Technology and Psychology: the Hypothesis of Techno-Humanitarian Balance

Akop P. Nazaretyan
Institute of Oriental Studies, Moscow

This is a draft conference paper, not to be quoted without permission of the author
History is the progress of moral tasks. Not doings, but just the tasks, which mankind’s collective might puts before any certain person. The tasks were more and more difficult, almost impracticable; nonetheless, they have been fulfilled – otherwise, all should have fallen to pieces long ago.

G. Pomerants [1991]

“After the notion of progress was basically discredited, no one dared to ask what mattered for the history of humankind as a whole”, – said William McNeill in the interview to the newspaper “Historically Speaking” (Vol. IV, #2, Nov., 2002) on his and his son’s forthcoming book [McNeill & McNeill 2003]. Still, the authors indicated and welcomed the growing interest in global retrospection among both professional historians and the interdisciplinary scientific community.

In this article, we expound some results of cross-disciplinary research on the historical experience of anthropogenic crises carried out lately by Russian scientists. Insights from archeology, comparative history, social psychology, cultural anthropology, ecology and biology have been synthesized. A synergetic (chaos-theory) view of society as a sustainable non-equilibrium system and of culture as a complex anti-entropy mechanism served for data integration.

The research was mainly aimed at the practical tasks of ecological and geopolitical strategy, however its results acquired additional meaning in the context of my academic interest to Big (Universal) History [Christian 1991, 2004] [Spier 1996] [Nazaretyan, 1991, 2004, 2005-b]. Trying to discover common mechanisms and causal links, we noted certain regularities that may throw new light on two points thoroughly discussed in historical sociology. One is whether or not “panhuman history” may be reasonably construed; the other is whether or not there may be singled out anything like “laws of history”.

In chaos-theory terms, human history is the story of one “self-similar” system, which exists on a scale of a million or so years and has been successively transforming itself to maintain sustainability [Christian 1991]. Retrospective analytical procedures have shown at least five mainstreams of consecutive global transformations: increases of world population, of technological power, of organizational complexity, and of mental information capacity, and perfection of cultural regulation mechanisms.
The first three mainstretms are inferred as “empirical generalizations” that are easily illustrated with figures. The forth and the fifth ones require particular arguments [Nazaretyan 2004]. In the continuation, perfection of cultural regulation mechanisms in conformity with developing instrumental intelligence is argued.

The hypothesis of techno-humanitarian balance

Zoo-psychologists have gathered numerous evidence of what was called ethological balance: the more powerful species’ natural killing power, the stronger the inhibition of intra-species aggression. Summing up remarkable observations in his brilliant book ‘Aggression’, Lorenz [1981] noted that we ought to regret not having the ‘nature of the predator’. For had humans descended from lions instead of biologically harmless Australopithecus, he explained, we would have a much stronger aggression-retention instinct preventing warfare.

Meanwhile, comparative calculations have demonstrated that lions (and other strong predators), in ratio to their population number, kill each other more frequently than humans do [Wilson 1978].

This result looked sensational. First, it is true that lions, unlike humans, have a strong instinctive ban on killing conspecifics. Second, lions’ natural population density differs tremendously from that of human communities, whereas concentration usually increases aggression among both animals and humans. Third, ‘killing facilities’ are incomparable: the assaulting lion’s sharp teeth meet the enemy’s strong pelt, while mutual killing among humans who are armed if only with stones, is technically very easy, and since the Stone Age weapons’ ‘progress’ has been enormous.

Australian ethnographers received another interesting result having compared wars among aboriginals with World War II. Out of all participants, only the USSR lost more human lives in relation to population numbers than primitive tribes usually did [Blainey 1975].

According to our calculations, from 100 to 120 million people perished in all the international and civil wars of the 20th century. The numbers, which also involve indirect warfare victims, are monstrous. Still, they represent about 1% of the century’s planet population (no less than 10, 5 billions in the three generations). Approximately a similar ratio occurred in the 19th century (about 35 million war victims to 3 billion
population), and probably, in the 18\textsuperscript{th} century, while in the 14\textsuperscript{th} to 17\textsuperscript{th} centuries the ratio had been higher.

Contradictory data and lack of co-ordinate calculation procedures [Wright 1944] [Urlanis 1994] make comparative inquiry rather difficult. Nonetheless, general estimates reveal a paradoxical fact. While weapons’ killing power and people’s concentration have been successively growing for millennia, war victims’ ratio has not.

Besides wars, a total amount of victims includes people perished in ‘peaceful’ political repressions, and everyday violence, so that in the 20\textsuperscript{th} century, up to 5\% of world population seems to have died in the acts of \textit{deliberate} violence [Social violence 2005]. The decreasing trend is more manifest when non-war violence victims are compared. To calculate them retrospectively is even more difficult, but as far as the orders of magnitude are concerned, we may resort to the indirect evidence.

Wars, repressions, and everyday violence carried away approximately similar numbers of human lives in the 20\textsuperscript{th} century. Meanwhile, the proportion of non-war violence victims to the warfare ones had been different in the past. We may see the difference distinctly having compared remote epochs of cultural history.

Thus, Diamond [1999: 277] summarized his own field observations and critically revised information of his colleagues: “Much more extensive long-term information about band and tribal societies reveals that murder is a leading cause of death”. This conclusion apparently considers the total sum of infanticide, geronticide, inter-tribe, and inner conflicts, hunting for heads, etc.

