

Culture as Extraorganic Mode of Adaptation to Environment (Education and Teaching as a Culture Phenomenon)

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CULTURE AS THE ELEMENT OF NICHE

Man lives in a certain universe. It concerns not only the capacity of his body but surrounding environment as well. This is not the whole geographic space but those parts which are closely related to human needs. This range of universe is the man's environment, and the system of his relations is called niche. Niche is characterized by information, energetic and material links, and in other words niche is the way of environment exploitation. The basic relations have the biological character and are necessary for life supporting. Because the organism surroundings are changing, niche is changing as well. Each organism has to be adapted to the environment otherwise it dies. Development is the way of permanent adaptation to environment, and in this context, development is the strategy for surviving (Wolański, 2006).

The biological way of adaptation to the environment includes changes in body build and functions of the organism. When exposed on cold the organism responds by muscle tremble what increases body temperature. The longer time to cold exposition causes that the animal skin is covered by thicker fur. Clothes, houses and tools belong to non biological forms of adaptation. Those are effects of man culture, secondary products of his biological brain. However, the culture itself is not the biological phenomenon. Abstract thinking is the biological phenomenon, but the product of our intellectual activity in the form of culture is a new evolutionary achievement. Simultaneously, culture is an extra organic way of adaptation to environment.

Culture is a specific for our Species part of niche. The man niche is characterized by his biological and cultural needs, and natural and social environmental interactions.

CULTURE AS THE EFFECT OF EVOLUTION

Culture is the result of phylogeny, because as the product of human brain, culture has been

favoured by natural selection. At the beginning, individuals possessing appropriate biological characteristics have had better chance for survival and have left more offspring. They were better fitted to the surrounding environment by their body build and functions. Also the brain structure, capacity of telencephalon and number of neurons have been under the natural selection. Especially the great number of synapses (connections between neurons) has been favoured. This had given the steps forward in such mind processing as facts' association, generalization, and had been the base for the intellect creation.

Always, during the evolution, those organisms who acted more efficiently have had better chance for survival. The easiest actions concerned the food obtaining, and protection against unfavorable climatic conditions and life threats. In circumstances, where biological properties and mechanisms have failed, no biological (cultural) acts have been retained during the evolution.

Culture is the form of intellectual brain existence; this is an extra organic product which manifests through spiritual imaginations and feelings, as well as through material products. The non material product of brain is mind, and culture is the product of mind.

Culture is the set of resources for the certain aims realization and their effects. It combines the material and symbolic achievements of humanity. Culture creates and concentrates itself as the results of social contact, but its achievements are the result of certain individuals' productivity, as the consequences of the individual brain activity.

Culture is the complex of knowledge, beliefs and practices gathered by society. Cultural practices, as opposed to unconditional instinct behaviours, are not inborn but trained (taught). In human ecology sense, culture is an extra organic way of the man adaptation to environment, and the conscious way of its transformation and formation

Culture is the product of abstractive thinking, and simultaneously the man specific achievement. Currently, the existence of abstractive

thinking in apes is considered. However, it depends on the definitions of abstractive thinking and culture. Even if some Primates are characterized by ability to generalization it may not have any common with abstractive thinking, since the certain practices of animals can be based on imitation of human practices or random events, and then selected as instinct behaviours.

Behavioural practices do not belong to culture. The human infant shows the Darwinian reflex (its fingers are clenched around a keeping object), but nobody considers it as the result of abstractive thinking. All depend on the definition of abstractive thinking.

The association of different events and the recognition of the results of causal events have taken place as the effect of the brain development. In a way it can be said that there exists "thinking by acting" what means the realization of actions directly controlled by the nervous system.

Even though some Primates are capable to create "generalizations" of existing reality, only Man is capable to create the projection of a non existing future. Because of this, he can plane our actions.

Presumably, even ancient humans were not fully aware of time continuation, but observing daily and seasonal changes, they treated them as the cyclic process of creation and end, from the birth to death. However, they were probably aware of the motives and results of their actions, and comprehended the perspective existence what was manifested by the secondary tool processing (production of tools for production of other tools, what shows the planned action in the future). The historic vision was created latter on.

