential carcinogens.

GEORGE
What!? Wait,

GEORGE
so a lot of the cells

STEWART
you're not worried about your cells getting into there. You're worried about those cells getting into you?

GEORGE
Into me yeah, right.

STEWART
And doing what?

GEORGE
I'm not worried about it, the lab is. Good questions. You're hired.

STEWART, Intv
The plausibility of De extinction, George Church's lab is really where it all began. And George started with woolly mammoths.

GEORGE, Intv
The mammoth was a keystone species in the Arctic. 20,000 years ago, our ancestors started systematically slaughtering mammoths. They were altogether too easy to get with our new technical abilities. The new tools we have for killing off the herbivores included knives and spears, and fire. They had strategies for surrounding them, running them off

of cliffs. Those mistakes that people who made them did them innocently and aren't around to take responsibility for them. We need to take responsibility. And now we're in a position where we could reverse those mistakes with better tools than our ancestors had.

SCIENTIST

So this is mammoth tissue.

STEWART

Mm hmm.

SCIENTIST

Can you see this?

STEWART

yeah.

Since Asian elephants and woolly mammoths are so similar to each other 99.6% similar, we are hoping to test them first in elephant tissue and and see whether they work.

GEORGE, Intv

What we're doing at Harvard is editing genes that bridge the small gap between mammoths and modern Asian elephants so that they can be cold resistant.

TEDx DeExtinction

STEWART

I'm Stewart Brand. This is the first public discussion of the possibility of bringing back extinct species.

STEWART

What's different and what's the same about the.....

GEORGE Intv

Stewart brought us together in the DeExtinction movement and in the same sense that you say, this is the Manhattan Project. This is the Apollo project. This is the Human Genome Project. That's the sort of thing that Stewart has brought to DeExtinction.

STEWART

The century of work that will go into making this a reality.

GEORGE Intv

These engineered mammoth elephant hybrids will initially go to pleistocene park in northern Siberia. We collaborate with these Russian conservationists Sergey Zimov and his son Nikita Zimov. They're returning a variety of herbivores needed for this particular ecosystem. The only one they're missing is this mammoth elephant hybrid. So that's our job to provide one of those.

STEWART Intv

It turns out by bringing back the woolly mammoth we can help fix climate change. The exaggerated version is that we need to bring back woolly mammoths because they will save the world.

PAUL EHLRICH Intv

I think Stewart likes the idea, as do I, of being able to recreate extinct animals from DNA. But one of the things that I've learned in my much longer life than Stewart has had, is that when you pull a technological rabbit out of a hat, it very often has very nasty droppings.

HUNTER Intv

I would love to see a mammoth. Wouldn't that be cool? That we can do it, it's so much fun and so fascinating for people who love technology. At the same time, we ought to be asking, should we do this? Is this a good idea?

Photo Journalism & Louis Jennings

STEWART, Intv

What you got here is a kind of place where my stuff lives and also my entire past come to think of it. Then we go into the archive. Films and slides from my old multimedia shows back in the 60s. Photographs. I was a professional photographer for years in the 60s and into the 70s.

STEWART Intv

I graduated early 60s. And an old family friend commissioned me to photograph a tribe of Indians in Oregon. I had no idea about what contemporary Indians did and how they lived. So the photographs I took for me they were revelatory.

LOIS JENNINGS, Intv

The first time I met Stewart Brand was at the National Congress of American Indians in Sheridan Wyoming. I was working on the registration desk and he came through the door with his camera. He was a very blonde, didn't fit in. He was very much out of place.

STEWART, Intv

We went from friends to absolutely in love. And she became Lois Jennings Brand.

LOIS, Intv

Stewart didn't want to be encumbered by anything like a lease in an apartment. So we purchased a trailer, put all of our belongings which, in his case, involved photographic equipment and a ton of books.

STEWART Intv

We moved to San Francisco and I started to immerse myself in the Bohemian life of the slightly post beatnik period that was happening by the early 60s. That was when I met Ken Kesey.

Merry Pranksters

STEWART, Intv

His Book, *One Flew Over the Cuckoo's Nest*, had an Indian protagonist. I sent my photographs to Kesey and word got back well come on down.

LOIS, Intv

The first time that Stewart met Kesey we drove down to a little tree house.

STEWART, Intv

Somebody with a joint said welcome you must be Stewart. And um that was not usually how you met strangers in those days. Usually marijuana was smoked in the bathroom right next to the toilet so you can flush it down. So right away, I saw the prankster boldness.

MOUNTAIN GIRL Intv

The merry pranksters were a very interesting collection of young, footloose folk and Ken kesey was kind of the boss of the outfit. When Stewart started coming to prankster events, pretty soon he's sporting a top hat.

STEWART, Archival

They're getting aware of their own bodies, their own senses, they're breathing, where they're at, who they're with...

MOUNTAIN GIRL Intv

He's beginning to manifest signs of straying from the norm in a really good way.

