

**SUSTAINABLE DEVELOPMENT OR COLLAPSE,
REGENERATION AND TRANSFORMATION?**

From Noah's Ark to the Titanic and Back Again

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1 INTRODUCTION

Nobody made a greater mistake than he who did nothing because he could do only a little.

Edmund Bourke

On 14 April, 1912, twenty minutes to midnight, the “unsinkable” Titanic collided with an iceberg while on her maiden voyage from Europe to New York. The ice mass tore a 90 m gap in the starboard side, below the waterline but above the double bottom level. Water began flooding six of the sixteen watertight compartments. These could be sealed off horizontally, but not in the direction of the decks. As the front compartments became flooded, the ship pitched forward and water started to spill over the tops of the bulkheads into other compartments. Five minutes to midnight the captain ordered the crew to launch lifeboats. At half past midnight the boats began filling with women and children. Some boats remained nearly empty as men were not allowed to board and some families wished to stay together. Others were reluctant to board the boat and set off in the dark, leaving behind the only well-lit place in sight. Only the very last boat was crowded.

On 15 April 1912 at two twenty in the morning the Titanic sank. Of the 1,316 passengers and 855 members of the crew, only 706 people survived. More than two thirds of the people on-board died, most from hypothermia and drowning.

It has been over a hundred years since the disaster, and now more than ever before, the tragic fate of the Titanic should serve as a lesson and warning. Escalating global problems of humankind could exceed the ecosystem’s limits, and it would take entire biosphere to buffer and absorb these problems. We can ignore hazards and warning signs but that does not mean that the problems will go away.

The crew and passengers travelling on the Titanic very likely also believed that nothing bad could ever happen: the ship had been built to be the safest in the history of mankind. This is why the crew and commanding officers in particular forgot to act with caution. This recklessness ultimately led to disaster. The Titanic had been warned by the *Californian*, a nearby ship, that it was entering an area of icebergs and packed ice (the constellation of the

Moon, the Sun, and the Earth had produced a strong tide that released a higher number of giant icebergs in the Atlantic Ocean).

In spite of this, the ship did not slow down. There was no moon or wind that night, which reduced iceberg visibility (and there was no water crashing against the ice, which would have formed visible spume).

For inexplicable reasons the lookouts did not have binoculars available. After noticing the danger, the watch officer began an evasive manoeuvre to the left but it was too late. There were only 37 seconds between spotting the iceberg and the collision. Ironically, had the ship continued its course head-on to the iceberg, the collision would have filled only three compartments and the Titanic would not have sunk. Naturally no one could have known this however.

According to the Bible, four or five thousand years earlier, sometime in the third millennium BC, another story took place. The Lord saw that the wickedness of the human race was great on the earth and decided to wipe the human race, animals, birds, and the creatures that move along the ground from the face of the earth. But Noah found favour in the eyes of the Lord. (Gen 6.5-8) God told Noah to build an ark – a wooden ship. It was only for him, his wife, their three sons (Shem, Ham, and Japheth) with their wives, and two of all living creatures, male and female, to keep them alive. (Gen 6.14-19)

It is irrelevant to what degree this legend is historically accurate. The point is that it is enlightening. Noah must have looked a fool, building a strange giant ship when there was no rain and because of a flood, the likes of which had not occurred for the entire known history of mankind. He, however, listened to his inner voice, presumably relying on a faith that had an element of uncertainty as to whether it really had been God's voice. Thanks to this faith and his willingness to put his own name at risk, Noah saved humankind.

Both the Titanic story and the legend of Noah's Ark can also be inspiring in the 21st century, in which we will either manage to act with foresight as Noah did, or we will not, which will have painful consequences.

2 TURNING POINTS IN HISTORY AND FORECAST CHANGES

Having lost sight of our goals, we redouble our efforts.

Mark Twain

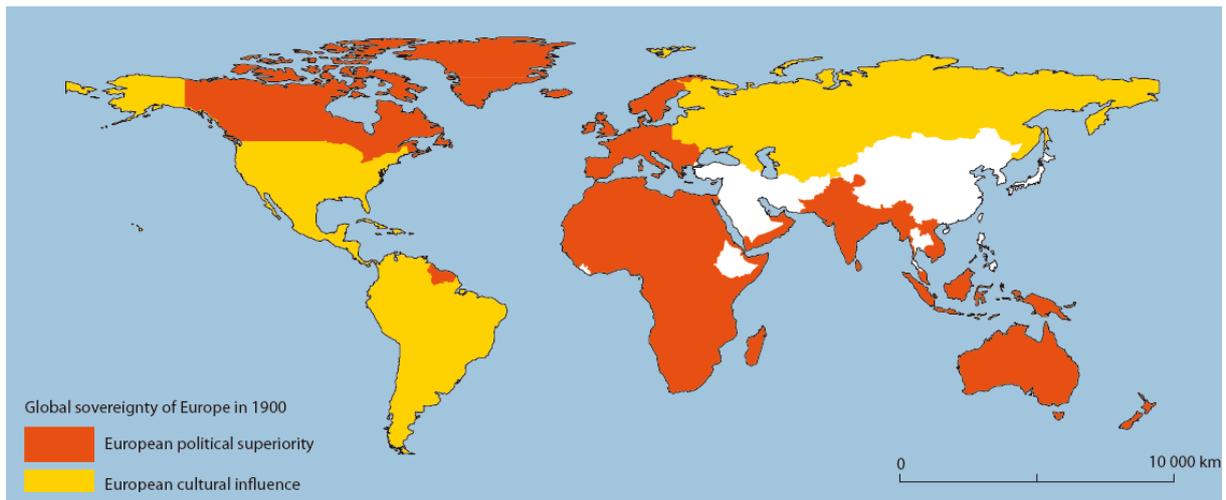
Not long ago we saw the 20th century turn into the 21st century, and the second millennium to the third millennium. Such milestones raise hopes and expectations, as well as worries.

In Christianity, hopes and expectations are linked to the second coming of Christ, while worries are mostly associated with the possible end of the world. Different cultures and nations, however, follow different calendars. Based on the Jewish calendar, the year 2000 was actually the year 5760, for Arabs it was 1378 and for the Chinese the year 4637. In Christian countries the arrival of a new century or millennium has always produced expectations of a major change.

In 998 Emperor Otto III declared a plan to restore the Roman Empire by the year 1000 and moved to Rome for this purpose. The historian Jaroslav Horejsek observes: *Around 1000, the spread of Christianity brought about a boom in church construction. Large new churches reflected the growing numbers of Christians. It seemed as if Christ's kingdom was indeed coming soon. Shaking off the horrors and misery before the turn of the millennium, especially those connected to various raids, common people were waiting, hopeful and worried at the same time, to see what would come next, in particular after the year 1000.* (Horejsek, J. in Tillich, Nováček, ed., 1994)

From this perspective, the late 19th century and early 20th century were completely different, at least in the West. The Industrial Revolution was underway, one amazing invention followed another, and the “white man” ruled the world. The sun never set on the British Empire, while other European colonial powers also controlled and exploited large territories. It was only a question of time before humans would come to understand the surrounding world to the last detail, and begin to take full advantage of the natural environment thanks to science and technology.

Fig. 1: *Global sovereignty of Europe in 1900* (adapted from Brzezinski, 1999)



In the last two or three decades of the 19th century Europe enjoyed peace, which only strengthened optimistic anticipations. Why wait for the arrival of the Messiah, who had failed to appear for nearly two thousand years, when we could build paradise on this earth using our own capacities? The twentieth century was bound to be a triumph of humankind, of its skills and intellect.

Today, a hundred years later, we can say that the 19th century ended symbolically in 1912, when the unsinkable Titanic went down on its first voyage. It was a warning that the pride of intellect and faith in the unlimited competence of humankind would all come to a bad end.

Two years later the First World War broke out. The world was stunned to see that Europeans had utilized the industrial method of production to create methods of mass destruction – machine guns, tanks, and chemical weapons were deployed in great quantities. The result was fifteen million dead and further millions maimed and impoverished.

This was followed by communist terror in Russia, the Great Depression, the onset of Nazism in Germany, and the Second World War, which left fifty million dead.

The 20th century demonstrated two things: that humankind is capable of self-destruction, and on the other hand, of an immense rise of humanity to prevent such destruction.

Valtr Komárek

While the second half of the 20th century was not as horrifying, the Soviet Union unscrupulously pursued the building its own empire, subjugating many European and non-European nations along the way. Russians and Americans fought to gain power in the newly independent countries of the Third World, tolerating regimes that would otherwise not be entitled to exist. Idi Amin in Uganda, the Khmer Rouge in Cambodia, military juntas in Latin America, etc. From 1945 until 1989 the world witnessed 138 wars that claimed the lives of about 23 million people.

The fall of the Soviet empire and communism at the turn of the 1990s brought great expectations. Soon enough, however, fifty years after WWII, another conflict broke out in Europe. Citizens of the former Yugoslavia not only killed one another but also committed shocking atrocities. A genocide swept Rwanda, killing nearly a million over the course of three months, while the world watched on, doing nothing.

It would be naive and also dangerous to believe that the 21st century is going to be a terrific era of us all entering a consumer paradise, one which would give our lives meaning. It would, however, be equally dangerous to become paralysed with fear of what the 21st century has in store - for us and especially for our children and grandchildren.

Man is ready and willing to shoulder any suffering as soon and as long as he can see a meaning in it.

Viktor Frankl

3 BEGINNING TO SEE OUR STORY

Humans are a wildly improbable evolutionary event.

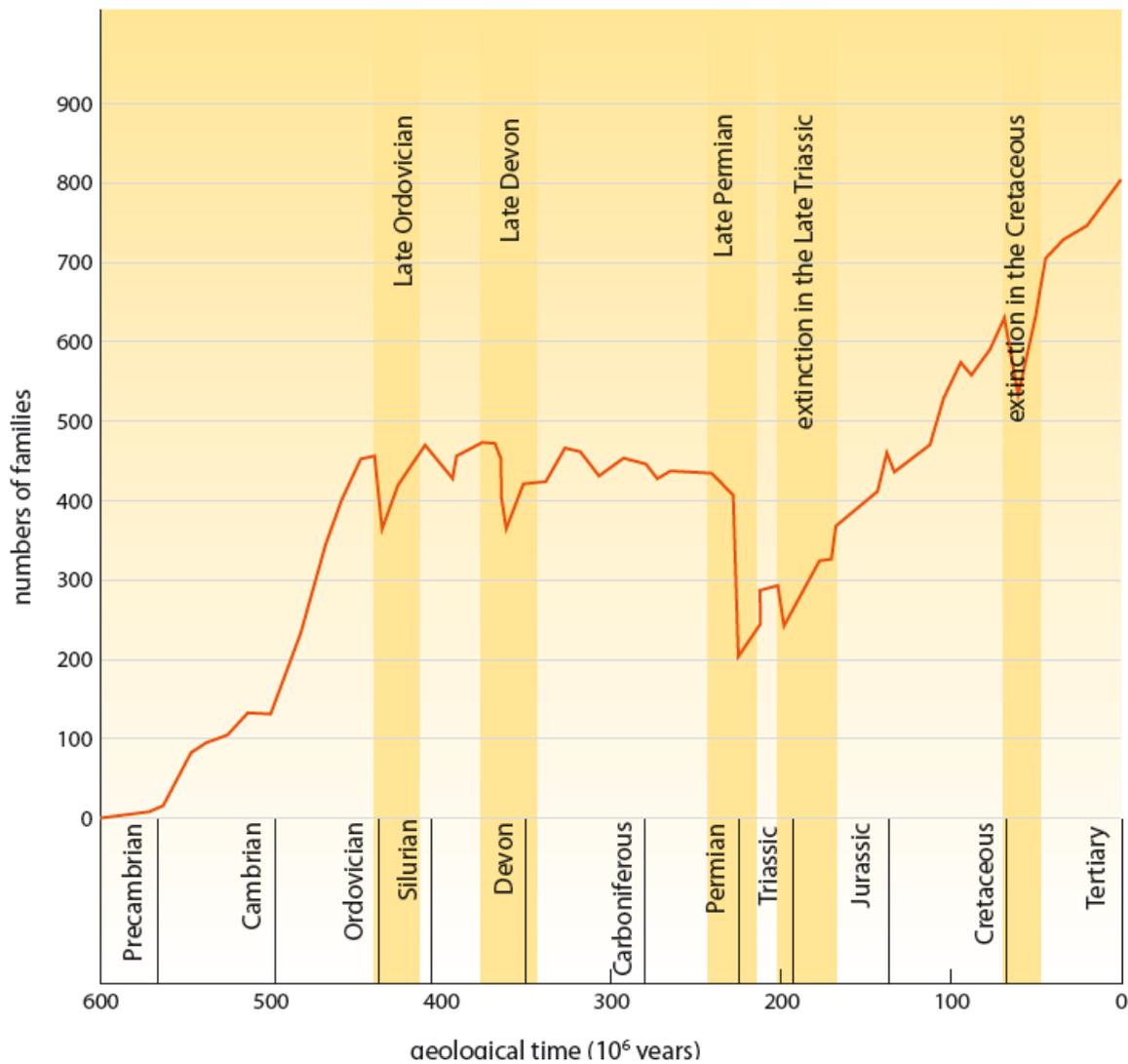
Stephen Jay Gould

Compared to previous generations, ours has so much information and data available that we get lost in it. We are, nevertheless, beginning to get to know our story, where we have come from and how. It is a proven fact that the universe as we know it was formed shortly after the Big Bang, 13.7 billion years ago. Our solar system, which is nearly five billion years old, forms a part of the Milky Way, which contains about 100 billion suns. There are approximately 140 billion galaxies similar to the Milky Way in the universe.

The only life we know of is that on Earth. Although it originated 3.85 billion years ago, we do not know how. Living organisms evolved, but it took them over three billion years to reach the level of multicellular organisms. Instead of a smooth process, evolution moves forward through a series of disasters. In just the last 500 million years, there have been at least five major catastrophes, each of which ultimately eliminated 75–95 % of existing plant and animal species. Surprisingly enough, after each such disaster, evolution progressed towards more perfect species, making a leap ahead.¹ As if even evolution followed the phrase “through hardships to the stars”.

¹ The evolutionary theoreticians Niles Eldredge and Stephen Jay Gould, who developed the theory of punctuated equilibrium in 1972, are probably not far from the truth. Evolution takes place in sudden bursts, where each disaster is followed by a rapid and rich branching speciation. Over time the emptied ecological niches fill up and the formation of new species (speciation) slows down. The organisms of terrestrial biomes and their sub-ecosystems arrange into a new dynamic balance. This theory did not replace but rather complemented Darwin’s theory of evolution.

Fig. 2: Mass extinctions in the last 500 million years (adapted from UNDP, 1995)



The last catastrophe – a massive asteroid impact 65 million years ago – marked the end of the dinosaur’s dominance, making way for the age of mammals. Roughly seven million years ago, African tropical rainforests produced a new group of beings, who started living in savannahs – the Hominidae. Although twenty hominidae species have been identified to date, only one of them has survived – the Homo species. It was probably around this time that human beings crossed the path from the unconscious to consciousness; however, it is unknown when and how.

Another mystery yet to be solved is how a physical body could produce an immaterial mind. Biological evolution peaks with modern humans, the Cro-Magnons, who emerged about 45,000 years ago. The arrival of humans changed the biological evolution into a cultural one.

Humans made use of and improved tools, used fire, and later (following the last glacial period that ended 10,000 years ago) went on to domesticate animals, develop agriculture, architecture, and systems of writing. Religion and philosophy appeared, later followed by science and technology. In the twentieth century, humans learned to affect the entire biosphere, in both a good and bad sense.

In every age, in every society, there is always one who wonders, one who questions.

Eileen Lynch

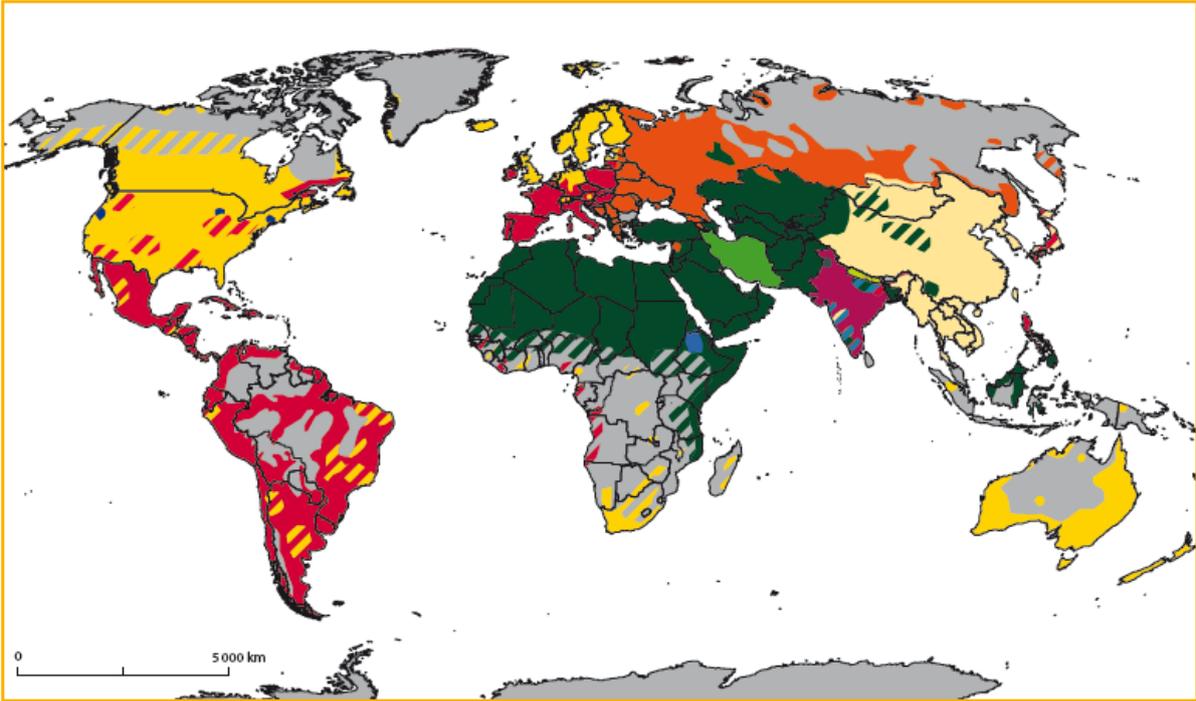
The process of evolution has been disrupted many times but never brought to an end. Once life emerged on earth, it has never gone away again. We are therefore related on a single evolutionary line not only with primates and mammals but also with all animal and plant species.

We even share predecessors with the most primitive bacterium. There is, however, a significant difference, as Josef Svoboda points out: *From subatomic elements to humans, development proceeds from the general to the unique and unequalled. Each human being is an original, inimitable prototype. As identity diminishes, so does predetermination.* (Josef Svoboda, 1997) In other words, every human being is an unparalleled original, endowed with a free will to participate in shaping his or her fate and in the great work of the evolution of the universe and life within.

do not care. Most probably, though, there are only very few such individuals, especially the closer to the end of their earthly journey they find themselves.

All global religions concur that God is a creative mystery. Three monotheistic religions (Judaism, Christianity, and Islam) point out that God is not only a creative, but above all a loving being. He wants us to learn to do the same. Our mission, and the purpose of life on Earth, is therefore to find knowledge, to learn to love and create. All major religions share a very similar message of how we should treat each other and the world around us. Referred to as the “golden rule of humanism”, it says: *One should treat others as one would like others to treat oneself. Or: One should not treat others in ways that one would not like to be treated.* The concept is present in Hinduism, Buddhism, and Confucianism, as well as Judaism, Christianity, and Islam.

Fig 4: Major global religions (adapted from Smith, 2003)



- Catholics
- Protestants
- Orthodox
- Copts
- Jews
- Sunnites
- Shiites
- Northern and Southern Buddhists
- Lamaists
- Shintoists
- Hindu
- Sikhs
- Confucians
- Nature worship and uninhabited areas

With science and technology, we can now exert substantial influence over the entire world and biosphere, both beneficial and detrimental. Faith helps us change our hearts to prevent a collapse through a fatal misuse of the enormous possibilities that open up thanks to science and technology. As long as the moral and spiritual evolution of humankind lags behind the biological evolution, we will continue to face the hazard of misusing the increasing capacities of man and the resulting destruction of the world around us and ourselves.

The future of civilization depends on the way the two most powerful forces of history, science and religion, settle into relationship with each other.

Alfred North Whitehead

What might be the ultimate ending of the story of humans on earth? We are not sure, but perhaps the fundamental purpose to the long process of transformations from the Alpha mineral sphere (from the sphere of the inanimate physical world) through the biosphere (animated world) could lie in reaching the sphere of spiritualization, the pure spirit Omega. Teilhard de Chardin (1989) considered reaching the Omega Point the pinnacle of universal evolution.

4 MAJOR CHALLENGES AHEAD

The core values of Christianity are faith, hope, and love. The core values of contemporary modernism are speed, affluence, and fun.

Tomáš Halík

The conclusion of the previous chapter might have given the impression that the development of human civilization has been heading rather directly for a positive outcome. Unfortunately this is not the case. Our role in shaping our fate grows with the knowledge we acquire and our resulting capabilities and potential. It is also necessary to bear in mind that in history, evolution has taken place through great challenges (problems), and in some cases through major global catastrophes (asteroid impacts, climate changes, etc.) It is therefore logical to believe that our progress toward human-controlled evolution and spiritualization will inherently include great dangers and challenges, where evil may win for a time and cause great harm and suffering.

Human beings have always had a major impact on their environment. Hunter-gatherers killed off selected species and intentionally set fires to hunt for animals. Nomads and livestock breeders overused and destroyed pastures. In many places, farmers turned fertile land into barren land with their farming methods. Since prehistoric times, people have been destroying forests through grazing, farming, and building cities and ships.

This process has accelerated significantly since the beginning of the Industrial Revolution, when fossil fuels came into wide use. Thanks to the Industrial Revolution, developed countries boast standards of living that not even the nobility in medieval times could enjoy. We are well-nourished and have high quality hygiene available; life expectancy has doubled, we are all literate and free to improve our qualifications if we want. There are, nevertheless, two sides to everything. Let us now focus primarily on the adverse side of progress, on the risks and hazards the modern way of living entails and will entail.

Nobel Laureate and founder of ethology, Konrad Lorenz, wrote a thin but enlightening book, *Civilized Man's Eight Deadly Sins* (1974), which indirectly builds on the seven deadly sins as formulated around the year 600 by Pope Gregory I: pride, greed, envy, wrath, lust, gluttony,

and sloth. Konrad Lorenz defines the following eight deadly sins for today, which could cause immediate hazard to human existence: overpopulation, devastation of environment, man's race against himself (exaggerated orientation on mutual competition and profit), emotional entropy, genetic decay, the break with tradition, indoctrinability, and nuclear weapons. While inspiring, the list is certainly not complete. Let us now briefly review substantial problems of an extensive and generally global scope. Some of the problems or "sins" of humankind are manifest, happening here and now.

The seven deadly sins of today: wealth without work, pleasure without conscience, knowledge without character, commerce without morality, science without humanity, worship without sacrifice and politics without principle.

Mahatma Gandhi

Others are more concealed or have not manifested yet, and pose a potential threat as they are "distant in space and time".

4.1 Problems of "here and now"

There is no reason to be pessimistic – until one hears the reasons given by optimists.