A contrasting combination of the long-term trends – the violent death rate irregular decrease in the context of a successively increasing potential for mutual destruction and population densities – implies an additional assumption: there should have been a certain cultural factor which compensated for the growth of instrumental capacities. The factor’s dynamics are better shown as we supplement global comparisons with regional ones (see below). As to its essence, it is described by a hypothesis that arises from quite different empirical data; in fact, our calculations are conducted to check a corollary of the hypothesis.

Summing up diverse information from cultural anthropology, history, and historical psychology concerning anthropogenic crises we suggested that there was a regular relation between the three variables: technological potential, cultural regulation quality, and social sustainability. The pattern called the law of techno-humanitarian balance, states that the higher production and war technologies’
power, the more advanced the behavior-regulation means that is required for self-preservation of the society.

The circumstances of early hominids’ existence were of the kind that only a dramatic development of instrumental intelligence gave them a chance to survive [History... 1983]. Meantime, having begun tool making, they dramatically interfered with the ethological balance. The power of artificial weapons rapidly exceeded the power of instinctive aggression-inhibition, and the proportion of mortal conflicts within the herd grew incompatible with its further existence. This could have been the main reason for a fact demonstrated in archeology [Klix 1983]: many groups seem to be on the line between animals and proto-humans, but very few could cross it; those few groups managed to cope with the endogenous danger.

Indeed, individuals with normal animal motivation were doomed to mutual destruction in the new unnatural conditions, and certain psychostenic and hysterical individuals got selective privileges. Their survival required artificial (beyond biological instincts) collective regulation, which was paradoxically provided by pathological changes of the psycho-nervous system, abnormal mental lability, suggestibility, and phobias. Thus, irrational fear of the deceased and posthumous revenge is supposed to strongly restrain in-group aggression and stimulate care for cripples that could play a key role at the earliest stage of anthropogenesis.

The assumption of a “herd of crazies” who seem to be our remote ancestors, has been thoroughly argued by neurologists, cultural anthropologists and psychologists [Davydenkov 1947] [Pfeiffer 1985] [Grimak 2001] [Nazaretyan 2005-a]. Here, the relevant point is that the initial forms of proto-culture and proto-morals emerged as an outcome of the first existential crisis in human prehistory.

From *Homo habilis* on, hominids’ unnatural intra-species killing facility seems to have been a key problem of pre-human and human history: the ways of solving this existential problem influenced essentially the forms of social organization, cultural, and spiritual processes. As far as further life of *hominidae* family (including *Homo sapiens*) has not had a natural background any longer, it was to a great extent enabled by the adequacy of cultural regulation with technological power. The law of techno-humanitarian balance has controlled socio-historical selection, discarding social organisms that could not adapt to their tools’ power. We shall demonstrate that the pattern helps explain causally both sudden collapses of flourishing societies, and break-
throughs of humanity into new historical epochs (which often look still more mysterious).

Although the pattern is based on voluminous empirical evidence, its universal character remains hypothetical. Besides violence victims’ comparative calculations, there are some additional non-trivial corollaries under verification. Furthermore, a special apparatus is being constructed, which will, as we expect, allow estimating social organisms’ sustainability as much as it depends on technological potential and cultural regulation.

For an initial and rough guide, internal and external sustainability are distinguished. The former, Si, expresses the social system’s capability to keep away from endogenous catastrophes, and is estimated as the ratio of catastrophes per population number. The latter, Se, is the society’s capability to withstand the natural and/or geopolitical environment’s fluctuations.

If we letter cultural regulation quality as R, and technological potential as T, a simple equation represents the techno-humanitarian balance pattern:

\[ Si = f_1 (R) / f_2 (T) \]

It goes without saying that T > 0, for in case of no technology at all we have to do with a herd (not a society), where biological causalities are effective. When technological potential is very low, primitive cultural regulation means are sufficient to prevent anthropogenic crises, as in the case of the Paleolithic tribes. A system is highly sustainable, up to stagnation, as cultural regulation quality considerably exceeds technological might (Confucian China is a textbook example). Finally, the denominator growth increases the probability of anthropogenic crises, as it is not compensated by growth of the numerator.

Actually, the indices’ structure, the methods of quantitative estimation and the definition of functions f1 and f2 are under consideration. Thus, the magnitude of R is composed of at least three parameters: the social organization’s complexity, the culture’s information complexity (anthropologists work over calculation procedures for these indices [Chick 1997]), and the average individual’s cognitive complexity (the parameter is investigated by experimental psycho-semantics [Petrenko & Mitina 1997]). The last component is the most dynamic one, and we will show that the decline of cognitive complexity under emotional impulse is the leading reason of crisis-
causing behavior. In contrast to internal sustainability, the external one is the technological potential’s positive function:

\[ Se = g(T...) \]

Thus, growing technological potential makes a social system less vulnerable to external fluctuations, and more vulnerable to the internal ones, i.e. mass and individual mental states (less “fool-proof”).

One more conclusion is that the specific weight of anthropogenic crises versus the ones caused by outside factors (spontaneous climate fluctuations, geological and cosmic cataclysms, incoming aggressive nomads, and so on) has been historically increasing.

**The consequences of techno-humanitarian imbalance**

Ethnographic papers are full of sad stories about the aboriginals of Africa, Asia, and America, as soon as they first mastered European technologies, like the following. During the Vietnamese war, a Paleolithic *Mountain Khmer* tribe obtained American carbines. The hunters mastered the new weapon, and soon after that, exterminated the fauna, shot each other down, and those who survived, left the mountains and disappeared [Pegov & Puzachenko 1994].

