

# Futurists

Tony Scarlatos

# Notoriously Wrong Forecasts

- Weather
- Stock & Commodity Prices
- Election Results
- Astrology & Tarot Card Readings
- Apocalypse
- These predictions tend to focus on the near-term.



# Technology is Hard to Predict – Even for Technologists

"Heavier-than-air flying machines are impossible."

- *Lord Kelvin, British mathematician and physicist, president of the British Royal Society, 1895*

"There is no likelihood man can ever tap the power of the atom."

- *Robert Millikan, American physicist and Nobel Prize winner, 1928*

"I think there is a world market for maybe five computers."

- *Thomas Watson, chairman of IBM, 1943*

"640K ought to be enough for anybody."

- *Bill Gates, co-founder of Microsoft, 1981*

# What is a Futurist?

“Futurists are scientists, researchers, inventors, and social scientists whose specialty is to attempt to systematically predict the future, whether that of human society in particular, or of life on earth in general.”

- *Wikipedia*

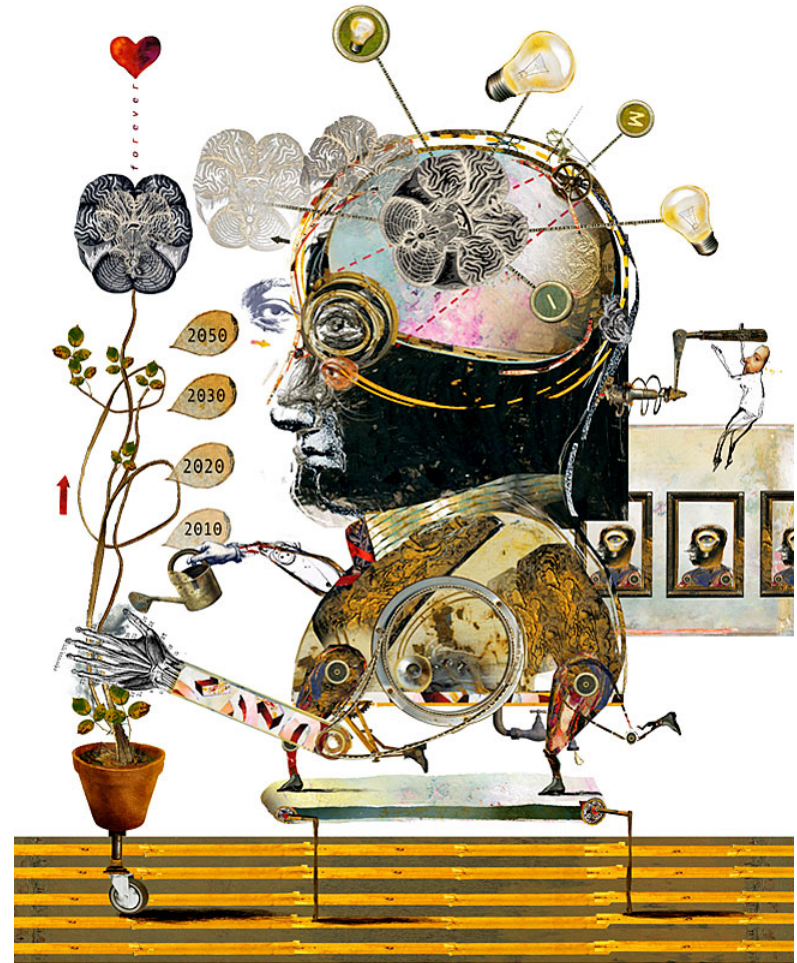


Illustration by Bruno Mallert for the NY Times

# Don't confuse with Futurism

A label adopted by the Italian and Russian futurists:

The artistic, literary, and political movements at the turn of the 20<sup>th</sup> century which sought to reject the past, and embrace speed, technology, and (possibly violent) change.

Emphasis on *dynamism*.

Influenced a variety of movements, from Cubism to Fascism.



"Unique Forms of Continuity in Space",  
by Umberto Boccioni, 1913

# Futurism Manifesto

“It is from Italy that we launch through the world this violently upsetting incendiary manifesto of ours. With it, today, we establish Futurism, because we want to free this land from its smelly gangrene of professors, archaeologists, ciceroni and antiquarians. For too long has Italy been a dealer in second-hand clothes. We mean to free her from the numberless museums that cover her like so many graveyards.”

- Filippo Tommaso Marinetti, *The Founding Manifesto of Futurism* (1909)

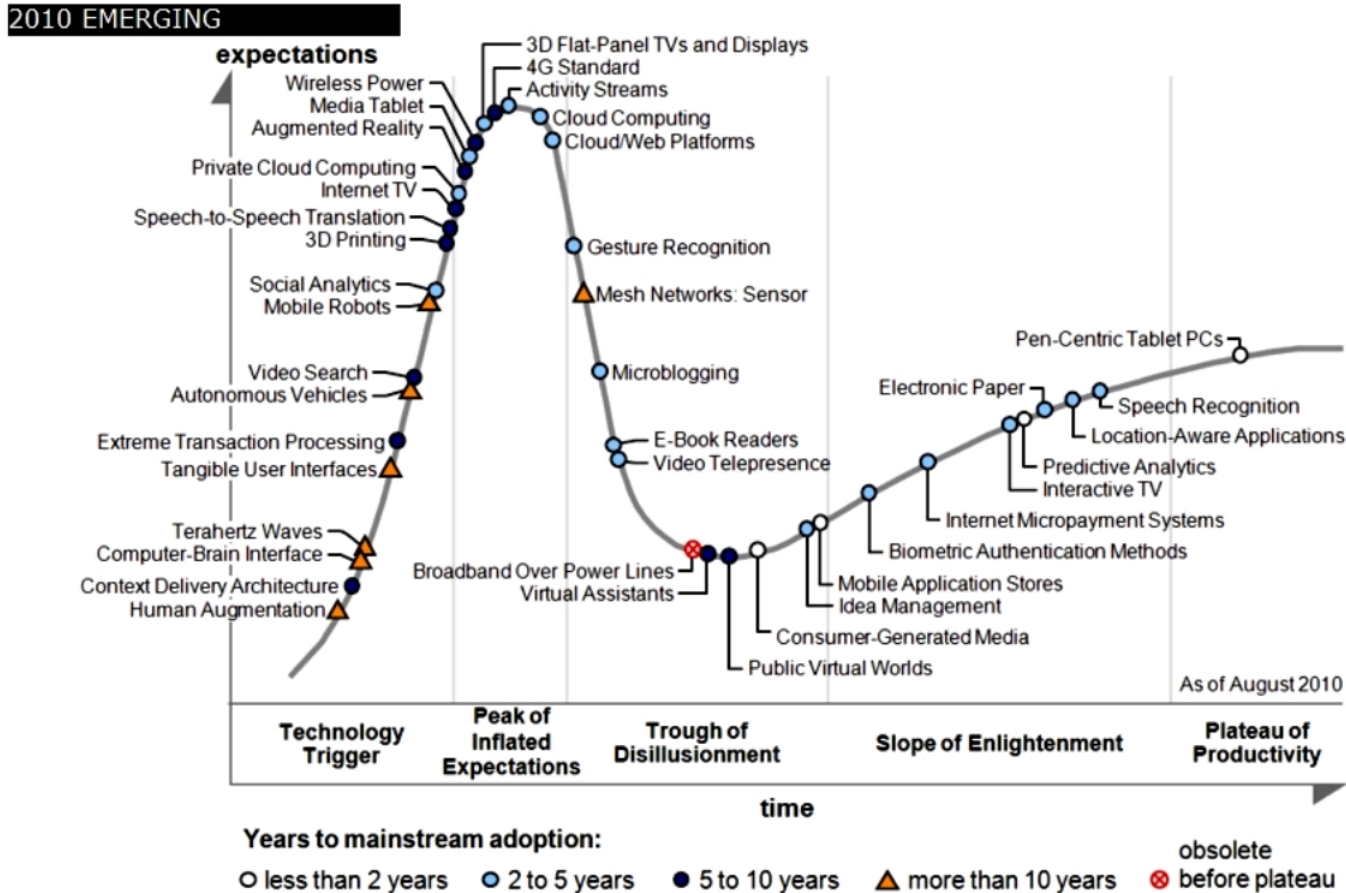


# Modern Futurology

In the mid-1940s the first professional "futurist" consulting institutions like RAND and SRI began to engage in long-range planning, systematic trend watching, scenario development, and visioning, at first under WWII military and government contract and, beginning in the 1950s, for private institutions and corporations.

Dennis Gabor's *Inventing the Future* in 1964 is considered a key early work, and the first U.S. university course devoted entirely to the future was taught by futurist Alvin Toffler at The New School in 1966.

# Example: Gartner's "Hype Cycle" for Emergent Technologies





# Futures Studies

- Institute for the Future, Palo Alto, CA
  - Think Tank spun off from RAND Corp. in 1968
  - Founded by Paul Baran, Internet Pioneer and co-developer of packet switching technology
  - Issues a Ten Year Forecast, Technology Horizons, and Health Horizons for primarily Fortune 500 companies
- Singularity University, NASA Research Park at Moffett Field, CA
  - First Graduate Program begun in 2009
  - Ray Kurzweil is one of the founders
  - Founding partners include NASA, Google (Sergei Brin), Nokia, Autodesk, LinkedIn, and the X-Prize Foundation (Peter Diamandis)
  - Notable faculty include Will Wright (developer of the Sims), Bob Metcalfe (3Comm founder), and Vint Cerf (developer of TCP/IP technology)

# Singularity University



# The 3 P's & 1 W of Futures Studies

**Possible**

**Probable**

**Preferable**

**Wildcard**

“Futures studies is the study of postulating possible, probable, and *preferable* futures, and the worldviews and myths that underlie them. It is considered a branch of the field of history.

