

Future Evolution of Humanity

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Abstract

The future evolution of humanity is a huge topic. There are a number of factors that will influence the future evolution of humanity, including how people view and deal with change in general; different models of the processes of evolution and change transforming our world, and different substantive stages of evolution - in physical, biological, cultural, technological, and consciousness areas - which it is argued all work through us as human beings and will influence our ongoing evolution. For more on the process and substance of evolution in different areas, see Groff (2005a), which is a good companion piece to this article.

Additional nearer and middle term factors influencing future human evolution include: negative trends and dangers (including global megacrisis issues and dangers of nuclear and other types of warfare), positive breakthroughs and opportunities (including breakthroughs in many areas of technology-all with important societal implications, and social innovations), unexpected events or "wild cards;" the emergence of increasingly diverse and complex system levels over time, the movement of humanity out into space (to explore, industrialize, and settle in space), military interests in space, the extinction of species and dangers to ecological systems on earth, interspecies interactions and eventual offspring from humans and "alien" species (if other intelligent species exist in the universe), the evolution of humanity remaining on earth; and the evolution of consciousness-on earth and in space.

Farther-term and far, far future factors that can or will influence future human evolution (if descendants of humans still exist-in whatever form-at that time) include: the evolution of our solar system; the evolution and fate of the universe itself; and the possible evolution of consciousness to other dimensions of reality. All of these and other factors will be briefly dealt with below.

Keywords: evolution-physical, biological, cultural, technological, consciousness, global megacrisis issues, nuclear proliferation, terrorism and anti-terrorism, transhumanism, social innovations, Inner-Outer Space Age, wild cards, L-5 La Grangian Libration points, SETI, String Theory, complex systems

How Futurists View Change

When futurists look at the future, including the future evolution of humanity, they do not claim to predict the future, but say that there are different alternative futures, including: possible futures (anything that could happen in the future, including unexpected, low probability events that, if they occurred, could have a big impact), probable futures (what is most likely to happen), and preferable futures (what is most desirable in future). The goal then becomes to make preferable futures more probable, and to anticipate possible, though unlikely events, that if they occurred, could have a big impact, so that people will be at least somewhat prepared to deal with such developments. We are also creating the future by what we are doing right now, and we always have choices-including how we respond to negative events and catastrophes, as well as to positive opportunities (Groff, 2004 & 2005a).

Evolution as Process and Substance

When looking at the future evolution of humanity, one can view evolution as both the models and processes of change and evolution transforming our world, as well as the substantive stages of change and evolution in different areas. Different writing by this author has looked at sixteen different models of change and evolution, with examples of each. What is interesting is that older models of change-from Eastern and Western cultures-envisioned a more predictable future, while more recent models (and new scientific paradigms or worldviews) involve increasing complexity, as well as increasing uncertainty and unpredictability (Groff, 2004 & 2005a).

One can also look at different substantive stages and areas of evolution. This writer has written elsewhere that there are at least four, and possibly five, broad substantive areas of evolution-physical, biological, cultural, technological, and consciousness-and that they all work through us as human beings, making us complex, multi-leveled beings, who embody aspects of all previous stages of evolution, that will no doubt also influence our ongoing future human evolution. (Groff, 2005a)

In the broadest sense, one can argue that humans are continuing products of four, and possibly five, broad stages and aspects of evolution: (1) the physical-chemical-geological evolution of the universe and earth ("We are all star stuff," as Carl Sagan said, and made up of the same atomic elements that exist throughout the universe); (2) the biological evolution of species (we have drives, instincts, and automatic body processes that we share with the animal kingdom, i.e., our animal nature); (3) the cultural evolution of all of our socially-learned behavior, including technology/tools, social organizations of all kinds, and values, beliefs, ideas, myths, and symbols (humans create culture and are products of culture and learning, which is what makes humans unique and different from the animal kingdom); and (4) the evolution of consciousness-our ability to wake up and become conscious of all the other areas of evolution, so that we can use our intuition and creativity to move evolution forward in new ways (Groff, 2005a).

There is also a debate about whether technology will become an independent, silicon-based, life form itself in future (Kurzweil's argument, 2005, and earlier books; Smart, n.d.; and World Transhumanist Association, n.d), and how technology will

continue interacting with humans in future—both in society and via technological implants in the human body itself.

Nearer and Middle Term Futures

Introduction to specific factors

The future evolution of humanity will be influenced and molded by many factors and trends—both positive and negative, including both problems and dangers, as well as positive breakthroughs and opportunities, as well as by unexpected events or "wild cards." Not only the events themselves, but how we respond to them, will determine whether we just survive, flourish, evolve beyond what it means to be human today, or perish. Some of these different factors include the following.