In such cases, the processes were accelerated, and causes and effects were apparent, because the society had skipped over several historical phases, and left a deep gap between firearm and Stone Age psychology. Similar leaps do not usually occur in authentic history; therefore the disproportion between ‘instrumental’ and ‘humanitarian’ intelligence development (the ‘force’ and the ‘wisdom’) is not that manifest. So, causal links are complex, delayed for centuries or, in early history, for millennia. To be revealed, the same causalities require a thorough analysis supplied with an appropriate working model.

To explain the model, we may first resort to a classic experiment in a Petrie dish. Several bacteria impetuously propagate themselves in the closed vessel with a nutrient medium, and soon, the population suffocates in its own wastes. This is a graphic image of living matter’s behavior: as long as the capacity of extensive growth prevails over habitat’s resistance, the population keeps on capturing available vital space, and repressing as much as it can any counteraction or competition. For this reason, a natural ecosystem is full of ecological micro-crisis.
In natural conditions, the aggravations are usually regulated via dynamic equilibration mechanisms, which have been developed for billions of years. Strategically, the processes of breaking and restoring an inner balance lead to ecosystems’ increasing variety and joint sustainability, which go together with the highly irregular conditions of each population’s existence (oscillations in ‘predator – prey’ circuit, etc.).

Culture, in both its material and regulative hypostases, has been always aimed at emancipation from spontaneous environmental fluctuations. Social communities, unlike animal populations, do not behave so rectilinearly as the bacteria colony in a Petrie dish does, until cultural restraints substitute for the environment’s resistance. Meanwhile, a broken balance between grown technological opportunities and former regulation mechanisms can change the situation radically. According to formula /II/, it decreases internal social sustainability, but the approaching menace is not noticed right away.

On the contrary, the superiority of instrumental intelligence entails the rise of ecological and/or geopolitical aggression. Insufficiency of cultural restraints makes the society’s behavior essentially similar to that of a biological population, especially as natural expansion impulses are supplemented with a specifically human factor: needs go higher as soon as they are satisfied.

The psychological aspect is given more detailed analysis in the following section. We must just note here that sooner or later, extensive growth runs against real limits, which leads to anthropogenic crisis. Most frequently, it is followed by the catastrophic phase: the society falls victim to its own non-compensated power.

Special investigations show that most tribes, states, or civilizations in the past were destroyed not so much by external factors (such cases also took place, but they are less interesting for our subject), as they had subverted the natural and organizational bases of their own existence. As to military interventions, epidemics, ecological cataclysms, riots, and so on, events of that kind usually accomplished the society’s self-destroying activity, like a virus or cancer cells do a similar job in a weakened biological organism.

Numerous facts gathered in relevant papers [Grigoriev 1991] [Global... 2002] testify to the distressing destiny of the societies that could not anticipate the delayed consequences of their economic activities. In spite of all peculiarities, a common script
was simple: increasing intervention into the ecosystem → landscape destruction → social catastrophe.

As many researchers have indicated, empires’ destruction frequently followed their flourishing, if increasing inner diversity did not accompany their extensive growth. Toynbee [1991] cited various examples to illustrate the inverse relationship between “military and social progress” and was puzzled by the fact that this was surprisingly true about production tools as well as weapons. As we observe agricultural technique development in Hellenistic history, he writes, we realize that new technical achievements preceded civilization’s decline. On the whole, increasing power over nature most frequently caused “fracture and decomposition”.

The facts of the social system’s fracture conditioned by technological growth are so numerous that they serve as a pretext, on the one hand, for total technological pessimism and, on the other, for denial of a common humanity’s history. The patterns of closed civilization cycles deprived of continuity started to supplant the ones of single historical process in the late 19th, early 20th centuries. The discussion of those problems has resurfaced lately in relevant literature. To a considerable extent, it centers on the psychological aspect: has or has not human consciousness been transforming historically, and if it has, were or were not those transformations ‘progressive’?

In particular, Kohlberg’s [1984] idea of correlation between humankind’s intellectual and moral development is still a subject of criticism, even by the adherents of social evolutionism [Sanderson 1994].

Nowadays, the idea gets new empirical and conceptual support. The technohumanitarian balance hypothesis highlights both the facts of a social system’s self-destruction and the opposite ones, concerning the constructive solution of anthropogenic crises. The latter have been less frequent in history; however, they were world history’s turning points.

Namely, as a certain crisis involved a vast region highly saturated with diverse cultures, its inhabitants managed to find a cardinal way out of the deadlock. Each time it was conditioned by a set of irreversible social, political, and psychological transformations (see below), which have been lined up as the consecutive evolution mainstreams. As special analysis shows, society’s capacity for appropriate transformation of its economy, policy and mentality essentially depended on marginal groups, which had been formerly neglected and despised; this we called the redundant variety rule.
No less than seven crucial breakthroughs for all of human history and prehistory have been revealed and described. Still, most researchers have so far either confined themselves to phenomenology or left the problem of revolutionary transformation causes and premises for the future. Thus, Jaspers [1955] has adduced “the simultaneity puzzle”: how could the Axial Revolution occur simultaneously on the immense geographical area from Judea, Persia, and Greece to India and China?

The techno-humanitarian balance hypothesis proves helpful for causal scrutiny of great historical turning points, each of which had been preceded by a wide-scale anthropogenic crisis. Human consciousness has progressively evolved, restoring step-by-step the disturbed cultural balance. So more curious is the fact we find out as we make a close study of social activities foregoing crises aggravation: pre-crisis extensive growth phases are attended by psychological states, processes, and mechanisms, which have astonishingly reproduced themselves regardless of the population’s cultural and historical peculiarities. That is why a coming crisis may be diagnosed by psychological symptoms while economic, political, and other signs still indicate growing social prosperity.