There is a previous, separated from action caring at the moment, "an abstracted idea of action" which is possible to realize by the tool produced even long time ago, and this planned idea exists only in Man. It also influences on brain activation. From the one hand the brain activity initiated the planned action; from the second hand the realization of this action stimulates the brain functions. It is the strengthening feedback mechanism between brain functions which stimulated body movements, whereas these movements (under the brain control) caused the farther brain development.

If life is the form of proteins' existence, culture is the form of rational brain's existence. The human nature as the biological Species separates

the Man from the animal World not because his physical properties, but because of the product of his mind, called culture.

CULTURE AS THE FORM OF ADAPTATION/ADJUSTMENT

Cultural practices are the form of regulatory adjustments which protect against biological adaptational changes. As it was mentioned before, cultural practices are based on the abstractive thinking, which predicts a long temporal effect of the action. Cultural practices can be parallel to biological adjustments, sometimes they have supplementary character, but more often they prevent biological changes.

Cultural practices operate very early, even in advance, usually at the moment when the signal about a certain stimulus reaches the organism. This signal does not have to come directly from the external environment, but it can be inducted by our experiences. Thus, cultural practices have not only conservative but also prophylactic characters.

The prediction of the effects of our activities (actions) has an important meaning for our civilization. Humans aspire to progress, which is called modernization and modernity. Progress depends on immanent characteristics of human psyche, and is a product of complex structures of brain. In human societies, progress is inevitably as long as human nature is characterized by the terminating satisfaction (Fig.1). This phenomenon occurs because of biological adjustments and psychological accustoms (habituation) to the new conditions (circumstances) (Wolański, 1983, 1995).

Human activities combine deliberated and unintentional changes (side effects). Most of side effects are usually unpredictable and unprofitable. Those unprofitable and unintentional changes are the price we pay for progress.

Reaching only benefits is rather impossible; especially that side effects are very hard for prediction, and is rather difficult to associate them with a certain cause, especially that they have a delayed effect. Only the observation and scientific analysis of side effects may help in avoiding them in the future.

The role of science in cultural relations between man and his environment seems to be important. Science gathers observations which can, in some perspective, correct the way of action.

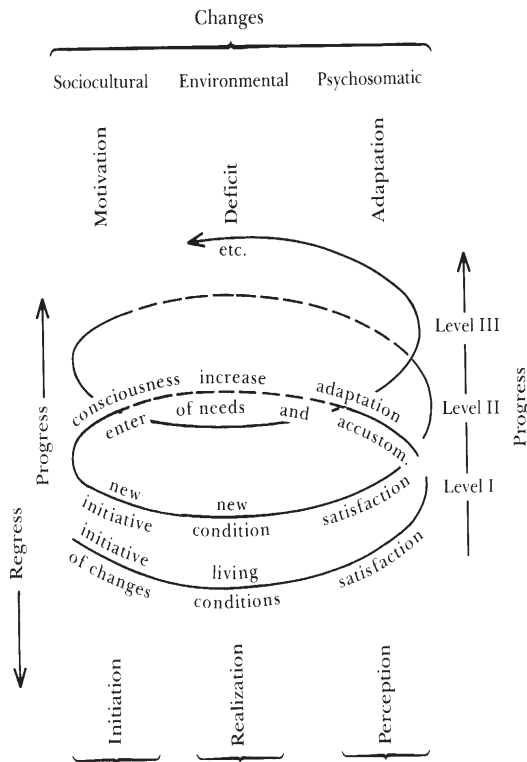


Fig. 1. The spiral of changes causing progress in the society. Unintentional effects are greater when changes are more rapid (Wolański, 1989).

This is the base element for ecological culture, understood as spiritual culture. Science belongs to spiritual culture, whereas engineering and medical technique belong to material culture. Environmental economy belongs also to material culture. Ways of environmental managements can be included to both: spiritual and material cultures. The last ones are based on scientific approaches and their effects (results) are used in practice.

