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THE NEW HUMAN PENN JILLETTE
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RAY KURZWEIL

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Are you old enough to remember when computer screens came only in black and white? Do you own the kind of truck that guys at the hardware store always try to buy from you—a truck so old it not only sports just an AM radio but has no software in it at all? Can you remember when music players were composed of several fairly heavy boxes covered with laminated walnut and had to be wrestled up onto a high shelf? Are you old enough to remember the smell of mimeograph machine fluid?

If so, you have lived through the extraordinary changes of the last few decades of the 20th century. But this will be nothing compared with the changes through which your second-grade daughter is living. Imagine her a decade and a half from now, home for the holidays. You were so proud of her when she not only put herself through Ohio State but graduated summa cum laude. Now she has taken on her most formidable challenge yet: competing with her generation’s elite in her new law school. “What are your classmates like?” you ask.

“They’re all really, really smart,” she says. She thinks of the stars in her contracts class. How does she explain to you what these people are like? Her classmates have amazing thinking abilities. They’re not just faster and more creative than anybody your daughter has ever met but faster and more creative than anybody she has ever imagined. They have photographic memories and total recall. They devour books in minutes. They talk casually about living a very long time, perhaps being immortal. They’re always discussing their next lives. One fellow mentions how, after he makes his pile as a lawyer, he plans to be a glassblower, after which he wants to become a nanosurgeon. One of her new friends fell while jogging, opening a gash on her knee. Your daughter freaked, ready to take her to the hospital. But her friend stared at the wound, focusing her mind on it. Within minutes the bleeding stopped. This same friend has also been vaccinated against physical suffering. She never feels acute pain for long.

Your daughter’s new friends are polite to her when she can’t keep up with their conversations, as if she were handicapped. They can’t help but condescend, however, when she protests that imbedded technology is not natural for humans.
OUR SINGULAR FUTURE
Ray Kurzweil, author of The Singularity Is Near: When Humans Transcend Biology, was inducted in 2002 into the National Inventors Hall of Fame.

In the mid-1980s inventor Ray Kurzweil predicted that a few interconnected computers used by scientists would serve as the basis for a worldwide communications network. At the time it seemed far-fetched, but Arpanet evolved into the Internet. Kurzweil subsequently postulated the law of accelerating returns, which holds that information technology increases exponentially, doubling every year. He later predicted that computers would exceed human intelligence, eventually reaching a point—the singularity—at which civilization would fundamentally be transformed. In his new book, The Singularity Is Near, Kurzweil explores the implications of that change. He believes our bodies will evolve as much as our machines. In fact, he predicts a clear separation will no longer exist between the two. “If you describe what human beings enhanced with this technology will be capable of some decades hence,” Kurzweil says, “they would appear like gods to us today.”

PLAYBOY: What is the singularity?
KURZWEIL: It’s a metaphor borrowed from physics, which in turn had borrowed it from mathematics. In physics it’s a point of profound transformation, a rupture in space-time. There’s an event horizon around it that’s hard to see into. But the historical singularity is an event that will occur, in my estimation, in about 49 years. It will be a profound transformation of human civilization caused by the emergence of nanobiological intelligence billions of times more powerful than unenhanced biological intelligence.

Underlying all this is the observation that information technology grows exponentially. Bandwidth, the price-performance ratio of computers and the size of the Internet all double every year. That’s true of all kinds of information. For example, the amount of DNA sequencing we’re doing doubles every year. The resolution of brain scanning doubles every year.

PLAYBOY: What if there’s a limit to Moore’s law, which says computing power doubles every 18 months?
KURZWEIL: Certain things follow predictable trends. Moore’s law will reach a limit, it’s estimated, in 2020. But every time we’ve come to the end of one paradigm, we reach another. Moore’s law was the fifth paradigm. The third was vacuum tubes; the fourth was transistors. The sixth will be three-dimensional molecular circuits. One cubic inch of nanotube circuitry, for example, would be 100 million times more powerful than the human brain.

PLAYBOY: But will it be better than the human brain?
KURZWEIL: We’ll take the power of human intelligence—our ability to recognize (concluded on page 134)

FUTURE SHOCK

“Prediction is very difficult,” said physicist Niels Bohr, “especially of the future.” But according to futurists, we are on the verge of astonishing developments. Here are four innovations we should see in the next decade.

ENHANCED EYES Some time after 2010 active contact lenses will be used to produce computer-generated overlays on what we see in the real world. “Even if your partner’s physical appearance is not quite up to your hopes,” writes Ian Pearson, futurist for British Telecom, “it could be digitally enhanced with something closer to your dreams.”

MY ROBOT By 2010 all-purpose robots should be available for common household tasks. Carmakers (Honda, Toyota) will lead the way. Hans Moravec of Carnegie Mellon predicts that by 2025 the robot market will be larger than the market for automobiles.