**Mental conditions on the threshold of crises**

To begin this section, I consider selected historical episodes that belong to a kind of ‘optimistic tragedies’. This will help us observe some specific psychological features of both the pre-crisis state of culture and minds and the one after having coped with the most dangerous aggravations. I should make a reservation that only the inner logic of the processes is considered; this approach does not deny the influence of outside factors, up to cosmic ones, on social events, but abstracts from it.

Apparently, in order to describe those episodes as single separate stories we have to single them out of the continual historical process; for this reason, the conventional beginning and end of each are distinct by means of dots.

…Upper Paleolithic millennia were marked with an unprecedented development of “hunting automation” and distant projectiles. Hunters learned to dig trap-holes, and invented the lance, lance-thrower, darts, and bow with arrows [History... 1983] [Semionov 1964]. This created good conditions for demographic growth and
human expansion all over the planet. World population reached 5-7 million people [McEvedy & Jones 1978] [Snooks 1996]. As one hunter-gatherer’s nourishment required an average territory of 10 – 20 square km, the planet’s resources could not provide for many more people.

However, not only demographic growth created the problem (growth by itself is usually a function of a disturbed technology-psychology balance): archeologists reveal the Upper Paleolithic hunting bacchanalia. While natural predators first get sick and weakened individuals, a well-armed hunter had the opportunity (and desire) to kill the strongest and the nicest ones, and besides, the amount of preys far exceeded the hunters’ biological needs. Some kind of wild animals’ “anthropogenic graveyards” were discovered by the archeologists, and a great part of the meat had not been used by humans [Budyko 1984] [Burovski 1998] [Anikovich 1999]. The dwellings made of mammoth’s bones exceeded construction needs. In Siberia, 30-40 adult mammoths’ bones were spent on each dwelling, plus a lot of newly-born mammoths’ skulls, which were used as props and, perhaps, for ritual aims. In Northwest Russia, pit-stores of mammoths’ bones (their predestination is not quite clear) have been found near some dwellings. Enclosure hunting led to annual extermination of herds.

Since the fact was discovered that the last mammoths lived on Wrangell Island about 4000 years ago, until the first humans appeared there [Vartanian et al. 1995], the “overkill” theory of mammoths’ and many other big mammals’ extinction hardly has an alternative. The first symptoms of mega-fauna elimination are registered near 50000 years ago in Africa, and the process peaked near 20000 years ago in Eurasia, and near 11000 years ago in America [Karlen 2001]. Skillful hunters penetrated into America, quickly spread from Alaska to Tierra del Fuego, and eradicated all big animals, including elephants and camels, which had never before met hominids. Similar effects of mega-fauna extinction followed the first humans’ appearance in Oceania and Australia [Budyko 1984] [Diamond 1999]. In total, up to 90% big animals disappeared for ever, although those species had endured twenty Pleistocene climatic cycles.

The trend of merciless extermination was intensified on the threshold of the coming Holocene, the post-glacial epoch, which could have helped foraging economies flourish; instead, it led to a deadlock. Nature could not bear endless pressure on the part of such an unrestrained aggressor as the Upper Paleolithic hunter. Uncontrolled resource exploitation led to the ecosystems’ exhaustion and destruction, and it
aggravated inter-tribe competition. The Middle latitudes’ population decreased several times.

The Neolithic revolution was society’s creative response to the Upper Paleolithic crisis: some tribes made the transition to settled agriculture and cattle breeding, and the new economic idea rapidly spread from several centers (in Eurasia, and later in America). Humans first started “partnership with the nature” [Childe 1945]; their ecological niche essentially deepened. Thanks to developing agriculture, the territories’ carrying capacity increased one, then two, and then three orders of magnitude [Korotaev 1991], and the population rapidly grew.

Complex transformations in social relations and psychology attended the transition from a foraging economy to food production. One needs a relevant mental horizon of delayed causalities to throw into earth eatable grains, or to feed and protect animals instead of killing and eating them. The mind’s grown information volume was embodied in all vital activities. Social links and role repertory essentially broadened. Production and combat tools were first differentiated, and a new kind of relationship between agricultural and “warrior” tribes was established. The warriors could guess that it was more profitable to protect the producers, and regularly appropriate production “surplus”, than to kill or to drive them away, and the farmers understood it was better to pay off the warriors for protection than to leave the land or to perish in hopeless battles.

Such forms of inter-tribe symbiosis and “collective exploitation” supplanted genocide and cannibalism of the Paleolithic. As Telhard de Chardin [1965] notes, since the Neolithic, physical extermination has been an exclusive or, anyhow, secondary factor: the cruelest warfare still included some form of assimilation. Modern anthropologists have also indicated more than once that only in the Neolithic tribe integration (the chiefdoms), people learned “for the first time in history, how to encounter strangers regularly without attempting to kill them” [Diamond 1999: 273].

Population geneticists have recently added a bright trait to the Neolithic portrayal [Sykes 2001]. Unlike previously prevalent scenario, they showed, the substitution of foraging economy by agriculture had not occurred via swimming aside or eliminating the hunters-gatherers by an incoming tide of farmers (for instance, from the South Caucasus to the East and to the North-West) but via voluntary acceptance of the progressive technologies and organization. At least, so it was in Europe: most of
modern Europeans proved to be genetic offspring of the Cro-Magnon hunters. To all appearance, the European story was not an exception.