Negative problems and dangers

Various negative trends and problems are already identified by people and need to be addressed by humanity, if increasingly negative consequences are to be avoided in future. Some of these issues include global climate change, global population growth, water quality, and dangers of nuclear terrorism and war. Global climate change and global warming, if it continues, could lead to the melting of ice caps (which is already occurring), the rising of ocean levels submerging coastal areas and cities, with huge geopolitical effects as people are left homeless and growing seasons change around the world (Gore, 2006). Global population growth, from 4 to 6 billion people in just the last 25 years of the 20th century (Meadows, et. al, 1972), and now about 6.6 billion (2007), with people taking over increasingly more of the land areas of the planet, pushes animals further back, which turns more soil to desert, as well as leading to starvation of some people without access to adequate food or water supplies as a consequence. Having adequate quality water supplies in future is a huge global issue for much of the world. Poverty also remains a crying global need, and a possible breeding ground for terrorism as well (Worldwatch Institute, Annual *State of the World Report*, covers many of these issues). Finally, dangers of nuclear proliferation, nuclear terrorism, terrorism and anti-terrorism continuing to dominate world politics in general, and chemical-biological warfare—the poor man's nuclear weapons, all remain great. These are just a few of the pressing global problems confronting the world today.

One way of looking at crises is that they are evolutionary drivers of change, since they force us to reframe how we look at and deal with problems, if we want to find solutions (Hubbard, 1993). Usually these solutions must also occur on larger system levels, as from national to global system levels today, but with decentralization within those larger system levels also necessary, allowing both global and local needs, and their interactions, to be addressed.

Positive breakthroughs and opportunities

There are many breakthroughs in technology, societal change, and consciousness, which are all changing life in important ways, as they have in the past, as humanity has moved through Agricultural, Industrial, and Information Ages—Toffler's three major waves of change (Toffler, 1980 & Groff, 1996). The agricultural revolution (the

first great human technological revolution) occurred when humans realized that they could plant a seed and harvest it and thereby give up a nomadic life in favor of living in settled agricultural villages and communities. The agricultural age includes several sub-stages, including the first villages in prehistoric, Neolithic times; the later rise of ancient civilizations and empires, along with writing, astronomy, conquest, and slavery; and later feudalism, with its feudal lords, serfs or peasants, and artisans, who still made everything by hand. This Agricultural Age lasted thousands of years.

Next came the industrial revolution, when people moved to cities to work in factories, and the age of mass production began. This lasted 200-300 years. More recently, the information revolution followed, allowing the collection and analysis of data from the very macro level of the whole universe on down to the very micro, subatomic level, along with the telecommunications/internet/digital revolutions, with the internet becoming the infrastructure for an emerging global brain of humanity. Each subsequent age has occurred much more rapidly than previous ages, with interesting questions on what age will emerge next (Groff, 1996 & 2005a, pp. 198-199)?

A number of additional technological revolutions are occurring simultaneously today-in what some have called NBIC areas (nanotech, biotech, infotech, and cognitivetech) – a focus of transhumanists, as well as spacetechnology areas (space exploration, industrialization, and settlement). (See Halal, 2004; Platt, 1981; Smart, n.d.; and other technology journals noted in the Bibliography) In addition, there are important social innovations (Hubbard, 1998), as well as the consciousness revolution. Each of these revolutions are having profound effects on human life and future evolution, as elaborated below.

Beyond the information revolution and internet (noted above), machine and artificial intelligence are evolving, with transhumanists, such as Ray Kurzweil, believing that by 2029, machines will pass the Turing Test (when humans will no longer be able to distinguish answers from a machine versus a human), and by 2048, a "singularity" point will be reached where the computational speed of machines will outpace that of the human biological brain, leading eventually to the uploading of human intelligence into machines as the next stage in evolution (Kurzweil, 2005). This writer rejects this view as too reductionist in terms of what it means to be a human being, partly because it also reduces human consciousness to the physical brain only. Nonetheless, there is no question that the human-machine interface will be an increasingly important issue effecting future human evolution.

The biotechnology revolution involves various aspects, which all raise important ethical questions, and which all involve humans "playing God" and intervening in what were previously natural processes of biological evolution. This rapidly evolving biotech revolution includes: gene splicing and recombinant DNA (where new genes are substituted for defective genes); cloning (or reproducing carbon copies of members of a species, like Dolly the Sheep, with huge ethical questions about the possibility of cloning humans in future, and if so, what rights the clone would have), as well as stem cell research (where generic stem cells could evolve into any specialized cell, with great hopes for medical treatment of various diseases). Here some governance of biotechnology is called for (Anderson, 1996).