The knowledge possessed by an individual has two roots. One is based on its own experiences (Fig. 2), and the second one is identified as symbolic information. The knowledge has been closely related to generalizations in technology of actions, and from the beginning it has had a practical meaning. Only the specific need of human mind - its passion for cognition, has made from the process of cognition the target in itself. This target has secondary started to be the driving factor for civilizational improvements.

The question arises "what wisdom is and what intelligence is? The possible answer is that wisdom is the ability to predict farther effects of our practices whereas intelligence measures an effective practice in unknown circumstances. Another definition concerns smartness, what is understood as the ability to derive personal benefits from a given situation. The presented definitions show that some animals can be intelligent, but wisdom is the trait which characterizes

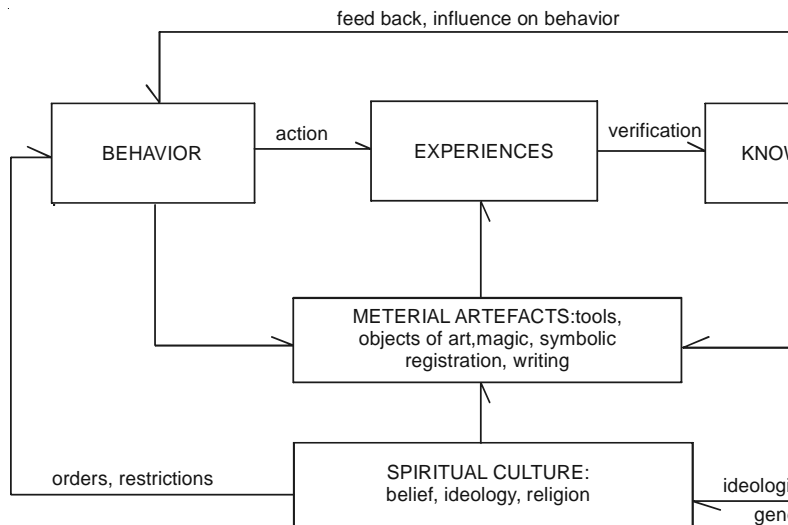


Fig. 2. The circulation of symbolic information. Repeated cultural practices are checked experimentally by their effects and by effective practices recorded in our knowledge. This knowledge is sanctioned as spiritual culture, and material culture is the way of its realization.

only Human being. Intelligence is the base of tool practices (some objects were used as tools), but wisdom let us to predict future, those circumstances which could have happen, and simultaneously it allows to plan our future fates, control our own future and history of mankind.

CULTURE AS HUMAN HERITAGE / PATRIMONY

Genes include biological information selected during evolution by passing down from generation to generation. Culture is the symbolic information handed down not only from generation to generation, but also exchanged and transmitted between living people within the same generation. Many years ago culture was represented by speech, then by manuscripts and finally by a process of printing. The top achievement of culture in information is current mass-media.

Gene heredity (biological information) protects our Species against degeneration; culture heredity (symbolic knowledge) protects humankind against degeneration. Culture is a more effective system in adjustments to the environment. It assures survival: optimize existence and reconstruction of society systems

Culture comes into existence as the integrated effect of adjustments in two directions: (1) to the type of the environment (ecosystem, landscape, and biome) and (2) to the level of technology of environmental management and protection. The culture formation is a historical process, differentiated in time and space. There have been many cultures, but they are very important because they have been created as the form of adaptation to the environments which have been inhabited by people – the cultures' creators. The primal and basic aim of all cultures is the fulfilment of biological needs of Man. Because these needs are the same for all representatives of our Species, and only the way of their fulfilment is different, it points out that all cultures are equivalent.

It was mentioned before, that cultural practices have sometimes the adaptational character, however, culture can not be adapted. Thus, the transformation of a certain cultural niche to different environmental conditions does not have sense. Culture consists of general experiences obtained in the particular and very specific conditions in the given time and space, so culture is conservative from the beginning. Non-biological adaptation of Man to different

environmental conditions is possible by creation of a new culture. Culture, differently than nature, creates the artificial Man's environment.