This is a sensational discovery. It means that first in human history a progressive idea won through change of mental matrix, instead of physical removal of the old idea bearers, what had been usual for the Paleolithic. So, the competition of social models was not merely a struggle of races any more: it shifted partly to the “virtual” sphere, which imparted a new long-term mechanism to the historical development…

...In the 12-11th centuries BC iron production appeared in the Middle East, Transcaucasia, and East Mediterranean, and soon spread to India and China. This produced a steep rise in extensive (including demographic) growth opportunities.

Bronze weapons had been expensive, fragile, and heavy. Small professional armies composed of physically very strong men had waged wars. It had been extremely expensive to prepare and to arm such troops, as well as to replace a killed fighter. Therefore, each commander had tried to spare his own warriors, and exterminate as many enemies as possible. War-captives had been usually killed, and a subjugated population had been terrorized into obedience, by demonstratively destroying, or “taking prisoners” the local gods’ statues, etc. [Berzin 1984] [History... 1989].

Steel weapons were considerably cheaper, more durable, and lighter than the ones of bronze. This allowed arming the whole male population; something like a ‘people’s volunteer corps’ replaced the professional armies, and competition for productive soils aggravated. Meantime, the combination of new technology with former social, political, and military values made early Iron Age leaders extraordinarily bloodthirsty [Berzin 1984] [Vigasin 1994].

Emperors and generals hewed on stones boastful ‘accounts’ to their gods about the numbers of enemies killed, and towns destroyed and burned, which presented sadistic details of their “deeds” (a relevant texts collection from ‘Reader on Ancient East History’ see in [Nazaretyan 1996]). Battles became so bloody that the further life of technologically advanced states was threatened.

Culture responded to the challenge with the Axial Spiritual Revolution, the causes of which, as indicated before, has remained a puzzle so far. On vast geographical area, great prophets, philosophers, statesmen and generals set the tone for society’s intensive job on the whole value system’s revision. Cultures transformed unrecognizably in several centuries. The cognitive complexity of social and individual minds, hu-
mans’ capacity for abstract thinking and reflection, and the scale of generic identity radically increased. Universal ideas of good and evil, and personal choice and responsibility appeared. Authoritarian mythological thinking first in history partly made room for criticism, and the new private self-control instance, the conscience, made an alternative to traditional gods-fear. Enemies learned to see each other as human beings, to understand, and to sympathize. Aeschylus’s tragedy ‘The Persians’ was the first work of art in history that described warfare as seen by the enemies’ side [Jaspers 1955] [Yarkho 1972] [Nazaretyan 1997].

These mental processes were distinctly reflected in political relations. Objective aim achievement, instead of the number of victims, became a matter of virtue and the combat success criterion. The role of military reconnaissance and propaganda among enemy troops and population grew. A new tradition of the conqueror’s protection over local gods and priests appeared. ‘Political demagogy’ as a means of persuasion and pacification contrasted with the usual terror methods: in 539 BC, the Persian king Kir Akhemenid having captured Babel, proclaimed a Manifesto, which said that his army was just going to defend Babylonians and their gods and priests from their own bad king Nabonid. The genial trick soon spread far outside Middle East, to South Europe, India and China...

...All symptoms of the evolution’s next deadlock were manifest in II Millennium AD Europe. Development of agricultural technologies stimulated demographic growth; besides, the Christian Church, which had primarily called to refuse marriages and child-bearing, in the 9th century changed its attitude by the opposite one [Arutunian 2000]. The woods area was decreasing, swamps were being formed, and their water steamed down to rivers, together with all the wastes of growing cities.

The ecological crisis provoked social tension, disorders, and epidemics. Wars were becoming more and more murderous. Even the disaster of black death in the 14th century that took away more than 1/3 of Europe population, only temporarily interrupted the demographic tendency [Le Goff 1977]. In the 16th century, wood area on the territory of actual Moscow District was twice-thrice as less as we have it today [The Large-Leaved... 1994] [Kulpin 1995], while its population was 100 times as less as at present. Development of agricultural technologies had produced a new strategic evolutionary deadlock, as hunting technologies had done long before.
The crisis of agricultural civilization was partly softened by mass emigration, and besides, introduction of the overseas plants (potato, maize), and carbon utilization [Le Goff 1977] [Bondarev 1996]. The ‘Pre-Industrial Dash’ that turned Europe from a Eurasian outsider to the world leader, was forestalled and attended by impetuous development of the ideas of humanism, individualism, enlightenment, and progress. The values of individual success, qualification and education increased unprecedented. According to the calculations of Russian economic historian V. Meliantsev [1996], on the turn of II Millennium, West European countries fell behind the leading Asian states in literacy of adult population twice and more, while on the threshold of the Industrial Revolt, exceeded them 3-3.5 times.

A new legal and moral mentality was being formed, which implied equal natural rights, and panhuman ethics in place of the foregoing clan mentality. The humanitarian achievements enabled the new historical breakthrough, and it left behind the agricultural crisis (which may be therefore qualified as regional by geographic extension, and global by the evolutionary consequences). It also implied the superiority of the active Spirit over the passive Matter, and the Future over the Past.

European nations spread with fire and sword the light of reason, and their power soon enveloped the whole planet, resources of which fell under parent states’ control. European citizens’ faith in moral progress and future everlasting peace was based on the indisputable superiority of the Western mind, and was growing together with social and economic prosperity, needs, and ambitions. While the soldiers fought in exotic lands, mother countries’ inhabitants believed wars and their cruelty were a thing of the past. No wonder: in all the colonial wars of the 19th century, Europeans’ losses were 106000 people, in contrast with millions of natives who perished in the same warfare [Urlanis 1994].

