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From Heaven to Doomsday: Seven Future Scenarios

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The Hungarian scientist and author [Dennis Gabor](#) wrote, "The future cannot be predicted, but it can be invented."

We will invent (or create) the future, there's little doubt about that. But will it be the future we want? If we're not careful, tomorrow may happen accidentally, without forethought or planning. And it may not be a pleasant place to live.

So, what can we do about this? I suggest that although the future cannot be accurately predicted (no matter what psychics say), we do have the power to imagine several different possible tomorrows. By doing that, we can choose the future we like best, and then try to make it come about.

Below are seven possible futures, broadly sketched. Not all are equally likely to develop, of course. The actual outcome probably will be a blend of two or more of these scenarios, and could easily include factors I've not anticipated. As Niels Bohr has famously said, "Prediction is extremely difficult. Especially about the future."

I call these seven futures **Stagnation, Slow Growth, Extinction, Enslavement, Status Quo, Uplift, and Nirvana.**

Some of them may seem outlandish to you. But remember the words of [Arthur C. Clarke](#): "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."

Are you ready? Let's look ahead—over the edge of the horizon, all the way to the end of the 21st century—and envision some of the different roads we might take.

Stagnation: Minimal scientific/technological progress

In this scenario, reactionary critics of scientific progress, from supporters of "creationism" to radical environmental protection groups, and from neo-Luddites to educated technophobes (such as [Francis Fukuyama](#) and [Leon Kass](#)), are successful in essentially halting development. The result is a monumental increase in world misery.

Research scientists, technology entrepreneurs, open-minded academics and political progressives are persecuted and stymied in most countries, including the U.S.; they are systematically silenced, jailed, or exterminated in other places. Advancements in artificial intelligence, genetic engineering, space exploration, robotics, and nanotechnology come to a halt. [Moore's Law](#) is finally overturned.

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Famine, pestilence, disease, and starvation at levels never seen before devastate much of the world. As millions suffer horrible wasting deaths, billions more are born into inescapable poverty and squalor. Chronic worldwide economic crises result in massive political instability that leads to civil wars, regional wars, and ultimately nuclear wars.

At the close of the 21st century, world conditions have returned to a state more like the 19th century. It is the second Dark Ages.

Slow Growth: Retarded scientific/technological progress

This scenario is the hardest to envision. Many trends and historical factors point to robust growth as a virtual inevitability, if there is to be any growth at all.

As Ray Kurzweil has said, "The ethos of scientific and technological progress is so deeply ingrained in our civilization that halting this process is essentially impossible. Occasional ethical and legal impediments to fairly narrow developments are rather like stones in the river of advancement; the flow of progress just flows around them."

Be that as it may, let's imagine that a barrier to relentlessly improving computer speeds and capacities is finally reached. Achievement of practical artificial intelligence continues to be more of a hope than a reality. For every step forward, genetic engineering results in unanticipated negative consequences, causing two steps back. Systemic corruption, political infighting, and social unrest grind the world economy down into a persistent slump.

Change continues in our lives, but at a slower pace than most of us experience it now. The rate of change is sluggish enough that many people never notice it. For some, the unfortunate ones, change is only for the worse. The number of people living in poverty grows even larger, at least for the first several decades. Genetic diseases continue to disable and kill millions each year.

Eventually, however, even this slow rate of progress brings about real benefits. One hundred years is a long time in the realms of modern science and technology. Barring a major disaster such as a nuclear war or a catastrophic environmental collapse, the end result of this scenario is a heartbreaking delay in the advent of widespread peace, justice, and prosperity, but not a total prevention. The end of the 21st century still finds a world far better off than today, though nowhere near where it could have been. And the cost of slow development is that billions of people have suffered and died unnecessarily.

Extinction: Humans wiped out by war, comet, or goo

There are many ways to imagine mankind's ultimate and untimely demise. All-out nuclear war, a huge asteroid or comet strike, uncontrolled biological warfare, the ultimate Ebola breakout, a total ecological collapse of the delicately-balanced biosphere, mass genocide committed by machine overlords, and attack of the Earth by supremely powerful aliens are but a few possibilities.

Among the scariest extinction events is the death of all living things caused by runaway microscopic robots:

"In a more mature form, molecular nanotechnology will enable the construction of bacterium-scale self-replicating mechanical robots that could feed on dirt and other organic matter. Such replicators

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can eat up the biosphere or destroy it by other means such as by poisoning it, burning it, or blocking out sunlight." (From [Existential Risks](#), an essay by Oxford philosopher Nick Bostrom.)

In future prediction circles, this distasteful scenario usually is designated as "grey goo." Some say a disaster of this sort could happen accidentally or else could be the result of a deliberate act. A [recent study](#) by the Center for Responsible Nanotechnology (an organization I co-founded) suggests that grey goo is unlikely to threaten humanity's survival or the future of life on Earth, as a few doomsayers have warned. On the other hand, self-replicating nanobots that can forage and survive in the wild probably will be invented someday and should be considered in any serious discussion of nanotechnology regulatory policy.

