



ARMANDO VEVE

MARIA STRESHINSKY CULTURE 09.18.18 06:00 AM

# STEWART BRAND AND THE TOOLS THAT WILL MAKE THE WHOLE EARTH BETTER

At 79, Stewart Brand, the man who was wired before **WIRED**, sizzles and sparks when he talks about the future.



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**Maria Streshinsky:** *When I was really young, I went to the New Games Tournament.*

**Stewart Brand:** *Oh my gosh, in Marin County? That's amazing.*

**Streshinsky:** *I've been thinking about different things that you've helped create.*

**Brand:** *Do you remember the New Games at all?*

**Streshinsky:** *I remember the Earthball.*

**Brand:** *Ah, good. Well, it was mythic then, enough to stick to a small child.*

Here's the thing about [Stewart Brand](#): He has spent a lifetime creating mythic things that stick. The New Games Tournament was a festival of wackadoodle and wild games meant to get people outside, playing, but also—and more important—Brand created them during the Vietnam War to get people thinking about conflict and physicality.<sup>1</sup>

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<sup>1</sup> *"I wanted it to become normal for adults to have the same interest in routinely changing the rules of games that children have. For example, getting sensible amendments occasionally to the US Constitution would seem responsible and normal rather than impossible and dangerous even to attempt."* —Brand

The games happened for a few years in the San Francisco Bay Area. That Earthball was a 6-foot-wide rubber-and-canvas sphere painted with the continents and oceans and clouds. And, as a book about the games explained, it attracted people "like the force of gravity." "Everyone welcomes the chance to play with the planet, whether they are kicking or hugging it ... An all-out game of Tournament Earthball might reveal the very core and essence of world conflict." (It was also dazzling to me as a 5-year-old.)

Surveying the landscape that formed and energized WIRED, you can't avoid the mythic stuff of Brand: He was one of Ken Kesey's [Merry Pranksters](#), as immortalized in Tom Wolfe's *Electric Kool-Aid Acid Test*. He worked with Douglas Engelbart on "[The Mother of All Demos](#)," which in 1968 introduced hypertext, email, the mouse. He created the *Whole Earth Catalog* and its

descendants; he founded *CoEvolution Quarterly*. He helped start [the Well](#). He's written tech books and science books (and many, many articles).<sup>2</sup>

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<sup>2</sup> "How mass use of computers might go is not even slightly known as yet, except for obvious applications in the schools. One informative place to inquire is among the hackers, particularly at night when they're pursuing their own interests." —Brand, *Rolling Stone*, 1972

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He helped start the [Long Now Foundation](#) to get people thinking really, really long term. (The group is working on the 10,000-year clock.) He cofounded Revive and Restore, a group using biotech for wildlife conservation, climate adaptation—and to bring back extinct species.

You get the picture.

For our 25th anniversary, I wanted to talk to Brand. Partly because he was an apparitional presence through my childhood; my father, a photojournalist, spent a lot of time with him, shooting the photos for *The Electric Kool-Aid Acid Test* and taking pictures for the *Whole Earth Catalog* and covering other Brandified events like the New Games. But mostly, I wanted to talk to Brand because, at 79, he sizzles and sparks when he talks about the future.

## **On the Tools he's excited about:**

One of the initiating ideas of the *Whole Earth Catalog* 50 years ago was Buckminster Fuller's concept that human behavior was pretty damn stable—as in very, very hard to change. Fuller didn't have much patience with politics or politicians or various kinds of social engineers who he thought were basically trying to change something that resists change very actively. But tools, he said, are easy to change.<sup>3</sup>

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<sup>3</sup>In the *Planet Economics* section of 1974's *Whole Earth Epilog*, John Holt wrote, "A society of large tools cannot be democratic, egalitarian, socialistic, humane, and just. It must be hierarchical, exploitative, bureaucratic, and authoritarian. If the day comes when all of humanity's wants can be supplied by a few giant tools, the people who tend them will rule the world."