CULTURE AS A HISTORICAL PHENOMENON

Homo sapiens at the beginning of his evolution had probably not been aware of the historical flow of time, but the cyclic time continuation might be recognized. Cultures have two dimensions: in space and in time. Cultural adaptations are different depending on the progress in relations with environment. There are many cultures depending on various ecosystems and social systems where the formation of human groups took place. In the history of humankind, stages of cultural development were recognized as great discoveries or adaptations, which were called transitions. Studies on the new history single out demographics, epidemical and cultural transitions. In this article the cultural transition are under our interest (Takacs-Santa, 2004).

The first cultural transition concerned the use of fire (acquiring, holding and utilization). The oldest proofs of the fire use had come from Israel and were dated on at least 790,000 years ago (Goren-Inbar at al., 2004).

The second transition – the use of language – was anatomically possible even 2 millions years ago (*Homo habilis*). The wooden spear from Schöningen, gave evidences that the symbolic thinking could characterize hominids about 400,000 years ago (Gore, 1997). Other investigators revealed that cognitive abilities and abstractive thinking took place 280,000 years ago. The proofs that *Homo sapiens* were able to use articular speech, and transfer the whole information, revealed that it could happen about 40,000 years ago.

The third transition – the beginning of food production – caused the increase in population, sedentary lifestyle and appearance of first settlements. It occurred about 10,500-11,500 years ago.

The fourth transition concerns the state and towns formation. It is controversial whether the social stratification took place at the time of the horde formation (several hundred individuals) in hunter-gatherers or when human societies switched to agriculture. The first towns appeared in Anatolia, Mesopotamia and in Indus Valley about 7,000-5,000 years ago. About 5,500 years ago the wheel was invented, but not in the all

continents. The wheel was unknown by Mayas.

The fifth transition started by the 15th century. From that time the great voyages took place and new continents were discovered. Europeans were able to reach and inhabit other continents.

The sixth transition – the scientific-technological revolution - occurred in the 18th, 19th and at the beginning of 20th centuries. Three events were responsible for this transition: (1) the spread of fossil fuel, 2) the technologies based mainly on coal supply (3) the development of European science. This last transition is characterized by enormous progress in medicine. It started from the identification that infectious diseases are caused by microbes (Pasteur in the 1860s and Koch in the 1870s). New discoveries included vaccines against infections. There was observed an intensive development of pharmaceutical industry, antibiotics were discovered (Flaming in 1929) as well as pesticides and insecticides. All these inventions eliminated many diseases and decreased mortality, but simultaneously, there are observed exponential acceleration of world population growth.

The next transition, which is expected in near future, or maybe has just started, has a rather computer-science character. It depends on the range and speed of information transition and virtual contacts between people.

RESULTS OF THE NOT-ADEQUATE CULTURAL NICHE

The relation between traditions and cultural practices has been considered many times. In same degree it can be related to very well known phenomena observed in the 20th Century in cities of Gdynia (the 1930th) and Szczecin (the 1950th) in Poland, where infant mortality during several years had been the greatest in the country scale. At that time the immigration of people from distant rural areas to these cities had been very intensive. The migrated individuals represented different cultural practices, and were not adjusted to new living conditions (Wolański et al., 1970).

Another example shows Polish-Jewish population at the beginning of 20th century. Jewish people had better income, and better living conditions than the average Polish population. However, their cultural practices did not favor better health status in Polish environmental conditions (Miklaszewski, 1912, 1914).

In about 1860 Indians Navajo were removed

from their territory and settled in mountain areas. They had been pasturing sheep and goats, as they used to do before. In 1934 the US government surrounded the territory for pasturing to protect the environment. Indians were forced to change their cultural practice including nutritional patterns. Navajo Indians started to present all symptoms of disadaptation and there was observed increase in morbidity and mortality.

