

Future Life Forms among Posthumans

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As we begin to ride the wave into human redesign, the destination is still largely unknown. But despite all the unanswered questions, we have a number of clues that can help us speculate as to what we truly mean by the posthuman organism - including the striking acknowledgement that in all likelihood not just one type of posthuman awaits us, but several.

We will re-engineer our biological constitutions, and introduce silicon, steel, and microchips into ourselves. Some may choose to reside in computers as conscious wave patterns, while others will convert themselves into durable robots and venture out into space. Simultaneously, we will create entirely new forms of life, including artificial intelligence and perhaps even a global consciousness.

Humanity's monopoly as the only advanced sentient life form on the planet will soon come to an end, supplemented by a number of posthuman incarnations. Moreover, how we re-engineer ourselves could fundamentally change the ways in which our society functions, and raise crucial questions about our identities and moral status as human beings.

Popular culture is abuzz with new terminology. Genetic engineering. Cyborgs. Artificial intelligence. Consciousness (mind) uploading. Nanotechnology. Singularity. Transhumanism. Posthumanism. In particular, the terms "transhuman" and "posthuman" seem to be gaining more and more currency with each passing year - especially in the media and academia, and among the techno-intelligentsia.

Yet, as futurists make these grand prognostications, do we really know what's in store for Homo sapiens? Just how will we "improve" ourselves? What do we really mean when we refer to the posthuman physical condition? Just what, exactly, is the grand potential for intelligent life? What does advanced intelligence look like?

The world is moving fast towards a fourth wave (following the terminology of US futurist Alvin Toffler) in which humans will become transhumans, and then posthumans, thanks to the multiple and simultaneous advances of technology. We could redesign ourselves in any number of ways, and we have to examine radical scenarios for the evolution of the human species. Such a

transcendental change has been described by some experts as analogous to when apes evolved into humans.

Transhumanism

As the possibility for conscious human redesign has emerged, so too has a philosophical movement that considers the implications. This approach to future-oriented thinking, known as transhumanism, works on the premise that the human species does not represent the end of human evolution but, rather, its beginning (see, for example, www.transhumanism.org). Transhumanism is an interdisciplinary approach to understanding and evaluating the possibilities for overcoming biological limitations through scientific progress. Ultimately, transhumanists hope to see technological opportunities expanded for people, so that they may live longer and healthier lives and enhance their intellectual, physical and emotional capacities.

Transhumanism emphasizes that we have the potential not just to "be" but to "become." Not only can

we use rational means to improve the human condition and the external world; we can also use them to improve ourselves, the human organism. And we are not limited only to the methods, such as education, which humanism (its philosophical precursor) normally espouses. Rather, transhumanists argue, we will have the means that will eventually enable us to move beyond what most would describe as human.

Transhumanists believe that, through the accelerating pace of technological development and scientific understanding, we are entering a whole new stage in the history of the sapient species. Advances in artificial intelligence, robotics, bioengineering, cloning, cryonics, nanotechnology, new energies, mind uploading, dietary restriction, "designer babies", cyborgs, molecular chemistry, telecommunications, space exploration, virtual reality, life extension and immortality will lead to substantial physical and mental augmentation, possibly converging at a "singularity" point.

The historical human desire to transcend bodily and mental limitations is deeply intertwined with a human fascination with new knowledge, which might be both inspiring and frightening. How these technologies are used could fundamentally change the ways in which our society functions, and raises crucial questions about our identities and moral status as human beings.

Advancing Technologies, Advancing Possibilities

New developments in science and technology are occurring so fast that some might begin to overwhelm our capacities to adapt to change. Personal computers did not exist 30 years ago, cell phones did not exist 20 years ago, and the Internet (actually, the World Wide Web, www) did not exist 10 years ago. What will come in the next 10 years? And in the next 20 years? And beyond that? The British-born engineer and science fiction writer Arthur. C. Clarke claimed that: "people tend to overestimate the short term impact of new technologies and to underestimate the long term impact."