André Brie

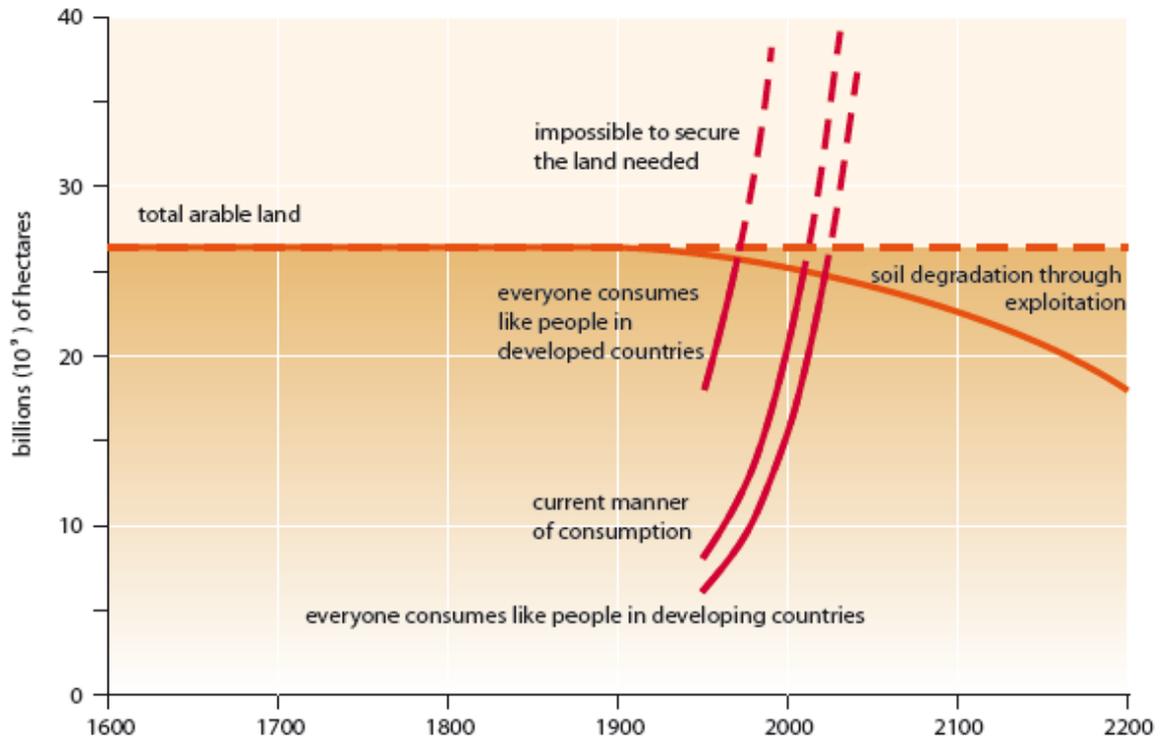
4.1.1 Fear of hunger – man's ever-present companion?

Although people do not live on bread alone, our civilisation has not been able to provide everyone with it yet.

Jacques Bergier, Louis Pauwels

In the course of history, people have always struggled to have enough food, regularly fighting against shortage or even famine. Only since the 1950s have developed countries felt that we have and will always have enough food. This might not be the case though. The number of people on the planet is growing. Crop yields are likewise on the rise, alas due to the supplementary energy provided by the use of fossil fuels.

Fig. 5: Land needed to produce food (adapted from Barney, Blewett, Barney, 1993)



While the EROEI (energy return on energy invested) of hunters-gatherers was 5:1 to 10:1, the ratio in modern agriculture is negative. We put more into agriculture than what we receive in return. This negative balance is subsidized with external energy, in particular fossil fuels. Thanks to them we are able to produce fertilizers, agricultural mechanization, irrigate and transport farm produce (often nonsensically) between countries and continents.

If we lose the sources of cheap supplementary energy (through their depletion or shortage), the cost of food will soar and its availability will drop. Lack of food and hunger may (or may not) return even to today's developed countries.

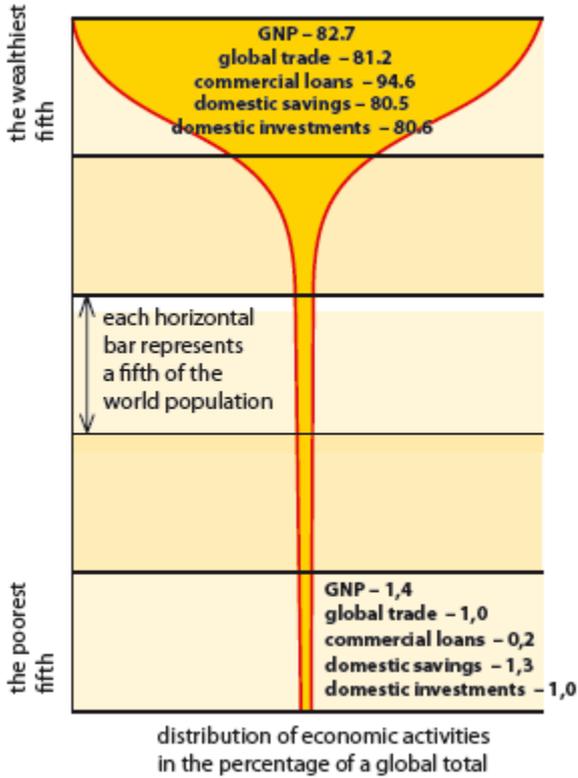
4.1.2 Poverty

The poverty of being unwanted, unloved, and uncared for is the greatest poverty.

Mother Teresa

Besides the fear of hunger, another eternal companion of man is the fear of poverty, or more precisely of destitution. In Christianity, poverty is considered a virtue; however, it needs to be voluntary and harmless to human dignity. Today we would refer to it as voluntary modesty. In contrast, destitution is a painful shortage of the basic means for living and represents a problem mainly in developing countries, where over a billion people live in absolute poverty (daily income of less than 1.25 USD per person). In developed countries, too, there are people who live in poverty and who struggle for daily bread, whether this is their own fault or not. When the majority of people in society were poor, the situation felt natural. If, however, there are major differences in financial circumstances, the atmosphere becomes volatile. And differences there are. While the wealthiest countries enjoy GDP of about 40,000 USD per head per year, the poorest countries have to make do with a few hundred dollars per year.

Fig. 6: Global economic differences (adapted from Moldan, 1994)



Even more serious are differences within individual countries, especially developing ones. For example, India boasts that it is the world’s most populous democracy, and yet of more than a billion Indian citizens, 250 million live below the poverty line. India has developed and owns nuclear weapons, has its own space programme, and aspires to be one of the world’s superpowers. At the same time, at least a quarter of its inhabitants are destitute. Material

poverty may, nevertheless, still be an easier burden to carry than a feeling of being useless and excessive. When no one is interested in your work, life loses meaning. Such a situation, paired with the incapacity to provide for one's family, is distressing.

Life in the country is worse than life in slums. Here, hunger is only a part of the terrible existence of the culture of poverty, which also includes the ordeal of sleeping on a dirt floor, bugs, and other insects, lack of water, and perhaps above all – darkness. In tropical regions the sun sets at six and it is completely dark until six in the morning.

Ryszard Kapuscinski

4.1.3 Migration

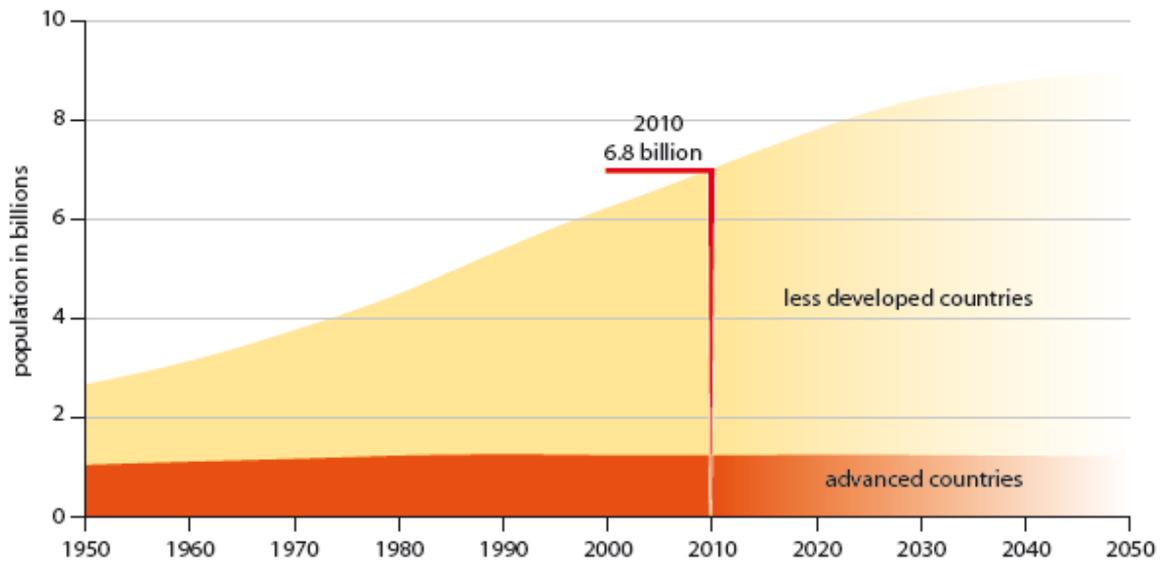
The answer to the question of why some countries develop rapidly and others lag behind is the same for an economist as is the “theory of everything” for a physicist or the recipe for turning iron into gold for an alchemist: it is almost within grasp, but at the very last moment it always slips through the fingers of the unfortunate scientist.

Daniel Deyl

High population growth in selected regions, the impossibility of finding a livelihood, and the resulting destitution make people vote with their feet, i.e. leave home in search of happiness somewhere else. The developed world has been and will increasingly be exposed to waves of migration from poorer regions. This concerns chiefly Europe, which is not protected by two oceans as the United States are, but is connected directly to Asia and very closely to Africa.

Due to the media, citizens of developing countries are aware what a wonderful life Europeans enjoy in terms of wealth. This, in combination with their imagination and often naive ideas makes Europe a consumer paradise in their eyes; once they cross the borders, life will be good.

Fig. 7: Increase of world population in the years 1950 – 2050 (adapted from World Resources Institute, 2005)



Imagine a young man from North Africa. He is unemployed, working very insecure jobs, just as half of his peers do. In addition, he cannot find a bride because no father will give his daughter away to a young man without any prospects. Thus he spends days hanging around, growing increasingly frustrated, angry, and perhaps willing to commit at first petty and later more serious crimes.

The luckier ones may manage to get to Europe (illegally, through marriage or family reunification), but even once there, most immigrants are once again marginalized. The opulence around them makes their humiliation likely even more painful than it was back home. To a large degree this is their own fault, as they lack education, good work habits, and many of them even refuse to learn the language of their host country. The generous social welfare system gives rise to an entitlement mentality, which ultimately and logically leads to an escalating tension between the locals and immigrants. It is interesting that these problems are significantly smaller in the USA, which provides far less generous social security.

Migration is one of the problems that could trigger either the collapse of western civilisation, or its transformation, in which it would lose its current character (built on the legacy of Judaism, Christianity, Greek philosophy, and Roman law).

4.1.4 Population Health

Over the past one or two centuries, all developed countries have made enormous progress in health care, in particular thanks to higher quality of nutrition and better access to hygiene. The average life expectancy has grown dramatically, which entails higher incidence of diseases that previously people simply did not live long enough to acquire (Alzheimer's disease, cancer, etc.) This is natural, and no one claims we should live shorter lives. Hardly any of us, as amateurs, however, realizes that the infectious diseases that troubled humankind in the past and continue to do so in developing countries, have not disappeared, and may come back. Should Europe ever sink into chaos and poverty, cholera, tuberculosis, plague, and other illnesses would most likely reappear. So far, the only infectious disease to have been eradicated was smallpox in the 1970s.

I remember the first time I went to India in the autumn of 1994, exactly when the Surat slums had just been hit by plague, a bacterial infection transmitted to humans via fleas found on infected rodents (mostly rats). It came as a shock to the Indians, and panic was about to begin spreading. Luckily, in the end there were “only” about fifty victims, mostly poor inhabitants of slums. This is a good illustration of the fact that a number of seemingly wiped out “medieval” diseases may reappear due to poor nutrition and hygiene.

In addition, there are new diseases, such as bird flu, Ebola, AIDS, and SARS (severe acute respiratory syndrome). In a way it is only natural that we will continue to face a steady stream of new challenges. What is not natural, though, is our idiotic method of livestock breeding. The large-scale agricultural industry feeds animals with antibiotics to protect them from various illnesses. The bacteria these treatments target will however sooner or later become antibiotic-resistant.

Fig. 8: *Effects of the environment on human health* (adapted from Braniš, 1999)



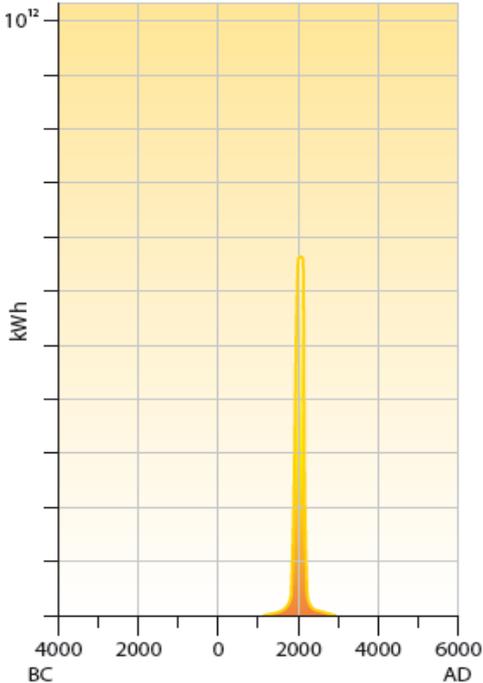
4.1.5 Natural Resources

Due to the exponential growth of the exploitation of natural resources, humankind has since the mid-19th century spent more raw material and energy than in all the preceding years in total. This is not sustainable. Oil reserves, for instance, are estimated to last some 40 to 50 years more; but it is quite irrelevant whether oil will last twenty, fifty or hundred years. What is important is that it is a complex carbohydrate, which has formed underground for tens of millions of years under specific conditions. Fossil fuels in general have been in development since the Paleozoic Era, for a whopping 500 million years. And we will use them up within a few centuries.

There have been no indications suggesting that the hunger for energy and raw materials is now satiated, because the rest of the world, some six billion people, would like to grow as rich as the western civilisation has.

Naturally, a few new deposits are yet to be found, plus we will manage to replace some of the raw material with other sources. Our fundamental dependency on fossil fuels is, however, alarming. Globally, 85% of energy needs are met with fossil fuels. Imagine if for one single month, there was no power available at all or no petrol or diesel-fuel sold at petrol stations. The use of fossil fuels will have a major impact on what our future will be like.

Fig. 9: The use of fossil fuels throughout history (adapted from Radermacher, 2004)



4.1.6 Violence in the World

Demobilization does not come easy for men who know little but the sword and the horse, the camaraderie of combat, the thrill of killing and the joys of rapine.

David S. Landes

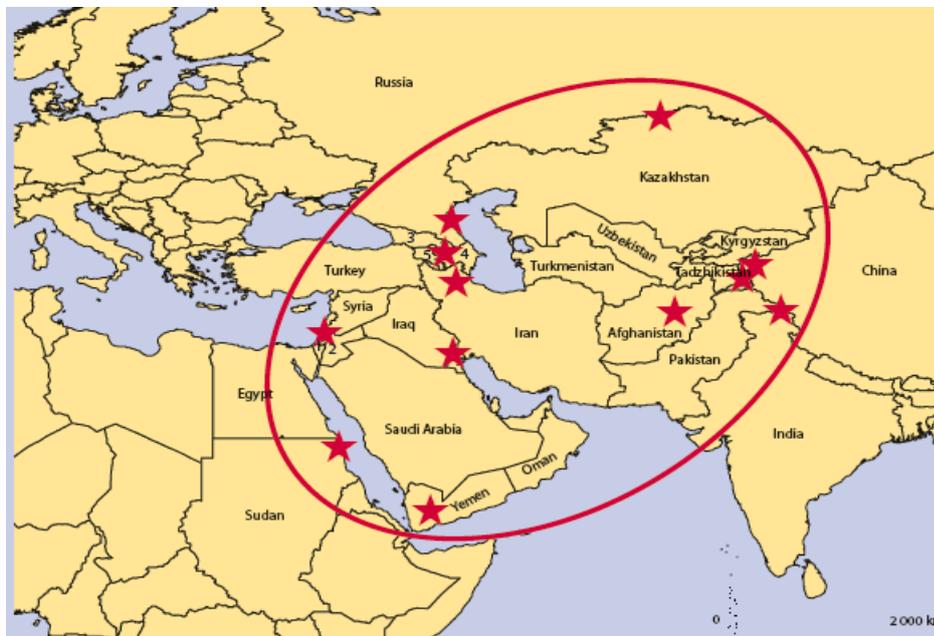
The fact is that the world of today witnesses a spreading phenomenon of velvet, bloodless revolutions. Today, blood is spilt during attacks of blinded nationalism or religious fanaticism or zoological racism – three black clouds that could overcast the sky of the 21st century.

Ryszard Kapuscinski

It would be only naive to assume that the world will be spared from wars or violence in the near future. Based on calculations made by Jean Jacques Babel, since 3500 AD, there have been a mere 292 days of absolutely no wars.²

We are not facing an imminent major global conflict involving mass deployment of nuclear weapons, as was the case during the time of Cold War in the second half of the 20th century. Nonetheless, poor developing regions are struggling with a growing number of failed states, while wars or clashes between tribal warriors are perceived as a way out of problems associated with sheer survival.

Fig. 10: Zone of simmering violence (adapted from Brzezinski, 1999)



The social psychologist Harald Welzer observes: *These are not two clearly defined armies standing against each other, but rather a great number of war entrepreneurs who fight primarily civilians and pursue economic interests. These are entrepreneurs dealing with violence, ransacking, trading weapons and drugs, extorting ransom, and last but not least securing a substantial share of aid supplied to the region.* Developed countries are, naturally, partly to blame. “Dealers in death” run a profitable business from weapon export and sales. Five of the permanent members of the UN Security Council (USA, Russia, China, Great Britain, and France) are responsible for 85 % weapons imported into developing countries.

² A war is usually defined as a conflict that causes over 1,000 battle-related deaths.

4.1.7 Environment

Man has sufficient objective reasons to cling to the safe-keeping of the wild world. But nature will only be saved after all by our hearts.

Jean Dorst

I went purposefully where the problems of the environment and humanity can be connected, especially in the social area. This is not a question of natural science; natural science provides basic information on how nature works, while technology enables technical solutions; but the key to it all is in social sciences, starting from philosophy through psychology, sociology. It is simply essential to interconnect social, technical, and natural sciences as it makes people think in context.

Josef Vavroušek

The human environment is the part of the world with which humans interact, i.e. which they use, affect, and to which they adapt. The human environment is basically identical to the scope of the biosphere, which is a thin layer encircling the planet and containing life. While the Earth's diameter is 12,756 km, the biosphere is a mere 20 km deep. It is only here that life exists, and it is the only life in the universe known to us so far.

According to the former Czechoslovak Minister of the Environment Josef Vavroušek (1993), the environment is composed of components (air, water, earth, woods, settlements, etc.), whose condition and development are monitored in detail. Vavroušek distinguishes between natural and anthropogenic factors that positively or negatively affect the quality of the environment. Natural factors include for example changes in the intensity of solar radiation; changes in the properties of the earth's atmosphere; climate and volcanic changes; tectonic phenomena; and various biological factors. Anthropogenic factors (human caused) include for example the method and volume of the exploitation of natural resources; the amount and method of waste emissions; landscape interventions; and introduction of foreign substances into the ecosystem.

The above factors affect the environmental components, leading to specific consequences such as complications with water supply and water quality; drop in the volume and quality of agricultural production; contamination of the human food chain; physical and mental stress of the human body; accelerated corrosion of machinery and buildings; and the costs of the reduction and compensation of damages.

There are at least two levels of the individual phenomena in three of the mentioned environmental categories³:

- the primary level, which involves the immediately apparent, usually fast-acting, and measurable phenomena (e.g. sulphur dioxide emissions from coal power plants in the air; surface water contamination);
- the secondary level, which includes intermediated, more complex, harder-to-identify and harder-to-measure phenomena that usually take place with a delay (e.g. climate change; food chain contamination; damage to the self-cleaning properties of ecosystems; damage to the hydrologic system of the landscape; loss of the soil's organic matter).

As the secondary level phenomena tend to be of international or even global character, they are extremely important. Although freon emissions, which damage the ozone layer, were terminated in 2005, this does not mean the problem has been solved. The already released freons will continue to destroy the stratosphere for a few more decades, even though hopefully the damaged ozone layer will not deteriorate any further.

Fig. 11: The curves of the population growth and Earth's carrying capacity (adapted from Moldan, 1994)

³ While Vavroušek defines three levels of phenomena, this text will operate with a simplified version of his model.

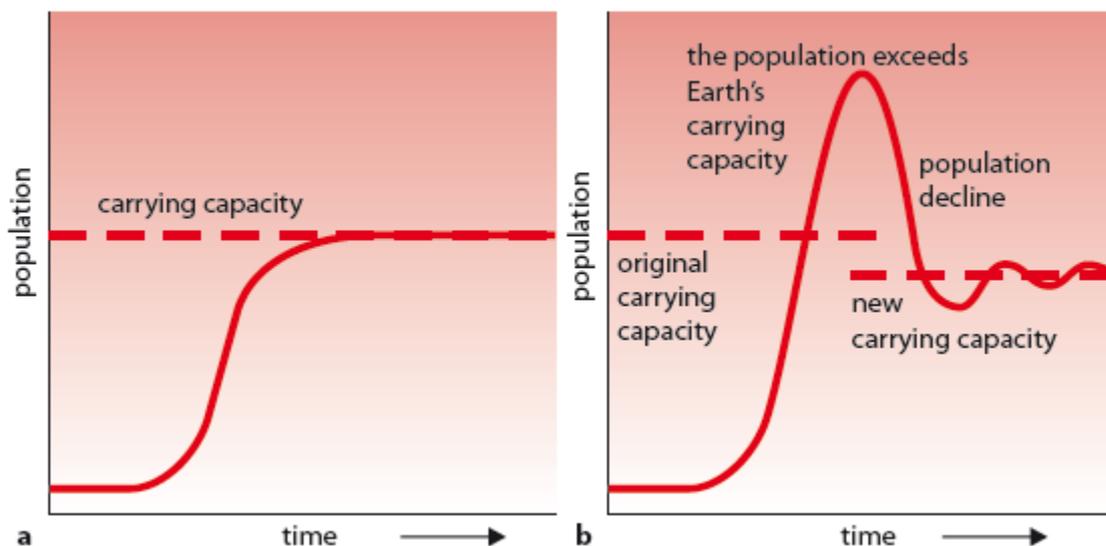
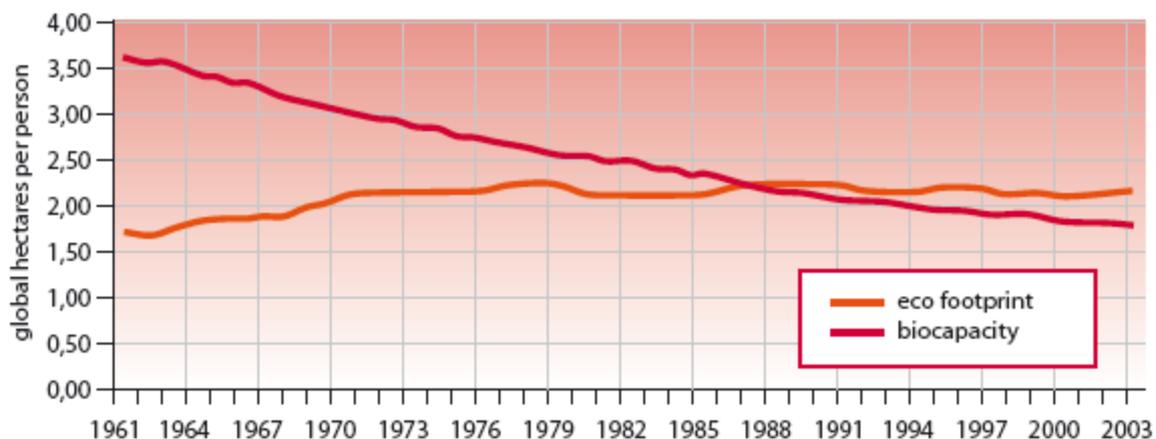


Fig. 12: Comparison of the global ecological footprint⁴ and the biological capacity per capita between 1961 and 2004 (adapted from Potůček, Musil, Mašková, 2005)



The most serious of the environmental problems for humans is probably the ongoing climate change, which will be discussed further in the text, and the decimation and loss of species and eco-system diversity. Nearly everything can be, sooner or later, restored (e.g. polluted rivers, overused woods), except for the loss of animal and plant species, which is final. Another key problem will be regional access to water and lack of water.