In the early 20th century, reserves of extensive growth were exhausted, while it was yet far from sobering the public. By the following events, by various official and memory documents, and by indirect testimonies, we can see that the inertia of extensive development and corresponding state of minds still dominated. Thirst for new successes and achievements produced joyful expectancies of either a “small victorious war” or a “revolutionary tempest” among politicians, intellectuals, and masses. The photos of August 1914, which show us happy crowds in Petrograd, Berlin, Vienna, and Paris streets after the war had been declared, are a brightest illustration [Man... 1997].
Now, we may observe a result of those social and psychological processes. Whereas European countries’ summary warfare losses during the 19th century were about 5.5 million people (according to our calculation, about 15% of all world war victims), in the 20th century they rose to 70 million – no less than 60%. Two World Wars, Hiroshima, and many years of nuclear “equilibrium of fear” were required for Europeans’ psychological alteration. Was it for long time?..

Having compared crisis episodes of the past and the present, we may sum up certain psychological observations. Once new instrumental facilities exceed former cultural restrictions, and an extensive development begins, public attitudes and sentiments acquire peculiar features. A sense of omnipotence and permissiveness is intensified together with increasing needs and ambitions. Optimistic ideas of a world full of inexhaustible resources and the object of subjugation are formed. Success euphoria produces an impatient expectation of new successes and victories. The subjugation process and the search for new moderately resisting enemies are becoming self-valuable and irrational.

The proximity of desired aims intensifies motivational tension: this is called “aim-gradient phenomenon” in psychology. According to another psychological pattern, the Yerkes – Dodson law, efficiency of a simple activity is proportional to motivation force, while a complex activity’s efficiency decreases by excessive motivation. This is one of the sources of danger.

As psycho-semantic experiments have shown, emotional tension decreases cognitive complexity [Petrenko 1982]. So, the world picture becomes lower dimensional, thinking turns primitive, and the problem situations look elementary, while objectively, the task of the social system’s maintenance becomes more difficult, as technological opportunities grow. In other words, the numerator index in equation /II/, instead of increasing in proportion to the denominator’s growth, is falling. Therefore, cultural imbalance lowers the society’s internal sustainability.

Exploring the premises of revolutionary crises, Davis [1969] has shown that growing life quality usually precedes them: economic level, political freedoms, social mobility, etc. Simultaneously, expectations grow as well. In a certain moment, increasing expectancies run against a relatively reduced possibility for their satisfaction: frequently, because of demographic growth and/or unsuccessful warfare, which was expected to be “small and victorious”, whereas the expectancies go on increasing under
their own momentum. The gap produces frustrations, the situation looks unbearable and humiliating, people tend to seek those guilty, and aggression that cannot find release externally, gives vent inside the social system. Emotional resonance [Nazaretyan 2003] provokes mass disorders, which in many cases become the last act in pre-crisis development tragicomedy.

Having applied Davis’s model to various countries and historical situations, we have estimated its high reliability. My own experience shows that it is applicable both to large communities, such as states or civilizations, and relatively small ones, such as political parties. Nowadays, the model may be used, with certain reservations, in global situation analysis as well.

Since some countries and regions, and planetary civilization as a whole are experiencing typical anthropogenic crises, which are fraught with great dangers in the 21st century, the question about the mechanisms of such crises’ aggravation and overcoming is not a purely academic one. Certain facts show that during the second half of the 20th century some changes for the better took place. Politicians abstained from the most destructive weapons usage; new kinds of inter-state coalitions were formed, which were not aimed against any outer force, and effective international ecological measures became usual. These facts had had no precedence in human history. A hope emerged that Western type cultures had already developed a strong rational control reserve over intrinsic rectilinear expansion impulses.

Unfortunately, what followed one side’s unconditional victory in the Cold War demonstrated that maturity of political thought even in the most advanced modern cultures does not yet meet the requirements imposed by actual technological potential. Current Homo prae-crisimos psychological symptoms are described in [Nazaretyan 2004]: lowered political intelligence, a lowered decision-making quality, and a lowered propaganda rhetoric level in the 90s compared to the preceding decades.

The book (its first edition appeared in July 2001) shows how simplified worldview and rectilinear extensive activities are provoking hostility. Meanwhile, emerging forms of sophisticated weapons and new methods of political terrorism, it says, make impossible the continuation of the previous half-century practices, which was canalization of the global conflict in local wars. According to the techno-humanitarian balance hypothesis, actual challenges, including the political terrorism with its growing technical opportunities, will either destroy the planet’s civilization, or play a great
educating role, comparable to the ones of the atom bomb and other dramatic technical inventions in the past.

An outline of global anthropogenic crises and revolutionary breaks

In conclusion, I will quickly enumerate human history’s turning points, when anthropogenic crises, which we may qualify as global ones by their evolutionary meaning, were solved via a breakthrough into the new epoch. Once some of them have been mentioned above, I cannot escape repeating certain details to give an overall portrayal of consecutive transformations in macro-social behavior as it is seen from current perspective.

All appellations of the revolutions in the following list go with quote marks, for some of the terms have not been widely accepted, though all are present in relevant literature.

1. The ‘Paleolithic Revolution’ (0.7-1.2 million years ago) was connected with standard tools’ emergence, regular fire usage, and eventually, transition from predominantly gathering to hunting. Mystical dread of the deceased (after-life revenge) furnished the primary super-instinctive proto-cultural regulation: intra-herd aggression was first artificially limited, and an unnatural care for the cripples appeared. So, hominids’ further existence and development was enabled in the condition of essential unbalance between the artificial weapons and instinctive aggression-retention.