Futures studies does not generally focus on short term predictions such as interest rates over the next business cycle, or on strategic planning with time horizons of a few years.”

# My List of Futurists

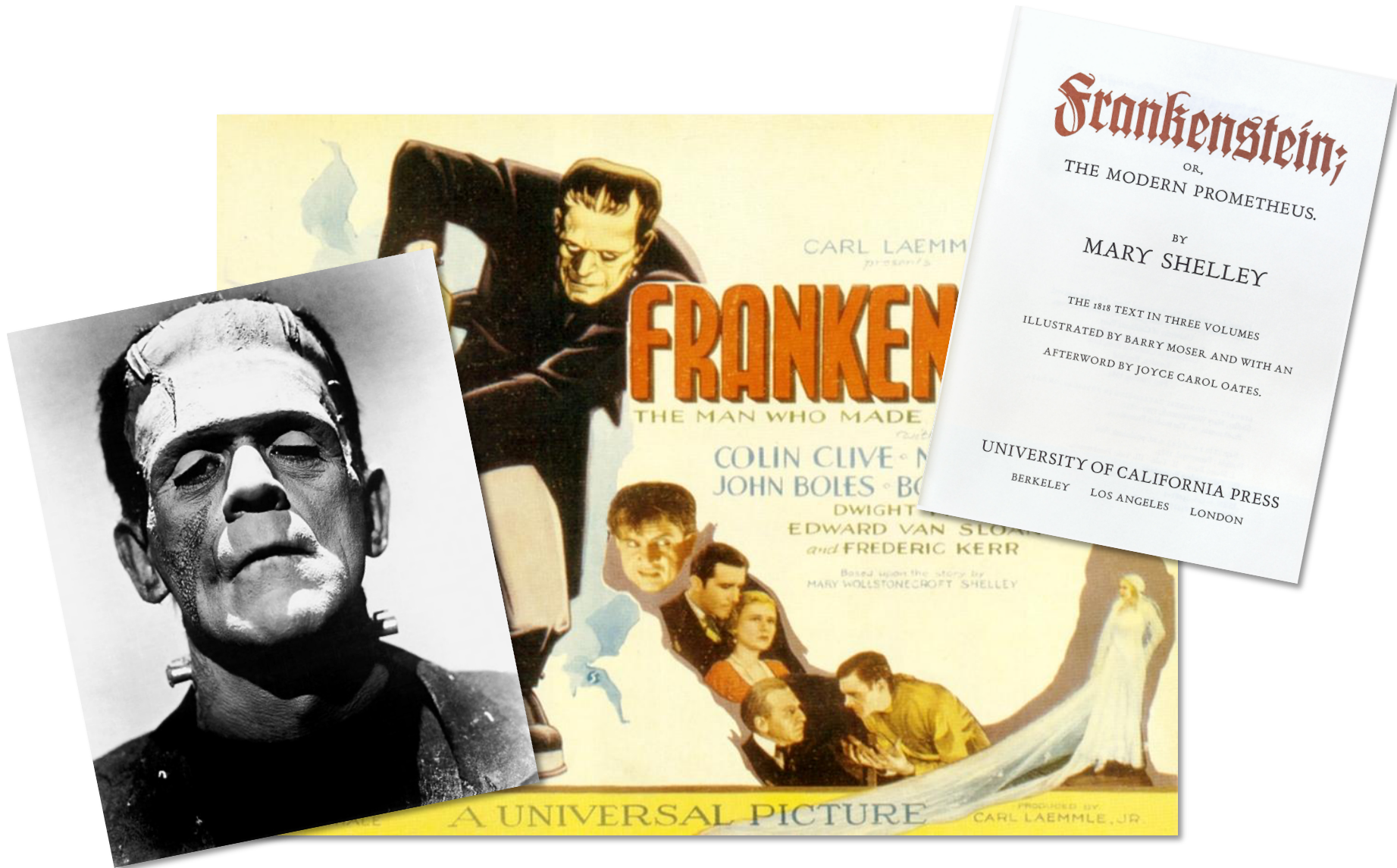
- This is not a list of visionaries per se. Many inventors did not make the list (da Vinci, Babbage, Edison...) because the focus of their work was primarily on technological advances, not societal progress.
- Some authors were excluded (Sir Thomas More) because their interest was more in societal change than in technological advancement.
- My list then, is a compilation of individuals who not only envisioned technological change, but who also considered its implications on society.

# Mary Shelly



- August 30, 1797 – February 1, 1851
- Author of “Frankenstein: or, The Modern Prometheus” (1818), which is considered to be the first science fiction novel.

# Frankenstein in popular culture

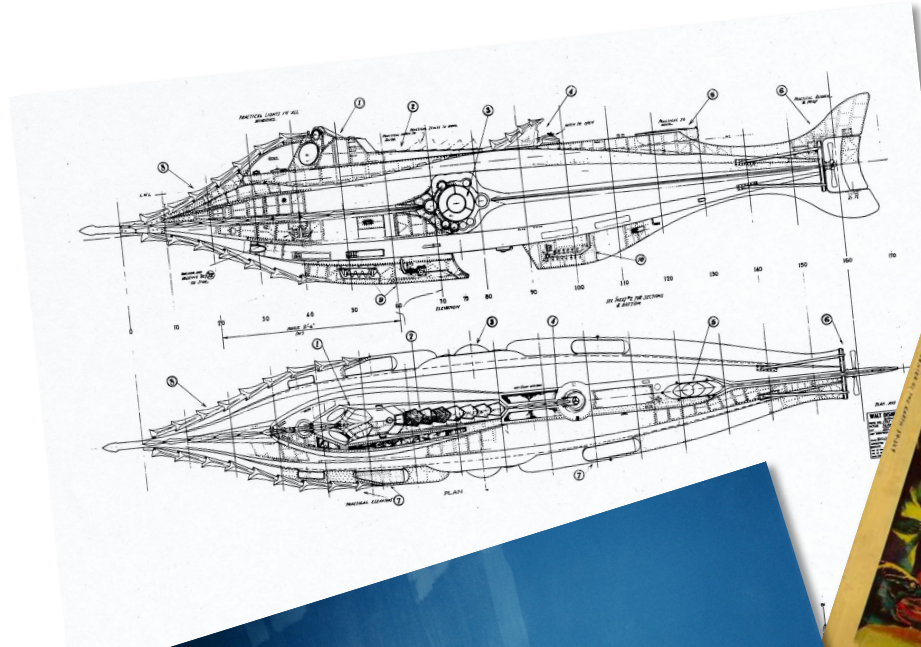


# Jules Verne



- February 8, 1828 – March 24, 1905
- Author of “Journey to the Center of the Earth” (1864), “From the Earth to the Moon” (1865), and “Twenty Thousand Leagues Under the Sea” (1870), among many other novels.
- Verne envisioned explorations by submarine and spacecraft decades before they were realized.

# Verne's stories in popular culture





# H. G. Wells



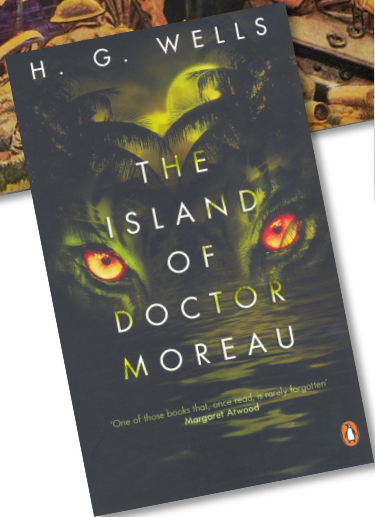
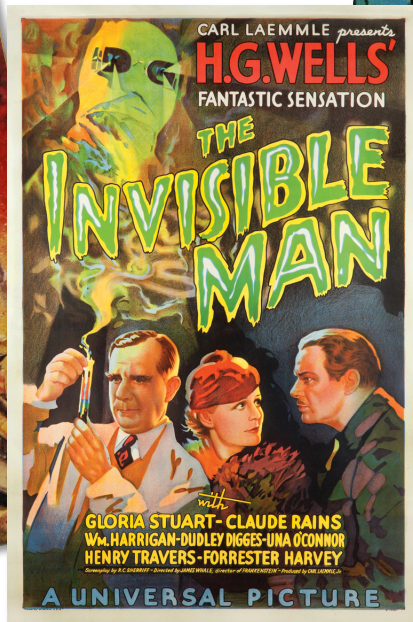
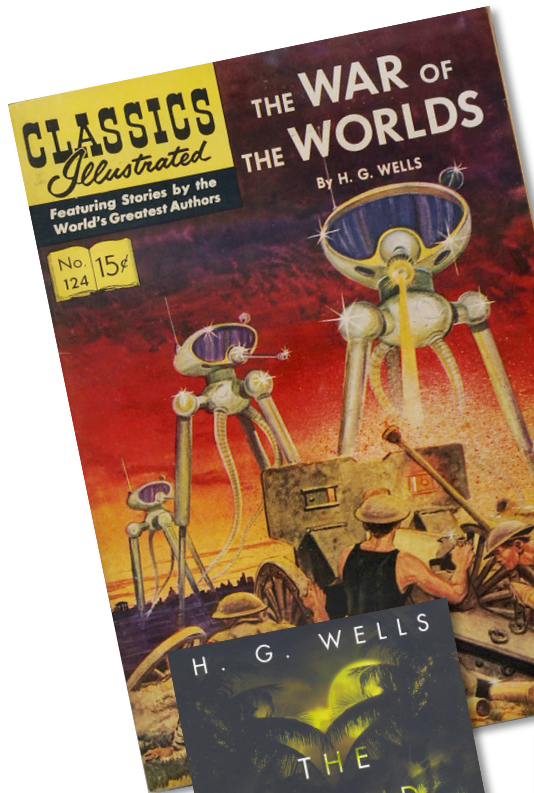
- September 21, 1866 – August 13, 1946
- Author of “The Time Machine” (1895), “The Island of Dr. Moreau” (1896), “The Invisible Man” (1897), “The War of the Worlds” (1898), “The First Men in the Moon” (1901), and “The Shape of Things To Come” (1933).
- Socialist, sympathetic to pacifism, and ardent believer in world government.