In the Near East, water is already more expensive than oil. While life is possible without oil, even if it is hard to imagine, without water we would not be able to survive more than a week. Therefore, there are apprehensions of future wars over water sources, similar to our wars over

⁴ The ecological footprint expresses the consumption of natural resources by „global hectares per capita“, which are a comparative unit of the consumption of natural resources and the actual capacity of biologically productive areas on Earth. (www.ecologicalfootprint.org)

oil and other key raw materials. Another problem we are facing is deforestation and the expansion of deserts. They say forests precede civilisations, deserts follow them. This is due to population growth and the need for food supply. That is why forests are cut down, burnt down, and turned into pastures, plantations, and arable land. The loss of forests, however, results in the loss of humidity in the air, reduced rainfall, and thus a lower quantity of water in the landscape. Over time, the land turns into semi-desert and desert, as for example has been the case with the Sahara and the Sahel zone south of the Sahara.

It is within human power to bring nature back to the state of a “Garden of Eden”. Before this happens, we will first need to undergo a change of mind, a change in our way of thinking and behaviour. In theology this is referred to as ‘metanoia’, which means conversion – return to God, our Creator.

4.2 Problems Removed both in Space and Time

We live in a consumer society. Religion has lost its power and consumption has become a core value, driving the economic boom. The deity of consumer society turns everything into goods – art, sport, and politics. Moral values have receded to the background because they hinder consumption.

Valtr Komárek

Throughout its existence, Western civilisation has been influenced and formed by the Ten Commandments, a manual for Jews and Christians that describes how to treat God and other people.

The Jewish and Christian tradition has been prevalent here for centuries. Even those who are not practising Christians admit that one should not steal and kill; anyone committing these vices is well aware of doing wrong.

All other world religions also follow codes of conduct similar to the Ten Commandments. As mentioned before, around 600 AD, Pope Gregory I defined the seven deadly sins. Like the Ten Commandments, these sins are straightforward and categorical. If you bear false testimony against another, it is wrong. If you steal, it is wrong. If you are proud or greedy, it

is wrong. With new scientific findings and new opportunities generated by modern technologies, nevertheless, new, less straightforward problems emerge.

In 2008, the Vatican Bishop Gianfranco Girotti tried to outline which other vices associated with the modern times and the process of globalisation the Catholic Church could consider grave wrongdoings against God and fellow men and women in the 21st century.⁵

According to Girotti, these include genetic manipulations; human experimentation; environmental pollution; causing social injustice; causing poverty; living in excessive wealth; drug dealing and drug abuse.

To some extent, Girotti's ideas lean close to Konrad Lorenz and his eight deadly sins. Unlike the Ten Commandments, though, these "new" sins are less straightforward, less categorical. The boundary between good and evil is for us, at least for now, blurred.

While genetic manipulations are controversial, not all of them can be unequivocally condemned across the board (e.g. genetically modified crops). Human genetic engineering may provide an excellent prevention against selected diseases. And yet, for instance, human cloning and "enhancement" is probably interfering with the "tree of life"⁶, with us acting as creators of life, which we of course are not, nor will ever be.

Human experimentation is definitely wrong, but it needs to be said that it is also very wrong to make redundant and unjustified experiments on animals and cause suffering where not entirely necessary. A typical example is the pharmaceutical industry. Aptly, if a little abrasively, the Czech philosopher Erazim Kohák observes: *People were horrified after the war when they read about medical experiments carried out on children in the concentration camps. Few of them noted that the only difference between Mengele's research and the experiments we accept without hesitation is that Mengele drew a thin line between prohibited and permitted animals, between "Aryans" and "non-Aryans", while we draw it between humans and chimpanzees.* (Kohák, 1998)

⁵ It should be noted that this is not an official stand of the Catholic Church but only a deeper contemplation of an influential bishop from the Vatican.

⁶ See Gen 3.22: *The man has now become like one of us, knowing good and evil. He must not be allowed to reach out his hand and take also from the tree of life and eat, and live forever.*

Although pollution is certainly erroneous, zero contamination is unattainable. Even if we aimed for close to zero contamination, the economic costs of reaching such a condition would be nearly infinite. Humans have always influenced their environment, just as after all other animals and plant species affect the environment. It is about the extent of the pollution, about finding a workable compromise to minimize the suffering of others – not only people but all animal and plant species.

Another “blurred” sin is causing social injustice. Although we are all equal, we are not the same. God and our parents have provided us with various aptitudes and talents, and it is up to each individual whether they strive to develop these gifts or lazily let them lie fallow. Therefore, there will never be equality, which is the way it should be. Again, this is about the extent; the inequality must not be devastating and outrageous. Finding an acceptable degree of inequality, however, is challenging, as was demonstrated by, for example, the Swedes, who in the 1970s and 1980s adopted such a progressive tax that it proved unsustainable and counterproductive. And yet, the only socialism in the good sense of the word that existed at that time in the world was in none other than Sweden, and not in the countries of real socialism of the Soviet Empire.

Contribution to the poverty of others is a sin that to a varying degree is committed by all of us. We can only beg God to have mercy on us here. Whenever you buy wonderfully cheap food or goods from Asia, Africa or Latin America, rest assured that you are helping to exploit people in these countries. Buy a cotton T-shirt at the market for two or three dollars, and the favourable price is certainly due to slave labour and probably also child labour. However, this takes place several thousand kilometres away; we cannot see it and nor do we want to.

Life in excessive wealth is difficult to define. From the perspective of an average African, all people in the West are excessively wealthy. The goal is not, however, for everyone to be poor. Our planet has enough resources to satisfy the needs of the whole population. At the same time, it is difficult to define justified and adequate human needs, nor is it easy to define a tolerable capacity of ecosystems and the biosphere, that is, how much anthropogenous pressure it can take.

Drug dealing and drug abuse may seem obvious, and yet they are not. The production, sale, and abuse of heroin are clearly wrong and destructive to human lives. However, the generally

tolerated alcohol, nicotine in tobacco, and even caffeine in coffee are all drugs. Where to draw the line then and how strictly? Should drugs be criminalized? In recent years, Mexico has adopted a rigorous policy to fight drug dealers, with the outcome of 40,000 dead. This is basically a civil war. In Bolivia, I would often order tea made with the coca leaf, which is the national Bolivian beverage. Placing a ban on the cultivation of the coca plant would be absurd since there is a great difference between the coca tea and cocaine. Similar to the one between poppy seed pastries and opium or heroin refined from poppy fields.

Neither Girotti nor Lorenz gave a complete list of new sins and vices, nor did they ever strive to. The future undoubtedly will continue to bring new challenges, where we will have to consider what is right and what is wrong, what is acceptable and what is not. These new challenges and possible hazards will generally emerge in three rapidly-developing areas of human knowledge: nanotechnologies, bio-technologies, and information technologies.

Nanotechnologies facilitate the manipulation of molecules and atoms. Nanomaterials in solar filters may, nonetheless, become absorbed into the skin and enter the food chain. Nanoparticles used in the military may be, over time, released and inhaled by soldiers or civilians. Thanks to nanotechnologies, humans will likely in the near future manage to generate artificial blood cells, which can, however, also lead to multiple organ dysfunction syndrome. Expansion of nanoweapons is hazardous for both humans and the environment.

The use of nanotechnologies that enhance human senses may lead to addiction, chronic fatigue syndrome, and a damaged nervous system. Artificial “viruses” engineered to select specific human targets based on definable genetic markers may mutate, causing a biological pandemic.

Nanocomputer-controlled nanotechnologies could fully replace human soldiers on the battlefield. This would, nevertheless, make it much easier and politically correct to launch a military campaign. On the other hand, a civilisation that would master the technology of manipulating matter on the atomic level would change substantially and find ways to solve a great number of social and environmental problems.⁷

⁷ If we managed to assemble objects on the atomic scale, computers could assemble atoms at pre-defined positions until the required product was created. Production of objects based on individual requirements and at

Biotechnologies work with living organisms. Thanks to biotechnologies, humans will learn to identify and remedy genetic disorders before they even develop. In the future, the health care system could undergo a transformation from the traditional “diagnosis and therapy” to “prediction and prevention”.

We have already mentioned genetically modified organisms. Developing countries view them as an opportunity for “Green Revolution No. 2”⁸ and a means to satiate their inhabitants. Multinationals see chances for major yields, because in this case farmers depend on annual purchases of seeds. Biotechnologists today insert genes of foreign organisms not only into microbes and plants but also into fish and mammals. These organisms then “produce” specific molecules. Additionally, a whole organ may be genetically modified, so that following transplantation into the human body it starts producing the requested substance. Kauffman (1995) suggests the artificial synthesis of new substances be referred to as “applied molecular evolution”.

Bioengineering, aimed at enhancing the bodily structure and mental capacity of humans, is a part of biotechnologies. Thanks to biotechnologies and bioengineering we will likely be able to regenerate the human body (or its parts); the estimate is that humans could remain healthy to the age of 120 or so. The question is how this will affect intergenerational relations.

Although genetic manipulations have already been allowed to a certain degree, there is a chance that we will learn from the negative consequences and will strive to restrict such manipulations by raising awareness and taking legal action, as has been the case with tobacco and drugs. In the case of genetic manipulations, the stakes are, however, much higher.

A major topic these days is cloning, which Gordon Taylor (1968) refers to as the “biological time bomb”. Cloning does not lead to immortality; it produces new and different beings.

In 2004 South Korean scientists announced they had derived embryonic stem cells from a cloned human embryo. In the end the research was found to have been faked. Sooner or later,

the point of consumption would improve product quality and cut costs of transportation, sale, packaging, eliminate waste, etc.

⁸ The Green Revolution was based on cultivating high-yield crops (especially wheat), use of mechanisation, and irrigation. The Green Revolution is estimated to have saved about 250 million people from starving to death.

however, one of the state or private research institutions will manage to clone a human cell. This would mean a major step forward towards using such cells to replace other cells in the human body that have been damaged by diseases such as diabetes or Alzheimer's disease. Still, the research raises multiple ethical and legal questions. A more precise definition of what constitutes human life will probably need to be formulated. If another being is cloned from our cells, will it be eligible to inherit? In what legal relation will it be to "standard" offspring? What if someone has their double cloned only to use it for body organs later? Will that constitute a murder?

Cloning is also discussed as a method of reviving extinct species. Australian scientists have been striving to bring the Tasmanian tiger back to life through cloning, as the species has been extinct for a mere 80 years and thus preserved cells from the beast's body are available.

In terms of information technologies, the internet has become one of the most powerful driving forces of globalization, democratisation, education, and economic growth. Cyberworlds compete with the real world, drawing the attention of millions of people. Within ten years, most of the world's population could be connected to the "planetary nervous system".

In 2007, there were 34 billion emails sent per day. The adverse side of this figure is the fact that 90% of the emails are spam. (Glenn, Gordon, 2007)

The internet may be evolving into the global brain of humanity, which will enable various communities to associate based more on their interests and preferences than national, ethnic or territorial aspects. As the internet and information technologies have, however, been generally developed by people, who are not perfect, the use of these technologies equally has both positive and negative aspects. About a third of software continues to be acquired illegally. Software piracy costs amount to tens of billions of dollars per year. (Glenn, Gordon, Florescu, 2011)

In Japan, people are fascinated by robots, which are also computers, or rather computerized machines. The robots are used in factory production, as household helps, and "pets". It seems as if many Japanese (and not only Japanese) citizens would prefer the company of robots to other humans.

The greatest risk of information technology abuse is that governments or organized crime could use it to deprive us of privacy and freedom. A magnetic stripe card can contain thousands of pieces of data about each individual. *Everyone could then be identified and classified based on their health, finances, criminal record, etc. Such a system is naturally vulnerable. Instead of making us invisible, permanent RFID wristbands or microchip implants will enable our localisation (retroactive, too) anywhere on the Earth, i.e. who was where and when (yesterday, a week ago, a year ago). We are not talking about far future here but about the present reality,* says Josef Svoboda (Svoboda, Nováček, 2002)

Summing up the danger of these new technologies, the Millennium Project (Glenn, Gordon, 2003) considers the following research and its application as the most hazardous for humanity:

- intentional or unintentional release of genetically modified organisms with a frightening impact on the biosphere;
- abuse of biotechnology for the purposes of producing weapons of mass destruction;
- abuse of nanotechnology for the purpose of developing secret weapons of mass destruction;
- loss of biodiversity due to aggressive marketing of patented genetically modified species;
- intelligent nanotechnology that will evolve beyond human control.

Chart No. 1: Categories of threats to environmental security (Glenn, Gordon, 1999)

	Caused by ignorance or mismanagement	Caused by intention	Caused by a mix of natural and human actions
Within a country	<ul style="list-style-type: none"> - Oil spills in Ogoniland, Nigeria - Aral Sea depletion in Russia - Indonesian fires - Ground water contamination and fresh water scarcity - Hazardous wastes - Soil erosion - Human settlement and development patterns 	<ul style="list-style-type: none"> - Sarin gas attack in Tokyo subway - Chemical attacks and draining marshes in Iraq - Poisoning, diversion, or misuse of water resources 	<ul style="list-style-type: none"> - Floods - Famines - Soil salinization - Earthquakes - Introduction of exotic species
Trans-border	<ul style="list-style-type: none"> - Rain forest depletion - River use (the Jordan, the Nile, the Tigris, the Euphrates) - Chernobyl nuclear accident - Diminishing biodiversity - Ozone layer depletion - Fisheries depletion - Global climate change - Acid rains and air pollution - Poverty - Radioactive waste 	<ul style="list-style-type: none"> - Burning oil fields in Kuwait - Water poisoning - Dam construction and water diversion - Biological weapons 	<ul style="list-style-type: none"> - Solar radiation changes - Global warming - New drug resistant diseases such as AIDS - Desertification - Population growth - Gap between the rich and the poor

As humans develop, the Creator increases our share in shaping our fate and the world around us, making us more and more co-responsible for not only our life but for all life on this planet. In the future we will face not only our profanations and errors, which are obvious and clear, but also “sins” removed both in time and place. In addition, we will probably need to seek answers to questions concerning “blurred” problems of what is good and what is wrong, of what is still an acceptable risk and what is not.

We have a chance to act preventively and eliminate the gravest risks. The question remains if we are capable of taking the chance, as throughout history, in the vast majority of cases, humans have acted ex post (dealing with consequences) and not ex ante (focusing on causes and preventing negative impacts).

As humans conquer the outer world with science and technology, they lose control over their inner world. Although they penetrate the secret of infinitely small and infinitely large worlds, their own secret they cannot grasp. They wish to control the universe but have lost the ability to control themselves.

5 THREE SCENARIOS FOR DEVELOPMENT

Prediction is very difficult, especially about the future.

Niels Bohr

Futurologists today face the threat of falling into the trap of convenience, passing the buck, and self-satisfaction, which shows in that they only describe the future instead of giving it deep thought. Such an attitude is more futurography than futurology. Current futurography goes hand in hand with futurosophy with a prophetic charge. The result must involve more than just a few scenarios: ultimately futurosophy must help us uncover the meaning and purpose of life, of our activities and direction; it has to provide a view of the final outcome of the human story on the Earth.

Karel Skalický

One of the most renowned historians studying the development of civilizations, Arnold J. Toynbee (1985), was aware that civilizations, just like individual people and whole species, emerge, grow, age, and disintegrate. He also noticed that civilizations begin to fall apart once they lose their ability to respond creatively to great challenges. The failure of creative power often follows after a period of major accomplishments made by the civilization. Given the scientific and technological progress and accumulation of wealth that our Western Euro-American civilization has enjoyed for the past two centuries, we should take special care to keep our eyes open at this point.

It is not humanly possible to forecast which direction humankind will head in the 21st century. We can, however, try to describe the major threats and risks as well as opportunities that await us on our journey through the 21st century. The elementary “map of the future” could, I believe, consist of three basic scenarios: sustainable development, sustainable retreat or chaos and anarchy.

5.1 Sustainable development

There are those who want to have and those who want to be.

Erich Fromm

Politics and economics have a rich glossary for one's triumph over another but limited vocabulary for love and victory of both parties. We assume that if one is to win, the other must inevitably lose. One of the principles of sustainable development, however, is a positive approach, i.e. that everyone can win.

Dennis Meadows

Sustainable development was formulated by the UN World Commission on Environment and Development in the report "Our Common Future" in 1987. It is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs. In its broadest sense, the strategy for sustainable development aims to promote harmony among human beings and between humanity and nature. This definition is quite vague though, and its biggest deficiency is the fact that it fails to even attempt to define human needs.

Headed by the then Prime Minister of Norway, Gro Harlem Brundtland, the Commission had big plans for sustainable development: *We need to successfully carry out the most important global transformation since the agricultural and the industrial revolution - the transition to sustainable development*, (United Nations World Commission on Environment and Development, 1987) More than 25 years later it transpires that it is one thing to formulate sustainable development but quite another to have the will to promote it. Sustainable development, nevertheless, remains perhaps the most serious attempt at finding an answer to the question of how to allow all people and nations to develop and improve their quality of life, while preserving functional ecosystems and a healthy environment for humankind. Six years later, Josef Vavroušek came up with a more relevant definition of sustainable development: *Sustainable development, and more specifically a sustainable lifestyle, aims at the ideals of humanism and harmonious relationships between man and nature. It is a way of life that searches for a balance between the freedoms and rights of each individual and his or*

her responsibility to other people and nature as a whole, including responsibility to future generations. (Vavroušek, 1993)

Based on the above definitions we can now formulate four specific requirements that need to be gradually fulfilled in order for us to head toward long-term sustainable development:

1. the requirement that all the people on Earth are able to meet their (basic, at minimum) needs;
2. the requirement to respect the right of future generations to be able to meet their needs;
3. the requirement to respect an adequate level of rights for other living beings;⁹
4. the requirement to learn from the future (learning based on forecasting the potential consequences of our current activities) and respect the precautionary principle.¹⁰

Following more than 25 years of striving to promote sustainable development, and three major UN conferences on these issues (Rio de Janeiro in 1992, Johannesburg in 2002, and again in Rio in 2012), it is now easy to see that moving towards sustainable development is probably beyond our strength, especially on the international and global level. The United Nations is today (unfortunately) an organization of 193 member states that promote above all their own individual or group interests, and not the interests of the planet as a whole. This all does not, however, mean that we should not strive for sustainable development.

Sustainable development may be feasible if:

- We gradually change our values to make them comply with the principles of sustainable development. According to the sociologist Stanislav Hubík (1992), the value sphere is quite permanent (and only changes very slowly, over decades and centuries), and despite being the most ground-breaking change of all, such a revolution in values takes place discreetly. The question is then whether there is enough time to change our values, and create and enforce economic tools directing us towards sustainable development; or more generally, if we manage to implement new, eco-friendly priorities for economics and the world's economies that will respect the ecosystems' sustainable capacity.

⁹ Peter Singer (1975) says: *We are equal, but equal does not mean the same.* Erazim Kohák (1998) adds: *We may have different needs but we have the same right to satisfy them.*

¹⁰ The precautionary principle is defined in Principle 15 of the Rio Declaration on Environment and Development: *Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.* (Moldan, 1993)

- We manage to create and enforce economical and more effective technologies. The aim is to imitate to the maximum possible extent the functioning of ecosystems that produce no waste, or ecosystems in which the waste from one process is the initial raw material of another process. Similarly to nature's economy, human economy should also head towards the termination of material flows and use of energy from renewable energy sources that build on the energy of the sun's rays.
- We manage to build functional and effective states and self-governing municipalities and regions, while becoming able to agree on the basic principles of international or global governance. We need an effective tool to solve global problems, namely global governance – which does not mean a “global government”, but a set of jointly adopted, respected, and enforceable rules. These rules are similar to traffic regulations: all around the world drivers need to stop at red at traffic lights and not overtake another vehicle when there is a solid line. This is not understood as a threat to our personal freedom but as a precondition for all road users to stay alive and safe.

There are only a few developed countries today that are at least on their way to sustainable development – Germany, New Zealand, Scandinavia, and perhaps also a few others (Austria, Switzerland, and the Benelux states). Among developing countries, this could include the Buddhist Bhutan with its idea of “gross national happiness”¹¹. The question is, however, what impact the gradual opening to the world and the lure of globalization will have on Bhutan and its inhabitants, especially in the case of this rather economically underdeveloped country. In Latin America, the main hope lies in Costa Rica, the most developed country of the region, which has long been quite stable politically and safe despite not having its own army. Will these islands of positive deviation nonetheless manage to inspire and influence others, or will they give in to the prevalent direction of the global economy, which is far away from long-term sustainability?

Symbioses are widespread in nature and occur along a continuum from parasitism to mutualism.

Eugene P. Odum

¹¹ Gross National Happiness attempts to define the quality of life more holistically than Gross Domestic Product (GDP), emphasizing the non-materialistic aspects of life. Gross National Happiness symbolizes the undertaking to build an economy that would serve the unique Bhutanese culture, which is based on Buddhist spiritual values.

We know the facts. We know what we want. We know how to get it. All we need is the will to do it.

Tarja Kaarina Halonen

5.2 Sustainable retreat

Inside I am truly scared, but I am not sure whether my feelings are reflecting the atmosphere in society or the actual condition of the planet.

Václav Cílek

If we admit that we will never make sustainable development a reality, that there is not enough will or time for its implementation, then it is wise to explore other options. In 2006, in his book *The Revenge of Gaia*¹², the British physicist James Lovelock was probably the first to articulate the idea that it is too late for sustainable development and that we should strive for sustainable retreat instead:

It is much too late for sustainable development; what we need is a sustainable retreat. The error the supporters of sustainable development and laissez faire of business share is the belief that further development is possible, and the Earth will continue, more or less as now, for at least the first half of this century. Expecting that sustainable development or a conventional method are viable approaches is to think that lung cancer can be cured by giving up smoking. (Lovelock, 2006)

For Lovelock, the deadliest issue is the ongoing climate change, as it is irreversible and can only be mitigated. He compares the growing global temperatures to a growing temperature (fever) in the human body. In humans, fever always indicates there is something wrong in the body, even if it is not yet certain precisely what.