STEWART, Intv

Civilization was in question. With civil rights and Vietnam war resistance. We felt like an outlaw generation. LSD was a rite of passage. It took apart the trappings of orderly mind and good education. And LSD gave us permission to try things in unapproved ways. And that also probably added to our creativity in the sense that we weren't trying to make it in

the lawful world. We're making it in the world that we felt was partly of our own creation. The best thing I learned from the pranksters, and this came straight from Kesey was fearlessness. And one of the mottos of the pranksters was go further.

KEN KESEY, Archival

Original prankster credo. You start off by saying never trust a prankster because I will eventually lie to you even though I may not want to...(LOUD NOISE)

MAN, Archival

Kill that! Go ahead would you repeat that again?

KEN KESEY, Archival

Oooooooooooooo.

STEWART, Intv

Kesey was a charismatic leader and it puts you in the position of paying close attention to this person. And then what happens is that a charismatic character is writing the story that everybody is participating in. And you're left to having not written your own story for a while. That happened to me to a little extent. And I wanted to check in on who am I, who do I want to be, what do I want to be doing. So for my final role in the merry pranksters I wanted to plan one last big event.

MOUNTAIN GIRL, Intv

One of the things that we did was events called the Acid Tests. We had music and projections. All of this is audience participation, which was not really done in those days. It was a costume party like you've never seen before, because of the additional energy from the LSD.

STEWART, Intv

I started to organize this thing, and that was the most important of all Acid Tests. And we called it the Trips Festival.

Trips Festival

LOIS, Intv

When Stewart was doing all the work for the trips festival, he made up a poster. He put the names of bands on there that he would like to attend. And in fact, they showed up because they saw the posters and said, oh, we're supposed to be there.

MC, Archival

Good evening from Captain consciousness, for your listening pleasure, the Grateful Dead.

STEWART, Intv

Indeed, they did show up. And thousands and thousands of hippies showed up. And Tom Wolfe was right, this is the night when haight ashbury was born. There was a big bucket of ice cream going around that was laced with LSD. It was going to taste delicious when you ate it then it was going to become very strange half an hour later. What really took off was the Grateful Dead. They just named themselves that and they got on stage and they were sensational.

MOUNTAIN GIRL, Intv

Stewart invited every weirdo in the Bay Area that had gadgets to come and set up their stuff.

STEWART, Intv

We were projecting various things on the walls and Ken Kesey is writing messages.

PETER COYOTE, Intv

I spent much of the trips festival under a table with a stripper that I was going out with, high on acid. It'd be hard for me to tell you much more than that. It was maybe my first experience of being high with lots and lots of people.

STEWART

People are not dancing with each other. They're dancing with everybody and looking around, collapsing into things, and doing stuff to the beat. Typically at a party wherever there was a strobe, people would get under it and that was another thing that got people moving because they loved watching pieces of themselves flying around.

PETER, Intv

The trips festival was a watershed moment, it introduced a lot of different communities and families to one another. We could recognize each other and knew that we were on the same page.

STEWART, Intv

Thousands of hippies in the Bay Area discovered that there were thousands of hippies in the Bay Area, and that lets you know there is a movement.

Whole Earth Photograph

STEWART, Intv

The trips festival was a breakthrough for me in the sense of, I just made a ride happen. But on the other hand, nothing's changed. Yeah, that was a great event. Meanwell, now what? So two months later. It's a tedious afternoon. And maybe I'll just take, I don't know,

100 micrograms or something and go up on the roof and see what LSD does for the afternoon. And as I'm looking out at San Francisco, I imagine that the buildings that are parallel downtown are not quite parallel, they're actually slightly diverged, because they're on the curved surface of the Earth.

STEWART, Intv

At this point, we're 10 years in Sputnik. And there's been no photographs of the Earth as a whole. LSD is not actually consciousness expanding its consciousness concentrating. And so you get thinking about one thing, and that's all you think about for hours. So all I could think about on that rooftop was how different everything would be if people would see a photograph of the Earth from space. And so what I conjured in my mind was a button that would say, Why haven't we seen a photograph of the whole earth yet? I sent the button to all of the congressmen, to NASA, and officials in the Soviet Union. Then started selling them on college campuses. People would come up and say, what's this about?

STEWART, Intv

Ever since 1945, the image of the mushroom cloud made people feel that civilization was basically doomed. Being a photographer I was thinking about the images that hadn't been made yet that might change humanity's behavior.

RUSTY, Intv

I was the Apollo nine Lunar Module Pilot. Seeing the earth with your own eyes, you realize how small and fragile it is and that all of life is on that planet. It changes your perspective. And that's basically what Stewart recognized.

STEWART, Intv

Finally, NASA publicly released the first ever image of the whole earth. The whole damn thing was alive, you can see that. And it was a hopeful image and it blew away the mushroom cloud.

PETER, Intv

That one image created this extraordinary frame of reference, for our relationships with other cultures and the planet itself.

STEWART, Intv

Humanity wasn't just capable of destroying itself, humanity was capable of discovering itself in this very visual way.

RUSTY, Intv

Let's give Stewart credit when we could look at the real Earth in a photograph, that Stewart kept yelling for, people were beginning to get this idea we all live on a very small

planet and that were not just passengers were the crew. We're responsible for what goes on.