Siberia is the region where thousands of people were resettled in the new industrial centers and towns. The morbidity of migrants is 10 times higher than that of native population inhabiting these regions from many generations (Alexeeva, 1977, 1986, 1998).

Summing up these examples it is important to conclude that migration movements to the completely different environment cause that migrants are alienated from their own surroundings. They have to change their niche, what is identifying with cultural practices.

Using the ecological terminology, the above examples show that the traditional niche (cultural relations with the environment) was moved to different bio-climatic conditions, where this niche is inadequate. The best solution is based on assimilation of local and adequate (to this environment) cultural practices, that is, local or regional elements of niche.

CIVILIZATION

Together with the material culture development, leisure was naturally formed; the time free of everyday worries about food and security. Leisure favors the spiritual culture development. People could stop thinking about everyday problems, and start to contemplate, meditate and even dream about the existence in transcendental categories. Dreaming is the first step to cognition.

The cultural evolution took place parallel to the biological evolution, stimulating, modifying and consolidating each other.

Civilization is the complex system of social organization, being in a given stage of socio-cultural development, and inhabiting a region characterized by specific bio-climatic conditions. This way of organization is usually considered by a community as the best, because this is the most effective strategy of existence, survival and development, which is the social expression of culture.

Civilization is also understood as the highest

stage of cultural development which includes art, science and socio-political organization; is identify with the state, which had been created through sedentary style of live and urbanization. The beginning of this process took place about 10,000-6,000 years ago.

Civilization is the complex system which includes: environmental exploitation and protection, human existence protection and formation of human living conditions. Civilizations are the very advanced forms of social being; ideologies are their superstructure, and cultural behaviour is everyday practice adequate to environments (ecosystems) in which they exist. Social organizations (institutions) are stereotypes depending on ideological imperatives and possibilities (more often willingness) of their realization (Fig. 3)

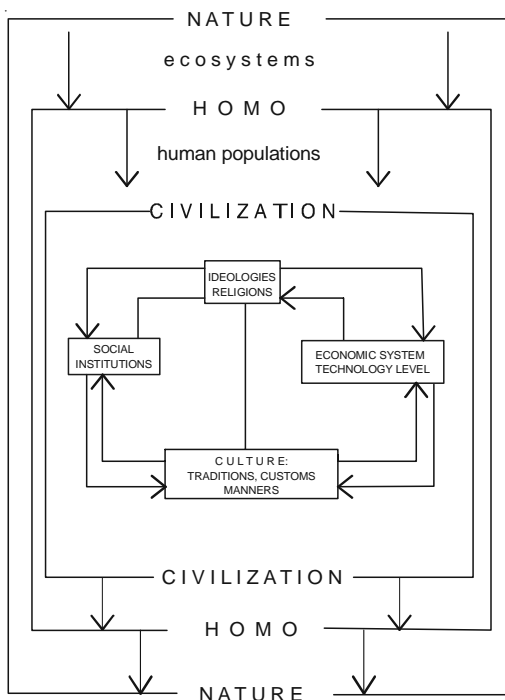


Fig. 3. Civilization is a very complex form of social life; it includes the ideological base (very often religion), economic system, technical level of society, which allows realizing the theoretical assumptions of social institutions, and practice in a form of cultural practices of an individual according to his knowledge, traditions and customs. Culture is also understood as believed values and related norms of proceeding, which have a comparative and social character.

The great civilizations in ancient times were based on agriculture and sedentary lifestyle. They were consequences of conditions in which they come into existence; however, they were also related to existing traditions and knowledge. Certain elements of culture can dominate and overtake the civilizational progress, which is understood as technical and economical achievements (Wolański, 2006).

The first great civilizations came into existence 5,000-6,000 years ago. Their existence is less than ½ percent of the mankind history. One third of the great civilizations belong to the Latin civilization, where our roots come from.

In ancient times there were two centres of civilization: west and east. One was created on the border of Africa and Asia (Sumerian civilization, Mesopotamia, Egypt), and the second one was created in certain regions of India and China.