In addition, the mapping of the human genome by Francis Collins for the U.S. Government and Craig Ventner for his own company, in 2000, was based on mapping the two percent of the genes originally deemed important in influencing human behavior, with progress since towards determining the effects of different genes, or combinations of genes, on different aspects of human behavior, although the ninety-eight percent of the so-called "junk DNA" is now being recognized as also playing a regulatory role that needs to be examined (Groff, 2005a, p. 197). The relationship between genes and different diseases is progressing. In future, a genetic blueprint of new babies could show individual genetic propensities to certain illnesses, which could be monitored.

Bruce Lipton also shows how the cell interacts with, and gets guidance from, its environment, showing that genes alone do not determine the behavior of the cell (Lipton, 2005).

The nanotechnology revolution takes two forms: the first, Eric Drexler's original vision of molecular manufacturing (being able to change the atomic configuration or structure of molecules, thereby being able to manufacture anything from the molecular level on up in future) (Drexler, 1990); and the U.S. Government's National Nanotechnology Initiative (NNI) (of creating very tiny-scale nanobots or robots, or carbon nanotubes, that could perform various mini-scale functions, in health and other areas).

The outer space revolution (including human exploration, industrialization, and settlement in space) extends our human habitat from an earth only to an extended earth-space environment (Heppenheimer, 1977; O'Neill, 1977; von Puttkamer, 1979 & 1985). Some have said humans going to space is as big an evolutionary leap as when the fish first came out of the sea onto the land.

Empowering people-via providing educational opportunities and fostering creativity and innovation in all people-can lead to important scientific, technological, cultural, societal, and spiritual/consciousness innovations, which can have important implications for future human evolution (Hubbard, 1998; Ray & Anderson, 2000).

The inner space/consciousness revolution (which all the world's spiritual-religious traditions hold out as a real evolutionary possibility for humanity), has examples of persons - often the unwitting "founders" - in all traditions who have broken the normal constraints on human experiences of reality and become spiritually-awakened beings, with prayer, meditation and various psycho-technologies that could assist in this process. (See, for example, the extensive work of Ken Wilber; *What Is Enlightenment Magazine*, as well as Wauters, 2002, on seven chakras or energy centers in the body, which are each associated with different levels of consciousness)

The outer space and inner space developments can collectively be called the "Inner/Outer Space Revolution" (this author's term), where we can potentially go infinitely outward into outer space, seeking outer mastery, and infinitely inward into inner space, seeking inner mastery, on journeys of exploration and discovery, to finally know and experience-as Stephen Hawking, Paul Davies, and other scientists, as well as mystics, have all talked about-namely "The Mind of God" or Divine Intelligence behind the creation of this universe (Davies, 1992 & Hawking, 1988).

It is impossible for anyone to totally know the full implications of all these different revolutions happening simultaneously today. All of the above technological revolutions—including the agricultural, industrial, and information revolutions and beyond—restructure jobs and the economy, as well as all of our societal institutions, and even our thinking and worldviews (Groff, 1996 & Toffler, 1980). Given the very rapid rate of technological change happening today, and the fact that the pace of change keeps speeding up, one can only conclude that much more technological change awaits our human future, including how humans will be interacting with all this technological change.

Unexpected events and "Wild Cards"

While it is difficult, if not impossible, to totally anticipate or predict unexpected, low probability/high impact events that could change future human evolution, we can look at recent examples to illustrate the impact of such events. Dramatic political examples include the fall of Communism and the breakup of the former Soviet Union, the U.S. adversary in the Cold War, which dominated world politics from the end of World War II, when the Cold War emerged, up until the fall of the Berlin Wall in 1989 and the fall of Communism in the former Soviet Union in 1991, which very few people anticipated. This was followed by the breakup of the Soviet Union into a number of independent states. Another political example centers on the events of 9/11/2001, when Al Qaeda-backed terrorists attacked the World Trade Center in New York City and the Pentagon in Washington, D.C.—two symbols of U.S. power. This led to the Bush-Cheney Administration not only invading Afghanistan (where the Taliban was providing refuge to Osama Bin Laden), but also Iraq (under the mistaken charge that Saddam Hussein possessed or was seeking weapons of mass destruction or WMD, and was also linked to Bin Laden). When these justifications proved incorrect, then creating democracy in Iraq became the stated purpose of the U.S. invasion of Iraq, which has descended into a domestic civil war, distracted attention from the real war on terrorism and Bin Laden, and created a great tragedy for all concerned, illustrating how unexpected events, such as 9/11, can trigger many consequences that were not adequately anticipated.