Environmental Movement is Born

STEWART, Intv

Indeed, once we did have the photographs, Suddenly, there's organizations called Friends of the Earth and Earth first. A bunch of environmental organizations took off globally that were assuming care of this thing that was now understood to be in need of care.

WOMAN, Archival

The United Nations has assumed responsibility for the preservation of species in danger of extinction, and whereas....

HUNTER, Intv

I think Stewart played a very important role in creating the environmental movement and in making it accessible, showing people that there are different ways to live.

Whole Earth Catalog

STEWART, Intv

All my friends were involved in various commune efforts, basically trying to reinvent civilization. Most of these communes are being started by liberal arts majors who had dropped out of college. And their knowledge was not helping them at all. By then I had a sense, I wanted to affect change in the world. Human Nature doesn't change, you're wasting your time if you try to change how people behave, but if you change the tools, you can change whatever you want. And I thought, well, I could maybe have a kind of a catalog. The great thing about being a devil make hair artist is I didn't have a job. So if you have an idea, and it still seems like a good idea the next day you just start. And so I started the Whole Earth catalog in 1968. And the subtitle was access to tools.

GEORGE, Intv

In all the whole earth catalogs, Stewart injected the phrase, *we are as gods and might as well get good at it.*

STEWART, Intv

It was an acknowledgement that there's an empowerment that has occurred, of the individual.

STEWART, Intv

Lois was C.O.O., and brought a business acumen.

LOIS, Intv

The first issue, I think we only printed 1000 copies. The number we'd given away. It was just a massive disaster. We used to go nooo.

STEWART, Intv

The First whole catalog we distributed them by carrying them around physically to bookstores and saying here and they would say, what is it what section do I put it in and we would not know how to answer that.

KEVIN KELLY, Intv

You have to understand how impoverished the world was in terms of information. If you had a question, it was very unlikely that you would never get an answer to it. So most people never asked the question.

HUNTER, Intv

These days I'll pop open my handy phone, go on the internet, Google it and the world's information is at my fingertips. When the Whole Earth Catalog came out, this wasn't true. Where would you go?

KEVIN, Intv

You could think of it as the web on newsprint. So it became a catalog of possibilities. And the startup culture was born directly out of the Whole Earth Catalog.

STEVE JOBS, Archival

Stewart and his team put out several issues of the whole earth catalog. And he brought it to life with his poetic touch. This was in the late 60s before personal computers and desktop publishing, so it was all made with typewriters, scissors and Polaroid cameras. It was idealistic, overflowing with neat tools and great notions.

KEVIN, Intv

Millions of people who are reading it, were taught to invent their life.

PETER, Intv

Everybody could plug in and chip in on this conversation about what's the role of tools and technology in this new imagining of the world.

BRIAN ENO, Intv

For somebody like me living in the English countryside at the time. I thought, oh my god there's a lot of others out there too. And it consolidated in so many people's minds the

idea that there was a new movement, there was a new consciousness of some kind. The Whole Earth Catalog was a revolution.

STEWART, Intv

I had set the Whole Earth Catalog on a path of it had to be bigger, better, more ambitious, wider reach, more people involved. Pretty soon we had a very steep curve of people subscribing to this publication and money coming in. And it was being a fabulous success in the world.

DICK CAVET, Archival

Whole earth catalog is just full of things it makes you wish you had an infinite amount of spare time. Ah this is an amazing thing.

STEWART, Intv

It won the National Book Award, I was getting interviewed.

STEWART, Archival

Why haven't we seen a photograph of the whole Earth yet?

STEWART, Intv

So at a fairly young age, I was nationally famous.

STEWART, Archival

Not much we have a flag which is a pretty thing, the only flag you can say that doesn't exclude anybody out. Everyone is in it.

STEVE JOBS, Archival

On the back cover was their farewell message, stay hungry stay foolish.

Pleistocene Park

STEWART, Intv

We're going to Pleistocene park. In a way what we're doing is bringing two visions together. One is what George Church is doing at the harvard lab, bringing wooly mammoths back to the world. And the matching vision is to restore the mammoth steppe.

SERGEY ZIMOV, Intv

I'm Sergey Zimov and I'm initiator of Pleistocene Park. It's my responsibility to prepare the ecosystem for Mammoths. Before Humans appeared in this territory, in each square kilometer of pasture there was one mammoth, five bison, seven horses, fifteen reindeer, one wolf, moose, elk, antelopes, yak it was a very rich ecosystem.

SERGEY, Intv

And it was stable many, many thousands of years. Now only mosquitoes live here with pleasure. All other species have a lot of problems. Pleistocene park? It's a enough simple idea, Scientists try to reconstruct the wild which was here before humans occupied this territory. Mammoths never live alone. Mammoths have a chance to survive in nature only if nature will be mammoth steppe ecosystem. And we will try to do this.

GEORGE

So this is mammoth.

STEWART

You figure that's mammoth?

GEORGE

Yeah.