¹² Nearly forty years ago, Lovelock came up with the “Gaia” hypothesis, based on which the Earth behaves as a unified self-regulatory system composed of physical, chemical, biological, and human elements. Interactions and feedback between individual components are complex, exhibiting time and space variability on multiple levels. It is a dynamic physiologic system that has been preserving conditions for life for more than three billion years. The “Gaia” hypothesis views the biosphere as an active adaptive system capable of keeping the Earth in homeostasis.

Fig. 13: Distribution of living organisms on the present-day, warmer, and cooler Earth
 (adapted from Lovelock, 2006)

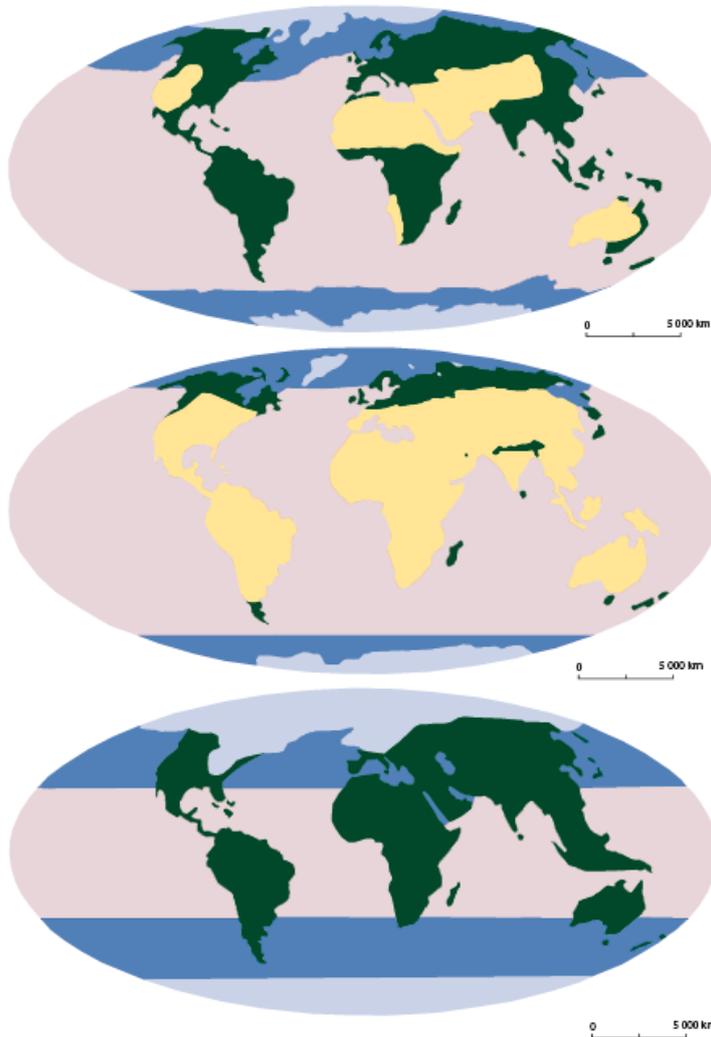


Fig. 49: Distribution of living organisms on the present-day, warmer, and cooler Earth
 (adapted from Lovelock, 2006)



James Lovelock is aware that so far we have not been able to adopt effective preventive measures, and with respect to his age he can see it is not the first time this has happened in his lifetime: *I am old enough to notice a marked similarity between attitudes over sixty years ago towards the threat of war and those now towards the threat of global warming. Most of us think that something unpleasant may soon happen, but we are as confused as we were in 1938 over what form it will take and what to do about it The Kyoto Protocol [which was adopted in 1997 and dealt with limits on greenhouse gas emissions – author’s note] was uncannily like that of Munich, with politicians out to show that they do respond but in reality playing for time.* (Lovelock, 2006)

It is alarming that at a time of crisis, those who should be leading and adopting responsible, if unpopular, measures are instead striving to preserve and maintain the current state of affairs.

In 1936 no one was ready to admit the mortal danger coming from the Nazi Germany, which was growing stronger by the minute, when Winston Churchill criticized the passive British administration: *The Government simply cannot make up their mind or they cannot get the Prime Minister to make up his mind. So they go on in strange paradox, decided only to be undecided, resolved to be irresolute, adamant for drift, solid for fluidity, all powerful for impotency. The era of procrastination, of half measures, of soothing and baffling expedients, of delays, is coming to its close. In its place, we are entering a period of consequences.* (Gilbert, 2008)

Lovelock believes that we will not be able to avoid the painful consequences of our universal dependency on fossil fuels, the burning of which produces the greenhouse gas carbon dioxide. Today human society depends on fossil fuel energy like addicts depend on drugs. While treatment is possible, it is painful and requires determination on the addict's side, not resignation: *We as a civilization are all too much like someone addicted to a drug that will kill if continued and kill if suddenly withdrawn.* (Lovelock, 2006)

What we now need most is to change the way we think and become aware of the mortal danger. Only then will we have a chance of accepting sacrifice and hardship. Equally important will be whether our future is subject to decisions made by politician-statesmen, who are willing to adopt unpopular measures and risk their careers if need be, or by politician-populists, who only care about winning the next election and remaining in power.

Most of us have been taught at school that Napoleon was a great commander and statesman, who ruled nearly all of Europe at his prime. James Lovelock disagrees, for good reason. While Napoleon was able to attack and conquer, he failed to recognise the point at which he should have retreated and kept his army strong for future battles and wars. This proved fatal in his disastrous Moscow campaign in 1812: *In September of that year, when he reached the Russian capital, he had already gone too far, and his precious supplies were daily being consumed while he consolidated his capture. He was unaware that the irresistible forces commanded by General Winter were siding with the Russians, allowing them to counter-*

attack and regain their losses. The only way he could have avoided defeat was an immediate and professionally executed retreat so that his army could remain intact to fight another time. The quality of generalship is measured in military circles by the ability to carry through and organize a successful retreat. The time has come when all of us must plan a retreat from the unsustainable place that we have now reached through the inappropriate use of technology; far better to withdraw now while we still have the energy and the time. (Lovelock, 2006)

That is the second scenario. Since the first report to the Club of Rome, *The Limits to Growth*, was published in 1972, we have been warned that the exponential growth of population, energy, raw materials, and pollution is not viable in the long run in our space-limited biosphere. For a quarter century, since 1987, we could and should have been promoting and cultivating the concept of sustainable development, but instead we have failed to take any effective action, at least on the international and global level. Although there is still some time left to strive for sustainable development, it is also time to brace ourselves for the fact that these efforts may fail and that we will have to give up our high demands on materials and energy. Now is the time to admit this is possible and begin devising ways to minimize the damage and pain this will bring. If we are not well prepared sufficiently in advance, the third scenario may arise, a scenario that has occurred many times before and which we would not enjoy going through again, but this time on a truly global level.

Sustainable retreat is hard to enforce politically and difficult to absorb mentally. We may thus trifle away our most precious, finite, and non-renewable source – time. We will continue to exponentially increase our consumption of resources and production of waste until we exceed the bearing capacity of ecosystems to such a degree that the ecosystems collapse. Acting in line with the precautionary principle will turn out to have been too difficult a task for humans.

A crisis is not a disaster; rather it is a turning point, the outcome of which depends entirely on us.

Lubor Kysučan

5.3 Collapse – period of anarchy and chaos

Now that we have learned to fly in the air like birds and dive in the sea like fish, only one thing remains – to learn to live on earth like humans.

George Bernard Shaw

Whole civilizations (for instance the ancient Minoan and Egyptian civilizations) and empires (including the Persian and Roman empires) have collapsed in the past. Such a decline may take place over dozens or even hundreds of years. The Western Roman Empire officially fell apart in 476, the year Emperor Romulus Augustulus was deposed by the Germanic chieftain Odoacer. This was, however, only a symbolic turning point. The empire had for some time been gradually eroding under the pressure of attacks by the Vandals, Visigoths, Huns, Germans, and other barbarian tribes. The citizens of the empire must have felt the gradual decay of Rome's glory but I suppose they could not have realized that they were witnessing the empire's disintegration and collapse.

Why some societies perish while others survive is the theme of the book *Collapse* (2004) by the biologist and cultural anthropologist Jared Diamond. He defines the collapse of a civilization as a decrease in population size or political, economic, and social complexity over a large area for a long time. This definition, too, clearly implies that the collapse of a society does not necessarily, nor even usually, come in the form of a sudden and apocalyptic, action movie-like downfall. Societies have collapsed in various eras in various parts of the world. To illustrate this, Diamond gives the examples of the Anasazi and Cahokia in North America, the Moche and Tiwanaku in South America, the Mycenaean Greece and Minoan Crete in Europe, Great Zimbabwe in Africa, Angkor Wat and the Harappan Indus Valley cities in Asia, and Easter Island in the Pacific Ocean. The collapse of these ancient societies was caused at least partly by environmental problems that Diamond places into eight categories:

- deforestation and habitat destruction;
- soil problems (erosion, salinization, and fertility losses);
- water management problems;
- overhunting;
- overfishing;
- effects of introduced species on native species;
- human population growth;

– increased per-capita impact of people.

Nowadays, in addition to the old dangers, we are facing four more environmental factors that pose a threat to societies:

– anthropogenic climate change;

– the accumulation of toxic chemicals in the environment;

– energy shortages;

– a near-full use of the Earth's photosynthetic capacity for human needs.

Studying multiple societies that experienced decline, Diamond observed that past collapses generally followed variations on a theme: *Population growth forced people to adopt intensified means of agricultural production (such as irrigation, double-cropping, or terracing), and to expand farming from the prime lands first chosen onto more marginal land, in order to feed the growing number of hungry mouths. Unsustainable practices led to environmental damage of one or more of the eight types just listed, resulting in agriculturally marginal lands having to be abandoned again. Consequences for society included food shortages, starvation, wars among too many people fighting for too few resources, and overthrows of governing elites by disillusioned masses. Eventually, population decreased through starvation, war, or disease, and society lost some of the political, economic, and cultural complexity that it had developed at its peak.* (Diamond, 2004)

Photo 1: The Aral Sea in 1989 and 2008 (www.en.wikipedia.org)



Whether a society collapses or not depends largely on its environment, including such factors as friendly or hostile neighbours and the existence or absence of trade partners. The absolute key is nevertheless the society's response to its problems and its capacity to solve them. An excellent illustration of this involves two societies, the Inuit and the Norse, who in the first half of the second millennium inhabited one large island – Greenland. The societies possessed two different cultures that did not mix. The Norse despised the Inuit, calling them “swines”.

However, unlike the Inuit they did not learn to endure at a time of a climate change (cooling), and in the end it was the Norse who died out, while the Inuit continue to live in the west part of Greenland even today. Greenland is thus an excellent example of the fact that a civilization need not collapse even in harsh conditions; rather it is all a matter of the choices the society makes. (Diamond, 2004)

That was a lesson from history. What would such a collapse look like today? Robert D. Kaplan aptly described a likely version of this scenario in his book *The Coming Anarchy* (2001): *Key factors that affect development include environmental scarcity, cultural and racial clash, geographic destiny, and the transformation of war. Their negative impact is today most visible in Africa, in particular in the Gulf of Guinea countries. This part of the planet is an appalling picture of poverty, disease, and exploited resources, a region of eroding nation-states and international borders, spreading crime, and permanent tribal wars. An uncontrolled outburst of criminal anarchy emerges here as the real "strategic" danger. The same could happen to the rest of Africa and the third world. In these countries, which are extremely hard to control, pressure does not end in totalitarianism but in the disintegration of social structures and the “street warrior culture”, as in Somalia for example. Waves of disorganized conflicts of unclear design will sweep the continents, which means that the West will not be facing any apparent, easy-to-define threat such as communism or Nazism.* (Kaplan, 2001) Today this situation does not only apply to the Gulf of Guinea. The number of “failed states”, such as Somalia, Congo, Afghanistan or Haiti on the American continent, has been growing. Even if the whole world order collapsed and fell into chaos, these countries would not notice because they basically live through this every day. The only reason they might notice the situation has deteriorated would probably be if the aid they receive from developed countries suffered drastic cuts.

The near future will show whether these epicentres of instability will continue to grow, with the flames of chaos and anarchy sweeping through large sections of societies which are currently stable and well-functioning.

Crises may be useful – brutally enforcing a decision which one would not have otherwise found the courage for.

Martin Weiss

6 GREAT DISINTEGRATION

Each era provides opportunities to do right and wrong. Today even people with no culture, history or education are given an opportunity. These are people of an inferior race: I do not mean the physical but the spiritual race. These people swell with outward stupidity instead of inward maturity.

Ludvík Vaculík

The moment we renounce the truth the worst is around the corner.

Zdeněk Müller

Earlier in the text we covered some problems of global impact that we will face in the 21st century. Our level of success in tackling these issues will depend on the key factor identified by Diamond – society’s response to its problems and its capacity to solve them. So far, it seems as if Europe in particular has been lagging behind in this respect.

In 2000, Otakar A. Funda wrote his book *Weary Europe Dying*, where he claims that a civilization disintegrates once:

- it has lost its sense of direction;
- it has lost its unwritten agreement on what is right and what is wrong;
- the costs needed to keep it going exceed the yields it produces;
- mechanisms serving to keep it going have become too complex to be repaired while in use;
- it has grown weary, having exhausted its enthusiasm and vigour after a destructive atmosphere has set in all over.

At present Europe is experiencing a number of phenomena that confirm Funda’s opinion:

- Europe no longer shares a vision. At the time the European Union was founded, the aim was to engage the whole of Europe, including countries behind the former Iron Curtain, to create an oasis of prosperity, peace, and successful cooperation. Today, too many countries are mainly interested in taking as much as possible from “Europe” while giving back as little as they can.
- There is no need to argue the fact that the costs required to keep the European Union and its states going are great. The bureaucracy is enormous, and a solution is nowhere in sight.

However, it is the last factor that Funda mentions – fatigue, exhausted enthusiasm, and a destructive atmosphere – which is mortally dangerous. Its prevalence is documented using seven examples, and the list is far from being complete and comprehensive:

a) We are having too few children. It is a great paradox that poor societies have many children and wealthy societies do not have enough. The vast majority of Europeans live like kings, but the phrase “I won’t bring children into such a terrible world” is much more frequently heard in Europe than in Africa. It is not easy for the young people of today who should be having families because there are too many opportunities for self-fulfilment. They need to study, travel, work on their career, secure decent accommodation and living standards, and only then might there be time for a child.

Unfortunately, “then” tends to be too late, or there is space for one child at best. A child ties one down for twenty to twenty five years, which is a step that is not easy to take in our times of great opportunities and “challenges”. We are at a loss here – as a result, many European countries fail to even maintain a positive rate of natural increase, and so their populations are in decline. For example, over the past 40 years in Germany the generation of grandchildren has always been half the size of the grandparents’ generation (Sarrazin, 2011). Generally speaking, any “vacant lot” tends to be filled in time, especially if there is an overflow in the near vicinity. Europe, therefore, faces and will continue to face major immigration pressure from Africa, the Near East, and Asia.

b) Ageing population. This problem is closely linked to the preceding one, and has been a hot political issue for many years. The percentage of working age population that work not only for themselves but also for those of pre-productive and especially post-productive ages continues to drop. Although the retirement age is rising, many jobs, in particular physically demanding occupations, cannot be performed until, say, 75 years of age. Thanks to the ever-improving effectiveness of medical treatment, human life can be prolonged, but health care costs could also potentially burn through most of the gross domestic product. This leads to a very sensitive question of what to cure and at what price, for how long and of what quality to preserve human life and when to let a person die naturally.¹³

¹³ This is not to say that I would support euthanasia at all. On the contrary, life should complete its natural cycle and everyone should have the chance to prepare for their departure. It is a magnificent and fortunate gift if one can leave “an old man and full of years”, to quote the Bible.

c) Family disintegration. Throughout human history we have not been able to come up with a better fundamental unit of society than the family. It is worrying that this model should be undergoing such a massive slump in Europe. The fact that half, and in cities much more than half, of all marriages fall apart, testifies to the reality that our society is seriously ill.

d) Poorer physical resilience. More and more often, hard physical work is performed by machines rather than people. There is nothing wrong with that, in fact it is on the contrary a positive advance. The problem is that we increasingly avoid hard physical labour. We drive to work, to the grocery and everywhere where we could easily walk instead. At school, children avoid physical education. Spending time in nature is considered a waste of time, if not directly harmful due to health concerns. The virtual world of computers is a tempting substitute but does not demand much physical labour. And yet, the human body is made to function best when regularly exerted and not when it spends days idling away on the sofa, taking it easy.

The last year that young Czech men were drafted into the army, only half of them were able to perform their military service without limitations (i.e. only half of the draftees were in sufficient physical shape). Finally, there is a lot of truth in the old saying “healthy body, healthy mind”, which are two sides of the same coin.

e) We have renounced Christianity. Built on Christian tradition, Europe has been Christian for nearly two thousand years, but this has been changing over the past fifty years. Lacking a shared ideal and goal is a major problem for Europe. We have built a consumer paradise but what comes next? Instead of moral principles and standards, European civilization is now held together solely by state legislation. Aleksandr Solzhenitsyn (1999) says: *A lawless society results in tyranny or anarchy. A society based solely on law cannot survive and falls apart. Societies hold together primarily with their moral principles.* We are politically correct to the point of becoming embarrassing. We are afraid to include any mention of Christianity or God in the European constitution¹⁴. At Christmas, people living in English-speaking countries send “Season’s Greetings” cards instead of “Merry Christmas”, let alone “A Blessed and Merry Christmas”. Not wishing to offend anyone, we offend our own self-respect. If a Muslim sent me a Ramadan card, I would not take offence and wish them Happy Ramadan

¹⁴ The United States does not have the same problem, for example the one-dollar bill has “In God We Trust” emblazoned on its reverse.

Mubarak in return, even though I will not celebrate it. We should be able to expect the same. The aim is not to have churches full of formally religious people whose hearts are elsewhere anyway. If, however, Europe gives up its values based on the Christian tradition, the suddenly vacant space will be filled with something else. Europe will then no longer be the same.

f) Entitlement mentality based on the generous social welfare system. Europe is wealthy, and, thankfully, developed European countries operate substantially generous social systems. Problems appear when we start treating these systems as something we are entitled to. Jeremy Rifkin (2004) writes about the American dream: how the desire to strive for happiness has gradually, for the new generation, turned into a feeling of being entitled to happiness. This might make a subtle but extremely important difference – striving for happiness and success versus claiming that society (the state) is obliged to provide me with it.

These factors paralyse society and civilization more than issues such as deforestation or desertification. If we are determined enough, we can confront and sooner or later solve environmental problems.

The above problems, nevertheless, erode our will and determination, which presents a mortal danger for Europe or any other society and civilization. During the Second World War, the Scottish writer and mountaineer W. H. Murray spent a few years as a captive in a German camp in Africa.

He tried to escape even though it put his life at risk. At the same time he was secretly writing a book on toilet paper, even though this also put his life at stake. The guards found and destroyed the book but he started again. In the end, *Mountaineering in Scotland* was published in 1947. Murray's definition of his view of life is apt and inspiring, giving us hope even at times of crisis: *Concerning all acts of initiative, there is one elementary truth that ignorance of which kills countless ideas and splendid plans: that the moment one definitely commits oneself, then Providence moves too.* (Murray, 1997)

7 RISE AND FALL OF CIVILIZATIONS

Leaders who don't just react passively, who have the courage to . . . anticipate crises or to act early, and who make strong insightful decisions of top-down management really can make a huge difference to their societies. So can similarly courageous, active citizens practicing bottom-up management.

Jared Diamond

All major societies, empires, and civilizations, in a similar way to humans, go through the stages of youth, adulthood, and old age. The duration of the stages varies. Unlike in humans, they need not decline (“die”) but can instead transform into a new form. Despite being mortal, humans live on in their children in a way. Similarly, Western civilization for example has been built on, and simultaneously has continued, the legacy of Hellenic civilization and the Roman Empire.

Carroll Quigley (1979) defines seven stages of the evolution of civilizations:

- mixture,
- gestation,
- expansion,
- conflict,
- universal empire,
- decay,
- invasion.

Over the last 6,000 years, multiple civilizations have undergone the same evolution: the Egyptian, Sumerian, Minoan, Hellenic, Babylonian, Hittite, ancient Syrian, Mayan, and Andean civilizations.

According to Samuel Huntington (1996), who continued in the tradition of the great historian Arnold Toynbee (1985), there are eight civilizations on the Earth today: Western, Orthodox, Hispanic, Islamic, Sinic, Hindu, Buddhist, and Japanese. A possible ninth major civilization is Sub-Saharan Africa, deemed “possible” because it includes fragmented tribal communities.

For two hundred years, the world has been dominated by the Western civilization due to its technological superiority. Today, though, the Islamic and Sinic civilizations are also competing for the privileged position, the former thanks to its demographic growth and determination to spread Islam and the latter on the grounds of its economic growth. As the American futurologist Alvin Toffler (1980) says, Western civilization has already started to gradually transform: *We are the final generation of an old civilization and the first generation of a new one. If we identify key change patterns as they emerge, we can influence them. The more basic political question, as we shall see, is not who controls the last days of industrial society but who shapes the new civilization rapidly rising to replace it. Some generations are born to create, others to maintain a civilization.*

In Toffler's view, the decay of Western civilization as we know it is not necessarily a tragedy or a negative development overall. The old makes room for the new. The generations that maintained the Western civilization will be replaced by generations that will create a new civilization. A crisis inherently contains a threat and an opportunity. The most important thing is our attitude to the crisis, how we deal with it.

In his book *Voluntary Simplicity* (1993), Duane Elgin compares the evolution of a civilization to the alternating seasons of the year: *Like the inexorable passing of seasons, civilizations also pass through their seasons of growth and decline. A number of industrial civilizations have already passed through their spring and summer of growth and have entered their autumn and winter of decline. Unless creative actions are taken soon to move beyond the industrial era, we will move deep into a harsh winter of civilizational breakdown.*

According to Elgin, there are multiple signals indicating that we are entering a stage of civilizational crisis: debt and stagnating economy, the loss of a compelling sense of social purpose, special-interest groups that override the public interest, overwhelming bureaucracy, and the inability to respond to local and global environmental problems. It is psychologically demanding to consider a civilizational collapse and transformation, as it is no abstract process but rather something we would have to live through.

Duane Elgin defines four stages of civilizational growth, which are briefly described in the following table:

Chart No. 2: Four stages of civilizational growth (Elgin, 1993)

Stage I: high growth, “spring”	Stage II: Full blossoming, “summer”	Stage III: Initial decline, “autumn”	Stage IV: Breakdown, “winter”
Era of Faith	Era of Reason	Era of cynicism	Era of despair
High social consensus; strong sense of shared social purpose.	Social consensus begins to weaken with fulfilment of shared social purpose.	Consensus very weak; special-interest-group demands grow stronger than shared social purpose.	Collapse of consensus; multiple and conflicting social purposes.
Bureaucracy is low; activities are largely self-regulating.	Bureaucratic complexity mounts; activities are increasingly regulated.	Bureaucratic complexity mounts faster than the ability to effectively regulate; bureaucracy begins to falter.	Bureaucratic complexity is overwhelming; bureaucracy is out of control; society begins to break down.