Natural disasters can also create unexpected, high impact events with great consequences. Examples include volcanic eruptions, earthquakes (that occur periodically in the "ring of fire" around the Pacific Ocean, which can then create tsunamis), as well as tornadoes and hurricanes that occur in other parts of the world (with Hurricane Katrina leveling New Orleans as one recent example). Another example focuses on the possibility of another asteroid hitting the earth again in future, like the one that it is believed hit the earth 65 million years ago, leading to the extinction of the dinosaurs, which then paved the way for mammalian reptiles which survived to evolve into many mammalian species, including eventually humans (Groff, 2005a). Global warming is another current danger that, if it continues, could lead to massive negative consequences for the planet (Gore, 2006). Global warming (unlike the other events above) is at least a development about which humanity has been warned. Whether humanity acts in time to avert a massive disaster—for humans and other species—is the key question today.

The above unexpected "wild cards" are good illustrations of the increasing uncertainty and unpredictability that seem to characterize life today—in both natural and human-made areas—and that is also reflected in "new scientific paradigms," in contrast to older cultural and scientific worldviews based on a more predictable view of life and the future (See Barber, 2006, for more on "wild cards.").

Increasingly complex systems with increasing diversity in them over time

One way of looking at evolution is to see everything in the universe as systems within systems within systems, with human integration occurring on ever larger system levels, with increasing complexity and diversity within them, over time. Thus, over time, people integrate at ever larger system levels, just as matter itself has come into being at ever larger, more complex, system levels over time, from vibrating strings of energy-'if' String Theory is correct (Greene, 2003), to subatomic particles to atoms to molecules to single-cell life to multicellular life, including finally plants, animals, and humans.

Humans themselves have integrated over time on ever larger, emerging system levels of organization—covering ever larger areas of the earth, and including increasing complexity within them. People began as mobile bands, then tribes (in the Hunting and Gathering period), then settled agricultural communities with people living in villages (at the beginning of the agricultural revolution), then city-states and ancient empires (as people began conquering other people and making them into slaves to support ancient civilizations as these emerged), then feudalism (when feudal lords had serfs or peasants working for them), then the rise of nation-states (with people moving to cities to work in factories) and modern European colonial empires emerging during the industrial revolution; then former colonies becoming independent nation-states, then bigger regional groupings emerging, plus a globally-interdependent world today—based on all the diversity of the world's races cultures, civilizations, and religions now seeking some common ground and unity amidst all this diversity (Groff, 2005b, especially Part III).

Humanity has also begun to leave its home planet—to explore our solar system, and our galaxy and universe beyond, with future space colonies and settlements on the horizon, along with the possibility of encountering intelligent extraterrestrial life and "alien" species (as so much science fiction, like Star Trek, seems to be intuitively anticipating), with the challenge then of integrating an even greater diversity of intelligent species into ever larger system levels beyond earth.

One thing we know about larger system levels is that they include increasing diversity, i.e., increasing complexity, within them. As global modeling studies of complex systems show (see Meadows, et. al., 1972, 1992, and later global modeling studies), there are always counterintuitive effects that can occur, which were not anticipated by one's own intuition or common sense, but which are the unexpected outcomes and consequences of so many different variables interacting with each other over time. Therefore, one can be sure that as humans begin to extend their environment from only planet earth (our home) to an extended earth-space environment—in our solar system and then ultimately on galactic levels, there will no doubt be many counterintuitive effects, as well as unexpected "wild card" events, that will intervene and influence the future evolution of humanity.

It is also a hypothesis of this writer that when people first encounter diversity - which is "alien" or "foreign" to them-that this can (if not dealt with carefully) lead to conflict, and even war, with the unknown, which can be perceived as a threat because they are different and not understood. Then, eventually, through increasing interactions and contact, people begin to integrate their behavior more and eventually they become integrated on a larger system level. But just when this happens and they think they have finally gotten their larger system integrated and functioning relatively peacefully and well, that larger system level then discovers that it is just a part of an even larger system, with other diverse parts in it, and the process (of needing to integrate on an ever larger system level with increasing diversity within that larger system) starts all over again, with conflict and even war possible in the beginning. As a peace researcher, this is not a pattern that one wants to occur, but it is one that often seems to occur. (This is not unlike two galaxies that collide with each other, creating a huge explosion, but with time their forced interaction leads to integration within one larger galaxy that has merged over time from the two previous galaxies)

Humans exploring and living in outer space

There is also no doubt that as humans move out to explore the universe, human colonies or habitats will be formed in space, and humans will begin not only spending longer periods living in space (as astronauts and cosmonauts have done and will do on space stations, such as the current international space station), but with time more permanent space colonies or settlements will be established. The L-5 Society-a citizen's group formed in 1975 to promote the establishment of colonies in space-believed that two of the five LaGrangian Libration points (discovered by the French mathematician, Lagrange, in 1772) are the most stable places to put a space colony, since the gravitational pull between the earth and moon would hold such colonies in a stationary position with respect to the Earth and the Moon (*L5 News*). (The L5 Society later merged with the National Space Institute, in 1987, to found the National Space Society)

Permanent space colonies will no doubt initially be supported by different governments or private groups on earth, each with different philosophies, ideologies, and belief systems which they would want duplicated in their space colony. One can envision a scenario, however, in which people living in a space colony would eventually declare their independence from their human sponsors on earth, just as the American colonies did from Great Britain, and just as former colonies in Africa, the Middle East, Asia, and Latin America declared their independence from their colonial masters in Europe. The space colony inhabitants would be living in totally different environments, facing different challenges in space, and they would eventually believe that they could better determine their human needs and future on their own, rather than relying on decisions made back on earth.

