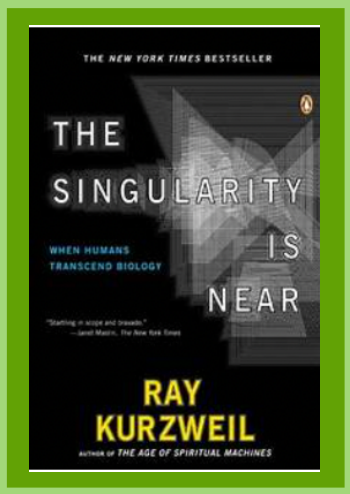

Thoughts from Linda:

The Singularity is Near

Ray Kurzweil

2005

According to the American dictionary, Singularity: "A hypothetical moment in time when artificial intelligence and other technologies have become so advanced that humanity undergoes a dramatic and irreversible change."

Singularity, according to Ray Kurzweil: "A future period during which the pace of technological change will be so rapid, its impact so deep, that human life will be irreversibly transformed."

This book was a gift to me from a dear friend and colleague, Barry Rosen, many years ago. Knowing that I enjoy, and am fascinated about, reading and researching 'the future,' he passed this book along to me in 2009 or so. I well remember being so fascinated with books like *1984* and John Naisbitt's 1991, *Megatrends*. Long before Ted Talks, my husband, Tony, and I annually attended a remarkable renaissance event every October in Camden, Maine called PopTech, managed initially by a futurist/designer and all-around 'renaissance man,' Andrew Zolli. It was here in the early part of the century when we learned of nanotechnology, personal manufacturing of devices, and even heard a presentation by a young Elon Musk.

This book was written in 2005 by Ray Kurzweil, who I would say is most like a modern-day Leonardo da Vinci (1452--1519). It follows his earlier book, *The Age of Spiritual Machines*, where he posited that the rapidly accelerating rate of technological change was leading to computers with intelligence to rival, if not surpass, humans. I understand that his next book, *The Singularity is Nearer*, is due out in 2022, so reading this first one might be a smart idea.

Kurzweil grew up in the New York City borough of Queens, having emigrated with his family from Austria just before World War II. His father was a concert pianist, a noted conductor, and a music educator, and his mother, a visual artist.

Kurzweil was a child prodigy, having become an inventor at the age of five. As a young boy, he had an inventory of parts from various construction toys given him and old electronic gadgets he'd collected from neighbors. At the age of eight, he built a robotic puppet theater and robotic game. In his youth, Kurzweil was an avid reader of science fiction literature.

He was involved with computers by the age of 12 (in 1960) when only a dozen computers existed in New York City. He built computing devices and statistical programs for the predecessor of Head Start. At the age of fourteen, Kurzweil wrote a paper detailing his theory of the neocortex. There is not enough space to document the many accomplishments of his life in this review, but I encourage you to check him out if you are not aware of him. He is also available in Ted Talks and on his website.

He is described as a 'radical optimist' even though you may find some of his ideas shocking or disturbing. The main point is that we are pretty close (this was in 2005) to a time where man and machine will merge, and we'll enter something he calls "The Fifth Epoch" on our way to the Sixth.

Here's how he describes this Fifth Epoch: "It is the merger of human technology with human intelligence… looking ahead several decades, the Singularity will begin the Fifth Epoch. It will result from the merger of the vast knowledge embedded in our brains with the vastly greater capacity, speed, and knowledge-sharing ability of our technology. The Fifth Epoch will enable our human-machine civilization to transcend the human brain's limitations of a mere hundred trillion extremely slow connections. It will allow us to overcome age-old human problems and vastly amplify human creativity. We will preserve and enhance the intelligence that evolution has bestowed on us while overcoming the profound limitations of biological evolution. Singularity will also amplify the ability to act on our destructive inclinations, so its full story has not yet been written."

It makes you wonder about Epoch Six. What could be next?

You can find the headlines of it on page 21 and the full explanation in Chapter 6, titled "On the Intelligent Destiny of the Cosmos." He speculates that we will circumvent currently understood 'laws of science' such as the speed of light. He believes that in this epoch, that "intelligence, derived from its biological origins in human brains and its technological origins in human ingenuity, will begin to saturate the matter and energy in its midst. It will achieve this by reorganizing matter and energy to provide an optimal level of computation to spread out from its origin on Earth."

He contends that this is the ultimate destiny of the Singularity and the universe.

The book has nine significant chapters, with titles such as A Theory of Technology Evolution, The Law of Accelerating Returns, Achieving Computational Capacity of the Human Brain, Achieving the Software of Human Intelligence: How to Reverse Engineer the Human Brain, and The Impact.

He does have a strong 'track record' of seeing predictions come to pass. And he does not shy away from continuing to make them. In 2005, he foresaw the 3-D revolution in virtual reality.

He went further and noted that with radical life extension would come radical life enhancement. He predicted in 2005 that within ten years, we would have the option to spend some of our time in 3D virtual environments that appear just as real as reality itself, which indeed did happen. But he noted that these would not yet be made possible via direct interaction with our nervous system. "If you look at video games and how we went from pong to the virtual reality we have available today, it is highly likely that immortality, in essence, will be possible." He believes that 20 to 25 years from now, we will have millions of blood-cell-sized devices, known as nanobots, inside our bodies fighting against diseases, improving our memory and cognitive abilities.

Kurzweil says that a machine will pass the Turing test by 2029 and that around 2045, "the pace of change will be so astonishingly quick that we won't be able to keep up unless we enhance our intelligence by merging with the intelligent machines we are creating." Kurzweil states that humans will be a hybrid of biological and non-biological intelligence that becomes increasingly dominated by its non-biological component. He stresses that "AI is not an intelligent invasion from Mars. These are brain extenders that we have created to expand our mental reach. They are part of our civilization. They are part of who we are. So, over the next few decades, our human-machine civilization will become increasingly dominated by its non-biological component."

In 2008, in an expert panel in the National Academy of Engineering, Kurzweil said that solar power would scale up to produce all the energy needs of Earth's people in 20 years. According to Kurzweil, we only need to capture 1 part in 10,000 of the energy from the Sun that hits Earth's surface to meet all of humanity's energy needs.

He was referred to as "the ultimate thinking machine" by *Forbes* and as a "restless genius" by *The Wall Street Journal.* PBS included Kurzweil as one of 16 "revolutionaries who made America" along with other inventors of the past two centuries. *Inc.* magazine ranked him #8 among the "most fascinating" entrepreneurs in the United States and called him "Edison's rightful heir."

Yes, this is a heavy-duty read. And it is a remarkable experience to go with him on this journey.

I will leave you with these quotes and highly suggest you take this one on.

From Kurzweil: “When scientists become a million times more intelligent and operate a million times faster, an hour would result in a century of progress (in today’s terms).”

From Mark Miller (Computer Scientist) to Eric Drexler in 1986: “You know, things are going to be really different! No, no, I mean really different!”