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The tools that I'm paying attention to right now: [biotechnology](#). And [artificial intelligence](#). And I'm gradually getting acquainted with [blockchain](#) and its possibilities. Those three domains—all of them code-based, two of them digital—are once again potentially revolutionary technologies that are on some kind of an S curve that feels like a J curve right now. How high it goes or how steep it gets is to be seen, but it feels still like early days for each.

Twenty-five years ago we were talking up [nanotechnology](#). It was coming on strong. WIRED was doing articles on nano. Then it just got beat out by the nanotechnology that's been around for about 3.5 billion years: biology [*Laughs*]. We figured biotech was coming and nanotech was coming, and whichever one takes off first will determine much of the future.<sup>4</sup>

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<sup>4</sup> *“Think about the prospects of quantum computing and DNA computing—which is just emerging as potentially practical. DNA storage is on the order of at least 100,000 times denser than ordinary digital storage, and far more stable. I like DNA storage because it's an even more direct blending of the two forms of code: digital code and bio code.”* —Brand

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Most of biotech played out in medicine, where all the urgency and money are. That helped it surge ahead—human genome, [Crispr](#), gene therapy, the like. (Nanotech developed new materials but not yet nanomachines, but there's lots more promise to come in nano.) As a biologist, I'm glad biotech took the lead.

There was a sense that biotech might be more organic and messy (and nano more mechanical and programmable). So is the future organic and messy? Yeah, I would say it is. How genetics and development actually work, it's a mess. It consists entirely of hacks and patches all the way down. It's not modular. It's not agile. It's not anything that an engineer would recognize; it's just crap that runs. So when you go to try to reverse-engineer it, you can't. It's no good, because it was never engineered in the first place. So how do you devolve what has been evolved? That's like trying to unstir the coffee.

We're running into that mess now with some issues that we humans have caused, like invasive diseases. In biology, you can never understand the whole system. But that's OK. You don't have to understand the whole system in order to affect it usefully. That's how human medicine works. We don't understand that whole system, but we have gotten to the point where we can do useful things to keep people from dying from this and that, or keep their teeth going, or whatever it might be.

## **On Reviving Extinct Species:**

A lot of us who are messing with where technology could go, we like to keep our reach just far enough in front of our current grasp. You asked, Is it exciting? You bet it's exciting when you can feel your way toward "my God, this is becoming possible." And then you say it out loud. But you can't be a science fiction author; you've got to actually deliver it.

And those extinct species, they will come. I'm completely confident. Probably not in my lifetime, but in yours. You will see the return of woolly mammoths and eventually woolly rhinoceroses and maybe cave lions in the far north. One precedent is the cryopreservation of cells and DNA from endangered species—something that many people have been doing for about 35 years now, starting with the San Diego Zoo, who we work closely with. In fact, we're bringing back to life two of the black-footed ferrets that they biopreserved about 35 years ago.<sup>5</sup>

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<sup>5</sup>*"When we disturb nature at its own scale—as with our 'extinction engine' and greenhouse gases of recent times—we risk triggering apocalyptic forces. Like it or not, we now have to comprehend and engage the still Longer Now of nature."* —From Brand's book *The Clock of the Long Now: Time and Responsibility*, 1999

They'll be identical twins of the ferrets who died. Amazing.

Ben Novak, an obsessive young scientist who joined Revive and Restore when we started a little more than five years ago—he's one of the young people I'm

watching right now. He grew up in North Dakota and won the local science fair. His nice little science fair project was bringing back the dodo. And by the way, he probably *is* going to bring back the dodo, which was a very large pigeon. I think that will happen soon enough.

## On Artificial Intelligence:

I don't worry about AI. It's a tool. I wear hearing aids, and it's not like I'm going to hate them [*Laughs*]. I can hear you because of them. I mean, I guess it's OK if there are people who are worried. It's true that the step from single-shot rifles to clips to machine guns brought a high degree of lethality, but individuals mostly don't want to kill each other. It's not like people are going to go out and burn torches outside AI labs. So far it's pitchforks-down about AI.