Another factor that could speed up the desire of permanent space colony inhabitants to declare their independence from earth is that their own physical bodies may change and evolve, as they respond to the zero gravity and weightlessness of space (or to the created, artificial gravity of a space colony or station), where constant exercise will be necessary to prevent their bones from atrophying, and where their bodies may become elongated, to the point where eventually their bodies would not be able to tol-

erate the greater gravity of earth, making it impossible for them to return to earth to live. Their offspring might also evolve physically, in ways different from humans on earth, creating the seeds for a possible new humanoid-type species to emerge in future (see NASA studies on "human factors in space," including by B. J. Bluth).

Military interests in outer space

Another issue-as humans move out into space-will be the role of the military in space. A basic military principle has always been that the nation or group that controls the "high ground" has the military advantage. Controlling the "high ground of space"- via controlling some of those same L-5 LaGrange points, or via placing missiles in space-would be the ultimate place, from a military standpoint, to control activities on earth.

No doubt U.S. President Ronald Reagan's Strategic Defense Initiative (SDI) or "Star Wars" (as it was called), and U.S. President George W. Bush's revised National Missile Defense, have goals of being able to intercept any missiles launched at the United States or its allies by their adversaries on earth-the Soviet Union, in the case of Reagan's Strategic Defense Initiative, and the so-called "Axis of Evil," in the case of George W. Bush's National Missile Defense. The additional problems with such a system are enormous, however, and include: the enormous costs of such a system, which also takes limited resources away from other technological, societal, and environmental needs of people; efforts at intercepting most missiles launched with such a system have been ineffective so far; and launching missiles in space has the very great danger of initiating new arms races in space by other countries concerned about the current United States efforts to dominate world politics, as well as space, without adequately consulting with allies and other interested parties.

President Reagan also envisioned this space-based missile defense system, 'if' it ever became totally effective, requiring the United States to also give this technology to the former Soviet Union, which would then allow humanity to move, theoretically, beyond the "balance of terror" that dominated world politics during the Cold War and the nuclear age, since *both* sides would now be able to intercept incoming missiles from their opponent, thereby making nuclear weapons obsolete -'if' the system was totally effective on both sides. (A very big 'if' indeed and very unlikely. As has been said before: "All it takes is one nuclear weapon to ruin your whole day!")

We are still very far from achieving such a system today, and the Cold War is now over, raising questions about the ongoing need for such a system. Nuclear missiles are not deterring terrorism today, and missiles in space would not deter a terrorist with a bomb in a suitcase who was willing to blow him/herself up. Whether a missile defensive system would deter Iran or North Korea - the supposed justification for such a system today - is questionable, since they would have to be quite insane to initiate a nuclear attack on the U.S. or its allies, since they would be vulnerable to a massive nuclear retaliation against them.

Terrorism also illustrates the difficulties of integrating the rich cultural and religious diversity of humanity into an effectively functioning, globally-interdependent world, on a global systems level today, which all the world's peoples could perceive as meeting their needs and allowing their cultural diversity to also be preserved and their

economic interests met. In short, an even more complex, global systems level is seeking to be born, and it is definitely experiencing some very difficult growing pains.

People have always said that the one thing that might finally bring the diversity of humanity together would be if an alien species from space were verified to have made actual human contact. (This is the premise of various science fiction stories and films, such as *Close Encounters of the Third Kind*.) Hopefully humanity can find common ground and recognize our interdependence today without such an event having to occur.

Ecological systems and the extinction of species

The increasing population of people on the planet is bringing about the extinction of increasing numbers of other species today. Indeed, some believe we are now in the sixth mass extinction of species on this planet, the fifth mass extinction being the extinction of the dinosaurs 65 million years ago (Groff, 2005a, pp. 196-197). While biotechnology and DNA samples from extinct species may make it possible to revive a few members of extinct species in future, there is no doubt that a major crisis is brewing on earth involving the extinction of vast numbers of species that humanity does not even know exist and may wish it had known about, for medical and other purposes in future. In areas like the Amazon Basin and rainforest, which are being rapidly developed, vast numbers of species are disappearing before they can even be discovered and identified. It is extremely important to collect samples of these species and preserve them, before they are totally extinct.