According to Elgin, Western civilization at the time was moving into the fourth stage – system breakdown – in the 1990s: *If we continue along our present course, children alive today will inhabit a warming world whose climate is so destabilized that it disrupts food production and results in massive waves of starvation; a planet with easily accessible supplies of petroleum depleted; with widespread deforestation; with the goodwill of the human family ravaged as nations fight over access to remaining resources; with coastal cities inundated by rising seas; with millions of people migrating to resource-favoured nations and regions; with solar radiation penetrating through a weakened ozone layer and threatening the earth’s food chain; with far less farmland and productive topsoil to feed an additional 3 billion people; with a drastically reduced number of plant and animal species; and with toxic pollution spread throughout the land, water, and air.* (Elgin, 1993)

There is no use in blaming anyone for our shift to the stage of civilizational change, because we all are responsible (although to a varying degree) for where we are now headed. People living in democratic societies ultimately shoulder the bulk of the responsibility however. Regardless of this, there will be a lot of opposition and resistance to the situation. People will feel wronged, which is natural. Only after living through the anger and sadness over broken dreams of material prosperity will they possibly be able to begin to create and build a new civilization, regardless of how long it may take. Only after we stop hoping that the golden age of infinite industrial growth may ever come back will we dare to move on.

There is a certain analogy to the human life cycle. Working with terminally ill patients, Elizabeth Kübler-Ross (1969) came to notice over time that their response to bad news nearly always followed the same pattern:

Stage 1: denial (shock, shutting out reality);

Stage 2: anger (outbursts of rage against physicians, nurses, all healthy people; feelings of cosmic injustice);

Stage 3: bargaining (the patient bargains with the disease, fate, God);

Stage 4: depression (limited life options);

Stage 5: acceptance (for some this is a stage of acceptance and reconciliation, while others fight until the end).

Most individuals come to terms with their situation and accept their own mortality. At the same time they believe or at least hope that there is life after death, and spend the remaining time preparing to cross to the other side. This is extremely important. In Christianity, the wish to have the chance to prepare oneself for the change is contained in a prayer: *Spare us from dying suddenly and unprepared, Lord.* Likewise, a civilizational transition also requires that we accept the change and have enough time to actively prepare ourselves.

We may thus expect an uncertain era of social unrest and turmoil, which will either transform or devastate the basic pillars, the very essence, of our culture and civilization. *I do not think our journey down the backside of the development curve will be this smooth. Just as our ride up the front side of this developmental curve had many bumps, plateaus, and sudden jumps, so, too, will similar variation characterize our movement through the systems-breakdown region of development.* (Elgin, 1993)

The journey down is not likely to be an era of sudden and apocalyptic change. The “winter” will in all probability involve a prolonged era of disharmony, strife, and fragmentation. The most important change will involve a loss of social cohesion and sense of a civilizational goal that mobilizes our joint effort.

Humans will tolerate a great deal of suffering as long as it is meaningful to them. Without a sense of common purpose, feelings of futility and despair will begin to control our lives. The

fundamental challenge then is to find a new “common purpose”: *We cannot be purposely building a future that we are unable to envision. The first requirement is to create a realistic, convincing, and arresting vision of a future that is easy to communicate. We need to find a story to describe the next chapter of our evolution and to catalyze our energy and enthusiasm.* (Elgin, 1993)

Along similar lines, the founder of logotherapy, Viktor Frankl, says: *Man’s primary motivational force is his will to meaning. True efforts to find meaning form a substantial aspect of human nature and self-transcendence. We live in a century of a spreading feeling of meaninglessness. In reality, though, a man can only survive if he has something to live for. It seems this is true not only about the survival of an individual but also about the survival of humanity. Mere survival cannot constitute the supreme value. To be human means not to place oneself in the centre.* (Frankl, 2006) If the will to meaning is suppressed, it is replaced by a “will to power” and/or a “will to pleasure”. The more a man or woman desires pleasure, however, the more it escapes them.

Viktor Frankl postulates that we need to overcome the preconception that humans principally strive to be happy. What they really want is to have a reason for happiness. Humans not only search for meaning but also discover it. Firstly, Frankl sees meaning in doing or creating. Secondly, he sees meaning in gaining experience and loving another.

Duane Elgin claims that if we, chiefly as individuals and communities, fail to start preparing in all seriousness for the fundamentally changing world around us, we (as individuals and as a whole society) will be poorly prepared when global changes hit us full force. Consequently, social cohesion could be decimated; democracy could vanish, to be replaced by anarchy and chaos, or, on the other hand, an authoritarian government or outright dictatorship. It could take dozens of years before we pass through this dark night, at which point we would once again witness a springtime of civilizational evolution with a restored sense of a shared common goal. This is still an open-ended story, the epilogue of which depends on us. If we fail, the “winter” stage of the decline may lead to civilizational collapse and cruel devastation of the biosphere. Another possible outcome is civilizational stagnation – people and whole nations will have spent all their energy and creativity on simple preservation of the current state of affairs. The last possible, and desirable, ending of the “winter stage” is the restoration of world civilization, which will flourish anew.

Civilization is not based on what it provides but what it requires of humans.

Marie Janů

7.1 Restoration following major crises and catastrophes

Everything is possible. The impossible just takes longer.

Dan Brown

A crisis is followed by hope, rebirth, and flourishing. This is a pattern in nature. Since the Paleozoic Era, the Earth has experienced at least five major global catastrophes (caused by events such as asteroid impacts). For reasons still unknown to us, these were never followed by permanent reductions in the diversity of life or periods of stagnation but, on the contrary, evolution toward higher life forms.

Human society has followed a similar trend. For example, after the Second World War, European countries enjoyed a baby boom with an extraordinarily increased birth rate. Likewise, the 1950s and 1960s were a time of blossoming and prosperity for European economies.

The Thirty Years War between Catholics and Protestants ended in Europe with the signing of the Peace of Westphalia in 1648. Among other benefits, the treaty brought about a giant shift in relations between individual countries. The principle of national sovereignty, the cornerstone of international relations for nearly 400 years now, was adopted. In our time of globalization its limitations have become apparent, allowing rogues such as Robert Mugabe in Zimbabwe to hide behind national sovereignty and the inviolableness of state borders. Nevertheless, the principle of national or state sovereignty was a fabulous “invention” that protected weaker countries from stronger ones –a major civilizational breakthrough.

The Civil War that broke out in North America eventually claimed 970,000 lives. On the other hand, it led to the abolishment of slavery in 1865, when the 13th Amendment to the U.S. Constitution was adopted.

After the First World War, which came as a shock to the world and was responsible for the death of 15 million people, a Parisian peace conference gave rise to the League of Nations – the first global attempt at joint management of international and global issues. The Allies were already preparing the post-war arrangement during the Second World War, and in July 1944, forty four countries adopted the Bretton Woods System that regulated international monetary relations. The Stabilization Fund was established, to be later transformed into the International Monetary Fund. In addition, the International Bank for Reconstruction and Development was founded, later known as the World Bank. After the war, in April 1948, the U.S. Congress approved the European Recovery Program, or the Marshall Plan, which proved to be one of the most successful projects in history. It was implemented by the Organisation for European Economic Co-operation (OEEC), which later became today’s influential Organisation for Economic Co-operation and Development (OECD). The Marshall Plan also initiated the foundation of the European Coal and Steel Community, which was later turned into the European Economic Community and still later into the European Union. The Marshall Plan is also unique in that the winner of World War II included its arch enemy in the war – Germany – in the project.

In 1994 a terrible genocide swept Rwanda, Africa: in 100 days, the Hutu killed between 800,000 and 1 million Tutsi and politically moderate Hutus, which was 20% of the entire population. Outrageously, the United Nations remained passive and even actively prevented any effective intervention of UN troops, who could have at least mitigated the genocide. After its awful past, current development in Rwanda seems quite promising. Economically, the country is enjoying relatively fast and successful growth for the Sub-Saharan region, and my own experience shows that these days it is the safest country in Africa. President Paul Kagame demands authoritatively that there are no distinctions made between the Tutsi and the Hutu, and now all are joined in the building of a new Rwandan nation. The country continues to receive major aid, while corruption is kept at a level that Central Europe, for instance, can only dream of. If the trend continues, Rwanda could soon become the hope for the rest of Sub-Saharan Africa as a positive example of a successful country.

Reaching further into history, a great source of inspiration is the Renaissance (rebirth), which took place roughly from the 14th to the 17th century. It was a period of an “explosion of creative genius”, the flourishing of art and science, and the return to antiquity. The Renaissance first occurred in Florence and later also in other Italian cities. Thanks to an

economic boom, the building industry and fine arts were enjoying their heyday. The considerable political freedom helped shape the “Renaissance man”, a person who develops their creative potential and draws on multiple bodies of human knowledge and arts. The defunct Western Roman Empire thus found its heir and successor, even though it had taken nearly a thousand years.

Clearly, regardless how big a crisis is, it always presents an opportunity for catharsis and hope for a new beginning. However, there is no physical law stating that a crisis must be followed by restoration and prosperity; we need to make an effort, and furthermore there is no guarantee of the results.

The ascent of man will go on. But do not assume that it will go on being carried by Western civilization as we know it. We are being weighed in the balance at this moment. If we give up, the next step will be taken - but not by us. We have not been given any guarantee that Assyria and Egypt and Rome were not given.

Jacob Bronowski

7.2 How to behave in an era of crisis?

The world needs people capable of action and not people who can only explain why they didn't do something.

Edmund Hillary

This is difficult to say. If a crisis is accompanied by chaos and anarchy, the situation will be out of control. We can only respond to what happens next retroactively (ex post) and not proactively (ex ante). Above all, we should do our best to survive while retaining our humanity, and help others if possible. It is a situation similar to war. No ordinary person wants to be caught in the middle of a war, which usually arrives unexpectedly with little chance to prepare for it. Such critical situations reveal character; often we are surprised to find out what others are like. People of meagre reputation may turn into heroes while “respectable” citizens may prove to be cowards if not worse.

I luckily have never been to war but I still remember the behaviour of people around me in the first days of the 1989 Velvet Revolution, when no one was sure what the outcome would be.

Many of them surprised me, both in the positive and negative sense.

In an era of civilizational retreat it would be crucial to preserve the basic human legacy – knowledge. That will guarantee that our offspring will have a chance to learn and build a new civilization over time. We should not rely solely on major centralized resources, as these may be ruined. Remember what an irretrievable loss the destruction of the Library of Alexandria was. Electronic data sources are not very reliable either due to their extreme vulnerability. The most durable material is probably the good old stone slab, which can carry a message for thousands of years, with the downside of being rather bulky. The best option would thus be to store data in various forms and in various locations.

“Hardened” individuals and “hardened” communities are vital in an era of crisis. The Scout Movement could serve as an example. In the past in England, Scouting used to prepare young men for military service in remote lands. Since then it has, of course, lost its original purpose, but everyone who has been a Scout can deal with temporarily difficult living conditions. A young man or woman that has spent a few weeks every year in nature will handle living for some time without conveniences such as power and hot water much better than an individual that spends all year long hunched over the computer in their room, escaping into a virtual world. Wars and major civilian unrest aside, let us imagine a week-long blackout during the winter months. It would be very important to observe how many people do not panic under the circumstances, wait out the worst, and help restore order when possible.

Another great source of inspiration is medieval religious and chivalric orders. After the Roman Empire fell, it was largely these orders that helped build a new civilization in Europe, bringing not only the Scripture from the Mediterranean but also education and the know-how of soil cultivation and colonization to the rest of Europe. It took hundreds of years, and they were prepared to make the ultimate sacrifice – their own life – for what they believed in. Many died young but their life had meaning and purpose. Perhaps this is what we are missing today – a higher meaning and purpose to our lives.

Unlike ancient Rome, our modern society has a substantial advantage that is described by Lubor Kysučan in his book *Them and Us* (2010). Democratic countries have developed a vital civic society. Besides the government and the business sector, there is a strong non-profit sector composed of thousands of varied NGOs, where people, often free of charge, pursue

activities they deem meaningful and beneficial. This gives us great hope for the future of human beings.

Identifying key actors who could serve as leaders at a time of crisis is challenging. There are both heroes and cowards among politicians, representatives of churches and businesses, artists and other elites. Most of us have no idea of how we ourselves would react, let alone about others. Despite the fact that we participate in various special-interest groups, associations, and societies, ultimately it will be individuals, each one of us, who will play the decisive role. We need to do our best so as not to fail.

*Where is the life we have lost in living? Where is the wisdom we have lost in knowledge?
Where is the knowledge we have lost in information?*

Thomas Stearns Eliot

8 CONTOURS OF REGENERATION

We cannot purposely build a future that we are unable to envision. The first requirement is to create a realistic, convincing, and arresting vision of a future that is easy to communicate. We need to find a story to describe the next chapter of our evolution and to catalyze our energy and enthusiasm.

Duane Elgin

After a crisis, a window of opportunity usually opens for a while, a chance for a new beginning, a chance to build a world better than the one before the crisis. This window of opportunity is nevertheless open for a limited time only, and then is gone. Therefore, how prepared we are and how we utilize this chance are extremely important. Knowing what we do not want is not enough; we also need to know what we want and how to acquire it.

One such window of opportunity emerged, for example, after World War II in Europe. Shocked that we could allow such an awful conflict with tens of millions of victims to happen, the once again free and democratic portion of Europe began to create a new world. To the surprise of many, France and Germany buried the hatchet and a community that is now called the European Union slowly began to form. The war was followed by a baby boom, which always signals expectations of a promising, better future. Economic prosperity reigned throughout the 1950s and 1960s.

Another window of opportunity created by World War II was the foundation of Israel. The Jews had suffered a horrific ordeal, with six million people being murdered by the Nazis. Were it not for this terrible tragedy, and the euphoria felt after the Allies defeated Germany, the international community would likely never have gathered enough will and courage to facilitate the foundation of the Jewish state.

A similar window of opportunity opened in Czechoslovakia when communism collapsed. Unfortunately, we failed to take full advantage of it. Despite knowing well what we did not want (socialism and a one party system), we were far from certain what we did want and, in particular, how to achieve it. We made a successful return to Europe and were generously accepted into the European Union in 2004. On the other hand, the country (Czechoslovakia) fell apart, we were building a “market without adjectives”, and a considerable portion of the

country's riches were simply stolen. This all led to what Václav Havel referred to as "social malaise": our hearts began to once again give in to the old socialist phrase: "He who does not steal from the state, steals from his family." Consequently, based on the Corruption Perceptions Index (Transparency International, 2011), the Czech Republic now ranks lower than Botswana, Rwanda or Jordan, placing as low as 57th together with Namibia and Saudi Arabia. In Europe we are perceived as schemers, a nation of people who are mainly interested in getting the maximum possible for themselves from the joint budget. We find it difficult to manage our own country with any kind of efficiency. The worst is perhaps that we take today's freedom and opportunities for granted because we did not have to make much effort to gain them. If you take something for granted, you can easily lose it.

Of course, life in the Czech Republic is good nowadays, but it has to be admitted that we have wasted many developmental opportunities due to our lack of preparation or interest; and the near future does not likely hold any similar opportunities (for example, land is being nonsensically occupied by logistics centres; the once dense rail network is being destroyed by closures of regional lines).

What will a window of opportunity and the contours of restoration look like after the future crisis? No one knows precisely, but that is all the more reason that the situation requires thorough analysis and consideration. I will now offer a few observations, or tiles in the mosaic of what the future restoration might look like.

8.1 Sustainable world

Right is right even if no one is doing it; wrong is wrong even if everyone is doing it.

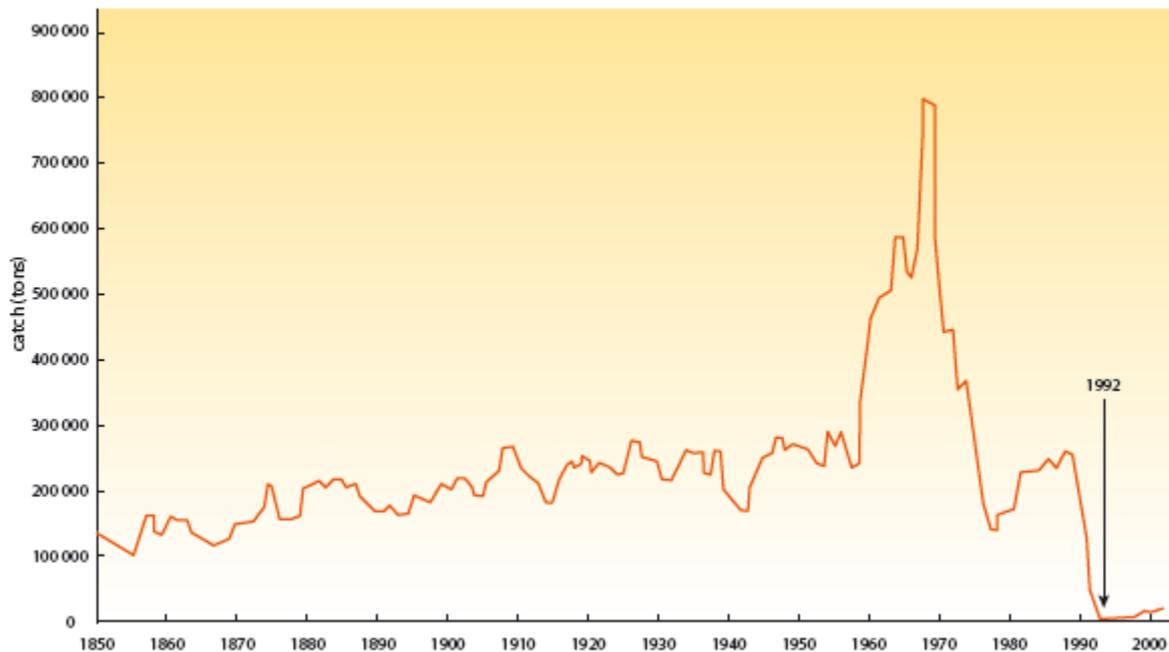
Albert Gore

After the crisis, human communities will crave to build a better and sustainable world and hopefully they will be determined enough to achieve it. In general, this involves following three basic principles defined by Herman Daly (1996):

– Renewable resources (forests, fish stocks, etc.) must be used no faster than the rate at which they regenerate.

- Non-renewable resources (e.g. fossil fuels) must be used no faster than renewable substitutes for them can be developed.
- Pollution and waste must be emitted no faster than natural systems can assimilate them (i.e. must not exceed the ecosystems' sustainable capacity).

Fig. 14: Population collapse of Atlantic cod (adapted from World Resources Institute, 2005)



8.2 Transformation of values

I am not bound to win, but I am bound to be true. I am not bound to succeed, but I am bound to live by the light that I have.

Abraham Lincoln

Will the values of the population change after the crisis? Although it is hard to say, they most likely will. As mentioned above, we will need to deal with “sins removed both in time and place”, and with challenges that are not black-and-white, (it will not be entirely clear what is right and what is wrong, what is acceptable and what is not), and take a stance. I hope that our values will change in at least two important areas, even though from the present perspective it seems like wishful thinking.

The first is the unacceptability of war. Wars have been around since time immemorial, but this was also true for slavery, which had existed for thousands of years. Only 150 years ago slavery was a reality in the United States; thanks to the American Civil War it was abolished, and today in general it is considered unacceptable by civilized nations.

More wishful thinking concerns our attitude to life and all living beings. In the Jewish-Christian view, man was created by God like everything else, but unlike animals, he has an immortal soul. This is not a scientific fact but a question of faith. In any case, what we can agree on (followers of various religions as well as non-believers) is that animals are our kin, albeit of lower standing.

As Peter Singer (1975) observes, the capacity to suffer and feel pain (common to both humans and animals) speaks sufficiently for solicitude. We and animals are equal, even though that does not mean we are the same. Erazim Kohák (1998) adds that there is a morally substantial difference between humans and other animals – freedom. *Humans are beings who can imagine that things could be otherwise, the only beings that do not live within firmly established instinctual parameters. Freedom, though, does not mean privilege. It means responsibility.* This includes our “lower-ranking” kin. Acknowledging this reality does not mean that we will all have to become vegetarian and not kill for food. Higher-order animals should have four basic needs respected (which not even slaves used to be entitled to, by the way):

- freedom of movement within a sufficiently large space;
- a natural cycle of day and night, activity and relaxation;
- company of their own kind, including maternal relations;
- a natural diet corresponding to the species’ requirements.

Although we have different needs, both animals and humans enjoy the same right to have them fulfilled. (Kohák, 1998)

True human goodness, in all its purity and freedom, can come to the fore only when its recipient has no power. Mankind's true moral test, its fundamental test (which lies deeply buried from view), consists of its attitude towards those who are at its mercy: animals. And in

this respect mankind has suffered a fundamental debacle, a debacle so fundamental that all others stem from it.

Milan Kundera

8.3 Freedom and responsibility

Nowadays, people know the price of everything, but the value of nothing.

Oscar Wilde

A major achievement of the 20th century, the Bill of Fundamental Rights and Freedoms, will likely be complemented with some form of a universal declaration of human responsibilities so that the rights and freedoms detailed in the Bill are counterbalanced with responsibility.

8.4 Global governance

I am not born for one corner; the whole world is my native land.

Lucius Annaeus Seneca

We will realize more clearly than we can today that it is necessary to adopt global governance principles, as too many challenges and problems pose insurmountably difficult tasks for individual countries or their associations to handle. Potential attempts at establishing “enlightened global governments” will need to be carefully watched, as candidates would no doubt be plentiful.

The world is extremely diverse in religion, culture, politics, and economics, and different entities pursue various goals. However, global governance rules are essential, just like the internationally recognized air or road traffic rules are.

It is difficult to say whether the United Nations can be revitalized or whether another organization will emerge (similarly as the UN replaced the League of Nations after WWII). Perhaps there will be a new type of institution, something along the lines of a trans-institutional organization, as the Millennium Project CEO Jerome C. Glenn refers to it. (Glenn, Gordon, 2007) A trans-institutional organization could function as a special type of

organization that would act in cooperation with governments, corporations, universities, NGOs, transnational or international organizations, and both with individuals as well as on behalf of them. When dealing with the government, one needs to be political. When dealing with a profit-oriented corporation, you need to respect its interests and perspective. When dealing with an academic institution, your theoretical knowledge must be on par. When dealing with an NGO, it is important to focus on the ethical points of the issue. And when dealing with an international organization, you need to consider the global and international aspects of the problem. These days neither people nor organizations usually behave in this way. Their thinking and behaviour tends to be analytic and specializes in a particular sphere of influence.

8.5 Reform of the United Nations

The structure of today's institutions was formed before Marx, Darwin, Freud, and Einstein. New institutions need to be built, just as the founders of the United States did 200 years ago. This applies not only to the reconstruction of government but also transnational organizations and local communities.

Alvin Toffler

Today the United Nations is the principal tool for national and international cooperation. It was nonetheless born into the bipolar world of 1945, and from the beginning people did not perceive it as theirs, as an institution that is there for them. Rather it gave the impression of serving the governments of the world, who used it and abused it to promote their own interests. (Commission on Global Governance, 1995) This holds true even today. In addition, while it was founded by 51 countries, today the UN has 193 member states with very diverse interests and ambitions.

The question is whether the excessive bureaucratization and inefficiency of the UN will lead to its demise or fundamental reform. The reform option has been discussed for over twenty years, but the decisive factor will be whether the member states will find the will to yield part of their national sovereignty. Without that, global governance can never be efficient. Contemplations of UN reform could draw on a proposal Josef Vavroušek made more than twenty years ago at the Earth Summit held in Rio de Janeiro in June 1992.

So far, the UN has responded to emerging problems by establishing new commissions and programmes. That is why the existing structure is inefficient and costly. It would therefore make sense to create a new, less centralized structure, which would comprise four specialized subsystems that would enhance its effectiveness without generating a highly centralized bureaucracy with a monopoly on power. The subsystems include:

- a) a UN security system aimed at promoting a peaceful solution to international conflicts; managed by the UN Security Council;
- b) a UN economic system that would support balanced, global economic development through effective financial, commercial, and other measures carried out by the UN Economic Council;
- c) a UN social system focused on promoting culture, education, health care, social welfare, and similar activities implemented by the UN Social Council;
- d) a UN environmental system concentrating on nature conservation and restoration in general and on human environments in particular; the environmental system would be managed by the UN Environmental Council.