# Foresight: The Origin of Futures Studies

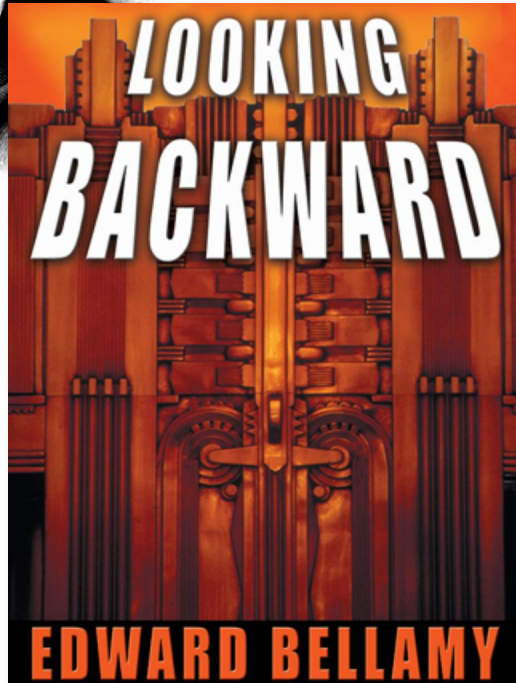
“It seems an odd thing to me that though we have thousands and thousands of professors and hundreds of thousands of students of history working upon the records of the past, there is not a single person anywhere who makes a whole-time job of estimating the future consequences of new inventions and new devices. There is not a single Professor of Foresight in the world. But why shouldn't there be? All these new things, these new inventions and new powers, come crowding along; every one is fraught with consequences, and yet it is only after something has hit us hard that we set about dealing with it.”

- From “Wanted: Professors of Foresight”, a 1932 essay by H. G. Wells

# H. G. Wells in popular culture

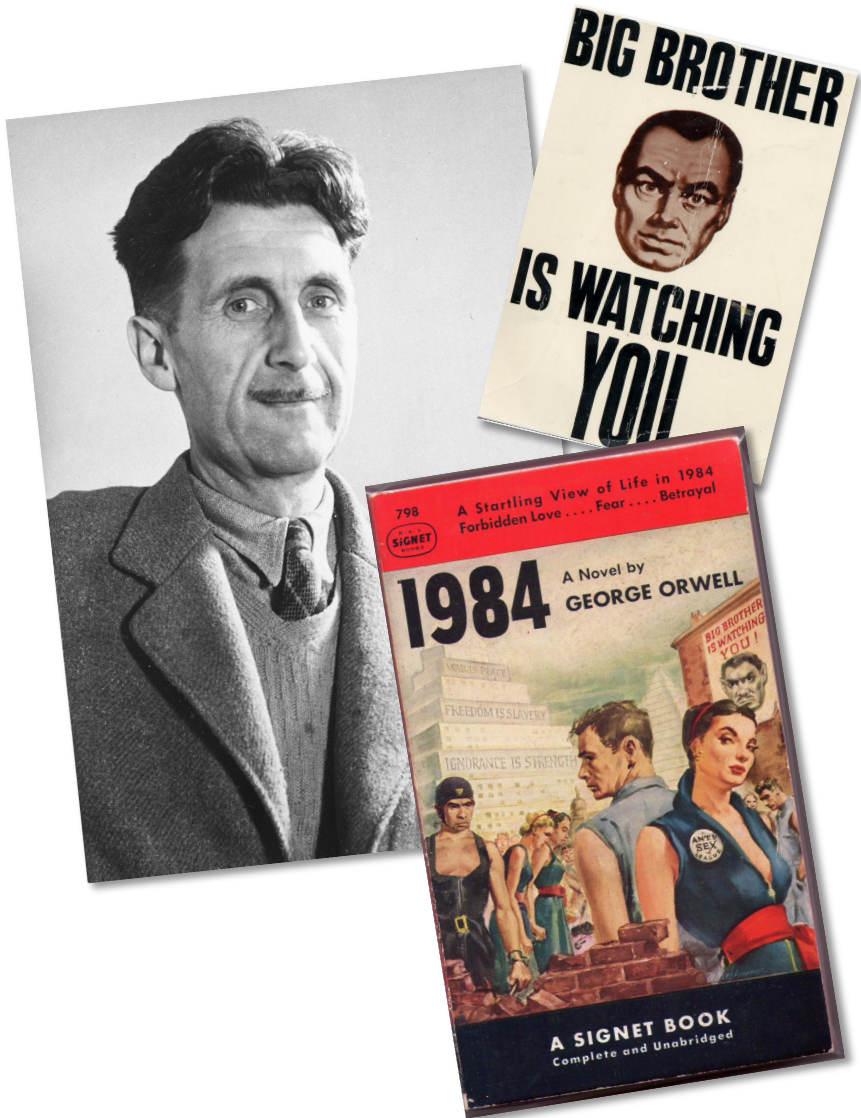


# Edward Bellamy



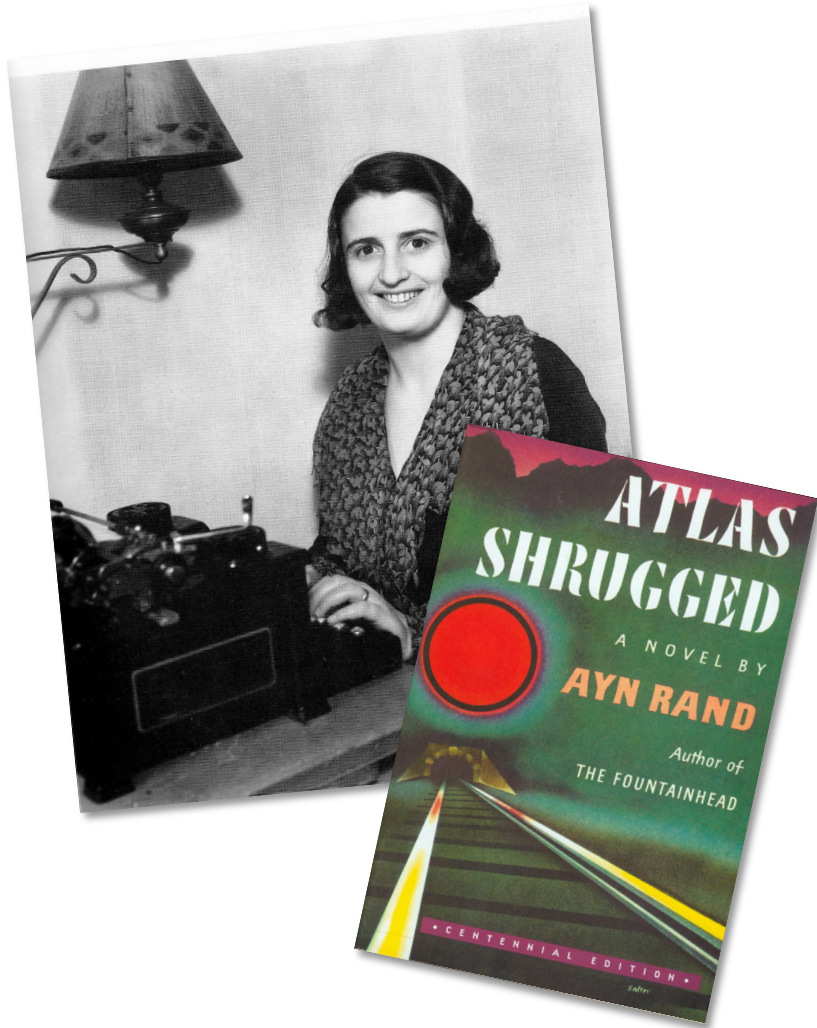
- March 26, 1850 - May 22, 1898
- Author of the socialist utopian science fiction novel, “Looking Backward, 2000 -1887”.
- The novel inspired hundreds of “Nationalist clubs” in the U.S. and Europe which met to discuss the political ideas in the novel, and sought to bring them about.