Nonetheless, species exist within complex ecological systems, where all species within it build on each other, creating a totally interdependent ecological system. Thus, if one species suddenly becomes extinct or endangered within an ecological system, it can effect the whole complex web of life within that system, endangering the survival of other species as well.

When looking at the effect of the extinction of species, two important facts give pause concerning future human evolution. The first is that 99.9 percent of all the species that have ever existed are now extinct (Groff, 2005a, pp. 196-197). There is no guarantee therefore that the human species, at least in our present form, will continue to exist forever. Second, the human species would probably not even have come into existence without the earlier extinction of the dinosaurs, which left small mammalian-type reptiles still existing, who themselves evolved into many other mammalian (milk producing) species, including eventually humans (Groff, 2005a, p. 195). We have no idea what the longer term consequences will be from so many diverse species becoming extinct today, but there will be many consequences.

Biosphere II: prototype for a space colony

If humans move to live in colonies in space, where they must be self-sufficient in their own food production in the colony, the question is whether humans have the knowledge and understanding necessary to develop human-made ecological systems in space that can produce sufficient food to support those living in the colony.

One such private attempt to develop an ecologically complex prototype for a future space colony was Biosphere II in Arizona (with Biosphere I being the natural

biosphere, and Biosphere II being a human-made one). Biosphere II included a large enclosed space, with private living quarters for the eight people who lived together inside the complex for two years, along with a large open domed space with sunlight coming through it, which had a number of different small scale biomes, or types of ecological systems, built adjacent to each other, each composed of their own combination of plant species from different parts of the world (See, for example, Allen, 1991).

As everyone knows, plants and humans have a symbiotic relationship with each other: plants give off oxygen, which humans breath in, and humans give off carbon dioxide, which plants breath in. In Biosphere II, which was supposed to be a controlled laboratory experiment, different plant species died in some of the biomes, and the oxygen supply to the whole enclosed complex got too low, requiring human intervention from outside via the pumping of more oxygen into the structure-a necessity if the experiment was to continue. Critics nonetheless argued that this undermined the scientific validity of the experiment's results. It also illustrates the difficulty humans have in anticipating all of the complex interactions and counterintuitive effects that can occur when humans try to create ecological systems quickly from scratch, based on multiple species interacting with each other that evolved over long periods of time in nature.

Clearly hydroponic-type agriculture (where plants are grown individually, usually without soil, in enclosed greenhouses with optimal temperature controls and nutrients needed to feed the plants and provide for their optimal growth) may offer better opportunities to grow food to support future colonies in space, rather than trying to create complex ecological systems over very short periods of time.

Interspecies interactions

The SETI (Search for Extraterrestrial Intelligence) Project has been monitoring radio-wave signals from outer space for evidence of intelligent extraterrestrial life. If other intelligent, humanoid-type, upright (two-legged) "alien" species exist in our universe, and eventual contact is made, followed by increasing interaction, it could initially lead to conflict, and even war (as noted above) - if not carefully managed on all sides (due to people's initial fear of the unknown).

Nonetheless, one can envision (as much science fiction, such as *Star Trek*, already has) that one can explore the universe and encounter other "alien" species in a genuine spirit of adventure that respects other species and honors the prime directive, i.e., not to interfere in the development of other species' civilizations. In this sense, *Star Trek* has had a great impact on the mass consciousness with its more positive vision of alien encounters. One can also envision that if alien species are proven to exist, that eventually individuals from diverse human and "alien" species may pair up and have offspring together, creating new hybrid offspring, and expanding the human and alien gene pool for future generations in the process, just as increasing intermarriage between peoples of different racial-ethnic backgrounds on earth is an inevitable outcome of the increasing interactions of people here.

Humanity remaining on earth

While the above scenarios (related to humans moving out into space to begin exploring, populating, and settling the universe) will no doubt occur with time- though not as quickly as original space advocates envisioned (Heppenheimer, 1977; O'Neill, 1977; von Puttkamer, 1979 & 1985), due to competing demands for resources, budget cutbacks, and mission problems-there will no doubt be vast numbers of people who will choose (for various reasons) to remain on earth, raising questions of how humanity will evolve who stay here. The evolution of life on earth will depend on all the crises, as well as positive breakthroughs and possible "wild card" events, enumerated at the beginning of this article. In addition, contact between future space colonies and earth will no doubt be an important ongoing feature of any life here on earth.

The evolution of consciousness

The world's spiritual-religious traditions were almost all begun by "enlightened" beings who were able to go beyond their original cultural learning and programming (via their five senses, which can be distorted without people knowing it), to activate their intuition, creativity, and higher mind, and via prayer, meditation, and other psycho-technologies, enable them to experience expanded states of consciousness and connection-to their fellow human beings, to life itself, and to other dimensions of reality within. Such mystical experiences have been defined as "a direct experience of ultimate reality" (Carmody & Carmody, 1996).