Each of the four specialized pillars should be autonomous as they focus on varied aspects of the sustainable development on our planet. At the same time, they should work in close cooperation, as the problems they will face are also interconnected.

The need to decentralize the system of UN activities so that sound knowledge of regional problems would improve efficiency inspired Josef Vavroušek to propose a “secondary” regional structure of the UN (the primary is the UN’s sectoral structure). This secondary structure should be continental and regional and be based on the existing regional UN commissions, whose number should however be higher.¹⁵

Each of these commissions would cover four principal sectoral areas: security, economics, social affairs, and the environment, matching the UN’s primary structure. The UN’s primary and secondary structure would form a matrix that would facilitate a reaction to global consequences of specific problems as well as to their regional effects.

¹⁵ There are currently five UN regional commissions: Economic Commission for Europe (ECE), Economic Commission for Latin America (ECLAC), Economic and Social Commission for Asia and the Pacific (ESCAP), Economic Commission for Western Asia (ECWA), and Economic Commission for Africa (ECA).

Chart No. 3: Main areas of cooperation between two proposed structures of the UN system

(Vavroušek in Prins, 1993)

Primary structure	Secondary structure UN system for Africa	Secondary structure UN system for Europe	Mission in general (UN global system)
UN security system	African security	European security	Global security
UN social system	African social and cultural development and health care	European social and cultural development and health care	Global social and cultural development and health care
UN economic system	African economic development	European economic development	Global economic development
UN environmental system	African nature conservation and environmental restoration	European nature conservation and environmental restoration	Global nature conservation and environmental restoration
Mission in general (UN global system)	Sustainable development in Africa	Sustainable development in Europe	Planet-wide sustainable development

Preparations for a global governance structure could draw inspiration from the European Union, which began to take shape after WWII. Any time before that it would have been unthinkable.

Evolving for over sixty years, the EU is still far from having a definite form. Nor is it certain that it will continue to develop positively. There is an ongoing discussion regarding the transition of partial powers from the national level to the European Union, and there have been concerns whether the Brussels bureaucracy truly aims to become an “enlightened European government”. One day, the new UN may follow a similar path; it is imperative we make sure the UN is not and nor can it ever be tempted to become the “world government”.

8.6 Natural Capital and Environmental Tax Reform

Although there are limits to growth, there need be no limits to development.

Donella Meadows, Dennis Meadows, Jorgen Randers

After the era of crisis, which will, to a large extent, also be an environmental crisis, we will hopefully realize the importance of natural capital and start acting accordingly. Today it is common to operate with financial capital (cash, investments, monetary tools) and manufactured capital (transport, energy and other infrastructure, machinery, tools, and plants). Other established forms of capital are human capital (work, intelligence, culture, and organization) and social capital (the sum of social agreements and relations). However, we grossly underestimate and neglect natural capital, which comprises the resources of living systems and services provided by ecosystems. Natural capital includes water, minerals, fossil fuels, fish, soil, air, etc. It also involves living systems such as pastures, savannahs, wetlands, river estuaries, oceans, coral reefs, coastal corridors, tundra, rainforests, and others. (Hawken, Lovins, Lovins, 1999)

Herman Daly (1996) observes that until recently, economists and politicians have focused solely on the productivity of labour and capital and their relationship. The productivity of natural wealth received little attention, which led to major wastage and ineffective use of natural resources. In the past this approach was understandable. The sources of energy and raw materials seemed infinite; ecosystems were absorbing the resultant waste and gas emissions. Now the situation has changed drastically. While it is still true that it is necessary to protect and make economical use of scarce resources, the most precious resource (of which there is the shortest supply) is no longer human-made capital (e.g. fishing boats or chainsaws) but the remaining natural capital (e.g. surviving fish stocks or forests).

Recognizing the importance and value of natural capital will help enforce environmental tax reform, which is one of the key tools for renewing and creating a new economic system following the crisis. Coined by economist Arthur Cecil Pigou, the idea of an environmental tax reform has been around for nearly 100 years. It is based on shifting the tax burden from what there should be plenty of (e.g. work) to what there should be the least of (e.g. exploited natural sources).

This reform entails a gradual (long-term) substantial taxation and thus also an increase in the prices of energy and raw material resources, which will be compensated by a lower or even non-existent taxation of labour. The environmental tax reform will follow a fiscally neutral policy: whatever the government earns on the higher taxes on natural resources will be used to decrease labour taxation. In short, this is not a new tax but a comprehensive tax reform that would primarily increase consumption tax and taxes designed to protect the environment, and decrease (or even eliminate) income tax and VAT (value added tax).

Environmental tax reform is a complex strategic manoeuvre. Therefore it should be implemented gradually, probably well over a decade. The long timeframe - limits for introducing environmental tax reform will nonetheless hinder its political support. In democracies, politicians are elected for 4 or 5 years, and this is the extent of the time frame in which they think.

It is difficult for them to fully back a comprehensive tax reform whose major benefits may take effect only long after their election period is over. Another aspect hindering the enforcement of environmental tax reform is the fact that it should be implemented immediately and in a large and strong economy. Ideally it would be introduced globally. The yields from introducing comprehensive environmental tax reforms are expected to greatly surpass the potential risks and costs.

The reform will clearly make both enterprises and households behave more economically with natural resources. Enterprises will be motivated to employ modern, more cost-effective technologies and households will mainly invest in energy savings (building insulation, energy-efficient bulbs, etc.). The introduction of environmental tax reform will encourage the use of renewable sources of energy, more consistent recycling, and also longer product life. As E. U. von Weizsäcker (1997) believes, environmental tax reform could give scientists, technologists, and managers a strong impetus to work on a revolution in efficiency. Additionally, this would promote employment as lower taxes on human labour make labour cheaper.

The recognition of natural capital and promotion of environmental tax reform will bring us closer to the key objective of human economy, which is the most faithful possible imitation of natural cycles, including waste-free management and minimized energy waste. In particular,

this means the most closed circulation of substances and use of energy from renewable sources or the sun (hydropower, wind, solar or biomass energy) possible. Thus we will learn to respect the limits of the environment or ecosystems and use resources sustainably.

8.7 Tobin Tax

Unless we adapt to the global village well, we shall regret having ever invented civilization.

Arnold Joseph Toynbee

On an economic level, it is desirable that a system similar to the forty-year-old proposal of the Tobin tax is adopted. In 1972, the Nobel Prize-winning economist James Tobin suggested imposing a tax on all spot conversions of one currency into another in order to control the movement of often-speculative capital across borders.

As early as in the 1930s, John Maynard Keynes highlighted the dangers of speculative financial operations dominating over direct operations: *When the capital development of a country becomes a by-product of the activities of a casino, the job is likely to be ill-done.* This holds true today more so than ever, when speculative capital makes up about 90% of all international financial transactions, and electronic money travels at the speed of light.

A Tobin tax would make short-term currency speculations less profitable because moving large amounts into a country and then quickly withdrawing them again would be costly. If the tax was set at, for instance, 0.25%, the annual yields would amount to roughly USD 300 billion. The existing system is unfair, taxing every employed person, while immense profits that require no effort at all escape tax free. The Tobin tax and its yields could become one of the tools that fund future global governance.

8.8 Global Marshall Plan

He will be saved who has saved others. That is the secret of progress – there is no other, nor there ever will be.

Vladimir Solovyov

One of the key elements of the restoration could be an analogy of the post-WWII European Recovery Programme, this time on a global scale. The US Congress adopted the Marshall Plan in April 1948. Between 1948 and 1952 the United States provided European countries with aid totalling USD 13.3 billion (at that time). The Marshall Plan helped revive economies in Western European countries, which led to political stability and a drop in Communist influence. The Marshall Plan very likely prevented a world economic crisis similar to the 1929 – 1931 crisis. Cooperation also sowed the seeds for the future gradual unification of Europe.

Following his electoral victory, President Harry S. Truman unexpectedly included the Point Four Program in his inaugural address in January 1949. Along with the UN, NATO, and the Marshall Plan for Europe, the Program was to be another pillar of US foreign policy, focusing on “global development aid”. In the end the Point Four Program only partially served its purpose– through bilateral agreements on developmental aid. (Johnson, 1999)

In the 1990s, the idea of a global Marshall plan came back to life thanks to the US Vice-President Albert Gore in his book *Earth in the Balance: What is required now is a plan that combines large-scale, long-term, carefully targeted financial aid to developing nations, a massive effort to design and then transfer to poor nations the new technologies needed for sustained economic progress, a worldwide programme to stabilise world population and a binding commitment by industrial nations to accelerate their own transition to an environmentally responsible pattern of life.* (Gore, 2006)

No political will to carry out such a plan was found in the 1990s, nor is it there today. This may nevertheless change in the future, similarly as the original Marshall Plan became useful after WWII. It could be funded from contributions made by developed countries or using newly set “global taxes”. Besides the above Tobin tax, this could include, for example, a global trade tax. Transnational corporations manage to avoid taxation on the national level

and environmental and social standards valid in developed countries. The turnover of the 15 biggest international corporations exceeds the overall economic performance of the 60 poorest countries. According to the NGO “Global Marshall Plan Initiative”, the tax could range from 0.35 to 0.5 %. This could generate a yearly income of about USD 50 billion. (www.globalmarshallplan.org)

What would a global Marshall plan be like? Firstly, it should be comprehensive, coordinated, and future-oriented. It also needs to aim at defined, measurable, and feasible goals. Projects should be sufficiently long-term and focused to be able to contribute to major change.

The principal candidate to coordinate the programmes and projects of the global Marshall plan is probably a reformed United Nations.

The main goals of the global Marshall plan should chiefly include those that are understood as elementary and acceptable across various cultures. These are: elimination of violence against women; promotion of basic education and crafts; eradication of selected diseases (leprosy, polio, etc.) and elimination of other infections; and access to clean water. Other important developmental objectives include the construction of infrastructure (chiefly transport and telecommunications); efficient public administration; and support towards creating a middle class – a stabilizing feature in society. Other central goals are effective and eco-friendly technologies; care for infringed elements of the environment; and support of R&D capacities in aid-receiving countries.

In general, the principal objective of the global Marshall plan should be to help the recipient countries out of poverty, help them achieve a level of development at which they attract private investors and are able to hold fair negotiations with foreign investors. That is why the priority is to invest in the development of human resources, in sharing of information and knowledge relating to education, public administration, and the development of the public sector.

If you have built castles in the air, your work need not be lost; that is where they should be. Now put the foundations under them.

Henry David Thoreau

8.9 Science Reinvented

Although an interdisciplinary scholarly project certainly stands on the excellent work of other disciplines, it is only when these intersect that general knowledge may make a step forward.

Josef Jařab

James Lovelock (2006) raises a question why our main safety net – science – which we have relied on so heavily, has failed us. *Science itself was handicapped in the last two centuries by its division into many different disciplines, each limited to seeing only a tiny facet of the planet, and there was no coherent vision of the Earth. ... that is why the pioneering bravery of the whistle blowers received little support from the lumpen middle management of science.*

This failure does not naturally involve only climate change. We are obsessed with specialization, and in the end leading experts “know everything about nothing”. (The other extreme would of course be endless generalization, an endeavour to “know nothing about everything”.) The lay public tends to put blind faith in such individuals because they are the most credible experts available. However, narrow-profile specialists can be as wrong as anybody else; moreover, it is dangerous if they begin to apply the self-esteem and self-confidence gained in their narrow specialization (where it is justified) to wider social questions and issues. They bring their expert reputation into an area where they are not, or at least need not be, experts at all.

Likewise, we are obsessed with what can be measured, weighed, and experimentally verified. While on one hand this serves to effectively fend off charlatans, on the other, living and learning about the world around us is more than simple “measuring and weighing”.

Studying the collapse of great human societies, Jared Diamond (2004) also fielded the question of whether such a topic can be studied scientifically. His response was quite apt: *Science is often misrepresented as the body of knowledge acquired by performing replicated controlled experiments in the laboratory. Actually, science is something broader: the acquisition of reliable knowledge about the world.*

After the crisis, science will be understood from this wider perspective. Greater attention will centre on interdisciplinary and synthesizing approaches. Science will hopefully be open to

studying various phenomena that lie on the border between reality and fantasy, including phenomena viewed as paranormal today, and the overlapping of the physical world and consciousness. Profound caution and scepticism should be applied but at the same time, it is neither advisable nor sustainable to fully ignore this area of study.

Problems cannot be solved with the same mindset that created them.

Albert Einstein

The possibilities are limited only by our imagination and determination and not by the physics.

Mike Duke

8.9.1 Matter and Consciousness, Science and Religion

The most beautiful experience we can have is the mysterious. It is the fundamental emotion that stands at the cradle of true art and true science. Whoever does not know it and can no longer wonder, no longer marvel, is as good as dead, and his eyes are dimmed.

Albert Einstein

The relationship and the overlap between matter and consciousness will constitute one of the future crucial challenges for science. As Peter Russell (2004) says, how does something as unconscious as matter give rise to something as immaterial as consciousness? *The underlying assumption of the current metaparadigm¹⁶ is that matter is insentient. The alternative is that the faculty of consciousness is a fundamental quality of nature...it is always present. We should develop a worldview in which sentience is a basic component of reality. If the faculty of consciousness is universal, what emerged over the course of evolution was not the faculty of consciousness, but the various qualities and dimensions of conscious experience – the contents of consciousness.*

Science in the future will be less materialistic; the study of matter will be complemented by studying sentience and the relationship between the two: *Science has had remarkable success*

¹⁶ The term “paradigm” relates to generally accepted theories, values, and scientific practice that form “standard science” within a field. A metaparadigm refers to a sum of paradigms that represent contemporary science.

in explaining the structure and functioning of the material world, but when it comes to the inner world of the mind – to our thoughts, feelings, sensations, intuitions, and dreams – science has very little to say. And when it comes to consciousness itself, science falls curiously silent. There is nothing in physics, chemistry, biology, or any other science that can account for our having an interior world (...) Nothing in Western science predicts that any living creature should be conscious. Consciousness is not composed of matter. And matter, we assume, does not possess consciousness. This is the paradox of consciousness. Its existence is undeniable. Yet it remains totally inexplicable. For the materialist metaparadigm, consciousness is one big anomaly. (Russell, 2004)

For the reasons above we can assume that science and religion, or faith, will merge closer together and exist in a certain symbiosis. But it is probably impossible to estimate if and when the future will see religious tolerance and cooperation. Whenever people believe that God is with them and consequently others are living a lie, danger looms ahead. The Old Testament teems with blood, telling of the fights between Jews and the neighbouring countries. Christianity likewise has a bloody history. And Muslims seem to be going through those unfortunate times of pride and intolerance right now. Judaism and Christianity may become significantly closer in the future. If Christianity and Islam, and above all Judaism and Islam will ever follow suit remains a mystery.

The relationship of monotheist and non-monotheist religions may be less tense in the future. These two religious groups find it easier to tolerate one another because they have very different world views. An attitude of “being far apart but tolerant and respectful of each other” is quite admirable.

Coming back to the relationship between science and faith, the post-crisis world will probably be a world that will not only ask “how it is built and how it works” but also, and above all, “who created it and to what purpose, and what is our place and mission in it”?

There is a “magisterium of science” and a “magisterium of religion”. Science is rational, “objective”, seeking to understand the functioning of the world. Alas, it is at risk of “the pride of intellect”, and over the last few centuries, also of a mechanical view of the world, a world as a machine that can be dismantled to components and thus fully understood. On the other hand, faith is subjective, more intuitive, searching for the purpose of this world and the place

humans hold in it. As science is threatened by the pride of intellect and the enduring mechanistic view of the world, faith faces the perils of extreme fundamentalism. *“Fundamentalism is the disease of faith,”* says Tomáš Halík (2009).

The terms “magisterium of science” and “magisterium of religion” are loaned from Stephen J. Gould (1999), who holds that science and religion are two independent domains (their approximation will not necessarily lead to a merge). The magisterium of religion is based on God’s revelation; it is an interpretation of the revelation. It is competent for the spiritual and moral aspects of life, teaching absolute and invariable truths of salvation. The magisterium of science, in contrast, contains what people have found through their own intellect and in the given historical situation. This learning is continuously developing, revising, and improving.

Science without religion is lame, religion without science is blind.

Albert Einstein

Science gives us knowledge, and religion gives us meaning. Both are prerequisites of a decent existence.

Michael Heller

9 CLIMATE CHANGE – A CASE STUDY OF AN ISSUE THAT MAY TURN INTO A CATASTROPHE

The only rational way of educating is to be an example – if one can't help it, a warning example.

Albert Einstein

When a system is thrown off balance, it behaves irrationally and not at all like a machine. It becomes nonlinear, which means that a small outside impulse can trigger gigantic changes within the system, while immense powers can have a minimum or zero effect. Chance becomes an agent.

Ilya Prigogine

Over the past twenty years or so, climate change has been one of the key topics on the global scene, and there is hardly any reasonable person left who would doubt this today. A big question is to what extent global warming has been caused by human activity, how fast the process is, and what consequences it will have. The following excerpt is from Mark Lynas's book *Six Degrees. Our Future on a Hotter Planet* (2008). Mark Lynas spent a few years at Radcliffe Science Library in Oxford University, which collects perhaps all available data on climate change. He went through tens of thousands of scholarly articles until he gradually saw what the world would look like if the global temperature rose by one, two ... or a whole six degrees Celsius. These forecasts are primarily based on computer simulation models and analogies of a higher global temperature in the near or far future. The data and models are gradually fed more information and continue to develop over time.

Therefore even the world described by Mark Lynas does not need to correspond to what will actually happen once the temperature rises. There is no better alternative available now, though, and the following image of a warming world is based on the knowledge that science has been able to generate so far. The description of "the world according to Mark Lynas" will serve as a launching pad for contemplations of a world at the time of collapse that may or may not take place. This collapse may also not be caused by climate change alone but by the synergistic effect of multiple adverse factors that create a "perfect storm", as will be briefly mentioned further in the text. Of these, climate change is now by far the most analysed and appears to pose the biggest danger to humankind, therefore extra attention is given to it.

Fig. 15: Principle of the greenhouse effect (adapted from Moldan, 1997)

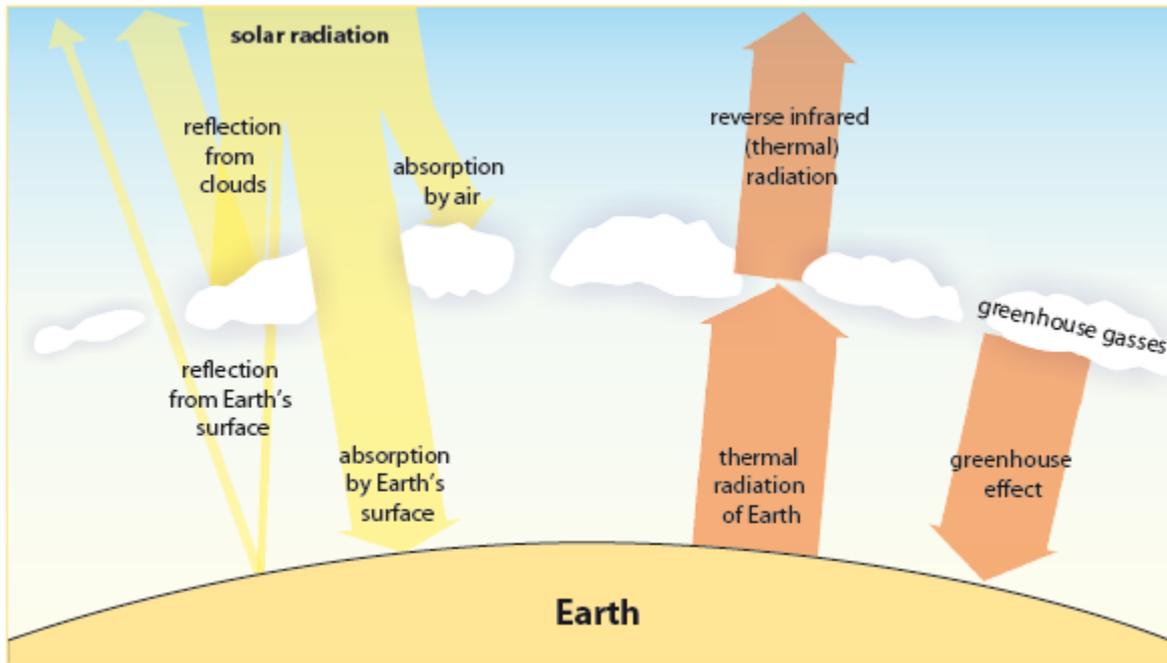


Fig. 16: Rate of the global emissions expressed in the equivalent of CO₂ (adapted from WorldWatch Institute, 2009)

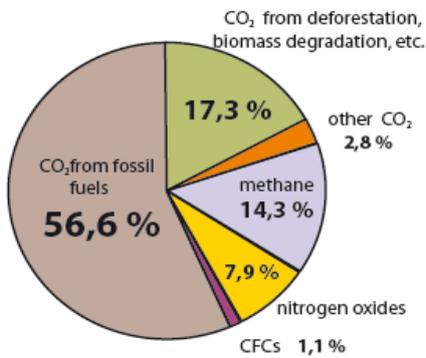
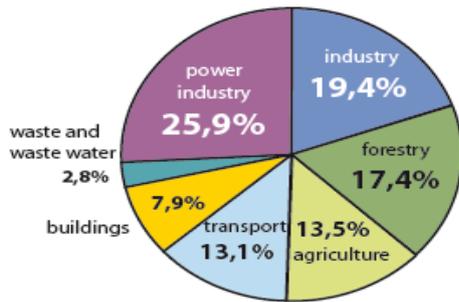


Fig. 17: Emissions by sectors expressed in the equivalent of CO₂ (adapted from WorldWatch Institute, 2009)



9.1 Six Degrees – Possible Worlds According to Mark Lynas

All that is necessary for the triumph of evil is that good men do nothing.

Edmund Burke

Global emissions of greenhouse gases are now growing by three percent per year, which is twice more than in the early 1990s. An insight into what the world might look like under the conditions of climate change was there for all to see in 2004, when New Orleans was struck by Hurricane Katrina. It seemed inconceivable that such terrible conditions of hunger, thirst and lawlessness could develop so quickly in the world's richest and most powerful nation. The veneer of civilisation had been torn away. Some members of the police joined in the looting, some deserted the area. Gangs of young men with guns seized the only food and water available. A military helicopter landed for just a few minutes, its crew flinging food parcels and water bottles out onto the ground before hurriedly taking off again as if from a war zone. Young men fought over water as pregnant women and the elderly looked on with nothing.

9.1.1 1 °C Increase in Global Temperature

In the 12th to 14th century the temperature in the northern hemisphere was about 1 degree Celsius higher than today. California was hit by periods of crippling droughts, which lasted several decades. This led to a decline in the indigenous population - Native Americans. Those who survived tried to fight off enemies at places that were difficult to access, such as steep cliffs.

Central Nebraska cradles the cattle ranching area Sand Hills. Underneath a thin layer of fertile soil there is sand. This region was a desert 6,000 years ago, when it was one degree warmer than today. Today, the sand dunes are stabilized with a protective layer of vegetation. If, however, it gets one degree warmer again, these deserts will probably come back to life and start “marching” across the fertile land.