2. The ‘Upper Paleolithic Revolution’, or the “Cro-Magnons” Cultural Revolution’ (35-40 thousand years ago): transition from the Middle to Upper Paleolithic and conclusive extermination of the Neanderthals. Stone material productivity grew, and the portion of tools made of bone and horn increased as well, which gave people relative independence from natural sources of flint. Sign communication systems, including articulate speech, were obviously perfected, and two-dimensional portrayal (the rock pictures) appeared. Why could not Paleoanthropes, who had developed complex Mustier culture and dominated their contemporaneous Neoanthropes (Proto-Cro-Magnons) during about 100000 years, resist more? We have to assume that Mustier culture was experiencing a deep crisis, though its essence is not quite clear.

I know two hypotheses which explain this; both well conform to the technohumanitarian balance pattern. One accents the facts of culture’s high material variabil-
ity and very scanty signs of ‘spiritual production’. Free choice of physical actions with insufficient spiritual regulation (no animistic thinking that became typical for the Upper Paleolithic cultures) produced the Neanderthal’s neurotic syndrome that was expressed in antisocial activity and splashes of uncontrolled aggressive energy [Lobok 1997]. Another hypothesis [Reymers 1990] attaches the Late Mustier crisis to ecological effects: the Neanderthals had hit upon the idea to burn vegetation off, which caused landscapes’ higher productivity, but this led to a fatal decrease of biological diversity.

3. The ‘Neolithic Revolution’ (X-VIII millennia BC): transition from a highly expensive foraging economy to food production, which went along with replacing the usual genocide and cannibalism with rudimentary collective exploitation forms, and was also accompanied by the original symbiosis of agricultural and ‘warrior’ tribes.

Those deep complex transformations were a response to the Upper Paleolithic crisis, which had been aggravated because of hunter technologies’ development. This had led to the elimination of wild animals’ populations and species, and to severe inter-tribe competition. During the Upper Paleolithic crisis, previous demographic growth had been replaced by a population decrease, and just after agricultural methods dominated, the population grew again.

4. The ‘Urban Revolution’ (V-III millennia BC): large human agglomerations were formed, irrigation channels were constructed, written language and the first legal documents appeared, which regulated large communities’ lives, with a high human concentration and complex common activities.

This revolution followed spread of bronze tools, new demographic explosion, and the aggravation of competition for grasslands and fertile soil.

5. The ‘Axial Revolution’ (the middle of the I millennium BC): new kinds of thinkers, politicians, and generals, such as Zaratushtra, the Judaic prophets, Socrates, Buddha, Confucius, Kir, Asoca, Sun-Tze, and others, appeared during a short time interval in advanced societies, which were yet weakly linked among themselves, and deeply transformed the world culture. Criticism first supplanted authoritarian mythological thinking; universal ideas of good and evil, and of personality as a sovereign moral choice subject were formed. Aims and methods of warfare changed: victims’ numbers ceased to serve as a combat masterpiece measure and a pretext for boasting; the value of communication considerably increased, and primitive violence and terror were partly replaced by intelligence data and ‘political demagogy’.
The Axial Epoch followed displacement of bronze with iron weapons, which were cheaper, lighter and more durable, and instead of professional armies, some kind of people’s militia had appeared. As a result, battles became extraordinarily bloody, and former values and norms in new conditions could have destroyed advanced societies. Therefore, the Axial Revolution was culture’s response to a dangerous gap between new weapons’ power and former aggression-retention mechanisms.

(American cultures that developed separately passed through the same stages, though later in time. There are signs that European conquerors found advanced societies of both Americas in a deep crisis caused by overpopulation, and on the threshold of a spiritual revolution, which could have been similar to the Old World’s Axial Epoch [Semionov 1995]. Meanwhile, aboriginals of the other isolated continent, Australia, conserved Paleolithic life, culture, and psychology without having reached the Upper-Paleolithic crisis, the Neolithic Revolution, etc.).

6. The ‘Industrial Revolution’ (AD 18-19th centuries): introduction of relatively “spare” technologies, which had higher special productivity than agricultural ones. It was prepared and attended by a complex spiritual framework, the ‘industrreality’, in Al. Toffler’s [1980] term.

The industrial revolution was preceded by a long crisis of agricultural civilization in Europe (12-18th centuries), when uncontrolled extensive growth, cutting down of forests, destruction of ecosystems and people’s concentration in the cities had led to outbreaks of bloody warfare and mass mortal epidemics. The development of agricultural technologies had produced a new strategic evolutionary deadlock, as well as, long before, hunting technologies had done.

In its turn, the industrial production having increased power of human effort, gave a new impulse to extensive development, demographic growth, and ecological and geopolitical ambitions. So, like it had been mostly before, the solution of one crisis opened the way towards the following ones.

7. The ‘Information Revolution’? In the middle of the 20th century, many people felt that planetary civilization was approaching a new crisis epoch. Its circumstances may also be well described in terms of the techno-humanitarian balance pattern. In the previous 100 years, weapons’ power had grown 6 orders of magnitude. Human intelligence had achieved such high instrumental might that the aggression-retention means, which reflected previous historical experience, could not meet the
new requirements any more. The instrumental intelligence became dangerous for its own bearer’s further existence again…

∗ ∗ ∗

Techno-humanitarian balance hypothesis gives an additional dimension to White’s [1975] conception, which was one of the most influential models of social development in the 20th century. In the words of his Canadian adherent V. Smil [1994, p.1]: “From the perspective of natural science, both prehistoric human evolution and the course of history may be seen as the quest for controlling greater energy stores and flows”. Now as we find out that excessive power is self-destructive for a social system unless it is internally balanced with proportional cultural regulation of behavior, the model of development reduced to energy aspect looks dramatically insufficient even from the point of view of natural science.