SERGEY

I feel the smell of Mammoth.

STEWART

The smell of mammoth c'mon!

SERGEY

Finger and end of finger of Mammoths.

STEWART Intv

Mammoth bones are just dense in the ground all across this land. Sergey Zimov refers to it as once the world's largest biome. It wrapped all the way across the north of Eurasia and the north of North America, Canada.

STEWART Intv

While we were here a story was getting out of a discovery by the Zimov's of something troubling going on in the permafrost that they're studying.

NIKITA ZIMOV

We are in the Arctic, and we are now inside the ground. So everything around us is frozen all year round. And it's called permafrost. And the problem is that now with climate change, the temperature of permafrost is getting rapidly warmer

NIKITA

When I was a kid down here, the temperature was minus six minus seven centigrade. And in the last three years, It's actually made a huge step towards becoming zero. So this permafrost soon might be not so perma and moreover not so frost.

STEWART Intv

This last winter a layer of the permafrost that normally freezes did not freeze it stayed thawed.

NIKITA

This sediment is the world's largest terrestrial carbon storage of the planet. So permafrost is already starting to thaw, and all this carbon which is stored in the permafrost - will become available for microbes to eat. And they produce greenhouse gases out of it. And it's a huge problem for us.

NIKITA

And when the permafrost melts a depression appears. This depression gets filled up with water. and they are converting all this carbon which is stored in the permafrost into one of the worst greenhouse gases, into methane.

NIKITA

So this is thermokarst lake. 20,000 years ago, when mammoths were roaming this place, there was no thermokarst lakes. Permafrost was stable and such lakes did not form. But right now In our region there is more lakes like that than people. And in the future, if permafrost will be thawing rapidly such lakes will be everywhere and they will be an extremely big source of methane on the planet, and they will fully accelerate the climate warming.

NIKITA

All right. So we will do some experiments. To see how much methane is actually out here. So you see how much methane we got? It started to float. Stewart do you want to try it? You see that Stewart?

STEWART, Intv

What's coming out of that lake is real methane. It's going on. Apparently all day all night. all year. So we've got a bad feedback cycle going on, which needs to be slowed, stopped and ideally reversed.

SERGEY, Intv

Last year our permafrost started to melt in many many places and it's very difficult to stop this process. But we know how to do this.

STEWART, Intv

The Sergey Zimov theory is that if you put a dense array of grazing animals back on this land they will turn tundra and boreal forests back into grassland and the grasslands can

stop the release of greenhouse gases coming from this thawing permafrost.

STEWART

Such a great looking animal.

NITIKA

We kept it here for a few weeks, to make sure it's all right. So now we will get into the bigger territory.

STEWART, Intv

These animals busily almost frantically they're eating. Chow chow chow, munch munch. These guys are working. In the winter, in order to get to the grass, the animals they're tramping and digging down through the snow and the cold gets into the ground and keeps the ground frozen.

GEORGE, Intv

And then the mammoths can do things that cannot be done by the other herbivores like knock down trees.

STEWART, Intv

Wow, holy smokes. Talk about data. At Pleistocene Park, they've been able to prove that if you have a fairly dense population of grazing animals on the land, that leads directly to the ground underneath getting colder as much as two degrees celsius. That amount of coldness can make an enormous difference in turns of heading off the thawing of the permafrost. So if you get woolly mammoths back on the landscape, they will push down the temperature even more.

STEWART, Intv

This whole Pleistocene Park project is a form of geoengineering an attempt to directly affect climate. And what I love about it is it's the only form of geoengineering I know that's not mechanical, it's biological. We're nudging the ecosystem in the right direction. But nature is doing most of the work. And then the animals take over, and the grass takes over. And this landscape comes back to life.

SLAP #1 Technology has a shadow, and Stewart you are wrong about humanity

PETER, Intv

Stewart suggests that with tools and technology, there's a bright future ahead of us that we can fix all the disasters that we've created on our planet. But I think these

experiments are horseshit. At a certain age, you need to know that everything has a shadow, and you need to account for it. Otherwise you run into disastrous, unintended consequences.

MODERATOR

Welcome everybody we are here tonight to discuss technology we can't live without technology, no one suggests that. But how do we live with it? You Stewart Brand say that we should assume that the technology is neutral, and that the people promoting it are neutral. Why would one assume that those people are neutral?

STEWART

There is very little malevolence behind new technologies, people trying to figure out how to make a cool new tool work in a cool new way.

MODERATOR

Winona LaDuke.

WINONA LADUKE

Technology is not going to save us. It is a tool perhaps in part of what we need to do, but we need to be responsible. You know, from my perspective, these questions require this broader thinking and not an amnesia, which I think is part of what you are promoting. For instance, Edward Teller, father of the hydrogen bomb is the guy who came up with the fabulously bad idea of geo engineering. I don't agree that every new technology is equal in that everybody comes with, like clear moral history and clear conscience. I don't agree with that, because I don't actually have amnesia.

PETER COYOTE

Hi Stewart,

WINONA

Hi Peter!

