Joel Garreau on Moore's Law

Is there anybody here old enough to remember when computer screens only came in black and white?
Is anybody here old enough to remember rotary-dial phones?
Is anyone old enough to remember what mimeograph machine fluid smelt like?
You know, is anyone here old enough to remember polio?
Well, the reason so many of these things sound so archaic—you know—that they're almost laughably archaic is that we've been going through a period of exponential change.
This is a change that involves not going up in a straight line but on a curve in which change is coming at us ever faster.
A lot of people are familiar with one example of this, which is called Moore's law.
There is a guy back in the mid sixties, named Gordon E. Moore, who was a physical chemist in California.
And this was—he was noticing in 1964—this was five years after the first commercial computer chip—that the number of transistors that you could get on a piece of silicon for a dollar had been regularly doubling every few months.
And he boldly projected that this increase would continue for another ten years.
Well, little did he know!
This ended up becoming Moore's—Gordon Moore ended up becoming one of the three founders of Intel, and he's now a bizillionaire many times over.
But he's probably going to be most remembered for what is now known as Moore's law, which is now the core faith of the entire global information technology industry.
And the way it's usually now stated is that the amount of computer firepower that you can buy for a dollar will double every eighteen months for as far as the eye can see.
Now, that's an amazing prediction, because it has major consequences.
And everybody has experienced this.
I mean, who hasn't looked at a whiz-bang computer at Christmas time—you know—that costs 2000 dollars, and it's got 512 of this and 60 gigs of something else and it's got—you know—just a multi-core, and it's a real fire breather, and the very next Christmas that exact same machine is available for 1300 dollars?
And the reason that is is because another way that Moore's law can be stated is that the price of any given amount of computer technology will drop in half every eighteen months, on a curve.
So this means that that fire-breathing 2000-dollar Christmas machine in ten years will be available for 31 dollars and 25 cents.
And you'll be able to get it free with a subscription to *Newsweek.*
And it will no longer be on the—on your desktop.
It will be your cell phone.
You know, cell phones now—an iPhone today has more computer firepower than did the entire North American Air Defense Command in 1965, when Gordon Moore first prophesied.
Now, this means about this curve—this change occurring on a curve, this has a lot of practical implications to people's everyday lives.
For one thing, it means that the last twenty years is not a guide to the next twenty years.
It means that the last twenty years is, at best, a guide to the next eight.
You know, if you want to look forward eight years, then think about where you were twenty years ago, and that's about right.
And the last fifty years is not a guide to the next fifty years.
It's, at best, a guide to the next fourteen.
And so—you know—when you're starting to think about what the future holds—you know—if you think that the future is going to be something like the past, well that's about the one thing you can confidently say it's not going to happen.
The one—now, this curve is nothing new.
It's been going on for a long time, throughout all of evolution.
I mean, if you look that the first organisms to the first mammals—that took about 400 million years—to get from the first organisms to the first mammals.
To get from the first mammals to the first monkeys took 150 million years.
From monkeys to chimps took 30 million years.
See how this is shortening?
For chimps to walk erect took 16 million years.

39 From walking erect to painting on cave walls in France took about four million years.
40 From painting on cave walls to first settlement—fixed settlement—took about 10,000 years.
41 See how the pace is picking up?
42 And then to writing took about 4000 years.
43 Now that is all biological evolution.
44 That's what Darwin was interested in.
45 And even that was—the pace was picking up.
46 But when we start to be able to write and have fixed settlement, then evolution kicked into an entirely different phase.
47 It's cultural evolution, 'cause we had a brand new way of storing and sharing and collecting our ideas beyond our little tribes into the—you know—the rest of the species.
48 Well, as soon as you kick into cultural evolution, the pace really begins to pick up.
49 From writing to the Roman empire takes about 4000 years.
50 To the industrial revolution takes about 1800 years.
51 From the start of the industrial revolution to the first flight—the Wright brothers—took 100 years.
52 And 66 years later we're on the Moon.
53 You know, and 20 years after that we're in the information age, wondering what the hell we've done here, and whether this is a good idea after all.
54 And, of course, what is interesting is that, as you enter this information age, this is where you start getting engineered evolution, this third phase.
55 First biological, then cultural, and now engineered evolution, or what I call radical evolution.
56 And this is the point at which we start taking control of our own evolution through our own technologies.
57 And this engineered evolution is what—really what I'm interested in.