# George Orwell



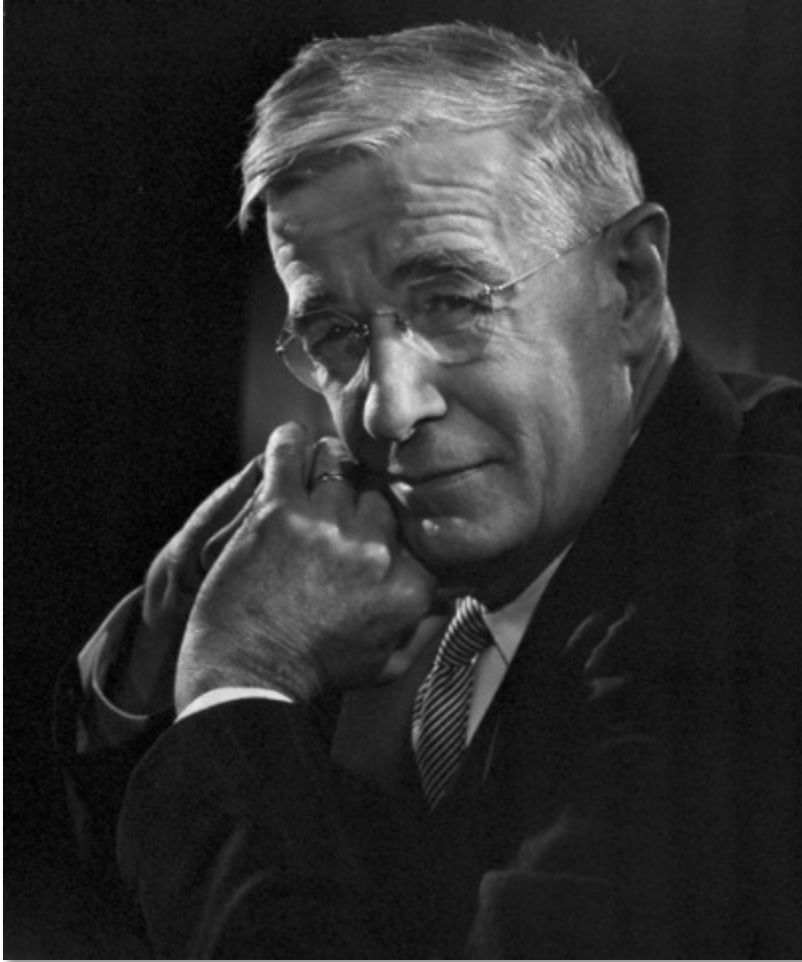
- (Eric Arthur Blair) June 25, 1903 - January 21, 1950
- Author of the dystopian science fiction novel “1984” (1949), and the allegorical novella “Animal Farm”(1945), among many other works.
- Strongly anti-totalitarian, he nonetheless considered himself a democratic socialist.

# Ayn Rand



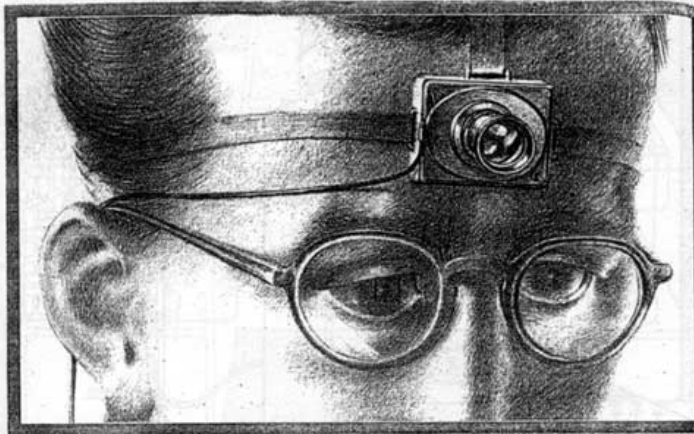
- (Alisa Rosenbaum) February 2, 1905 – March 6, 1982
- Her novel, “Atlas Shrugged” (1957), is set in a dystopian future where industrialists, scientists, and artists go on strike and build an independent free-market economy.
- Rand was an atheist, and a proponent of laissez-faire capitalism. She was close friends with the future chair of the Federal Reserve, Alan Greenspan.

# Vannevar Bush



- March 11, 1890 – June 28, 1974
- F.D.R.'s science advisor during WWII
- In 1945 he published his thoughts about the emerging information age in an influential article published in *The Atlantic* magazine entitled, "As We May Think".
- His design for the Memex (Memory Extender) was a vision of the personal computer of today. The article inspired J.C.R. Licklider (ARPANET founder) and Douglas Englebart (hypertext, GUI) among many other top computer scientists.

# The Memex



A SCIENTIST OF THE FUTURE RECORDS EXPERIMENTS WITH A TINY CAMERA FITTED WITH UNIVERSAL-FOCUS LENS. THE SMALL SQUARE IN THE EYEGLASS AT THE LEFT SHOWS THE SIZE

## AS WE MAY THINK

A TOP U.S. SCIENTIST FORESEES A POSSIBLE FUTURE WORLD IN WHICH MAN-MADE MACHINES WILL START TO THINK

by VANNEVAR BUSH

DIRECTOR OF THE OFFICE OF SCIENTIFIC RESEARCH AND DEVELOPMENT  
Condensed from the Atlantic Monthly, July 1945

This has not been a scientists' war; it has been a war in which all have had a part. The scientists, burying their old professional competition in the demand of a common cause, have shared greatly and learned much. It has been enlightening to work in effective partnership. What are the scientists to do next?

For the biologists, and particularly for the medical scientists, there can be little indication, for their war work has hardly required them to leave the old paths. Many indeed have been able to carry on their war research in their familiar peacetime laboratories. Their objectives remain much the same.

It is the physicists who have been thrown most violently off stride, who have left academic pursuits for the making of strange destructive gadgets, who have had to devise new methods for their unanticipated assignments. They have done their part on the devices that made it possible to turn back the enemy. They have worked in combined effort with the physicists of our allies. They have felt within themselves the stir of achievement. They have been part of a great team. Now one asks where they will find objectives worthy of their best.

There is a growing mountain of research. But there is increased evidence that we are being bogged down today as specialization extends. The investigator is staggered by the findings and conclusions of thousands of other workers—conclusions which he cannot find time to grasp, much less to remember, as they appear. Yet specialization becomes increasingly necessary for prog-

ress, and the effort to bridge between disciplines is correspondingly superficial.

Professionally our methods of transmitting and reviewing the results research are generations old and by now are totally inadequate for their purpose. If the aggregate time spent in writing scholarly works and in reading them could be evaluated, the ratio between these amounts of time might well be startling. Those who conscientiously attempt to keep abreast of recent thought, even in restricted fields, by close and continuous reading might shy away from an examination calculated to show how much of the previous month's efforts could be produced on call.

Mendel's concept of the laws of genetics was lost to the world for a generation because his publication did not reach the few who were caps of grasping and extending it. This sort of catastrophe is undoubtedly repeated all about us as truly significant attainments become lost in the maelstrom of the inconsequential.

Publication has been extended far beyond our present ability to make use of the record. The summation of human experience is being expanded at a prodigious rate, and the means we use for threading through it the current mass to the momentarily important item is the same as was used the days of square-rigged ships.

But there are signs of a change as new and powerful instrumental come into use. Photocells capable of seeing things in a physical sense, vacuum photography which can record what is seen or even what is felt, thermionic tubes capable of controlling potent forces under the guidance

### WHAT DR. BUSH FORESEES

#### Cyclops Camera

Worn on forehead, it would photograph anything you see and want to record. Film would be developed at once by dry photography.

#### Microfilm

It could reduce *Encyclopaedia Britannica* to volume of a matchbox. Material cost: 5¢. Thus a whole library could be kept in a desk.

#### Vocoder

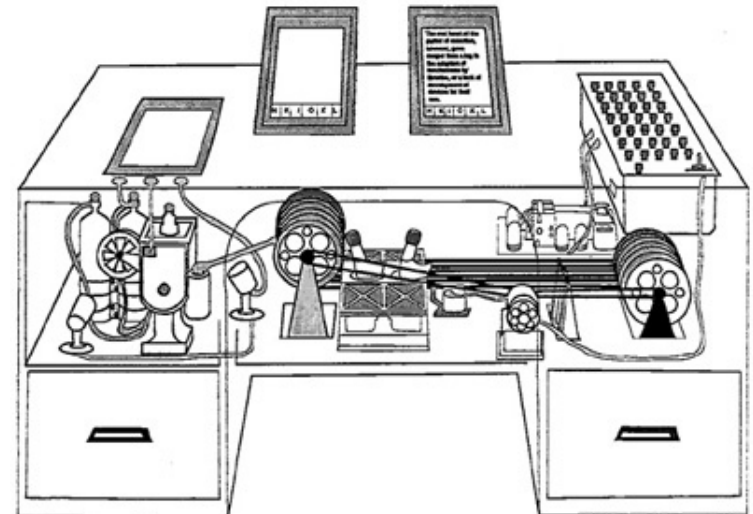
A machine which could type when talked to. But you might have to talk a special phonetic language to this mechanical supersecretary.