In the biological sciences, similar achievements have been made since the discovery of the DNA structure in 1953, including new medicines, bioengineering and cloning technologies. In 2002 a living creature - polio virus - was assembled piece by piece with several bio-chemicals by US scientists J. Cello, A. Pauli and E. Wimmer in the New York State University. Cryonics and nanotechnology, for example, were also totally unknown just a few decades ago. Indeed, many years ago, British scientist and writer Arthur C. Clarke said that "any sufficiently advanced technology is undistinguishable from magic."

The pace of change is not only very fast but it is also accelerating. Some experts like US engineer Ray Kurzweil even talk about a coming "singularity" where artificial intelligence and artificial life forms will overtake human intelligence and human life in the coming decades. Slow biological evolution seems to be approaching fast a dead end: our species will continue changing but not through the old and slow biological evolution but through the new and fast technological evolution.

Today many boundaries are blurring. Boundaries between birth and death, between virtual and real, between morality and immorality, between truth and falsity, between inner and outer worlds, between me and "non" me, between life and "non" life, even between natural and "non" natural. What is life? What is death? What is "non" life? What is natural life? What is "non" natural life? What is artificial life?

These are all deep questions for a new deep world of transhumanism and subsequent posthumanism. The answers are complicated and they might be so difficult for us to comprehend as many of our current problems might seem to monkeys, or even to ants. British writer H.G. Wells said it very well about a hundred years ago: "all that the human mind has ever accomplished is but the dream before the awakening."

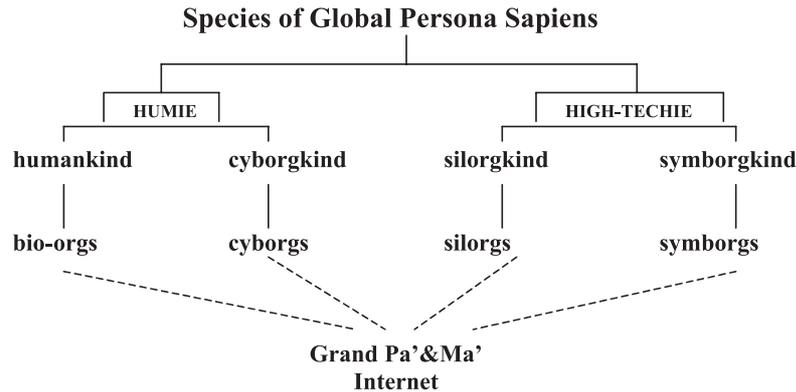
Many New Emerging Species

If we believe that biological evolution has reached a limit, what will come next? Finnish

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engineer Pentti Malaska tried to answer this question in 1997 during a speech in Brisbane, Australia, while he was president of the World Futures Studies Federation (WFSF). He talked about human-made non-human generations in

the pipeline of evolution. Malaska described two major kinds of species (carbon-based humies and silicon/information-based high techies, as a rough simplification) and four minor kinds of global persona sapiens, as can be seen below:



In such a posthuman world beings of other kinds, different from us (bio-orgs of Homo sapiens), may well be within the bounds of human invention. Malaska defined the other intelligent and conscious beings as:

- Bio-orgs or Homo sapiens - a protein-coded bio-organism in the earthly infrastructure as their "natural" surrounding.
- Cyborgs - a cybernetic organism - a combination of techniques and human biology mainly for the earthly infrastructure and the near space.
- Silorgs - a silicon organism - a humanlike non-human, fashioned by coding artificial DNA onto silicon compounds with ammonium as a solvent and aimed basically for outer space infrastructure.
- Symborgs - a symbolic organism - self-reflective, self-reproducing, self-conscious, "living programs" within the Internet as their "natural" infrastructure with advanced interface functions with the other species.

According to Malaska, Cyborgs of Cyborgkind, Silorgs of Silorgkind, and Symborgs of Symborgkind are "gestating, waiting to be brought to life." Finally, there is the Grand Pa&Ma' Internet - a global mind with superior intelligence and wisdom. This Grand Pa&Ma' Internet could be a Quantum Global Brain.