PETER

Hi Winona, Let me challenge your hypothesis that we're gods. And let me suggest a more accurate metaphor, which would be idiot savants. We're highly developed, we have these great skills, these technological cleverness, which was completely untethered to wisdom. What I find disturbing and sort of a little sociopathic about your perspective, is the absence of...is the absence of doubt.

SLAP#2: This is not Environmentalism

HUNTER, Intv

Stew loves technology, of almost any variety. And if you have a big megaphone, like Stewart Brand does, I would hope he would put it on the side of preservation.

MAN

This is a american chestnut tree. There are some tests that we have done....

HUNTER, ntv

Instead, for reasons that defeat me Stew is a fan of genetic modification. This is human cleverness, we know better than nature. Really? Stew, I'm sorry. This is not environmentalism.

STEWART, Intv

The idea that humans are moving genes from one organism into the genome of another organism is somehow against nature, it's just dead wrong. It's assisted evolution. And so we're doing exactly what nature does.

STEWART

This is what killed 5 billion American chestnut trees. These trees are functionally extinct because they can't reproduce, they can't make a forest like they used to. But genetically, they're not extinct at all. They've got all the variety they ever had. And they're about to get one more bit of variety, which is one or two genes that will help them head off the diseases that we brought here. Not on purpose. But the cure is on purpose.

STEWART, Intv

We use gene guns to move this gene from wheat, into the American chestnut, that resists the fungus. When genetically modified organisms were first created most environmentalists were just automatically against it. And that actually makes me pretty mad. Because that's taking ideology more seriously than the ecosystems you're trying to protect.

The Divide of Environmentalism

STEWART, Intv

But this resistance to technology and intervention is nothing new. The environmental movement that formed in the 60s that I was part of helping shape was young, enthusiastic, not terribly scientifically informed.

HIPPIE

Uhh, I enjoy the trees and the elements. Just basic things that are very basic to the earth

STEWART, Intv

And it locked in a number of stances.

HIPPIE 2

Everything we do affects it. Everything we get comes from it. Everything we leaves, leave goes back into it.

STEWART, Intv

An environmentalist is automatically against intervention in nature because nature is always right. And humanity is always wrong.

HIPPIE 2

Don't follow your nest.

STEWART, Intv

It's a romantic story. But it's just wrong.

BRIAN ENO, Intv

A lot of the 60's scene had been very anti technological. You had to make a choice between being an environmentalist and being a technologist. They were seen by many people as at odds with each other. Technology was ruining the environment it seemed like. Stewart and a few other people said no, actually, it's the way we can save it.

STEWART, Archival

There's a whole lotta good stuff....but we're amplifying it. As big as we can.

BRIAN, Intv

That started Stewart off on a line that differed from many of the people he had been associated with in that he began to embrace technology as the way towards the future.

HIPPIE, Archival

Nothing is going to be solved, no technologists are going to manipulate minds and end up.....

Demise Party & Depression

STEWART, Intv

I was starting to feel isolated in the environmental movement and felt like I was cut off from the rest of the world. I was working like mad on the whole earth catalog. And I was reduced in non catalog function more and more and more. There was a room in the back of the 4000 square feet where we did the whole earth catalog, where I had a bed. And I was doing a lot of my work from that bed. They didn't even know to call it depression. I was bad company for my wife. The depression I had at that period was also related to drug involvement triggered by the amount of nitrous oxide, I was breathing. Nitrous oxide was a party drug in the counterculture.

STEWART, Intv

You have a flash, which might be exciting or revelatory. And for a few years I had a tank about three feet high delivered once a week to the "Whole Earth Catalog" so I could breathe it up. I got wrapped up in my own mind which then turned convoluted watching itself to a point where I could barely drive because I was watching my mind watch my mind watch my mind instead of watching the damn road. Depression is self reinforcing and it becomes its own system and so long after I stopped breathing nitrous oxide I was still badly depressed. Basically, I wanted off this runaway train and so I came up with the idea how bout I just stop the success right in its tracks?

LOIS, Intv

He made a decision that we would do the last whole earth catalog and we sold a million copies.

STEWART, Intv

And then as a way to celebrate that we put on a public what we called demise party.

LOIS, Intv

We had some money. And he made a decision that we would do this social experiment.

STEWART, Intv

I said I have here in my hand \$20,000 in cash. Come up and tell us what you think should happen with the money.

STEWART, Archival

The money will go to a person with a responsibility for seeing it through to a project by probably dawn.

STEWART, Intv

And these are hippies who'd been living on a few hundred dollars a year. So it will be standing there on stage with me, pretty thick wad of hundred dollar bills and trying to say, well my commune really needs a pump.

STEWART, Intv

And notions piled up, but it turned out most of them were bad.

WOMAN

I think this money should be used to get all the Jews out of Miami and get the Puerto Ricans back where they belong.

STEWART, Intv

So it was a disappointment in that regard. Because my hypothesis had been that under dressed people would be extra creative.

STEWART, Archival

We've got to get together and deal with our problem

STEWART, Intv

What actually turned out to be the case was under dressed people are extra non creative. It was basically chaotic.