In the 1930s, the Midwest of the USA was hit by drought and severe sand storms (Dust Bowl). Hundreds of thousands of people, including 85% of Oklahoma’s total population, left the land and trekked west. In a 1 °C warmer world, the west of the United States could be faced with the same situation again.

That would raise the international prices of food substantially. Based on a computer model generated at Princeton University, if the temperature grew by one degree Celsius, the incidence of drought on Earth would double by 2100. Extreme drought would cover 30% of the Earth's surface compared with 3% today – one third of Earth’s surface would be void of water. Rainfall would come in massive waves that would alternate with long periods of drought. So for example, the band south of Sahara, the Sahel, would see a rise in total rainfall, alas in the form of downpours with flash floods, which would be followed by longer periods of drought and extremely high temperatures.

The Arctic may have already exceeded the tipping point of irreversible change. It is now warming twice as fast as the rest of the planet. Temperatures in Siberia and Alaska are growing even more rapidly. In Alaska, snow melts ten days earlier on average than in the mid-twentieth century.

Whole lakes have drained away through cracks in the thawing permafrost. Over the last 50 years, 10,000 lakes have vanished in this way and underground water levels have been decreasing on the whole. A 1 °C increase in the global temperature is expected to eliminate 10 – 18 % of currently existing permafrost. Roads, buildings, and pipelines will start caving in. The warming will also reduce the Arctic sea ice. If the Arctic loses its snow, it will no longer reflect so much solar radiation and energy in the form of heat will be absorbed into the ground. This will substantially increase the release of methane from the ground.

9.1.2 2 °C Increase in Global Temperature

In summertime in north China, the monsoon carries in moist air from the ocean. In winter, strong winds blowing from the north bring dust and freezing temperatures. 129,000 years ago it was 1 to 2°C warmer and the monsoon was weaker. A dry winter monsoon thus became dominant, introducing a period of drought and continental-scale dust storms. This could happen again. The Chinese government has begun preparing a gargantuan project that will transport billions of cubic metres of water from the Yangtze River in the south to drought-stricken cities in the north.

Oceans are naturally slightly alkaline. Carbon dioxide dissolves in water, forming carbonic acid. Due to human activities, ocean alkalinity has dropped by 0.1 pH.¹⁷ The current rate of CO₂ input is 50 times higher than normal. In less than 100 years, the pH of the oceans could drop by as much as half a unit from its natural level of 8.2 to 7.7. This could prove disastrous by as early as 2050 for life in the ocean, endangering organisms with calcareous shells, including coral reefs. By now oceans have swallowed about 400 billion tons of CO₂ from fossil fuels.

Due to the rising temperature, Europe will face summer heat waves similar to the ones in 2003, which claimed 22 to 35 thousand lives. As early as 2040, summer hot spells will be much more frequent and their consequences substantially more serious. The elderly will have to spend these periods holed up in air-conditioned places. Crops that require summer rain will literally roast in the fields, while woods will be destroyed by extensive fires.

High temperatures and extreme drought will reduce plant growth by about 30%. Photosynthesis levels will fall, and plants will be emitting CO₂ instead of absorbing it. The Mediterranean will struggle with more and more forest fires. The subtropical dry zone will travel north of the Sahara, and the southern Mediterranean will be increasingly drier and warmer. The number of days with 30 °C plus temperatures will be 5 or 6 weeks longer, while precipitation will fall by 20%. Hydroelectric plants will suffer from power outages. Water shortage will turn into a permanent issue. Human migration from the south to the north of Europe will probably increase.

¹⁷ pH is a measure of the acidity or basicity of an aqueous solution. Solutions with a pH less than 7 are acidic, solutions with pH greater than 7 are basic (alkaline).

125,000 years ago, when temperatures were about 2°C higher, the sea level was 5 to 6 metres above present levels. Greenland glaciers currently contain enough water to raise the sea level by several metres should they thaw completely. A 1 – 2 °C warmer climate could melt so much Greenland ice that all coastal cities around the whole world would be flooded over. Up to half of the global population would have to move to higher areas. A 2 °C global increase in temperature would mean a 3.2 to 6.6 °C rise in polar areas by 2050. That would alter the entire food chain – from plankton through fish and sea birds to mammals.

Vanishing Himalayan glaciers would reduce the flow of major Asian rivers; moreover, as the flows would be inconsistent, floods would alternate with long periods of drought. As a result, hundreds of millions of people on the Indian subcontinent would struggle with a shortage of water. Similar developments are expected in the Andes in South America, especially in Peru. If the global temperature grows by two degrees by 2050, plants and animals will not manage to change habitats fast enough and more than a third of them will die out. This could involve far more than a million species in total. Species that took millions of years to evolve on the planet could be wiped out forever within a single human generation. Social biologist Edward O. Wilson (1992) observes that the 21st century could be the age of loneliness as humankind realizes it is almost the only species left on the destroyed planet.

9.1.3 3 °C Increase in Global Temperature

In Africa, the tropical regions and higher latitudes will be swamped with flooding, while the subtropical regions will bake to death. The Indian Ocean is currently heating up considerably in the east, causing the devastating droughts that recently hit southern Africa. Rain clouds gather above the warm ocean, and instead of travelling inland, they pour out back into the ocean.

Global warming will divide Africa into two parts. While the north may see an improvement thanks to rainfall, the south will become increasingly drier, which may lead to extensive famines. The sleeping sand dunes of the Kalahari Desert will wake up and start moving. Higher temperatures will increase the amount of water that evaporates from the Earth's surface and from vegetation. Villages and towns will disappear from the Kalahari region and

across the whole of Botswana, and the land will be covered with active dunes. No longer inhabitable, the land will sink under sand rather than water.

An analogy of a 3 °C warmer world existed three million years ago, in the Pliocene. The global geography at that time was basically identical to that of today. The Andes and the Himalayas were already standing. The Panama Canal had closed, separating the Atlantic from the Pacific. Ocean currents were the same as today. Antarctica was covered with scrub. Only 500 kilometres from the South Pole, preserved petrified wood and beech leaves were found in rocks in 1995. Similarly, ancient wood from the Pliocene Epoch was found also in Greenland.

Up in the Canadian Arctic, on the Ellesmer Island, winters used to be 15 degrees Celsius warmer than today. Forested land was 2,000 km further north than it is today. There were absolutely no continental glaciers in the northern hemisphere, thanks to which the sea level was 25 metres higher than it is now.

Concentrations of CO₂ in the air ranged from 360 ppm to 400 ppm (compared to today's 400 ppm!). The question is: as concentrations of CO₂ comparable to the present levels induced three degrees of global warming in the Pliocene, could the same happen today?

Most probably it could, although it would perhaps take longer than a century. It will likely take hundreds or even thousands of years before the higher temperatures warm the oceans all the way to the bottom. This is an example of the planet's temperature consistency. Due to the extended reaction time of the global ecosystem, temperatures will always lag behind changes "enforced" by solar radiation or greenhouse gases. It resembles heating water on a gas range – the water will not start boiling immediately after the burner is turned on. If all emissions stopped tomorrow, it would take many decades before the Earth reached a new temperature balance. On the other hand, if emissions continue to rise at the same rate they are now, global temperatures could already grow three degrees Celsius by 2050.

So far, mathematical models have operated with the growing temperatures as if it was a linear process. Earth and ocean systems, however, would remain unchanged for the duration of major global warming. A warmer sea absorbs less CO₂. Continental soils now hold immense amounts of carbon – about 1,600 gigatons, which is double of all carbon content in the air.

When the ground is warmed, bacteria accelerate the decomposition of the stored carbon, releasing the main greenhouse gas, CO₂, into the atmosphere. Based on updated models, a 3°C increase in temperature would reverse the carbon cycle. Instead of absorbing CO₂, vegetation and soil would start to release large quantities of it. So much carbon would be emitted into the air that by 2100 the atmospheric concentration of CO₂ would have grown by 250 ppm, making global temperatures rise by another 1.5 °C. By 2100, the global temperatures would thus have grown by 4 to 4.5 °C.

If temperatures rise by more than 2 °C, the largest rainforest – the Amazon – will disappear. Rainfall would suffer a severe drop, to zero in some regions, and temperatures would reach Saharan levels, that is, approximately 38 °C. The landscape would become a desert.

Australia, too, will be warmer and dryer, with more extensive fires. The number of 40 °C plus days will be six times higher in inland Australia. The frequency of droughts will triple. Average rainfall will decline by 25 percent. Water scarcity will be chronic and agriculture will suffer a slump. Sea water will rise through damaged river systems, salinating underground water sources. Higher temperatures will lead to higher evaporation rates. Inhabitants will begin to migrate to Tasmania and possibly also to the northern tropical regions.

As soon as the global threshold of 2.5 °C is crossed, there will be a massive shortage of food, which will send food prices soaring. Hunger will grip the dried out subtropical regions most of all, and tens of millions of people will be displaced. The resulting migration of nations could surpass earlier migrations caused by wars and poor harvests.

People from Central America will move north to Mexico and the United States. Tens of millions of people from North Africa will push their way into Europe, where no one will welcome them warmly.

This may result in fascist parties winning votes by promising to keep the starving migrants out of Europe. People will travel by foot, carrying only what they can, with children and the elderly trying to keep up. Many will die on the road. No roots, no home, no hope – these will be the first generations of a new type of people – climate nomads, forever moving in search of livelihood.

The animosity Muslims feel today towards Westerners will be nothing compared to the new situation. As the social collapse accelerates, new political philosophies will emerge, blaming rich countries for having started a fire that has begun to consume the world.

9.1.4 4 °C Increase in Global Temperature

If greenhouse gas emissions send us into a 4°C warmer world, the sea level will have risen by 50 centimetres by as early as 2050. In Egypt alone this will drive 1.5 million people away from their homes. Beaches, wetlands, and farming regions will be flooded, which will destroy the heart of Egypt's economy. Bangladesh will lose a third of its dry area. This will send tens of millions of people out of the fertile delta of the Meghna River. World megalopolises such as Mumbai and Shanghai or Alexandria and Boston will become flooded or be placed in serious danger. New York, London or Venice will only be possible to save at the cost of immense investments into flood barriers. Similarly to today's New Orleans, cities of the future could become fortified islands set largely below sea level.

Hundreds of millions of people living in coastal areas will withdraw inland. Inland cities will therefore face a perpetual influx of refugees. Sea level rise is an irreversible process that will take thousands of years to stabilize even if we manage to get greenhouse gas emissions under control.

Island nations will be even worse off. Coral atolls will completely disappear. Mountainous islands such as Fiji or Barbados will suffer as their shoreline continues to shrink, with refugees struggling to survive on denuded hillsides and cliffs. Saline water spreading from the seas will poison underground water reserves.

The Western Antarctic Ice Sheet could become dangerous in the future. Unlike the Greenland glacier, which is firmly anchored to the continent, a large part of this sheet lies below sea level. It could easily collapse into the sea. A 4 °C increase in temperature would likely cause this to happen, which would lead to flash flooding of the coastlines of all continents. The East Antarctic Ice Sheet is up to 4 kilometres thick in some places, containing so much water that the sea level would rise by 50 metres. If the temperature grew by 4 °C, the Earth would have no ice left, not even at the poles. The last time this happened was 40 million years ago. It can be assumed that severe droughts caused by higher global temperatures will principally affect

the following regions: the Southwestern United States, Central America, the Mediterranean, southern Africa, and Australia.

In winter months, droughts could hit Southeast Asia, while the Amazon rainforest, Siberia, and parts of West Africa will suffer most in the summer.

New deserts will emerge in southern Europe, spreading primarily in Italy, Spain, Turkey, and Greece. The subtropical belt will grow from today's North Africa all the way to Central Europe. The harsh Russian winter will be but a distant memory as temperatures in December through February will grow by 7 °C on average as compared to what they are now. Snowfall on the entire continent will drop by 80 % and more, excluding Scandinavia. The new snow-free arrangement will reintroduce winter floods. The dry summers will drive temperatures in Europe up by as much as 9 °C on average compared to today. The number of tropical hurricanes will likely remain roughly the same, but they will be much more intense.

All Siberian sea ice will thaw away for the first time in 3 million years, and the summertime Arctic Ocean will be completely ice-free. Compared with today, temperatures in winter months will rise by 14 °C. The southern boundary of permafrost – permanently frozen soil – will move hundreds of kilometres north. The permafrost area will shrink from over 10 million square kilometres today to one million square kilometres. Roads, houses, and other infrastructure will collapse as the ground melts beneath them.

Global warming accelerates the release of greenhouse gases from the ground, which accelerates the warming even further. The permanently frozen Arctic soils hold up to 500 gigatons of carbon, which bacteria begin to release through putrescent processes. Wherever the soil remains too moist for oxygen-based decomposition, anaerobic bacteria begin producing infinite quantities of methane, a greenhouse gas that is 21 times stronger than CO₂. The volume of methane bubbling out of thawing lakes is already five times higher than previously assumed.

9.1.5 5 °C Increase in Global Temperature

The fifth degree of global warming will drastically alter the planet's surface: there will be no ice covering either of the poles. Rainforests will be burnt and gone. The rising sea levels will have flooded coastal cities, and the water will continue to spread deeper into continents. Regions still habitable after the double crisis – drought and floods – will be shrinking. Inland temperatures will be 10 °C higher than at the beginning of the 21st century.

Higher temperatures will lead to higher evaporation and rainfall. The intertropical convergence zone will generate heavy downpours. Extreme droughts will burn the world's tropical areas. By the end of the century, large portions of dry land around the equator, between the parallels of 30°, will see extreme 50 °C plus temperatures. This territory includes densely populated areas such as India and the Near East. The temperature in most of the United States, southern Europe, and coastal Australia will exceed 40 °C.

A drop in moisture levels in the soil of semi-dry regions will elicit expansion of large deserts such as the North American Desert, the Sahara and Kalahari in Africa, the Patagonia Desert in South America, and the Australian desert. In Asia, the Gobi Desert will spread east. A brand new desert will emerge in northeast Brazil as a result of the destruction of the Amazon. The southern half of the United States will begin to dry out at a staggering rate.

Two belts of permanent drought will form, encircling the entire planet. The dry belt in the northern hemisphere will include the whole of Central America, the southern half of Europe, west Sahel and Ethiopia, south India, Indochina, Korea, Japan, and the western Pacific Islands. In the southern hemisphere, this will involve the south of Chile and Argentina, eastern Africa, Madagascar, nearly the whole of Australia, and the Pacific Islands.

The five degree model forecasts a 20% drop in the Nile's flow, while the Rimac River, which runs through Lima in Peru, will completely dry out as the Andes glaciers will have thawed. Rivers in southern California will lose half of their flow rate. The levels of underground water reserves of all the continents will have already started to decline. Consequently, neither agriculture nor the total population of today are sustainable. A possible solution would be massive migration from evacuated dry regions to areas that have newly become habitable far

in the north, chiefly in Canada and Siberia. The solution will however be hindered by political issues that are hard to solve.

In the 5 degree world even northern Canada and Russia will record a slump in agricultural production. In this world, good farming and living conditions will only be available on the Russian coast of the Arctic Ocean and the Canadian islands in the north, where the sea will help keep summer temperatures bearable. In such a world, China could invade Siberia and the United States could invade Canada in an attempt to seize the remaining habitable areas. Any armed conflict, especially a nuclear one, would only result in further reduction of the life-friendly environment on the planet.

Frosted-over soils are thin, rocky, and infertile, with low nutrient and organic substance content. Increase in farming and forest fires would destroy the vast boreal woods in the northern parts of Canada, Alaska, Scandinavia, and Russia. The taiga would vanish.

The seabed houses massive deposits of methane hydrate – a combination of methane and water that resembles ice. It forms in the intense cold and pressure of the deep sea. Methane hydrate is only stable if kept at very low temperatures and under high pressure. This greenhouse gas could have leaked on a large scale in the past, warming the sea and leading to further leaks of methane hydrate. This is what perhaps took place 55 million years ago and helped escalate an extreme greenhouse effect on the Earth. Methane hydrate leaks contributed to colossal peat bog fires on land, which sent large quantities of CO₂ and methane into the atmosphere. Oceans turned to acid as great amounts of CO₂ dissolved in the water.

Rainforests of metasequoia emerged in the northern Arctic. The Arctic Ocean was warm enough for Mediterranean seaweed to thrive. No ice formed there for the next 15 million years. Water temperature in the middle latitudes of the Atlantic was 33 °C. In that period, carbon dioxide levels in the atmosphere reached 1,000 ppm and the average temperatures were 5 to 10 °C higher than today.

If methane hydrate started re-emerging from the seabed today, it would lead to unstoppable, rampant global warming. There would be nothing that could be done about it. It would, nevertheless, take thousands of years before the methane hydrate started to affect the climate

because it takes centuries for higher temperatures on the ocean surface to penetrate deep into the water.

Having outlined the “non-habitable zones” in the five degree world, we will now identify some of the habitable areas, hideaways where smaller groups of people could survive. Tropical and subtropical areas will be ruled out due to high temperatures and drought respectively. The same applies to the sea – the decline of coral reefs and rapid warming of the ocean surface will eliminate the majority of sea life in the tropical and subtropical zones. Higher latitudes will be the only option.

In Africa, small hideaways in the rainy mountainous regions could survive. These include the Ethiopia highlands, Lesotho in southern Africa, mountain forts and isolated valleys that can be defended against invasions. Northern Europe, including the British islands and Scandinavia, could be a desirable retreat. The demise of the Gulf Stream could restore a dryer climate with stable temperatures in Britain. In the southern hemisphere, western winds should continue to carry plentiful rainfall to Patagonia. Further south, human colonies could survive on the newly ice-free Antarctic Peninsula. Tasmania and the south island of New Zealand will likely remain in the moderate rainfall belt and could serve as a refuge for survivors. The immigrants should set up new communities at a safe distance from the coast. These regions would probably see a drastic decline in the populations of wild animals. Humans would kill and eat everything that moves, just as bushmeat trade has decimated the wildlife in modern day Africa. A serious conflict makes invaders treat locals, who deny them food, with malice. The way desperate outlaws behave was clearly demonstrated in the hurricane disaster in New Orleans and is shown every day in today’s Somalia, Sudan or earlier in Rwanda and Burundi. Local conflicts over the lack of land and food are the reason for the ongoing tribal fights and disintegration of states.

It may transpire that our current prosperity has only been an interlude, a lucky detour largely caused by the massive food and energy advances that fossil fuels have provided for our civilisation. A dramatic decline in human population is clearly the most probable outcome of the growing global temperatures in the direction of five degrees.

An even worse scenario is yet to come – a 6 °C increase in global temperature, which would put humankind at the risk of an apocalypse.

9.1.6 6 °C Increase in Global Temperature

There are only a few indications of what would happen if the global temperature rose by 6 °C. The last time the Earth witnessed a similar climate was at the end of the Mesozoic era, during the Cretaceous period 144 to 65 million years ago. Flowering plants were only beginning to evolve, and the world was mostly covered by fern, cycas, and coniferous trees.

The giant supercontinent Pangaea was ripping apart in the middle. South America and Africa were separating and the young Atlantic Ocean was no wider than today's Mediterranean Sea. As tectonic plates travelled several millimetres a year, the planet shook with massive volcano eruptions. The sea level was 200 metres higher than today. With the higher water levels, only 80% of present-day landmass was existent. The world was flatter because mountains form when tectonic plates collide, and in the Cretaceous period the continents were still in the process of tearing apart. India was then in the southern hemisphere and the Himalayan Mts. were still non-existent. Compared to today the temperatures were 10 to 15 °C higher. Freezing temperatures were rare or absent even on the edge of the Arctic Ocean. Northeast Siberia enjoyed current Mediterranean temperatures all year round, despite the two-month period of polar nights.

Thanks to the warmer oceans, hurricanes were much more intense and wilder than today. The more intense hydrologic cycle introduced higher rainfall in places. Inland North America had a tropical climate with rainfall of 4,000 mm a year. The tropical Atlantic would be as warm as 42 °C.

The broad humid belt around the equator experienced the heaviest rain and the most violent storms. The much wider dry zone that held the remaining tropical and subtropical regions, including all of Africa, South America, the south of the United States and Europe, was inhabited solely by xerophilous vegetation and animals.

In polar territories, the humid and moderate climate facilitated the growth of woods in both hemispheres – forests flourished in Siberia as well as in the Antarctic Peninsula. Evergreen forests perhaps even covered the South Pole (where they would, however, spend nearly half a year in polar night). At the North Pole, ocean temperatures were a pleasant 20 °C.

Estimates say that the CO₂ rates were about three to six-fold of present levels. Most of this excess CO₂ was volcanic. Life on Earth spent millions of years striving to remove the perilous levels of CO₂ from the ancient atmosphere. A major share of the carbon absorbed and stored by plants is the exact same substance that people today are sending back into the air by burning fossil fuels. We are releasing carbon dioxide about a million times faster than the rate at which Cretaceous organisms could absorb and deposit it. The Cretaceous ecosystems were able to adapt as they had a very long time in which to do so. The current plant and animal species are acclimated to cooler conditions and would simply not have enough time to adapt. They would start dying out on a massive scale.

Extinction peaked at the end of the Paleozoic, the Permian Period. Mighty volcanic eruptions resulted in sudden climate change. Temperatures rose by six degrees or possibly even more, and 95 % of all plant and animal species died out. This change took place over roughly 10,000 years, perhaps even less. Deserts at that time spread to the 45th parallel north, and at places up to the 60th parallel, close to the Arctic Circle.

Warmer seas hold less dissolved oxygen, and so oxygen-breathing sea life, from plankton to sharks, were facing suffocation. As warm water expanded, Permian sea levels rose by 20 metres. New shallow seas with extremely hot water came into existence. The warm water in the oceans gave rise to incredibly wild hurricanes – superhurricanes.

In a six degree world, sea water would gradually heat all the way to the bottom and start releasing methane hydrate. This would trigger another turbulent bout of global warming. The released methane would rush to the surface and shoot hundreds of metres into the air. A similar event took place in Lake Nyos, Cameroon, in 1986. Due to volcanic activity, carbon dioxide is continuously released there. On 12 August, 1986 the gas exploded, creating a 120 metre high fountain of gas and water and emitting a deadly CO₂ cloud, which suffocated 1,700 people who lived nearby. A methane cloud would behave similarly, with the exception that methane is flammable. Methane concentrations of as little as 5% can flare up, for example if hit by a spark. The destructive force of such eruptions would surpass the deadliest modern combat weapons. That would start an extremely rapid mass extinction of species. It is estimated that this would liberate energy equivalent to about 10⁸ megatons of TNT, which is 10,000 times the world's stockpile of nuclear weapons.

Particularly in warm seas, rotting dead plants and animals would release great amounts of hydrogen sulphide, a compound of which even a small amount is poisonous. This would finish off the remaining animals on land. Similarly, sulphur would also destroy sea life or all life forms that breathe oxygen. Additionally, the hydrogen sulphide cloud would set upon and eliminate the ozone layer, exposing the Earth to the dangerous ultraviolet radiation from the Sun. That would set off DNA mutations. Disfigured spores from the Permian Period were found in eastern Greenland, indicating that the plants that had survived could have had their DNA damaged by the long-term effects of ultraviolet radiation. After the mass extinction in the Permian Period, 50 million years passed before the planet fully restored its diversity of species.

A combination of a 6 °C higher global temperature, oceanic methane eruptions, hydrogen sulphide release, and a destroyed ozone layer would make the Earth a hell that would kill billions of humans.

But even in such a world some humans (small scattered groups of people) would perhaps manage to survive. Unlike animals, humans are endowed with a unique combination of intelligence and a strong survival instinct.