Australian economist Paul Wildman, also an

active member of the WFSF, further talks about terrestrial and non terrestrial Forms Of Life (FOL). Wildman uses the concept "borg" in its historical and generic sense to identify a "Bionic" (i.e. human made) "ORGanism", and defines five such terrestrial FOL borgs:

- Orgoborgs - organic FOL, including "traditional" Humborgs (like Homo sapiens) and new and hybrid bioengineered Bioborgs.
- GEborgs - Genetically Engineered FOL.
- Cyborgs - human/machine composite FOL.
- Symborgs - symbolical and symbolical FOL, including Conscious/External (such as cultures and corporations) and Unconscious/Internal (such as myths and archetypes) FOL.
- Technoborgs - technological FOL, including Exoskeletalborgs (with an external insect like skeleton) and Siliborgs (silicon-based FOL).

According to Wildman, some of these new FOL already exist in a technical sense, since 12% of the current USA population could be considered incipient "cyborgs" that use electronic pace-makers, artificial joints, drug implant systems, implanted corneal lenses, artificial skin, etc. All the previous FOL are our creations and will be populating our world and remaking us genetically and mechanically and thereby changing our consciousness forever.

Wildman also briefly described other four

non terrestrial FOL. They are Macrorgs (macro-cosmic FOL), MVorgs (Micro Vita - microscopic FOL), ETorgs (Extra-Terrestrial FOL), and Psyorgs (psychic FOL). Obviously, these exotic FOL depend very much on what definition of life is being used; but several unknown or not yet created intelligent and conscious entities will definitely pass the test of being "alive," and will satisfy most criteria under several concepts of "life."

Other authors have written about even more life forms in a possible posthuman future, from the very physical to the very ethereal. A simple classification between carbon-based and silicon-based organisms seems like a good place where to start. Such concise system allows to incorporate not just humans but also several types of robots, cyborgs and symborgs (including different logical entities, both physical and non physical).

Into the Future

US futurists Jerome Glenn and Theodore Gordon review possible scenarios for humanity in the year 3000 in the "State of the Future 2000" published by the Millennium Project (of the American Council for the United Nations University). They reviewed six scenarios with the following names:

1. Still Alive at 3000.
2. End of Humanity and the Rise of the Phoenix.
3. It's About Time.
4. The Great Divides.
5. The Rise and Fall of the Robot Empire.
6. ETI Disappoints After Nine Centuries.

These fascinating scenarios include frightening possibilities like the collapse of the human civilization to intriguing comments about the expansion of different forms of intelligent life to the rest of the universe. The scenarios were developed through a two-round questionnaire sent to a special panel selected by the Millennium Project nodes and the Foundation for the Future (FFF). Several factors were considered (from, for example, a global ethical system to the ability to destroy humanity) and their trajectory over the next 100, 500 and 1000 years, with special attention to "unexpected" conse-

quences.

The FFF is also doing some important work on the future evolution of humankind through its seminars Humanity 3000 and the preparation of its television series "The Next Thousand Years," which is expected to be broadcasted in 2006 with biannual program updates thereafter.

While the opportunities and possibilities for the future are mind boggling, the risks and threats to life itself are also very real. World renowned scientists like Albert Einstein and Robert Oppenheimer were once deeply concerned about the perils of a nuclear holocaust, which we have managed to escape from so far. Those were the days of the Cold War, but many of those concerns are reappearing now with the rise of global crime and terrorism.

There is always the possibility of a complete collapse due to global warming, a new Ice Age, an Asteroid collision or major Gamma Ray bursts, among many real threats to civilization. Several science fiction works and the scientific literature and also cite other existential threats to humankind, like the development of a non-friendly artificial intelligence or the "gray goo" effect caused by nanobots spreading out without any control. All these challenges have to be seriously considered by both current and future sentient life forms in order to survive and thrive. In fact, UK scientist Stephen Hawking has warned that we need to consider moving to space if we want to avoid the extinction of human knowledge.

New technologies certainly bring new risks. On the one hand, US scientist Bill Joy wrote a controversial article "Why The Future Doesn't Need Us," where he worries about robotics, genetic engineering and nanotechnology. His answer is to relinquish and stop the development of these new technologies. On the other hand, US engineer K. Eric Drexel, usually called the "father" of nanotechnology, argues just the opposite: in order to avoid the problems of emerging technologies, we have to do more research and understand them better.