DIGITALIZATION OF PHYSICAL OBJECTS Not only will information be convertible to digital codes, but atoms will be as well. This process may take a few years, but it will allow three-dimensional printers to use organic inks to create logic circuits or spray down individual atoms. “An example would be 3-D printing of organic tissue,” says futurist Jeff Harrow. “The day will come when you can replicate on a printer a new liver that won’t be rejected.”

ACTIVE SKIN According to Pearson, by the end of this decade we will be able to build ID and memory chips, sensors and short-range communications devices smaller than human skin cells. These will be printed on or blasted into the upper layers of the skin and arranged into circuits so that electronic devices such as cell phones, keyboards and MP3 players can be embedded into your forearm, the back of your hand or your wrist.
Nanobots like the tiny robot pictured at right will soon be able to perform medical procedures inside the body.
People from 40 to 80, maybe a little older, can extend their longevity by hanging in there for a little longer.

playboy: What if people don’t want to become more nonbiological? What if they can’t afford it?

kurzweil: There are always early and late adopters, but I think it’s going to be a slippery slope. Some conservative applications will be about just keeping you healthy and doing routine things like expanding your memory. Very few people will eschew those enhancements. How many people won’t use eyeglasses? When technology is introduced, only the wealthy can afford it and it doesn’t work well. A few years go by, and it’s expensive and works a bit better. Eventuallly it’s not that expensive and works well. Not so long ago, if someone took out a mobile phone, it meant he was a member of the power elite.

playboy: And you think all this technology will radically extend human life?

kurzweil: In the book I wrote with Tety Grossman, Fantastic Voyage: Live Long Enough to Live Forever, we talk about bridges to radical life extension. Bridge one is what we can do today. I think people from 40 to 80, maybe a little older, can extend their longevity by hanging in there for a little longer. The point of bridge one is to be in good shape for 10 or 15 years, when bridge two comes along.

playboy: How do you do that?

kurzweil: Aging is not one thing; it’s a number of processes. We have strategies for slowing down each of the dozen aging processes. The programs we prescribe depends on which health issues you have. Disease doesn’t come out of the blue. You can catch it. Find out where you are in certain measurements of health before you get cancer or a heart attack, a third of which are fatal.

playboy: What happens if you make it to bridge two?

kurzweil: Bridge two will be the mastery of our biology, being able to turn genes on and off. One of those genes, the fatty acid receptor gene, says, “Hold on to every calorie because the next hunting season may not turn out so well.” We’d like to turn that off. That technology will reach maturity in 10 to 15 years. This will bring us to the third bridge, which is nanotech, with which we can not just refine and reprogram biology but can go beyond it altogether. One killer app is nanobots, blood-cell-size devices that can go inside our body and brain and keep us healthy. We have already put microscopic machines into animals. If you apply these exponential trends, which I maintain are quite predictable, we’ll be able to have sophisticated computerized devices in our bloodstream, performing very sophisticated functions.

playboy: But the notion that life is limited has always been one of the principles that define what it means to be human.

kurzweil: I don’t think we need to give up on giving life meaning. There are different concepts of what it means to be human. My concept is different: We’re a species that goes beyond our limitations. We didn’t stay on the ground, we didn’t stop on the planet, and we didn’t stay within the limitations of our biology. Extending human longevity is not a new story. Human life expectancy was 37 in 1800. Sanitation and antibiotics brought it into the 60s and now it’s in the 80s. We’ll have another major jump in longevity when we reprogram our genes, turning off genes with RNA interference, turning on genes with gene therapy, turning enzymes on and off—things I believe we’ll master in 15 years.

playboy: Will this make us happier?

kurzweil: I’m not confident we’ll overcome human conflict. Some people think that because I talk about this technology’s problem-solving ability, it is a utopian vision. But I think we will introduce new problems along the way. Also, I don’t think that just being happy is the right goal. A salamander may be happy, but its life is not very interesting compared with our life. Would you rather be a happy salamander or have a dynamic life of accomplishment and challenge? The meaningful thing in life is creating knowledge. I don’t just mean random bits of data but knowledge—like art, music, poetry, literature or even our relationships and the way we express ourselves.

playboy: What will sex be like in 20 or 25 years?

kurzweil: These technologies will have a profound impact because sex and intimacy involve all five senses. By 2020 we’ll have perfected virtual reality that can be delivered from outside the body. We’ll have images written to our retinas, and we’ll be able to enter a full-immersion virtual-reality environment. So you could be with someone else from a sensory perspective. You’ll feel as though you’re really with that person. You could take a walk on a virtual beach. The whole idea of what it means to have a sexual relationship will be different. It will certainly change the whole idea of sex workers. But what’s really interesting is that we’ll eventually have virtual reality from inside the nervous system. We’ll have nanobots that go inside the brain, shut down signals coming from your senses and replace them with the signals your brain would be receiving if you were in a virtual environment. And you could go to this environment with one other person and have a sensual encounter involving all five senses. You could be someone else. A couple could turn themselves into each other. Ultimately it will be highly realistic and competitive with reality.

—ROBERT LEVINE