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But here's what interests me: There is a guy I'm watching, Judea Pearl—he wrote *The Book of Why*—and he's saying that we've been so enthralled by being able to mine data and use Bayesian algorithms and the like to get data to sit up and speak to us. Pearl's argument is, yeah, that's a great start; you can beat somebody at chess, you can beat them at Go. But those systems are devoid of

explanation, and devoid of understanding cause and effect. He argues that we let lag the possibility of finding out if there is a kind of geometry of cause and effect. Pearl's spent a few decades proving that, yeah, there probably is.

That's where morality comes from: Understanding the effects that might come from things that you do. And the whole runaway paper-clip-machine notion—the idea that even an AI optimized for the apparently harmless goal of collecting paper clips would eventually obliterate Earth—is based on machines that cannot understand themselves. My understanding of consciousness is that it's a system that has a model of itself—a system that engages our sense of how things can play out, and then adjusts to act accordingly. If we build rigorous capabilities of understanding cause and effect into computers, it would give them the ability to be introspective and moral, and talk to us in terms we understand.

## **On Bad News and Good News:**

The bad news is cyberwar. It's looking extremely powerful. It doesn't have any rules yet. And it will only get rules through some pretty wretched excesses and disasters. And it's going to take the world pretty much understanding and acting as one—which has never happened before. But I'm hopeful. Kevin Kelly's line is that it's pretty obvious we're going to have to have global governance. That is what it will take to develop the rules of cyberwarfare.

And here's my hopeful version: Climate change is forcing humanity to act as one to solve a problem that we created. It's not like the Cold War. Climate change is like a civilizational fever. And we've got to find various ways to understand the fever and cure it in aggregate.

All this suggests that this century will be one where a kind of planetary civilization wakes up and discovers itself, that we are as gods and we have to get good at it.<sup>6</sup>



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<sup>6</sup> *“We are as gods, and may as well get good at it. . . . . . include losing the pride that went before the fall we are in the process of taking. Rolling with such a fall is our present lesson—learning whatever resilience, ingenuity, basic skills, and enthused detachment that survival requires. And learning perhaps to reverence some Gods who are not as us.”*—Whole Earth Epilog

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One of the advantages of climate change is it forces you to think long term, because there’s nothing you can do this week to solve climate change by next week. Not going to happen. If we were able to somehow shut off excess greenhouse gases right now, the ocean is such a flywheel it’s going to keep on rising for a long time. So OK. The cities with innovation and economic engines are on the coasts, where the water will come. That means we’re all going to become smart Dutch engineers, solving problems at a large infrastructure scale, because we’ll be forced to.

Sea level rise and the other climate change issues, I think, get humanity into a joint problem-solving mode that will be massively beneficial in the long run, at the century scale.<sup>7</sup>

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<sup>7</sup> *“Whenever the ball approached a goal, players from the winning side would defect to lend a hand to the losers ... That first Earthball game went on for an hour without score. The players had been competing, but not to win. Their unspoken agreement had been to play, as long and as hard as possible.”*—The New Games Book, 1976

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Of course, it’s hard to see how the swim the Republicans are in now plays out. It is one of the most fascinating times in American history, because you have three branches of government all in the hands of one brain-dead party. What happens? [*Laughs.*] But I think that you can have a lot of dysfunction at the federal government level, and also have a whole lot of civic health and innovation going on in the city and town level.

Cyberwar, climate: We can see the problem but we can’t see the solution. So the problem fills our minds. But here’s the thing: Solutions don’t have to fill everybody’s mind—they just have to fill enough minds so that we can work them out. I see this as a fantastic century to be alive, where the problems are

very well understood. And we always surprise ourselves with our abilities to solve problems.

I think this is really going to be a global century. And I can't help thinking that's good news. —*As told to Maria Streshinsky*

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