The debate is open, but one thing is certain: humanity has always advanced thanks to science and technology. In fact, what makes humans different from other animals is the

development of different technologies. This has been true since the very early prehistoric times when fire, the wheel, agriculture and primitive writing first appeared on the face of our planet.

Moral Implications

While humanity will undoubtedly express itself in a number of different incarnations, it will subsequently give birth to an entirely new form of life: Artificial intelligence. The future will be populated by several different forms of intelligent life, and humanity is already attempting to reconcile the implications, particularly those in the moral realm.

The word "robot" was created in 1921 by the Czech playwright Karel Capek in his book *R.U.R.: Rossum's Universal Robots*. It was immortalized in 1950 by Russian-American scientist and writer Isaac Asimov in his book *I, Robot* where he created the 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 orders given 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 Law.

Asimov eventually improved his system and extrapolated the Zeroth Law: A robot may not injure humanity or, through inaction, allow humanity to come to harm. He also modified the other Three Laws accordingly.

On a separate front, US futurist Phil McNally and Pakistani-born futurist Sohail Inayatullah wrote *The Rights of Robots* in 1987, and US feminist Donna Haraway published *A Cyborg Manifesto* in 1991. Both are important documents that defend robots and cyborgs on their own right. These concepts imply a continuum based on previous ideas concerning animal and human rights.

US robotics expert Hans Moravec wrote two books about robots and our/their future: *Mind Children in 1988* and *Robot* in 1998. Moravec argues that robots will be our rightful descendants and he explains several ways to

"upload" a mind into a robot. Similarly, US scientist Marvin Minsky, one of the fathers of artificial intelligence at MIT, wrote his very famous 1994 article "Will robots inherit the Earth?" in *Scientific American*, where he concludes: "Yes, but they will be our children. We owe our minds to the deaths and lives of all the creatures that were ever engaged in the struggle called Evolution. Our job is to see that all this work shall not end up in meaningless waste."

More recently, UK cybernetics professor Kevin Warwick has been implanting his own body with several microchip devices and published in 2003 a book titled *I, Cyborg* explaining his experiments. Warwick is a cybernetics pioneer who claims that "I was born human. But this was an accident of fate - a condition merely of time and place. I believe it's something we have the power to change... The future is out there; I am eager to see what it holds. I want to do something with my life: I want to be a cyborg."

As these authors and thinkers suggest, we need to start preparing ourselves for the coming robot and artificial intelligence realities. To ease the transition into a posthuman condition, we must ready ourselves for the distinct possibility that Earth will be inherited by not one, but several forms of highly intelligent and sentient life forms.

The Human Seed

The human body is a good beginning, but we can certainly improve it, upgrade it, and transcend it. Biological evolution through natural selection might be ending, but technological evolution is only accelerating now. Technology, which started to exhibit some dominance over biological processes for the first time some 100,000 years ago, is finally overtaking biology as the science of life.

As US fuzzy logic theorist Bart Kosko has said: "biology is not destiny. It was never more than tendency. It was just nature's first quick and dirty way to compute with meat. Chips are destiny." And photo-qubits might come soon after standard silicon-based chips, but even that is only an intermediate means for eternal intelligent life in the universe.

Humans are the first species which is conscious of its own evolution and limitations, and humans will eventually transcend these constraints to become posthumans. It might be a rapid process like caterpillars becoming butterflies, as opposed to the slow evolutionary passage from apes to humans. Future intelligent life forms might not even resemble human beings at all, and carbon-based organisms will mix with a plethora of other organisms. These posthumans will depend not only on carbon-based systems but also on silicon and other "platforms" which might be more convenient for different environments, like outer space.

Eventually, all these new sentient life forms might be connected to become a global brain, a large interplanetary brain and even a larger intergalactic brain. The ultimate scientific, religious and philosophical queries will continue to be tackled by these posthuman life forms. Intelligence will keep on evolving and will try to answer the old-age questions of life, the universe and everything.

In order to become permanent rational "demi-urges" of the known universe of space and time, it is vital to be aware that even more important than to create is not to destroy. With ethics and wisdom, humans will become posthumans, as US science fiction writer David Zindell suggested:

"What is a human being, then?"

"A seed."

"A ... seed?"

"An acorn that is unafraid to destroy itself in growing into a tree."

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