In our times most of highly developed societies live in the urban-industrial civilization. If this had been the only one kind of civilization, and its cultural solutions were wrong, and was not able to assure a secure existence, the whole mankind would have been in danger (Wolański, 1993).

Let us protect our own culture, where we were brought up, which gave us the chance of survival, but let us think highly about diversity of other cultures, as the way of existence in various environmental conditions of many previous generations. Those other cultures could be our rescue in case of environmental changes which might happen in the future mankind development. There are similar rules to fight for preservation of extinct plants and animals in our World. They were also selected by environment as unique forms adapted to the specific environmental conditions.

BIOLOGICAL EVOLUTION AND CULTURE

In humans, biological information (as a genome) is transmitted from generation to generation. The genes transmitted to reproductive cells are under recombination. However, structural changes (mutations) are slow and the changed form is under selection. Thus, biological evolution of humans had been very slow and it was accelerated in certain periods only. Evolutional changes concern gene pools and mainly the reduction or extension of biological variation. It is possible, that in humans those changes took

place within their genome and concerned a part of DNA repression and changes in gene expression. The phenotype represents the active part of genome and possibility of its realization in specific environmental conditions, so the phenotype, at the moment, is mostly responsible for the chance of survival.

The cultural information, besides its transition through generations, includes also the information learned from other people or obtained by own experiences and reflections. Within the population, the similar gene pool is transmitted from generation to generation, but in case of cultural information each generation can enrich its knowledge, do new inventions and introduce new improvements (add new information to memo pool), thus, the cultural information of a younger generation is different than that obtained from an older one. At the earlier stage of anthropogenesis these changes were very slow. In time, when more fertile regions, characterized by more favorable climatic conditions were settled, there was observed an increase in food production and all these changes could have triggered population growth. There were regions where people matured earlier, and this caused the greater number of generations at the same period of time (ages or millennia), as well as more innovations, more rapid development of culture and earlier time of the beginning of civilization (Wolański, 1969).

Similarly like genes, culture is conservative, but culture is a rather elastic form of adaptation, because it modifies and corrects knowledge based on experiences of older generations.

Culture gathers new knowledge and experiences of each generation, but also cumulates them during historical experiences. As the results, each next generation does not have to reach experiences according to its behavioral patterns in a given environment, from the beginning.

Potentially, parents may transmit to their child almost all mankind knowledge, orally or as a book collection. Additionally, the cultural information may have been transmitted to any living people, as well as it has been also registered (carvings, writing, different artefacts). All of this favours its popularization and accumulation. From several decades the huge build-up of information is observed, and sometimes in science is more profitable to do new research than to look for data about studies done in the past, however, internet facilitates this work a lot. Additionally, culture starts to be a stopgap of biological

evolution, what means that culture limits and modifies natural selection. In the petrified animal body, the creator of culture is evolving.

This is a paradox that biological evolution in *Homo sapiens* probably does not exist any more, because it was suppressed by the development of cultural practices. However, the cultural sphere modifies the physiological functions of the organism and it stabilizes or disturbs human relations with ecosystem. In the history of mankind the role of cultural practices for ecosystems existence has been changing.

Culture is created as the product of the brain functioning in each human being, from the other hand Man is characterized by aspirations and needs for competition, which are impossible without contacts with other people. Culture serves also each individual, and fulfils oneself through social activities.

Social development was crucial in invention of cultural activities. The biological form of group coexistence together with functions splitted between group members does not signify cultural activities. These actions are instinct, established by imitation and natural selection. The verbal communication between group members motivated symbolic thinking and symbolic communication as well. This was the base for articular speech which allows transferring precisely formed thinking to offspring and other contemporary living people. This way of experience transmission has been more effective for progress, existence protection and for living resources assurance than the biological information transmission. In time, new experiences became the base of certain norms, rules, prohibitions and orders. The factor of adaptation to environment was characteristic for culture at its beginning. In that sense it is ecological culture, but ecological character of culture has been better known when ecology had been recognized as science and ecological movements have started to propagate ecological consciousness.