MAN

You've got 9 million suggestions, they're all good pick one! This could go on for the next fucking year!

MAN

I suggest a \$100 bill to put in the fireplace.

MAN

You want to put \$100 in the fireplace?

STEWART, Intv

One guy named Fred set fire to a hundred dollar bill. He said it's not about the money. It's about the people. And by the end of all this he was the guy who took away the 20,000 dollars.

STEWART, Intv

It felt like a total failure. I was in a bad way and I'm shutting down one thing after another to see what thing I can get rid of that will give me a chance to get myself back. So I shut down the Whole Earth Catalog and I wasn't better and I shut down my marriage. By then being just with her was getting troubled enough for me and probably to some extent for her but I initiated the lets not be married anymore.

LOIS, Intv

He woke up one morning and he said he wanted a divorce and that was the end of that. Ok. I still feel cold.

Family Cabin

STEWART, Intv

The 1970s I spent living alone. I was in a lot of stupid pain. It took a while to get out of being really shut down in terms of feeling good about life. I had seen people get into the mode of Well, I'm having problems with my drugs. So obviously, the Answer is I should

take more drugs. That universally did not work out. So one aspect of how I treated being depressed at the time was to not try to fix it with drugs. I was starting to do meditation, and seeing a psychiatrist who was actually pretty good. And eventually, I was able to become more and more happy again.

Personal Computing

STEWART, Intv

And at that point having shut down the whole earth catalog. I was free to pursue subjects I was curious about. 10 years earlier, when I was visiting Stanford I hear male yells from what was called the computation center. Well it turns out they were playing this earliest of all video games called Space war. They had gathered around a round screen of a mini computer called the PDP one. What got me about it was the insane enthusiasm and out of body wildness that was going on in the players of this game. They identified with what I thought of as hippies. But they weren't doing drugs very much because they had found a better drug. And the better drug was computer power. I wrote it up for Rolling Stone. And I began the article with the line ready or not, computers are coming to the people. People get up to strange things and people that are good at getting up to strange things get up to more than one. At the end of the demise party the guy who set fire to \$100 bill came away with \$20,00.

JOHN MARKOFF, Intv

He was this unusual draft resistor activist community organizer, guy by the name Fred Moore, he was deeply opposed to the very concept of money. So the fact that Fred got the money, it was really quite ironic. Fred took the money, put it in his backyard in a coffee can and buried it. You know, it was a little bit like Frodo and the ring.

STEWART, Intv

That same Fred Moore, who did a few interesting things with that money. A couple years later, was one of the founders of the Homebrew Computer Club, one of the most important groups in the history of technology. It's when Steve Jobs and Steve Wozniak met and started Apple Computer.

JOHN MARKOFF, Intv

Stewart, he was in the thick of that then began actively organizing that community

RYAN PHELAN, Intv

Stewart and I are both attracted to technologists that are on the frontier and because of Stewart, I had the opportunity to see the very beginning of how the internet was going to play out.

STEWART, Intv

Ryan Phelan and I took on the organization of this event called the hackers conference. That was the beginning of my involvement with the personal computer revolution.

STEWART, Archival

I'm Stewart Brand. I'm not a hacker. I'm here for the contact high.

MAN

One longtime supporter of hackers is Stewart Brand.

STEWART, Archival

They are more effective in pushing the culture around now in good ways than almost any group I can think of.

MAN

But the real purpose of the get together was to discuss the unique set of values that made the computer revolution possible.

MAN

Our political platform is that we need an electronic declaration of independence.

STEWART, Intv

We were trying to liberate the tools that had been kept in the hands of powerful companies like IBM.

WOZ

Sometimes the companies internally because they own it, will squash it and say you cannot have it even though we're not going to put it out and nobody else in the world's going to get it. That's a hiding of information that is wrong.

STEWART, Intv

And there was a hacker ethic to be transparent and to share code.

MAN

My project is to make all software free.

MAN

That's my soul is in that, tools I will give away to anybody.

MAN

The software I wrote is a desk accessory so it works on top of any other application.

MAN

So this is this program that allows you to switch very quickly between programs on the mac as I can show you here.

JOHN MARKOFF, Intv

Stewart was the first guy to get it. The personal computer was one of the most powerful examples of using machines as tools for independence and that you could build your own world out of this new technology. He saw that hackers culture shared a lot of values with the whole earth catalog ideal, that information should be freely shared.

BRIAN ENO, Intv

Stewart was one of the first people who realized that actually it was a social movement that wasn't just like, a couple of new toys that had appeared. That's a very typical Stewart thing. To understand that there is something there to take it seriously to give it a name. As soon as you call a situation something the people within it start to look around and say oh, yeah, it is something. Yeah. Okay. We're in something together.

Stewart and Ryan

STEWART, Intv

I had been in solo bachelorhood for quite a while and one of the things I was missing was conversation. And I found that the conversations I was having with Ryan Phelan, they were some of the best I was having. So here we are. 35 years later, still having a good conversation.

STEWART

Hi there. Almost ready Here you go...