#### Thinking machine

A development of the mathematical calculator. Give it premises and it would pass out conclusions, all in accordance with logic.

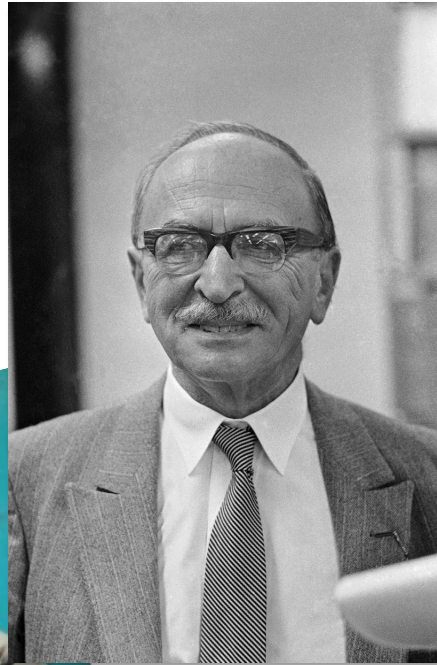
#### Memex

An aid to memory. Like the brain, Memex would file material by association. Press a key and it would run through a "trail" of facts.



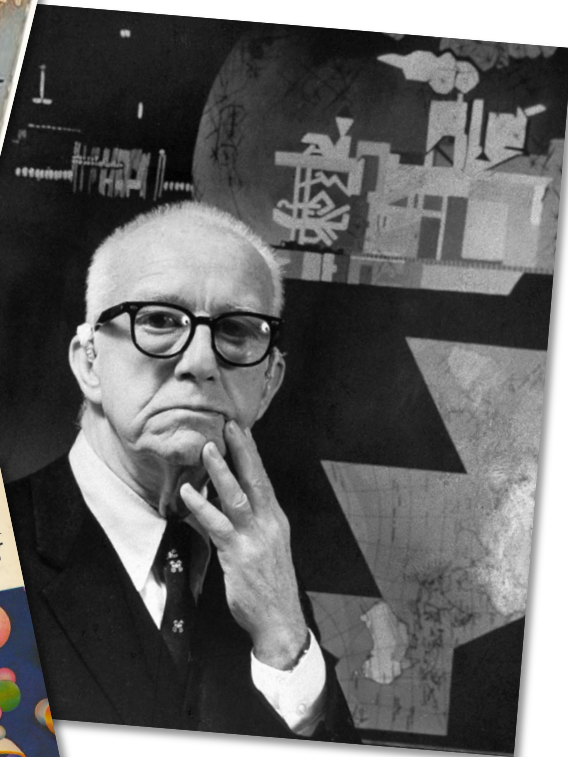
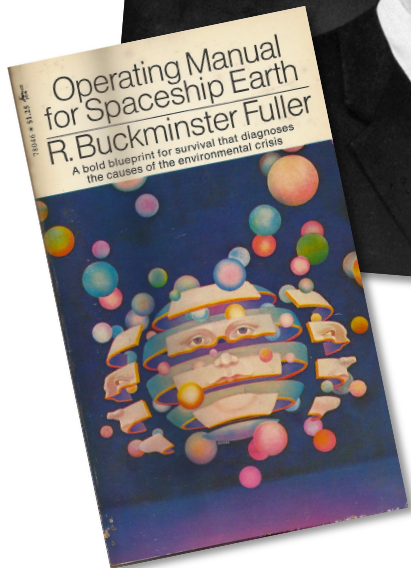
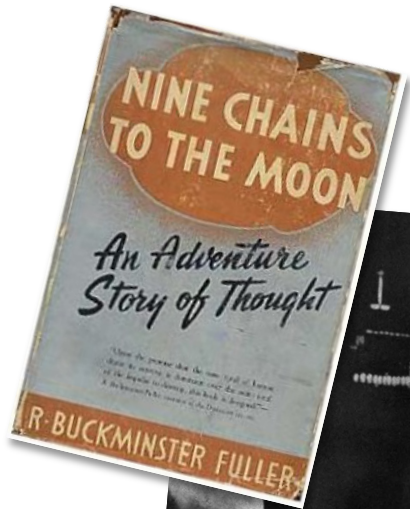


# Dennis Gabor



- June 5, 1900 –February 8, 1979
- Fled Nazi Germany in 1933
- Inventor of holography in 1947, for which he received the Nobel prize in Physics in 1971.
- Author of “Inventing the Future” (1964), “The Mature Society, A View of the Future” (1972), and “Beyond the Age of Waste: A Report to the Club of Rome” (1978).
- "The future cannot be predicted, but futures can be invented. It was man's ability to invent which has made human society what it is."

# R. Buckminster Fuller

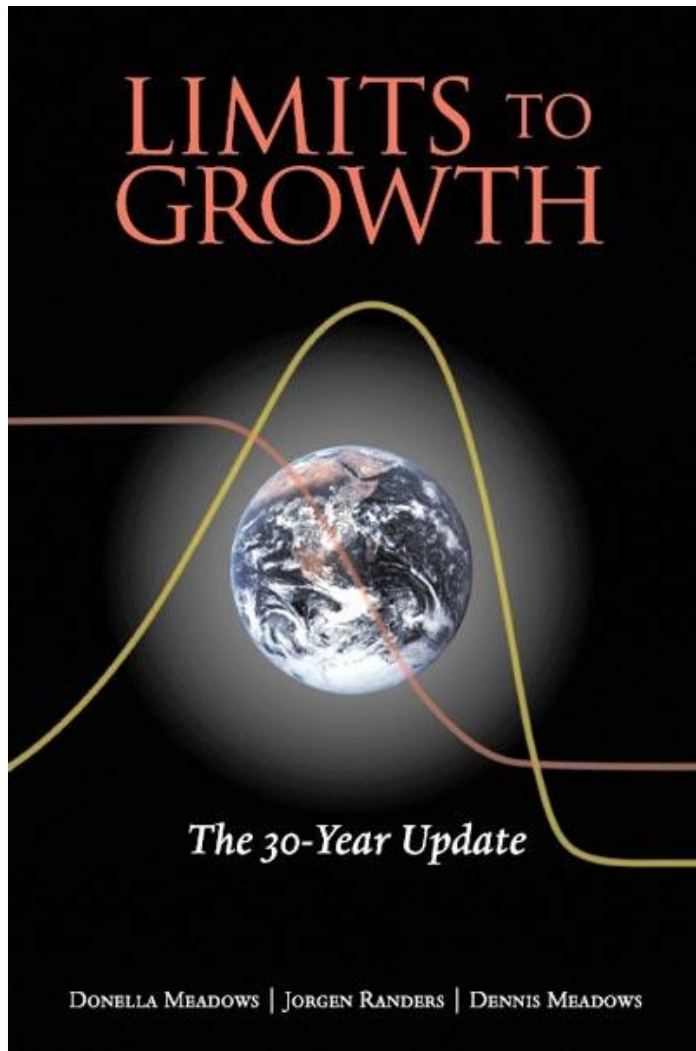


- July 12, 1895 – July 1, 1983
- Architect (geodesic dome) and engineer who published more than 30 books, held 28 patents, and coined terms such as “Spaceship Earth” and “synergetic”.
- Among his famous books are “Nine Chains to the Moon” (1938), and “Operating Manual for Spaceship Earth” (1969).
- Unitarian and environmental activist.

# Fuller with the Dymaxion House and Car



# The Club of Rome



- The Club of Rome is a global Think Tank founded in 1968.
- The club's publication, "The Limits to Growth" (1972), sold over 12 million copies and has been translated into 30 languages.

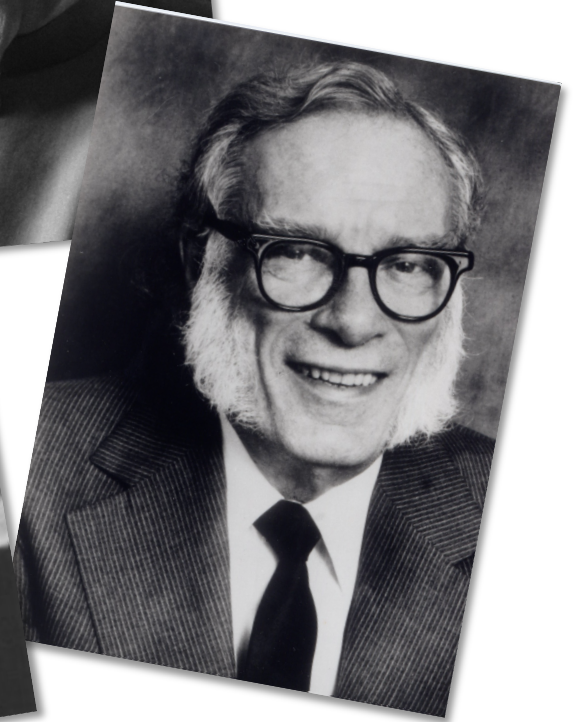
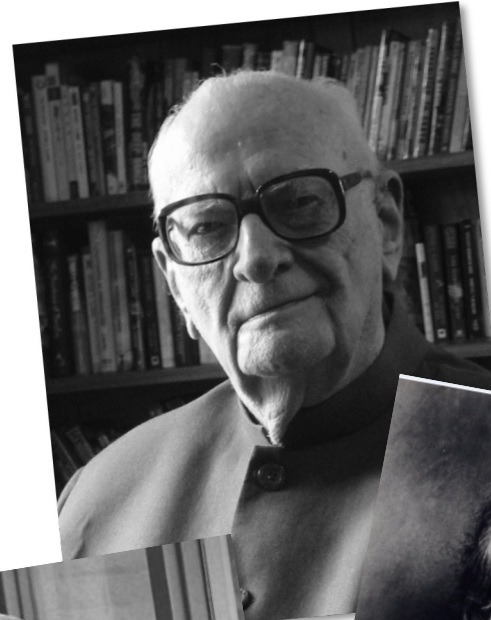
# The Enemy Is Us

“Because of the sudden absence of traditional enemies, new enemies must be identified. In searching for a new enemy to unite us, we came up with the idea that pollution, the threat of global warming, water shortages, famine and the like would fit the bill... All these dangers are caused by human intervention, and it is only through changed attitudes and behavior that they can be overcome. The real enemy then, is humanity itself.”