Turning back to the experience of ‘optimistic tragedies’, we may note that the constructive solving of each of the anthropogenic crises entailed a complex leap foreword by all the five long-term mainstreams mentioned above. More potential technologies furnished higher specific productivity, i.e. the paying load for a muscular effort and a unit of nature’s destruction. This implied higher variety of the social structure, higher information volume of the social and individual intelligence, and more advanced cultural regulation. As a result, humanity’s ecological niche broadened and deepened, and the population grew on. Over time, the evolutionary success entailed increasing social needs and ambitions, and… the way to the next crisis continued.

This model keeps us oriented within the palliative space of the future, and helps us discriminate between the constructive forecasts, scripts and projects, and the utopian ones. At the same time, it involves definite conclusions about the past.

In the 19th century, the Russian sociologist Danilevski [1991] argued that there had been no significant landmarks for all of human history, and therefore, no world history at all. In fact, he meant, separate civilizations’ ascent, flourishing and decay had taken place, successive in time but devoid of causal continuity. This ‘civilization approach’ was later caught up by many Western thinkers, for its pessimistic portrayal
conformed to the 20th century mass disappointments. Within the paradigm, Spengler’s [1980] notion that “humankind is a merely zoological concept” sounded reasonable.

Meanwhile, it was just in the 20th century that the historical discoveries disavowed the argument, and its far-reaching conclusions. As far as we take those discoveries into account, we may accept at least certain statements assertively.

To make sure of the substantially global character of human history, as well as life history, the proper ‘unit’ of consideration is to be singled out.

Thus, biological evolution is out of sight, concentrated on populations, species, or separate ecosystems: more than 99% species on Earth had extinct before first humans appeared. So nothing but life cycles is obvious until we look at the Geochronological Table, which represents the biosphere as a whole at the successive geological epochs. Similarly, humankind, or more precisely, the global society-nature system, is the only real subject of social evolution, while countries, nations, regional civilizations, and even hominid species (in the Paleolithic) repeatedly changed one another as the leaders; by themselves, all those smaller subjects cannot serve for an evolutionary portrayal.

Since hominids have once and for all turned to tool making, in spite of countless divergences, migrations and isolations, the culture has been a single and common planetary phenomenon, which is proved by many observations, leading off the fact that the first standard tools on all inhabited continents were surprisingly identical. As to the explosive growth of local diversities in the Middle and Upper Paleolithic, and later, it was a typical process of evolving system’s inner differentiation.

What we may call ‘progress’ is neither an aim nor a movement ‘from the worse to the better’, but a means of self-preservation, with which the complex non-equilibrium system responds to the challenges of declined sustainability. A succession of a posteriori effects of restored sustainability is retrospectively construed as a step-by-step ascent from more ‘natural’ (i.e. wild, and relatively equilibrium) states of society-nature systems to less ‘natural’ ones. So, having solved dramatic vital problems, progressive transformations produce more complicated ones, and at the same time, more developed means for their solution. After all, humans are still living on thanks to their virtue to adapt self-regulation quality to their own increasing might...
References


\[i\] In [Social violence], a distinctive cross-cultural index of practical social violence – Bloodshed Ratio (BR), a ratio of the number of killings per unit of time to the population size – was first introduced, which was completed with equations for its calculation (see also [Nazaretyan 2006]).

\[ii\] One more corollary is that population density a certain community can bear depends on how advanced its culture is, i.e. the number of anthropogenic crises, which have been overcome in the past (see below). Special analysis has confirmed this suggestion on the whole, however discovered an attendant factor that more belongs to population genetic than cultural development.
As our colleague has demonstrated [Borinskaya, 2005], explosive human concentration each time intensified natural selection: pathogenic microorganisms got favorable conditions and increased their activities, and the epidemics eliminated individuals and families with weak innate immunity from certain diseases. Thus, human gene pool has been consecutively changing; as a result, people in complex societies differ from their ancestors or contemporaries who live in simple societies by their biological resistibility (what certainly, has nothing to do with their mental capacities).

This fact restricts the validity of the data gathered by our group. Growth of population densities and structural complexity proved to be related not only to the improvement of cultural aggression-retention mechanisms (which followed from the hypothesis) but also to growing organic resistibility against biological aggression. At least it was so until the 20th century extensive and intensive development of anti-contagion measures started up an opposite trend of decreasing biological resistibility.

iii Those regulators may sometimes horrify an observer who belongs to another culture, but they enable the society’s existence in the ecological niche. Many ethnographers reported that a typical method of demographic stability for primitive tribes was normative infanticide, regular extermination of the “unwanted” babies, especially female, and castration. In some tribes, a man may not marry without having killed or castrated another man from a neighboring tribe.

iv In fact, it applies to social history the classical data by Piaget and his followers [Volovikova & Rebeko 1990] concerning individual development, and the “conflict-enculturation hypothesis” [Chick 1998]. The downward course of aggression with increasing age has been revealed both in Western and primitive cultures [Munroe et al 2000].

v Some Sinologists [Lin Yufu 1995] have shown that all technological and economic premises were in place for an industrial revolution in the 14th century China. However, world model and value system did not favor this radical transformation, unlike the situation of Europeans in the 18-19th centuries who had met the deep crisis and developed a new progress-oriented worldview, which was a psychological compensation of the Late Middle Ages mass alarms and phobias.