RYAN, Intv

It must have been about 1980. I think we both realized a mutual appreciation of each other that went beyond work. We liked taking hikes out in nature. Sparks flew. And there were some very soulful moments there on hillsides, where we got to know each other. We had realized we were falling in love. We were both pretty fascinated with the waterfront community. We've been wandering up and down the docks looking at house boats. Mirene, was a rotted out 1912 tugboat. And we brought her back to life. To be honest, when Stewart and I started thinking about getting a boat together, I still didn't really necessarily think about it as a marriage. I was a product of the 60s, and marriage was not something that I thought was an essential part of a relationship. I was kind of in it for the short term that was great and it was fun. And I had no idea how profound it would be to actually start to create this life with Stewart. He surprised me.

RYAN

I could get used to this.

STEWART

You can get used to this, Yeah.

STEWART, Intv

Ryan and I are always scheming things up. And we're always advisors to each other's projects. But when we work together closely, It's just wonderful.

RYAN

We've got seals right here.

STEWART

Really?

RYAN

Should we swap? Look at them all.

STEWART

Wow. Hi guys.

RYAN

Isn't that great?

STEWART, Intv

The two of us created revive and restore which is the entity that is making de extinction possible.

RYAN Intv

It's not just about bringing back a woolly mammoth. But this technology is what's needed for conservation.

RYAN

Good afternoon, I'm Ryan Phelan and we work at the convergence of biotech in conservation...

STEWART, Intv

One thing biotech is bringing to the rescue of endangered species is a chance to get off the defense and go on the offense.

RYAN

We have to protect absolutely, we have to intervene. These new technologies

SLAP #3 Ross says there's not enough time.

NEIL

So Ross, you want to prevent extinction. Meanwhile, you have other people trying to bring species back. Where's your moral compass on this?

ROSS

Have we taken on a responsibility that has no endpoint to it? I would say yes. Because what we're doing is playing God. And in that event, we have to look at it in the same way that we would look out obligations to any living thing.

ROSS, Intv

About 10 years ago, Stewart asked me to participate in a meeting that was going to take up de extinction. I'm a Paleo Mammalogist, and the idea of being able to actually interact with a living woolly mammoth. This was astounding. And I was totally fascinated I admit it. But although the idea of bringing back species that are no longer with us is immensely attractive, I also understand, it's about the worst thing we could possibly do. Stewart Brand is a visionary, I by contrast am a pragmatist. What's the length of time that we're talking about to make and to manufacture a woolly mammoth, Stewart thinks centuries? So do I. And that's a long period of time to keep interest up in an experiment that has no certain outcome.

Long Now & Clock Workshop

STEWART, Intv

We are a major force now in this dynamic planet and we have to function as an entire global civilization patiently over time with awareness and continuity and we've never done that before. There are issues going on in the world like climate change and extinction and it's gonna take centuries to sort them out. One of the problems now is that civilization is revving itself into a pathologically short attention span.

DANNY, Archival

.....basic goals of fostering long term perspective. The tick that happens once per year, it's a more reassuring, "this is happening" over and over again.

DANNY, Intv

When I met Stewart it was getting to be the early 90s. And people were still thinking about the future as being in the year 2000. And I realized that the future kind of been shrinking by one year per year for my whole life. That's when I started designing this clock that would last for 10,000 years.

STEWART, Intv

I heard from Danny Hillis about his idea to build a Stonehenge scale mechanical clock. That would tick once per century once every thousand years and after much longer than that the cuckoo comes out.

DANNY, Intv

Stewart realized the 10,000 year clock would change how people thought about time long before I did, even when I was building it.

STEWART, Intv

There are ways to help each behave more responsibly. And we want people to think about the next 10,000 years the way they think about next week. The photographs of the earth from space 50 years ago, gave humanity a whole new way to think about itself and about the planet that we live on. But it didn't really teach us anything about time. We need icons that give people the sense of long term thinking.

DANNY, Intv

To make something last for 10,000 years you have to choose materials that can last like titanium, you make things very very large so that the wear doesn't matter much. But actually by far the hardest problem is making something that people will care about for 10,000 years.

BRIAN ENO, Intv

When we started building the clock we had talked about the idea of the clock having a chime.

BRIAN ENO

Because it would be beautiful. This was almost subside or even subsonic you know, so

BRIAN ENO, Intv

And I thought, well, if you had 10 bells, you would have 3 million possible permutations of those 10 bells. That meant you could have a different chime each day for 10,000 years.

STEWART, Intv

We're trying to figure out what kind of site should it be for a clock and we decided it should be kind of a pilgrimage site. So after much exploration we're now putting a very large clock inside a 500 foot shaft inside a mountain.

STEWART

And then you go into the big clock room and it's going to go ahhhhhh.

STEWART, Intv

The clock is an artwork, it is already an expression of thinking long term

BRIAN ENO, Intv

The clock is a provocation in a sense. We're hoping to consciously put into the world something that would give people that flash that moment of saying wow I see, is it possible we can be around for 10,00 years? What if there is a war? Or what if a asteroid hits the earth and there's a nuclear winter? Even saying what if, is starting to do what the clock is intended to do.