It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is most adaptable to change.

Charles Darwin

The future is not what it used to be.

Paul Valéry

10 PERFECT STORM

No one is able to predict what kind of man will be born out of this development.

Antoine de Saint-Exupéry

The current news headlines report on New York, Tokyo or Berlin. In reality, the actual image of what the world has in store for us is being painted somewhere completely different.

Robert D. Kaplan

Climate change is now considered the greatest danger to humankind, which could, over the next decades and centuries, transform civilization and reduce the global population. The side-effects of climate change have probably already arrived – one temperature record broken after another; floods, hurricanes, and other manifestations of atmospheric turbulence striking in unprecedented numbers and intensity.

However, climate change is far from being the only factor that poses a threat to human society. While we no longer need to worry about the imminent danger of global atomic war, there is no knowing what North Korea, a country in possession of nuclear weapons, may do. Similarly unpredictable, the Iranian government may want to make history by attacking Israel in an attempt to wipe it off the map. Alternatively, if Israel evaluates the threat to be sufficiently serious, it may strike first. The next candidates to potentially employ a nuclear weapon are Pakistan and India, in connection with the Kashmir Conflict; for the time being it seems that both countries are sensible enough to stay away from nuclear weapons.

Aside from nuclear conflict, “conventional” terrorism alone is enough to destabilize or even disintegrate the rich western society. Today, terrorism primarily means Islamic terrorism. We can repeat a thousand times that Islamic radicals make up not more than one percent of the Muslim population. Unfortunately, roughly half of terrorist attacks around the world are connected to Islam. Similarly, in his book *Clash of Civilisations*, Samuel Huntington, former head of Harvard’s Olin Institute for Strategic Studies, said that “Islam has bloody borders” (Huntington 1996). This phrase is also extreme, and unfair to Islam, but at the same time it highlights a serious issue that is disastrous for many regions.

In his contribution *Big Ben: Real Holocaust and Stale Souls*, Benjamin Kuras (2012) observes that Islamist demonstrations in Western cities often use slogans of “Be prepared for the real Holocaust”, “Islam will dominate the world” or “Kill the Jews in the name of peace”. Although racial and religious hate is a crime, it seems that in some cases it goes unpunished. One day we might regret this. In many Islamic countries Christians are discriminated against and persecuted – for example in Iraq, Egypt, northern Nigeria, Mali, and northern Sudan. Up to 100 million Christians are estimated to be facing Islamic oppression. Western civilization, which is built on the Christian tradition (but has renounced Christianity to a large degree), pretends not to see or hear, as if it was of no concern. Sharia4Belgium, a Brussels-based jihadist group, is already telling Belgians to move away if Islam is not their cup of tea. It is loud-mouthed gibberish now, but by 2050, many European countries, including France and Germany, will be 25 to 30 % Muslim.

Another factor that could be a threat to Western civilization and the rest of the world is the concept of peak oil, that is, a lack of oil and subsequently other fossil fuels. Demand will continue to grow but supply will stagnate, or even start falling. Oil production in the United States peaked in 1970, and today the country imports oil from the Near East to the value of 700 billion dollars per year. Global peak oil would be a problem because prices would soar. While some think that global peak oil has already begun, even the greatest optimists set it at around 2035, which is not far away.

Besides increasing the price of gas in the tank, peak oil would also precipitate other problems. For example, food production is “subsidized” with fossil fuels. We invest more energy in producing crops than the harvest returns. Once oil prices begin to grow, food costs will soar too. This will severely impact poor inhabitants of developing countries. In sub-Saharan Africa, countries and transnational corporations are buying tens of thousands of square kilometres of land from corrupted governments in order to produce bio fuels or food for their own citizens. Land grabbing prevents local people from securing their own livelihood. A typical example is the Sudan government, which has leased out 1.5 million hectares of its land for 99 years, all this while international humanitarian and development organizations supply Sudan every year with food for 5.6 million starving inhabitants.

Peak oil and land grabbing could thus cause millions of people to starve, which would result in mass migration. We could list several series of causes and effects similar to this one, and they would all be logical. Predicting if they will ever take place, which these will be and when is, however, beyond us, at least for the time being. What we should fear most now is probably a perfect storm. You can deal with problems one by one, but when they cumulate all at once, the outcome is synergetic. Instead of adding up, their effects multiply. This all creates the effect of a perfect storm that pulls everything under.

The trigger could be something seemingly inconsequential. Chaos theory refers to this as the butterfly effect. Figuratively speaking, the flapping wings of a butterfly in a Malaysian rainforest can affect the weather on the other side of the planet. Nobody had expected that the assassination of Archduke Franz Ferdinand d'Este, successor to the Austrian-Hungarian throne, in Sarajevo in June 1914 would lead to World War I, which claimed the lives of 15 million people. No one would have ever imagined that “interior decorator” and corporal in WWI, Adolf Hitler, would not only instigate the Second World War but strive for the “final solution to the Jewish question” and have six million Jews murdered in concentration camps.

For a long time, ordinary people were unaware of what was going on. Some of them perhaps did not want to know; others could not believe it. Therefore in the future, even small and unexpected events, and inconspicuous beginnings, can give rise to something awful that like an avalanche that destroys everything in its path.

The best way to halt cancerous growth is to identify the danger in time and perform surgery. Along the same lines, it is best to prevent an avalanche promptly. Once an avalanche starts rolling, things happen very swiftly, and the faster the start, the more energy and power it acquires.

This is what warnings are for – highlight a danger, help promote a preventive action, and thus contribute to averting the worst. Futurologists refer to this as “self-destructive prophecy”. Authors of prophecies are happiest if their prognosis fails because then they hope they have helped a little to avert the danger.

When you stop falling you will be in heaven, but when you stop getting up, you will be in Hell.

David Torkington

We are all afraid – for our confidence, for the future, for the world. That is the nature of human imagination. Yet every man, every civilization, has gone forward because of its engagement with what it has set itself to do.

Jacob Bronowski

11 FROM REGENERATION TO TRANSFORMATION

Give me the strength to bear humbly what I have no power to change, the courage to change what I can in this world, and common sense that will always be able to tell what cannot be changed and what can.

Jan Skácel

Having read the preceding excerpt from Mark Lynas' *Six Degrees*, you might have thought that a world 4 to 6 degrees warmer than today would not be a suitable place to live and that the accompanying catastrophes would become apocalyptic. Let us try to see it as a "self-destructive prophecy". Mark Lynas wrote his book to warn us, to prevent the catastrophic scenarios from materializing.

Based on our current knowledge the universe was formed 13.7 billion years, the Earth 4.6 billion years ago. 3.85 billion years ago, abiotic evolution (evolution of the inanimate universe) developed into biological evolution, and the first "transgression" takes place. Life could have, of course, developed earlier in the universe, and it is in fact quite probable, but so far, we have not found any evidence of extraterrestrial life.

About forty thousand years ago, thanks to humankind, biological evolution transformed into cultural evolution. The second transgression happens through man, giving rise to, as Josef Svoboda (1997) put it, the homosphere.¹⁸ Humans quickly learn to make, use, and improve tools, make use of fire, and domesticate animals. Agriculture, architecture, writing, and philosophy flourish. Lately, the world has seen an incredibly rapid advance of science and technologies, information processing, and communication. According to Josef Svoboda, we are approaching the third transgression, where the homosphere will transform into the omegasphere.

Humans are learning to manage and control the biosphere; they will develop their biological-sociological self-organization from the local level all the way up to the global level; they will increasingly interfere with and control the process of evolution. It is possible that human nature¹⁹ will gradually change and our reality will start unifying. In other words, the entire

¹⁸ Homosphere is defined by the presence of humans and the scope of their influence.

¹⁹ This means that one day, the human mind could prevail over mass, the spiritual over the physical world.

physical universe, first formed then subsequently endowed with life, will become spiritualized through man.

Josef Svoboda and, with slight variations, other scientists, believe that this is the point and final purpose of the long process of transformations from the mineral (inorganic) Alpha sphere (sphere of the inanimate physical world) through the biosphere (animate world) to the sphere of spiritualization and the pure spirit of Omega.

For Teilhard de Chardin, reaching the Omega Point was the ultimate goal of universal evolution (Svoboda, Nováček, 2002). The whole universal process is described in the following images.

Figure 18: The three historical transgressions (developmental transitions of the world, including humankind) (adapted from Svoboda, 2006)

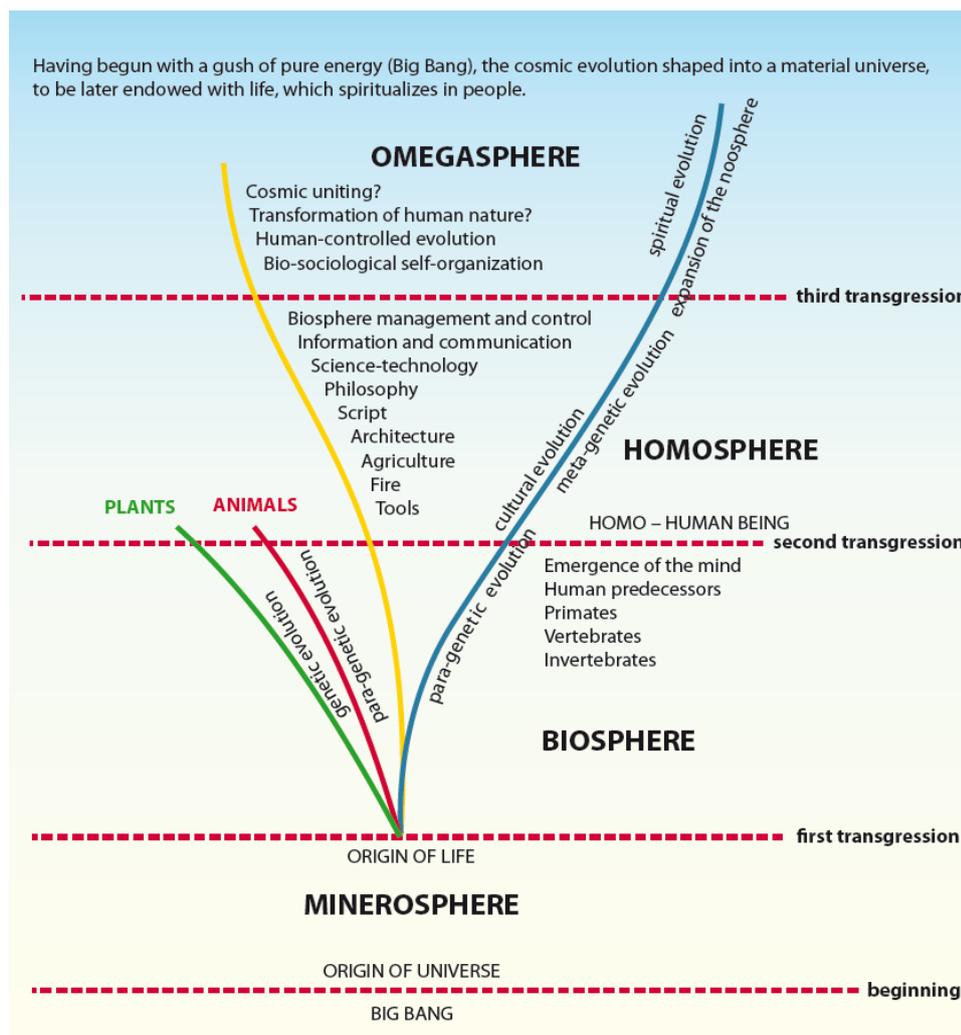
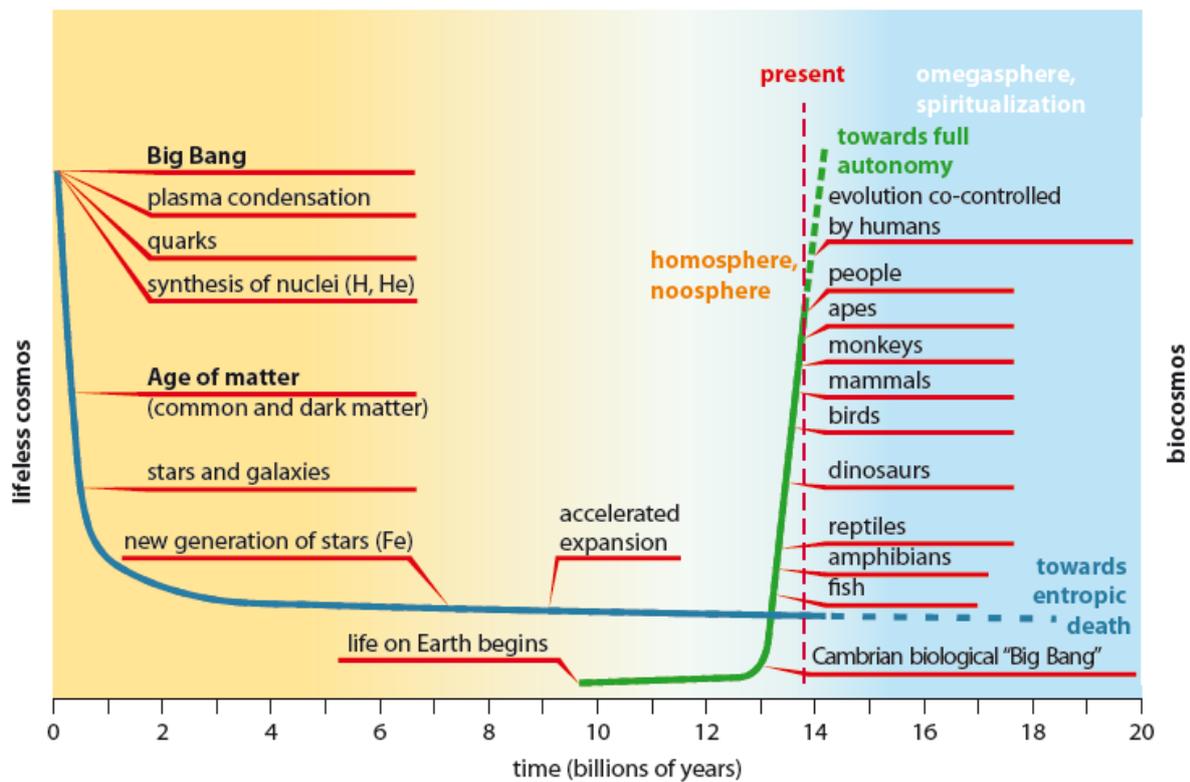


Figure 19: Self-organization in the universe (adapted from Svoboda, 2006)



What are the limits to human knowledge and use (and potentially abuse) of the surrounding world in the future? Infinite, it seems; as unbelievable as it may sound today, the whole universe as we know it could open itself to humans. We landed on the Moon, send unmanned probes to Mars and Venus; but what about the entire universe, with billions of its galaxies and with billions of stars in each galaxy?

Only five hundred years ago, Christopher Columbus could not have expected that one day anyone would be able to make the trip from Europe to America within a few hours, and that news would be broadcasted live, as it happens.

Michio Kaku (2010), a famed physicist who popularizes science, notes that physicists today understand the basic laws of physics extending over a staggering 43 orders of magnitude, from the interior of the proton out to the expanding universe. Thanks to that we are better able to differentiate between the achievements of future technology that are unlikely but possible, and those that are, at least from the perspective of current knowledge, truly impossible.

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.

Arthur C. Clarke

The “truly impossible” means impossible in accordance with established physical laws that, apparently, apply the same throughout the known universe. In his book *Physics of the Impossible*, Michio Kaku distinguishes three categories of the “impossible”:

– *Class I impossibilities*

Technologies in this category are unavailable today, but as they do not violate the known laws of physics, they could become available in some limited form in this century or the next. Examples would include teleportation, antimatter engines, certain forms of telepathy, psychokinesis, and invisibility.

– *Class II impossibilities*

These include technologies that are at the very edge of our understanding of the physical world. They could be developed in thousands or millions of years, provided they are feasible at all.

Examples include time machines, hyperspace travel, and travel through wormholes²⁰.

– *Class III impossibilities*

These are technologies that violate the known laws of physics. If these proved to be possible, it would mean a major shift in our understanding of physics.

Examples include perpetual motion machines and precognition.

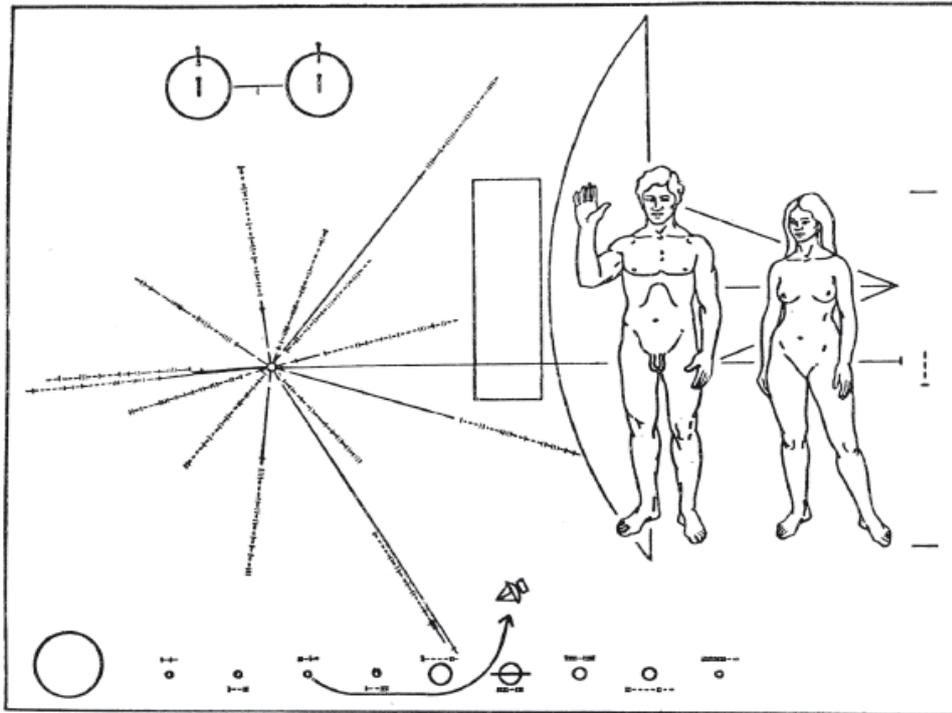
From the physics perspective, the “paranormal” phenomena that we know, such as telepathy and psychokinesis, are possible. Maybe one day we will be able to use thermal nuclear fusion, which will provide enough safe energy for a long time. Thanks to nanotechnologies, we will be able to operate with mass on the atomic level and build objects on the nuclear level. We could then manufacture “anything from anything”, without producing any waste. It is within our potential power to learn to use “paranormal abilities” and create wonders that border on

²⁰ In physics, a wormhole is a hypothetical object enabled by the ability of spacetime to create a "shortcut" through space and time.

miracles (not miracles themselves, though, as these go beyond the known physical laws and are therefore “from another world”). We will perhaps be able to travel through space to distances and at speeds that no one could even dream of today.

Fig. 20: The first “letter” for other cosmic civilizations, taken to space by the Pioneer 10 probe in 1972

(adapted from Pacner, 1976)



Similarly incredible breakthroughs are expected in the biological sciences. The first signs of “controlled evolution” are already here – artificial insemination, gene transfer, eugenic manipulations²¹, transhumanism²². While these possibilities are fascinating, the risk of misuse and of the consequences of such misuse is increasing accordingly.

The rational, scientific view historically tends to focus more on opportunities and less on dangers. It is natural to see oneself in the best light and to ignore the risks.

It is quite possible that science will help us become immortal or at least come close. We are already able to “mend” our bodies and significantly extend life expectancy. Human beings are in fact turning into cyborgs, a symbiosis of the human body and technology. We will likely

²¹ Eugenics is a social and philosophical discipline studying methods that aim to achieve the best human gene quality possible.

²² Transhumanism is a movement that supports the use of new scientific discoveries and technologies to improve human mental and physical capacities on one hand, and on the other to eliminate adverse phenomena, such as diseases, ageing and death.

merge with computers more and more, and our brain could become connected to a chip implanted in our heads, which would allow, for example, immediate access to any information available in cyberspace. Over time, we may be able to leave our biological bodies and live as pure consciousness in cyberspace, or find or build a new body. This is far from certain, though, because consciousness still remains a mystery to us. It cannot be measured, weighed, experimentally probed, even though we all agree that consciousness exists.

12 CONCLUSION

Nothing is more powerful than an idea whose time has come.

Victor Hugo

The future ahead of us is open, and thanks to our free will, also susceptible to human influence. Even now we have the capacity to destroy ourselves (through, for example, a global nuclear war or by initiating climate change of such scope and intensity that there will be no way back). The path to the Omega Point is, alas, full of obstacles, and probably also catastrophes, the strength of which depends largely on us. We still have two roads before us: evolution or revolution, transformation or a series of disasters of possibly apocalyptic dimensions.

Science looks to our future on the Earth with optimism, while religion is more pessimistic, because it knows well how tricky human nature and hearts are.

Religion (Christianity and Judaism) is more optimistic in terms of how the human story will unravel in the end, since those who find salvation will be offered entry to a new dimension, a new quality of life, where the human heart will become pure again in preparation for a direct and personal encounter with the Creator. Science cannot respond similarly, as then it would no longer be science but faith.

Owing to his foresight, Noah ensured humankind continues to live on the earth. He was God's obedient child, who did not ask many questions and simply fulfilled his parent's wishes. The Titanic is more of a picture of teenaged humanity. On account of science and technology we want to build a new beautiful world, a "paradise on Earth", where there will be no need for God anymore, actually he will be in the way, worrying us with his ethical demands. We simply want to establish rules ourselves. Friedrich Nietzsche says that "God is dead", but we will go under unless we have a reliable pilot. The fate of the Titanic and the entire twentieth century are convincing evidence.

Nothing is lost, however. Parents, too, love their teenagers and have patience with them, despite the fact that sometimes they would rather clip them around the ears instead. The teenage years of an individual and of humankind are extremely important. It is a dangerous

but also crucial period of time that largely decides what the adulthood will be like. With a bit of effort and luck, teenaged rascals will grow into responsible people who respect their parents even if they may be physically stronger. Instead of misusing their strength, they help out when necessary. Human community could follow a similar path – we can grow into adulthood and responsibility, or our pride and fascination with “freedom without limits” will lead us to one trouble after another. We need to behave and act with foresight, with regard to our future and the future of our children, so that we leave behind a habitable world in which they can live their story.

We will probably have to build, figuratively speaking, a new ark in the future, and quite probably more than once. Our journey on Earth, of us as individuals and of the entire human race, will be directed towards its fulfilment. There is no guarantee of a happy ending, but the chances are good.

Perhaps major changes will come sooner than we think. It took the Cro-Magnon 30,000 years to think of the first plough. Then, less than 200 years after the invention of the steam engine, Apollo 11 landed a human crew on the Moon. It seems that through humans, evolution has seen an unbelievable acceleration. (Svoboda, 2006)

The whole universe as we know it was born “out of nowhere”. Both science and religion are in agreement on it. In the middle of 2012, scientists from the European Organization for Nuclear Research (CERN) reported that they had probably discovered a particle called the Higgs Boson. They believe that these particles exist in a field that penetrates the universe, and their interaction provides all the other particles with mass. Although it is hard to believe or imagine, the “magisterium of religion” and the “magisterium of science” appear to be in a much closer agreement on the origin of the universe.

The deeper we delve into the spirit and mass, the more we realize they overlap, and that at the deepest level of conscience this division dies, and the spirit and mass, the supernatural and the natural, are one.

Bede Griffiths

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