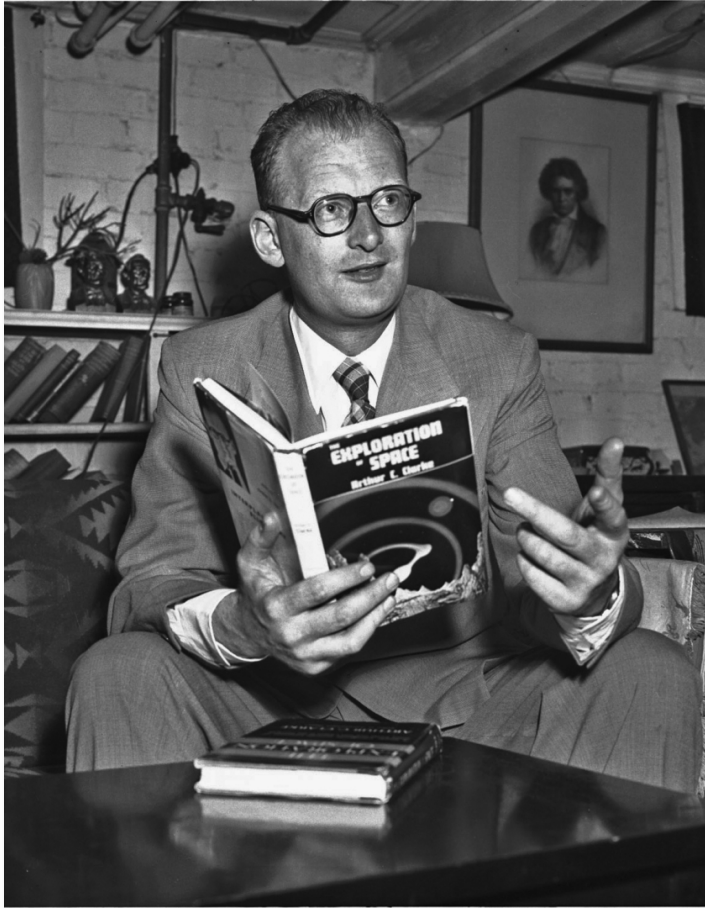
- *The Club of Rome, “The First Global Revolution”, 1993*

# The Big Three of Science Fiction

- Arthur C. Clarke
- Isaac Asimov
- Robert A. Heinlein



# Arthur C. Clarke



- December 16, 1917 –March 19, 2008
- 1945 paper in Wireless World magazine “*Extra-Terrestrial Relays – Can Rocket Stations Give Worldwide Radio Coverage?*” proposed the idea that geostationary satellites could serve as telecommunications relays. The geostationary orbit is sometimes referred to as the Clarke orbit.
- Famous novels include “2001: A Space Odyssey” (1968), “Rendezvous With Rama” (1972), and “Fountains of Paradise” (1979).
- Considered himself a pantheist.
- Knighted in 1998.

# Clarke's Three Laws

- When a distinguished but elderly scientist states that something is possible, he is almost certainly right. When he states that something is impossible, he is very probably wrong.
- The only way to discover the limits of the possible is to go beyond them into the impossible.
- Any sufficiently advanced technology is indistinguishable from magic.



# Clarke on Futurism

“I'm sure we would not have had men on the Moon if it had not been for Wells and Verne and the people who write about this and made people think about it. I'm rather proud of the fact that I know several astronauts who became astronauts through reading my books.”

- Address to the U.S. Congress, 1975

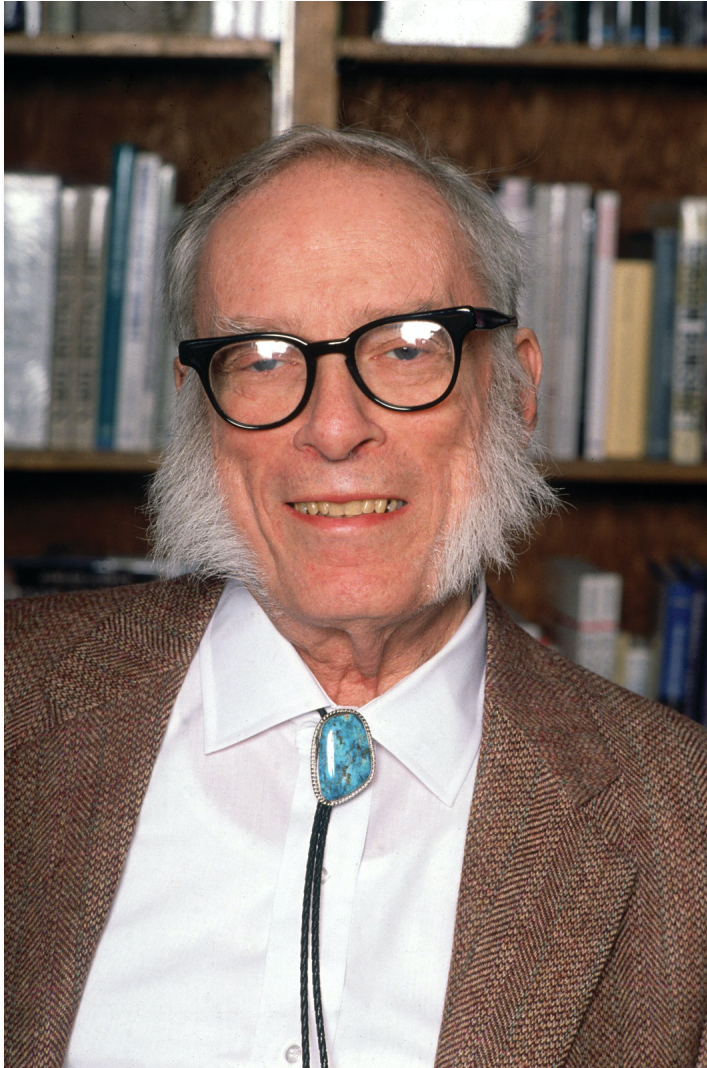
“If we have learned one thing from the history of invention and discovery, it is that, in the long run - and often in the short one - the most daring prophecies seem laughably conservative.”

- The Exploration of Space, 1951

# Clarke's work in popular culture



# Isaac Asimov



- January 2, 1920 – April 6, 1992
- Professor of Biochemistry at Boston University
- Prolific sci-fi writer, best known for three series: The Foundation series, The Galactic series, and the Robot series. He also wrote the Lucky Starr series for younger audiences.
- Considered himself an atheist, a humanist, and a rationalist. He was friends with writer Kurt Vonnegut. He advocated for progressive political causes.

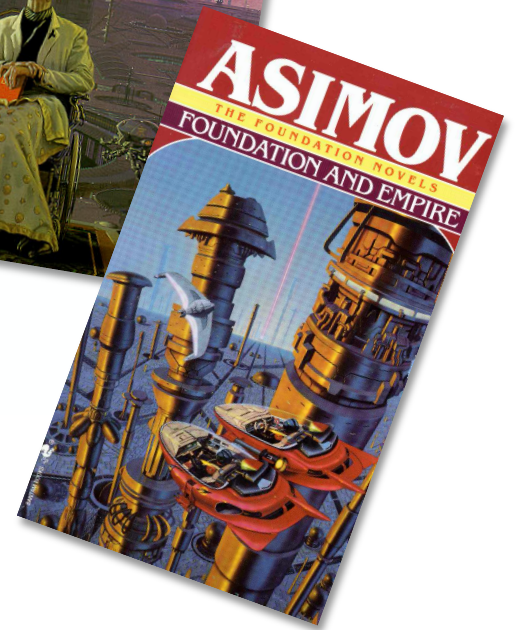
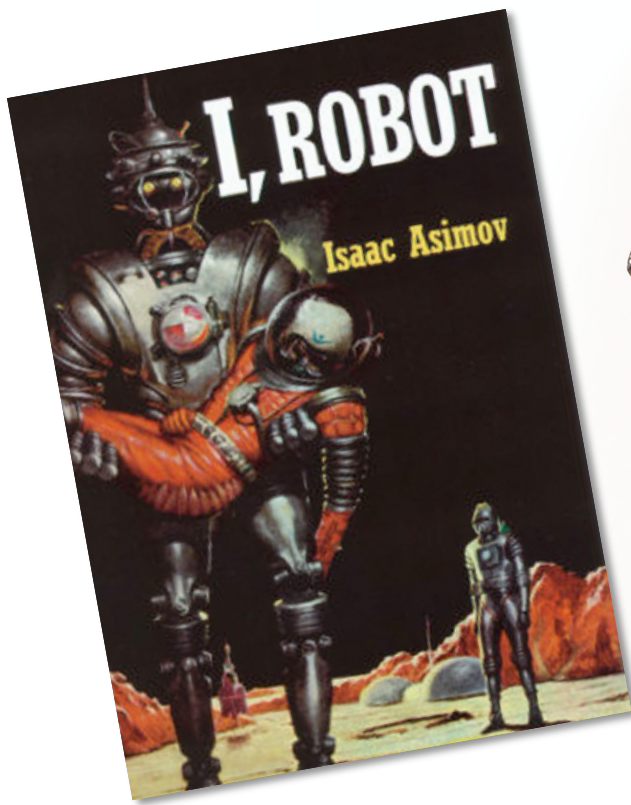
# Asimov's Three Laws of Robotics

1. A robot may not injure a human being or, through inaction, allow a human being to come to harm.
2. A robot must obey the orders given to it by human beings, except where such orders would conflict with the First Law.
3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Laws.