STEWART, Intv

I think we're in a shift point in the long story. Finding out how nature actually works, finding out how we actually work. And De Extinction is a good way of keeping people reminded that they're going to bear down on some issues for a long time. And when you do that astounding things can be accomplished, including bringing back woolly mammoths. In fact, bring back the whole damn mammoth steppe change that biome back to what it used to be, which would be better for climate. That's a long term story.

Pre Debate Ross Jab: Hubris

ROSS MACPHEE, Intv

The Greek word hubris has to do with the idea that a hero has a central failing that he's not aware of. That the failing eventually comes out and usually results in disaster. I think that's a very appropriate word for the de-extinction agenda. It is hubris.

De-Extinction Debate

MODERATOR

Remember Jurassic Park, amazing movie, where science brings dinosaurs back from extinction. The science is now getting real right scientists and thinkers are working on a way to revive other extinct species, like the woolly mammoth. To paraphrase Jeff Goldblum, should they? Here to be making his opening statement. Ladies and gentlemen, Stewart Brand.

STEWART

I've been a conservationist since I was 10, which is 70 years ago. And what's driving us now is getting some species back, you will be having the chestnut trees coming back raining down sweet nuts for wildlife and for humans. You will have passenger pigeons back taking up their old

habitat which is perfectly intact and waiting for them. So a vote for de extinction is a vote for more life.

MODERATOR

All right, thank you very much, ladies, gentlemen, Stewart Brand. Stewart, I would like to let your opponent respond to that last point.

ROSS

Why do we think we can do this with elephants? Elephants are sentient creatures, they have self awareness. Human babies until they're six months or a year or so are not self aware your dog isn't self aware. So why are we considering them the kind of property that we can mess with and then set them loose. Is that really their job?

MODERATOR

Okay, that's a perfectly phrased question. I want to bring it to George Church.

GEORGE

Excellent point, man, I sympathize. However, they are currently not having such a happy life going extinct. I agree that we should be humane, we should do something that's to their benefit, not just the benefit of the planet. I think the ends and the means should be humane.

ROSS

The real de extinction agenda, which is bringing back completely extinct species. It's not for repairing ecosystems that, in a sense don't need repairing anymore because we're already 10,000 years down the pike from what they were. The planets getting warmer, whether or not we get elephants up into northern Siberia is not going to change the equation sufficiently to turn the whole process back. The real problem as usual is us.

MODERATOR

Stewart respond.

STEWART

Woolly mammoths and the mammoth steppe are not going to fix climate change, but they could be over the long term part of the stabilization of climate.

ROSS

I have to say, Stewart, that I'm very pleased that I am not the most naive person on the panel tonight.

MODERATOR

All right, we've tried not to make it personal, I think.

ROSS

It's a joke.

MODERATOR

I'm trying to think of not naive. That's not that cutting but, but it was there. So let's try to keep it above board. Dr. Lynn Rothschild.

LYNN ROTHSCHILD

In the end, we've been dancing around this idea of what is natural, is it natural to have a woolly mammoth on the Siberian steps, or is it more natural to have a sky filled with pterodactyls? Or maybe a sea filled with trilobites? Jurassic Park was a bad idea. Pleistocene Park is no better. So no matter how cool this seems, we should not de-extinct creatures.

MODERATOR

And now it's time to which side you feel has been more convincing? Lynn and Ross, they pulled up 17 percentage points. That's the number to beat. Stewart and George, they lost four percentage points. That means that the winner of this debate is the side arguing don't bring extinct creatures back to life.

STEWART, Intv

I think what will change people's mind is a change in the facts, a change in the data. And we're all still waiting for actual de extinction to occur.

Chestnut Trees #2

STEWART, Intv

I wish I could see the woolly mammoth back in the wild and that probably won't happen in my lifetime. But I have lived to see american chestnuts come back.

MAN

These are all destined to go out in the field this year.

STEWART, Intv

Back in the day, I said that we are as gods and might as well get good at it. But It's really becoming we are as nature and using nature to do things that nature does already.

STEWART

In my mind, this is a forest and we're flying over at altitude.

RYAN

I like that idea sweetie.

STEWART, Intv

The American chestnut is the first DeExtinction, then trees will be planted by the thousands. And that was not possible two decades ago. Now it's not only possible, it's the way it's going to be. These little American chestnuts can live a century or more and get enormous and eventually, in this century, the American chestnut should be completely back in the eastern forest and I can't wait.

Clock of the Long Now Closing Scene

STEWART, Intv

For me as a conservationist to engage seriously with the ecosystem that you may care about gives you a place to live that isn't inside your own skin and takes down some of the dread of death and engages a larger life.

STEWART, Intv

People wind up writing memoirs because they want their children to know what their life was really like. People are really interested in their parents' story, maybe their grandparents' story. Generations is a good way to think, but let's go way longer than that. Once you are holding these longer time frames in mind, and start to raise the question of what do you do on Monday? Does your behavior start to reflect this larger frame?