One way of looking at this evolution of different states of consciousness is via the Hindu tradition of seven different chakras or energy centers in the body, starting at the base of the spine and moving upward to the crown chakra at the top of the head. In this system, each chakra is associated with a different level of consciousness. These seven chakras (and the primary focus of consciousness in each), are: the root chakra (survival); the sacral/sexual chakra (procreation); the solar plexus chakra (power and achievement); the heart chakra (love and the beginning of the inner spiritual journey); the throat chakra (communication, will, and speaking one's truth); the brow chakra (intuition and inner vision); and the crown chakra (beingness and the experience of cosmic consciousness) (Wauters, 2002). See also the voluminous life work of Ken Wilber on the "spectrum of consciousness" (Wilber, 1993/1977; and later work, including his four quadrant model on the evolution of consciousness).

Once someone has moved their energy upward to their crown chakra, and become "enlightened," they would then usually go back to share their spiritual experiences and wisdom with others, who often said, "Let's form a new religion" based on the teachings of that spiritually-awakened person, which teachings usually became the original scriptures of that new religion. The difficulty later is that others, who have not all had the same inner, mystical experiences that the original founder had, can interpret the original scriptures differently, often leading to the formation of different denominations within the same religion over time (Groff, 2005b, Part III).

Today the challenge is to find the common ground between the different socially-learned and spiritually-inspired religious traditions of humanity, so that we can come together as a common human family, while still honoring that there are many paths to God, Yahweh, Allah, Brahma, The Great Spirit (whatever label one's tradition calls

this ultimate reality), and that more important perhaps than the particular spiritual path that one embarks upon (which is often the tradition that one was raised in) is that one get on some spiritual path to begin to explore one's inner nature, not just to explore and master the outer, material world.

In terms of principles to live by, a code of ethics, much intercultural communication and inter-religious dialogue is occurring, and declarations being created, on common principles to live by in the late 20th century on into the 21st century. Some of these commonly agreed upon principles include: peace and nonviolence to solve problems; social justice; eliminating poverty; providing educational and job opportunities for all people-no matter what their racial-ethnic background or gender; taking care of the earth (our life-support system); and finding inner peace as well (See also Groff, 2002, on different aspects of an evolving view of peace).

Different cultural-religious traditions also bring different gifts to the table of humanity as a whole today-now that we are all interacting with each other. In general, one can say that Western cultures and religions especially focus on mastering the external world, and creating peace and social justice there; Eastern cultures and religions especially focus on finding inner peace and mastery; and indigenous cultures and earth-based religions especially focus on caring and speaking for the earth-our Mother and the source of all life, including our own (Beverluis, 2000 & Groff, 2002).

Humanity will be able to take a great evolutionary leap forward if we are able to be open to learn from each other's traditions and collective wisdom-especially in the areas that our own cultural-religious-scientific traditions have not developed as much-allowing the creation of something much richer together than any of us could create on our own. But this will require openness and a bit of humility on all our parts, as we all realize that none of us have all the answers, but that we can learn important things from each other, and then come together to advance the human journey and future evolution of humanity as a common human species, with great diversity and creativity and complexity within it.

Farther Term and Exceedingly Far, Far Futures

Evolution of our solar system

Within five billion years, our sun-which is a star at the center of our solar system-will burn out, and descendants of humans, if they still exist, in whatever form, will need to migrate beyond our solar system and begin the exploration and settlement of other reaches of our galaxy-if they want to survive. Space migration and settlement thus seem inevitable aspects of the future evolution of humanity.

Evolution and fate of the universe

There has been a huge debate within cosmology and astronomy about the future evolution and fate of our physical universe. The latest evidence is that the universe itself is accelerating in the rate at which different clusters of galaxies are expanding away from each other (like the outside of a balloon expanding). Earlier it was debated whether there was enough visible matter and dark (invisible) matter in the universe, for gravity to act upon, so that the universe would stop expanding and collapse back in

on itself, creating a Big Crunch or Heat Death of our universe. Now it is believed that the universe is made up of approximately seventy-three percent dark (invisible) energy, which has an anti-gravity effect (Einstein's famous "cosmological constant"), leading to the accelerating rate at which the universe is expanding today, and leading (if this continues) to an ultimate breakdown of matter itself into elementary particles and a Cold Death of the universe. Before this final end state, different clusters of galaxies will diverge so much from each other that only our local Milky Way galaxy and Andromeda galaxy will be visible from earth, creating a more lonely view of the cosmos, with far less stars still visible, for any human descendants remaining—who by this time will have had to migrate beyond our solar system (with the death of our sun) to other areas of our galaxy (Groff, 2005a, p. 191).

