

Select quotes from *Superconvergence: How the Genetics, Biotech, and AI Revolutions Will Transform Our Lives, Work, and World*

If the nineteenth was the century of chemistry and the twentieth that of physics, the twenty-first is clearly the century of human engineered intelligence and reengineered biology.

Although it may seem like addressing existential questions about the future of human-engineered life is bigger than each of us, they will need to be answered by all of us. Like a Seurat painting where the dots create the image, all of us is made up of each of us times eight billion.

We may not as individuals have consciously chosen to give our species godlike powers to transform life as we know it, but, whether we like it not, we now have them. How we use them is our choice.

The brain capacity of any one human is not radically different than that of our ancestors tens of thousands of years ago. The reason we're mining asteroids and they weren't isn't that any one of us is smarter than they were, it's that we benefit from a far greater body of accrued knowledge than they did. If we had a time machine and swapped babies with them, their babies would be genome editing life and ours would be picking gnats out of each other's hair.

Every innovation sits at the top of one pyramid of all the past innovations that made it possible and at the bottom of another pyramid of all future innovations to which it will contribute.

The cost of whole-genome sequencing went from 2.7 billion dollars for that first, low-quality sequence in 2003 to 4,000 dollars in 2015, to as low as 100 dollars today, a drop of 27 million times in just two decades. If the average cost of a cup of coffee had fallen by the same percentage over that same period of time, we could today be able to buy nine million coffees for a dollar. Since 2003, many tens of millions of people have had their genomes wholly or partially sequenced.

The embryo made by two 25-year-old parents is not 25 or 50, but, in biological terms, zero. The biological clock ticks in both directions.

Let's get one thing straight.

If you are a tree-hugging, nature-loving, Birkenstock-wearing hippie who only eats sustainably grown, locally sourced, non-GMO, organic fruits and vegetables, you are a radical biotechnologist.

If you are an indigenous subsistence farmer growing quinoa in the mountains of Peru using seed varieties passed down from your ancestors, you are a radical biotechnologist.

And if you are a scientist working in a cutting-edge lab gene editing new traits into various crops for one reason or another, you, too, are a radical biotechnologist.

All of agriculture is radical biotechnology. When we eat any type of domesticated plant we are eating radical biotechnology.

In ways that might seem counterintuitive to some naturalists, deploying advanced biotechnology, among other inputs, to make agriculture more productive and sustainable could make it possible for us to leave more wild spaces alone. Ramping up our application of radical biotechnology could open the door to fostering ever-greater swathes of undisturbed forests, wetlands, and other precious ecosystems.

A world where modern technology cannot be applied to agriculture is a world that will likely not be able to sustainably accommodate all humans at our current and anticipated population and consumption levels.

All of us, including the nomadic tribes in remote parts of the world and everyone else, were born into an age of genetically modified foods. Domestication, conventional breeding, genetic modification, and gene editing are, after all, just different ways of humans f-ing with plants. The question for us is not whether to genetically modify the domesticated crops we eat, but how best to do so wisely.

Our biological evolution makes our technological innovations possible which, in turn, increasingly drive our biological evolution.

We've supersized broiler chickens, making the average broiler chicken on a US farm five times bigger today than its ancestors were in the 1950s, so large that most of these chickens now hobble, when they have space to move, on legs barely able to support their weight.

Our choice is not between a natural state and a modified one but between different manifestations of human manipulation, each spurred by industrial processes at scale, each with its own unique mix of benefits and risks.

Our ancestors used the technologies of their day—fire, stone tools, and farming to name a few—to radically transform much of life on Earth. The result is a world most of them could not possibly have imagined.

Now the question we must ask ourselves is how we will use the technologies of our day to build a future for ourselves and future generations. It's too late for us to ask the question "technology: yes or no?" The question for us, yet again, is "technology: how best?"

Humans are the one species on Earth, and in the universe currently known to us, with the ability to imagine our future world into being. We've been doing this so completely and for so long that many of us have stopped noticing the extent to which we live in a world largely defined by our creativity and innovation. In light of this basic reality, not applying the most powerful technologies we possess in support of our principles is a foolish vote not for unadorned nature but for following the trajectory of our current status quo into oblivion.

If we only focus on racing forward, we will crash. But we will also crash if we cruise along with the status quo. Our goal cannot be to stop progress but to make sure we are moving forward as safely as possible.

Our technological progress is what makes our different futures possible, but it's up to us to turn our best visions into realities. Unless we do everything possible to ensure our most cherished values guide the application of our most powerful technologies, our seemingly greatest triumphs may well end up contributing to our undoing.

Because of the converging genetics, biotechnology, AI, and other revolutions, our world today stands at the beginning of a transformation that will prove, over time and in historical terms, every bit as profound as industrialization or the internet revolution and come at us with a far greater velocity.

Just like all our technologies sit at the top of one pyramid of all the past innovations that made them possible and at the bottom of another pyramid of all future innovations to which they will contribute, so too do we, our lives, and our ideas. We each live at the top of the pyramid of past knowledge and cultural development and at the base of the pyramid of what comes next.

Our new capabilities for engineering life, like our efforts developing artificial intelligence systems with vast capabilities we can't fully foresee, are creating new challenges that will need to be managed collectively if they are ultimately to be managed at all.

If we focus on realizing the great benefits of biotechnologies without considering the potential harms, the rewards of industrialization without addressing its downside consequences, or the positive magic of increasingly powerful technological ecosystems without factoring in the dangers, we will drift toward Armageddon on a mushroom cloud of hope.

Whether we like or even accept it or not, our fates are intertwined with each other, with all living beings, and with the health of our planet in our increasingly interconnected world.