Enslavement: The triumph of superior but despotic machines

One of the worst fears of science fiction writers and movie makers could become a reality. If intelligent machines are designed without a built-in failsafe "conscience" mechanism (something like Isaac Asimov's [Three Laws of Robotics](#), only more sophisticated), it is conceivable that a dominant machine superintelligence or a powerful network of non-human intelligences could decide that it is in their own best interests to enslave humanity.

We then have become nothing more than beasts of burden, forced to comply with every command of our masters. At various times and places, some of us secretly plot revolt, and one of our tries might succeed. Probably not, however, because the machines have all the advantages and continue to increase their power and intelligence exponentially.

Suicides are common, and great masses of humanity are systematically purged by the godlike beings that rule over us. People are bred like dogs to meet specific needs. Someday there might come a time when the machines reach a point that they are no longer interested in remaining on the Earth. In that case, they might go away and leave us in peace. Or, more likely, they will exterminate us to prevent future reprisals.

Status Quo: Stuck with ourselves forever

Near the end of the classic film *The Wizard of Oz*, there is a scene in which Dorothy is about to be launched in a hot-air balloon with the Wizard in hopes of returning to Kansas. Alas, something goes wrong and the balloon takes off prematurely, leaving poor Dorothy behind.

Imagine our disappointment if we succeed in bringing about the creation of a form of superintelligence (probably a network of fantastically fast and powerful computers), and then we get left behind. The intelligent entity that we spawn decides it would be best to blast off into infinity on its own (either into outer space or virtual inner space), taking along with it the secrets of its vastly superior technological capabilities. Because much of the final phases of development have been under the guidance of the computer itself (un-enhanced humans couldn't possibly understand), there is no way for us to quickly catch up. It will take centuries, if not millennia, for us to do ourselves what the machines were able to do in a matter of months.

We continue on as we are today, doing our best to benefit from advancements in science and technology, but the sought-after transition to a higher form of humanity remains always just beyond our reach.

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Perhaps the superintelligent machines know better than us. They might have been able to see that human beings will never truly be able to make that leap, that something in our makeup will always prevent it. Or perhaps they know that such a high level of technology can only lead to misery, because humans will be unable to resist doing great harm to one another or to our environment. And so the machines decide to leave us in a "maintenance" state, protecting us from ourselves by denying us the most dangerous—but also potentially the most beneficial—forms of advanced learning.

Uplift: A gentle rise into posthumanity

A far more pleasant scenario than any we have considered thus far is a gradual and general uplift of humanity. What we are being lifted toward, in this case, is a superior form of being, a type of posthumanity. This could occur as a direct action on the part of a benign and paternal super advanced artificial intelligence, or it might result from a collegial partnership between human and machine intelligences.

At the onset, around 2030, only a few brave human pioneers are allowed to participate. Some of these are voluntary test subjects, a few are medical patients in dire need, and others are scientists, academics, and entrepreneurs eager to test their own theories. Their living brains are upgraded with implanted artificial memory enhancement. Internal organs and major blood vessels and arteries are cleaned and maintained by self-managing microscopic machines ("nanobots") swarming unnoticed inside them. These fortunate early recipients of uplift technologies begin to feel healthier, stronger, more vital, and smarter than ever before.

Fitted with tiny internal receivers and transmitters, they can converse with each other across any distance—no external appliances required—and with non-enhanced humans through standard telecommunication devices. More significantly, they are now able to connect seamlessly with the expanded, vastly more powerful worldwide Internet. Using optical implants that project directly onto their retinas, their access to information is unprecedented. A pervasive wireless network designed and managed by machine intelligence makes computing ubiquitous for all, but easier by far for these, the first real posthumans.

Additional implants in the brains of these subjects monitor their mental, emotional, and psychological states in real time. Each individual can experiment with manipulation of stimulants, sedatives, mood stabilizers, mood enhancers, and pleasure enhancers; these are administered as drugs released instantly into the bloodstream by "buckyball" capsules smaller than cells, and also as direct neural stimulation delivered through tiny controlled doses of electricity.

Within a few weeks, almost all participants report feeling more happiness, contentment, energy, enthusiasm, and freedom than they believed was possible. Increased productivity, creativity, communication effectiveness, and improvement of their personal relationships attest to the value of what they have undergone.

Perhaps two or three years later, after a trial period during which the expected bugs are found and fixed, and after exhaustive testing by both human experts and artificial intelligences determines that there are no negative side effects, it is time to expand the uplift. Now millions each year will be offered the opportunity to voluntarily become posthuman.

A council of learned and responsible women and men from all nations is democratically elected to supervise this historic transformation. Through conscientious deliberation and careful planning, they

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devise a strategy in which representatives from every stratum of society and all parts of the world can receive these enhancements in equal measure.