Both outcomes for our universe—a Cold Death or a Heat Death—are in the exceedingly far, far future. If descendants of humans, in whatever form, still exist then, and also want to physically survive, they will need to figure out how to transit to some other parallel or bubble universe (based on current theories positing that our physical universe is not the only one), via a worm hole created between different black hole singularities at the center of our universe and some parallel universe, as one possibility (Kaku, 2004 & 2005), or via other possibilities that beings at that time will no doubt figure out.

Evolution of consciousness to other dimensions of reality

A totally different human outcome would be an evolution of spiritual-consciousness, where humans break the traditional limitations (from the five senses) on human consciousness, move towards spiritual enlightenment, and are able to travel to or become open to other dimensions of reality that coexist on higher vibratory levels, alongside this four dimensional world of our everyday reality - the three dimensions of height, width, and depth, along with time (Sahtouris, 1995). Such an evolution to a totally expanded state of consciousness would also reprogram humans, down to their cellular level, as a necessary part of becoming more open, luminous beings, who are able to function at higher vibratory levels, wherever they happened to be. If humanity was able, en masse, to evolve in this way, one might be able to say that a new humanoid-type species - the future human-had been born.

Indigenous cultures and Eastern cultures have traditionally had beings who had access to these other dimensions of reality, as well as the ability to travel to other planets and locations in our physical universe (Sahtouris, 1995), whose existence our Western, more materialistic, industrial culture has often negated. Nonetheless, future human evolution may once again honor this worldview as part of what it means to be a human being in the fullest sense of the term. Noteworthy here is that String Theory, one of the hypothesized new paradigms or worldviews in science, also posits a universe of at least ten-eleven dimensions (Greene, 2003).

Conclusion

In conclusion, it is important to remember that as humans, we can "wake up" and become conscious of all these different factors influencing the future evolution of humanity. In the nearer-term future, we also always have choices, and the choices that we individually and collectively make, every day of our lives, are in varying degrees creating and influencing the world that we will be living and working in future. Our decisions will also influence the future evolution of humanity as a whole, which will no doubt continue to diversify as it moves into ever more diverse environments, such as space and the oceans, in future. We should always favor life over death-honoring the sanctity of life itself, if at all possible; be open to encountering an ever greater diversity of life forms, as well as cultures; and be humble before the great unfolding mystery of life and the exploration of our inner and outer worlds-all of which will be part of the future evolution of humanity. The evolution of our solar system and universe-in the much longer term future-are factors beyond human control, but which descendants of humans, if they still exist, in whatever form, will no doubt deal with in new and creative ways, just as humans have shown the capacity to do (in their better moments) throughout much of human evolution. The possibility of human consciousness also evolving to more expanded states that are able to tap into other higher frequency dimensions of reality is also a possibility for the human future. Indeed, the human future will likely involve the endless exploration and discovery of both our inner and outer worlds, and their interconnections.

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Recommended Journals and Magazines:

- Astronomy. The world's best-selling astronomy magazine. <www.astronomy.com>
- Discover: Science, Technology, and the Future*. Published monthly. <www.discover-magazine.com>
- Futures: The Journal of Forecasting, Planning and Policy*. Published quarterly by Elsevier. www.elsevier.nl/inca/publications/store/3/0/4/2/2/
- Futures Research Quarterly*. Published quarterly by the World Future Society, Bethesda, MD. <www.wfs.org>
- Future Survey: A Monthly Abstract of Books, Articles, and Reports Concerning Forecasts, Trends, and Ideas about the Future*, Ed. By Michael Marien. Published monthly by the World Future Society, Bethesda, MD. <www.wfs.org>
- The Futurist: A Magazine of Forecasts, Trends, and Ideas about the Future*. Published bi-monthly since 1967 by the World Future Society, Bethesda, MD. <www.wfs.org>
- Journal of Future Studies: Epistemology, Methods, Applied and Alternative Futures*. Published quarterly by the Graduate Institute of Future Studies, Tamkang University, Taipei, Taiwan. <www.jfs.tku.edu.tw>
- ReVision: A Journal of Consciousness and Transformation*. A quarterly journal by Heldref Publications.
- Scientific American*. Published monthly. <www.sciam.com>
- Shift: At the Frontiers of Consciousness*. Published by the Institute of Noetic Sciences, Petaluma, Ca. <www.noetic.org>
- Technological Forecasting and Social Change*. Published by Elsevier Science, Inc.
- Technology Review: The Authority on the Future of Technology*. Published six times per year by M.I.T. Press. <www.technologyreview.com>
- What Is Enlightenment: Redefining Spirituality for an Evolving World*. Published quarterly. Covers many spiritual issues as these relate to the world and human evolution. <www.wie.org>

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