“... one of the stock plots of science fiction was ... robots were created and destroyed by their creator. Knowledge has its dangers, yes, but is the response to be a retreat from knowledge? Or is knowledge to be used as itself a barrier to the dangers it brings? With all this in mind I began, in 1940, to write robot stories of my own – but robot stories of a new variety. Never, never, was one of my robots to turn stupidly on his creator for no purpose but to demonstrate, for one more weary time, the crime and punishment of Faust.”

- Asimov, 1964

# Asimov in popular culture

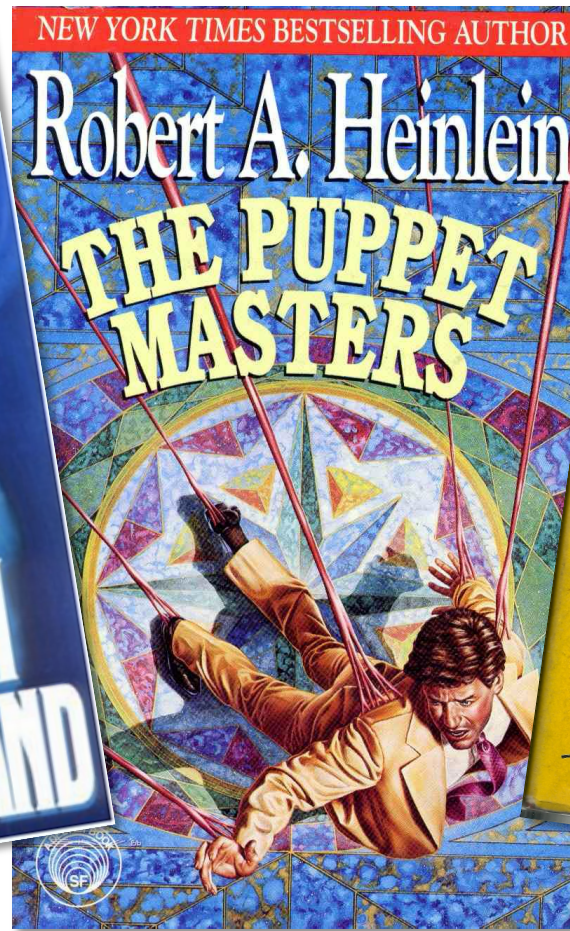
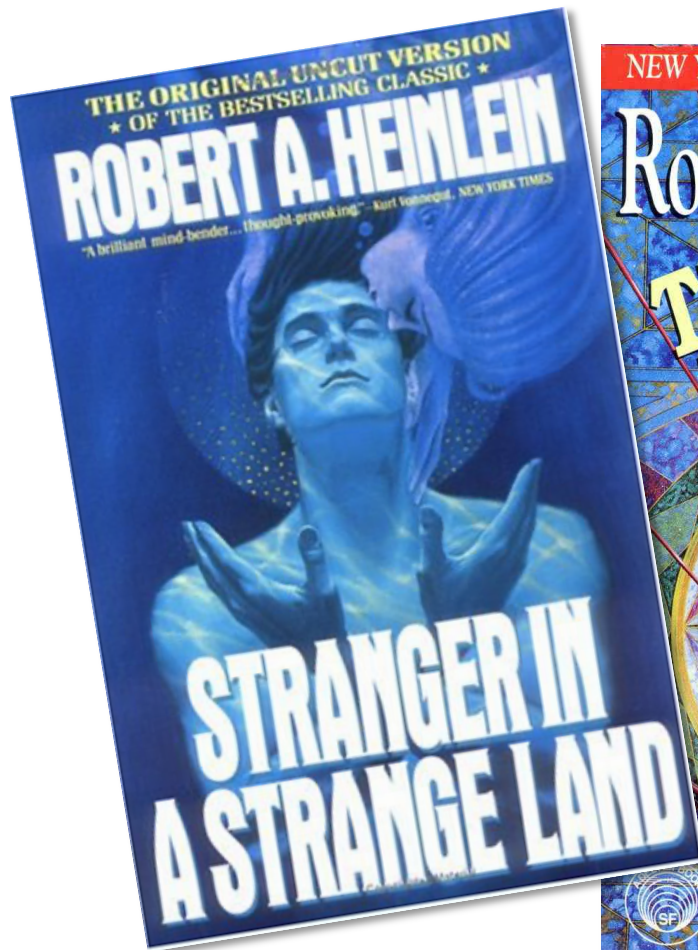


# Robert A. Heinlein

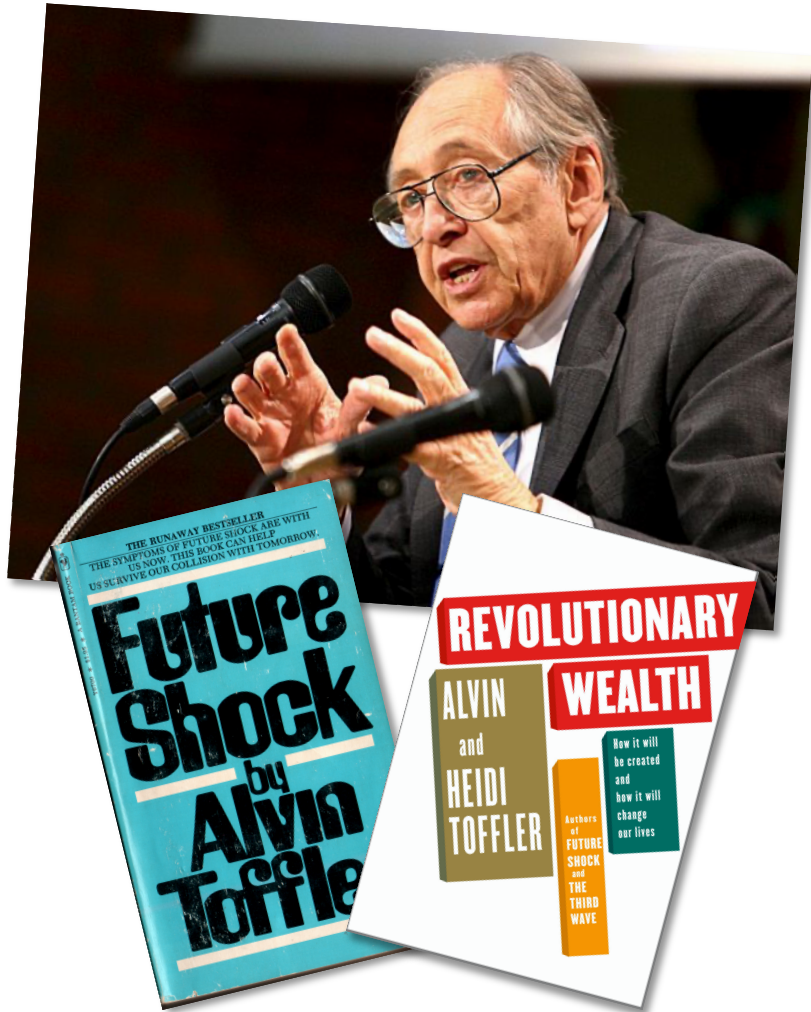


- July 7, 1907 – May 8, 1988
- Author, among many other famous works, of “Stranger In A Strange Land” (1961), and “The Moon Is A Harsh Mistress” (1966).
- His writings have a libertarian orientation.