Culture of a certain society is evaluated by its social contacts, adaptational behaviours to environment, rituals related to ideology or religion, levels of technique, art and science.

Because the natural and social environments are changing, culture manifests its fitness in adaptation to these changes. The demographic and social structure of human populations results from their life in these environments. Environmental conditions through hundreds and thousands

generations have established certain beliefs and customs summarizing the life experiences in a given environment. Thus, cultures are different, because behaviours of peoples to the whole society possession must be also different. Culture includes (is based on) knowledge development, improvements in practice, goods' production and life protection in a certain environment. If the ways of practices are effective, they are consolidated as a transmitter for other people and future generations.

Mits and customs support faith in effectiveness of human practices towards natural environmental resources, effectiveness in its exploitation and its existence protection. Thus, spiritual culture is inseparably linked with material culture, and also supports and strengthens it.

It is very important not to oppose modernity to tradition. Modernity coming from tradition should comprise adaptational principles which decide about stable and worthy survival.

CULTURE, VERSUS EDUCATION AND LEARNING

Education in the sense of the conscious modeling of certain customs is a part of culture. The development of technique and tools serving for the nature exploitation, fulfillment of requirements and existence protection, the best shows its association with material culture. This above and observations of incomprehensible powers of nature were the base of spiritual culture.

Scientific studies are the main source of cognition, knowledge collection, reality explanation and world view formation. Those elements have created the advanced forms of the integrated adaptation to environment, which is called civilizations.

Education as imitation has already existed in animals; also animals show certain forms of social organization, even in insects. The beginnings of social institutions had been observed in hunter-gatherers hordes together with the use of fire and production of primitive tools. However, the conscious modelling of world view and the education within its ranges exist in *Homo sapiens* only, at the phase of first civilizations (several thousands years ago).

Only epidemic diseases which appeared in the Middle Ages, because the lack of hygiene in towns, had been the real threat for the live environment and human activity. Fortunately, those

threats had a local character. Together with the increase of population number and consumption, the anthropopressure started to intensify. The urban-industrial civilization has had a very strong pressure on environment, and the effects were transmitted a long way, what caused the global risk. It concerns environmental pollution and changes in climate and atmosphere.

It was mentioned before, that the first civilizations have come into existence as the result of sedentary lifestyle and agriculture. All of this determines the intensive environmental exploitation. Thus, at the beginning, those civilizations have been the threat for natural environment. In this stage of the civilizational development, the strong efforts are needed to make progress in ecological consciousness, education for environmental protection and in formation of the human living environment.

CULTURE AND NATURAL ENVIRONMENT

Culture in relation to humans has two meanings. On the one hand, we live in civilized world and our environment includes not only nature but also all technical innovations and nature which are artificially changed by humans. On the second hand, the biological responses of human organisms are limited by our practices and cultural constructions.

Culture is a typical element of the Man-environment contact, as well as is a part of human niche. Besides biological contacts based on instincts, the formation of cultural forms of our behaviours in relation to nature, is very important. These must be distinguished from cultural practices, which are periodically or opportunistically forced by certain fashions and customs, not always common with the more deep reflection concerning human existence. There are some principles which should be emphasized because they are related to general human experiences. The well-bred man does not leave garbage in the forest, does not devastating nature, and his cultural worth is manifested by his aware action to keep the environmental equilibrium. Cultural practices are under fashion. The fashion has not always testified for modernity. Many people do not want to be modern in the sense of mindless imitation of others, they what to be original underlying their individuality. However, each behave should include cultural norms. Modernity is a kind of fitness to environment. Cultural

practices decide about the humankind future. The history shows that those civilizations (from several dozen to a few) have survived which have been very important for humanity.

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ABSTRACT The article contains an analysis of the notion of culture as an element of ecological niche, as an effect of evolution, as a form of adaptation, as a heritage of mankind - and shows the result of the inadequacy between cultural and biological niche. The next analysis concerns the notion of civilization and the question of biological evolution and cultural transitions, culture and education and science, and finally culture and natural environment.

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