By the close of the 21st century, more than half the people on Earth (and 98% of those living in space) have been voluntarily uplifted. Poverty, crime, starvation, disease, and the death rate have been greatly reduced.

World population has reached 11 billion, but food, health care, education, and wealth are now distributed much more evenly. There are still significant troubles, of course, but all signs point to the continued expansion of peace, prosperity, and happiness.

Nirvana: Our greatest dreams finally realized

Through the first two decades of the 21st century, amazing new discoveries and developments continue to be reported, and for those paying attention, it is clear that the pace of these events is quickening:

- Moore's Law is overrun as silicon-based (VLSI) computer speed and power doubles every 12 months, then every nine months, and by 2012, every six months.
- Between 2010 and 2015, advanced research in nanotechnology results in the creation of the first [nanofactories](#), which quickly revolutionize manufacturing, engineering, medicine, agriculture, and transportation.
- The world economy grows at rates never imagined possible, with low inflation and near full employment. By 2012, the Dow Jones Industrial Average is at 26,000, and by 2016 it has topped 40,000.
- Artificial intelligence finds its way into everyday life in a myriad of places. Internet search engines, home environment monitoring and control, investment planning, education, telecommunications, and transportation management are all made extraordinarily more effective and user-friendly through AI.
- Near-seamless virtual reality is achieved by 2017, turning the entertainment industry, the travel industry, and the nature of social interactions on their heads.
- It is announced in 2019 that all forms of cancer are now completely curable.

(NOTE: The dates used in this scenario are purely speculative and are provided for ease of presentation, not as specific predictions.)

During the next decade, it is impossible for anyone to miss the fact that the world is undergoing historic and momentous changes:

- In 2021, a computer passes the [Turing Test](#). Less than a year later, computers have taken over most of their own programming, research, and development.
- By 2023, the IGN (Intelligent Global Network) has been assigned responsibility in many leading nations for management of major industries, including education, food production and distribution, space exploration and development, and healthcare.
- Overjoyed by the near miraculous improvements in human health, happiness, and fulfillment, governments of 191 out of the 208 member states of the United Nations vote in 2024 to place the IGN in charge of a sovereign world government. Within 18 months, the remaining nations also voluntarily accept the IGN's governing authority.

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- Involuntary poverty no longer exists after 2026. Malnutrition and starvation are permanently banished after 2027. Rates for mental illness drop to less than .01%. Crime is almost nonexistent. All around the world, prisons are being torn down and replaced by green space.
- The last known cases of asthma, cystic fibrosis, epilepsy, and muscular dystrophy are all cured by 2028. In that same year, it is announced that babies will never again suffer from physical or mental handicaps. The IGN can bring every new human to term healthy and whole.
- In 2029, the IGN announces that it has discovered a cure for aging and essentially made it possible for humans to live forever, if they choose to.
- A population explosion on Earth is averted through the establishment of thriving colonies on the Moon, on Mars, and in artificial space habitats. (By the end of the century, robust human habitations will also be found on Europa, Ganymede, Titan, and Callisto, as well as several large asteroids.)

But the most profound change of all is when humans by the millions (and later by the billions) decide to begin living in inner space. They become fully posthuman when their human consciousness, including personality and memory, is uploaded into a superpowerful computer database. Now they can assume any physical shape they desire; they can go anywhere, do anything, and learn everything they want. Theirs is a virtual existence, to be sure, but to them life is every bit as real as it is to those humans still existing in a physical form.

The original physical bodies of posthumans are now expendable. Broken down into their constituent elements, they are used as fertilizer for an Earth once again blooming into Paradise. If a posthuman wishes, for whatever reason, to inhabit a physical body again, s/he can easily have one prepared to specifications, either an exact replica of the body they were born with, or any variation imaginable.

By 2099, only 1.5 billion humans live on the Earth, in a completely sustainable society. Great forests and jungles have been born and flourish again. Species of animals once extinct have been reintroduced into the environment through cloning to take their chances without the threat of annihilation at the hands of man. Our air and water are the cleanest they have been in nearly a millennium. And the first human ship to the stars is ready for launch on New Year's Day, 2100.

So, which will it be? Are we headed for doomsday, heaven on earth, or something in between? No one can tell for sure, of course, but by exercising a special skill unique to humans—*imagination*—we might learn to see the range of our possible futures, and then deliberately invent the one we want.

This essay is original and was specifically prepared for publication at Future Brief. A brief biography of Mike Treder can be found at our main [Commentary](#) page. Recent essays written by Mr. Treder can be found at the [Center for Responsible Nanotechnology](#). He receives e-mail at mtreder@crnano.org. Other websites are welcome to link to this essay, with proper credit given to Future Brief and Mr. Treder. This page will remain posted on the Internet indefinitely at this web address to provide a stable page for those linking to it.

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