# Heinlein in popular culture



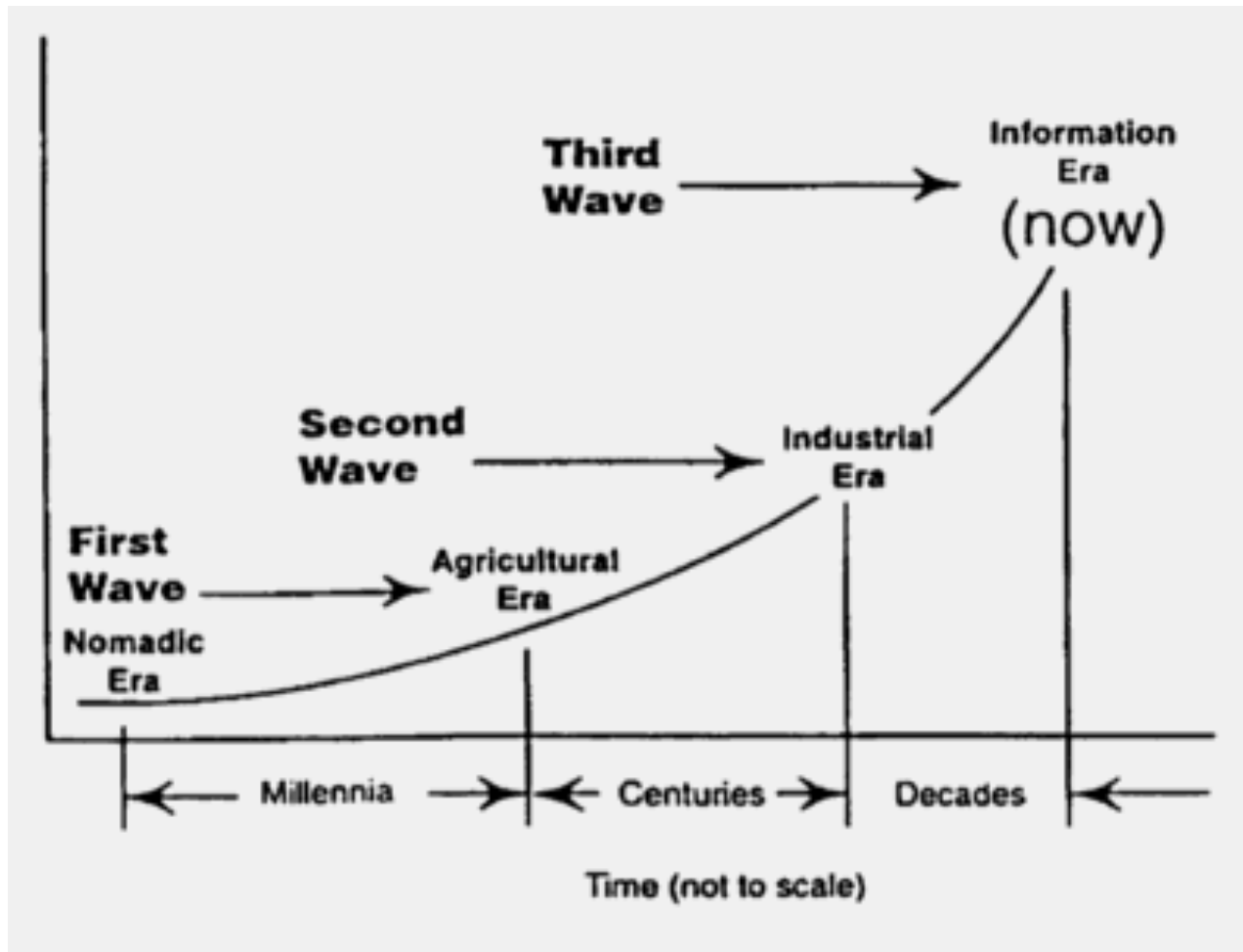
# Alvin Toffler



- Born October 4, 1928
- Former editor for Fortune magazine. His wife Heidi is his collaborator and co-author.
- His most famous books are: “Future Shock” (1970), “The Third Wave” (1980), “War and Anti-War” (1995), and “Revolutionary Wealth” (2006).
- “The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn.”



# Toffler's Third Wave



# Ray Kurzweil



- Born February 12, 1948
- Developer of technologies ranging from Optical Character Recognition (OCR), to Text To Speech (TTS), to Speech Recognition.
- Author of “The Age of Spiritual Machines” (1998), and “The Singularity Is Near” (2005).
- Inventor of the Kurzweil keyboard, and friends with Stevie Wonder, a blind pop-music artist.
- Recipient of the National Medal of Technology (1999), presented by president Clinton.

# Kurzweil's Singularity

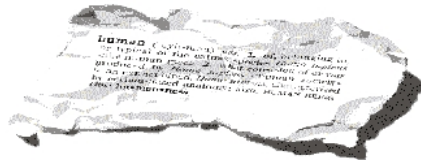
“Machines will follow a path that mirrors the evolution of humans. Ultimately, however, self-aware, self-improving machines will evolve beyond humans' ability to control or even understand them.”

- Ray Kurzweil, *Scientific American*, June 2010

# Bill Joy



**W I R E D**



**Why the Future  
Doesn't Need Us**  
By Bill Joy

- Born November 8, 1954
- Co-founder of Sun Microsystems. Contributing developer of BSD Unix and the Java programming language.
- His article in Wired Magazine, “Why the Future Doesn’t Need Us” (2000), is seen as a rebuttal to the more utopian view of the future of Ray Kurzweil.

# Joy Vs. Kurzweil

"Our most powerful 21st-century technologies — robotics, genetic engineering, and nanotech — are threatening to make humans an endangered species."

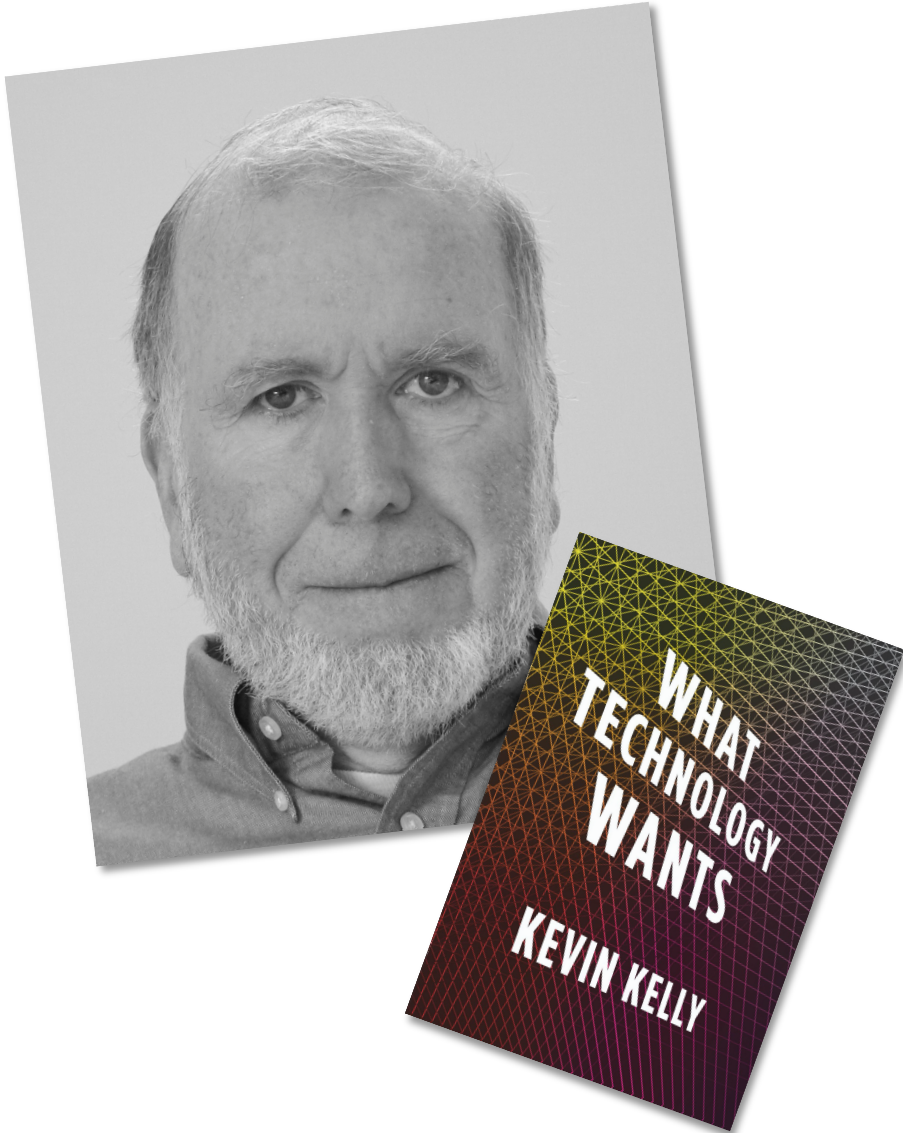
"The experiences of the atomic scientists clearly show the need to take personal responsibility, the danger that things will move too fast, and the way in which a process can take on a life of its own. We can, as they did, create insurmountable problems in almost no time flat. We must do more thinking up front if we are not to be similarly surprised and shocked by the consequences of our inventions."

- Bill Joy, Chief Scientist, Sun Microsystems, Wired, April 2000

"Should we tell the millions of people afflicted with cancer and other devastating conditions that we are canceling the development of all bioengineered treatments because there is a risk that these same technologies may someday be used for malevolent purposes?"

- Ray Kurzweil, The Singularity Is Near

# Kevin Kelly



- Born 1952
- Former editor of the Whole Earth Catalog, and founding editor of Wired Magazine.
- Author of “What Technology Wants” (2010).
- “Humans are the reproductive organs of technology.”

# Kelly's work in popular culture



# Dystopian Vs. Utopian

DYSTOPIAN	NEUTRAL	UTOPIAN
Shelley Orwell Club of Rome Joy	Toffler Kelly	Verne Bellamy Fuller Kurzweil