

今日人类学民族学论丛

Anthropology and Ethnology Today Series

国际人类学民族学联合会第十六届大会文集

Book Series of the 16th World Congress of IUAES

黄忠彩 总编

Editor-in-Chief Huang Zhongcai

人文生态学

Human Ecology

安娜·辛尼阿斯卡 拿破仑·沃兰斯基◎主编

Edited by Anna Siniarska and Napoleon Wolański



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Preface

China won the right to host the 16th IUAES World Congress in July, 2003. After six years of preparation, the Congress will be held in Kunming, China during July 27-31, 2009.

The International Union of Anthropological and Ethnological Sciences (IUAES) was established on August 23, 1948, when it merged, in fact, with the International Congress of Anthropological and Ethnological Sciences (ICAES), which was founded in 1934. The latter was the product of various Congresses of Anthropological Sciences, starting in 1865.

The IUAES is one of the member organizations of the International Social Science Council (ISSC) and also of the International Council for Philosophy and Humanistic Studies (CIPSH). The IUAES is also a member of the International Council of Scientific Unions (ICSU). Its aim is to enhance exchange and communication among scholars of all regions of the world, in a collective effort to expand human knowledge. In this way it hopes to contribute to a better understanding of human society, and to a sustainable future based on harmony between nature and culture. The IUAES once noted a draft statement on the future of world anthropology in "*Current Anthropology*" (1979): "The scope of anthropology in terms of areas of human interest includes such critical issues of the contemporary world as problems of environmental management, pressure for the progressive reduction of disparities and the restructuring of the world order, the future of the nation-state, ethnic pluralism and the future of national society, and the harmonization of the roles and functions of institutions with the basic and derived biological and psychic drives of man". The IUAES itself consists of national and institutional organizations in more than 50 countries in all parts of the world, and also includes some hundreds of individual members. The research effort and involvement of the IUAES is principally arranged by its scientific commissions, of which, currently, there are twenty-seven, and each of which concentrates on some area of anthropological interest. They included ethnic relations, aging and the aged, women, children, youth, migration, epidemiology and Aids, tourism, primatology, linguistics, and so on.

The theme of the 16th IUAES World Congress in Kunming, China is "Humanity, Development, and Cultural Diversity". The Anthropologists and Ethnologists around the world will present over 4,000 papers, which covered 33 sub-disciplines or research fields as follows: Aging and the Aged Studies, Aids, Archaeological Anthropology, Children, Youth and

Childhood Studies, Communication Anthropology, Development and Economic Anthropology, Educational Anthropology, Enterprise Anthropology, Ecological/ Environmental Anthropology, Ethnic Culture Studies, Ethnic Relations and Ethnic Identities, Food and Nutrition Anthropology, Gender and Woman Studies, Globalization Anthropology, Historical Anthropology, Human Ecology, Human Rights Studies, Indigenous Knowledge and Sustainable Development Studies, Legal Anthropology and Legal Pluralism, Linguistic Anthropology, Medical Anthropology and Epidemiology, Migration Anthropology, Museum and Cultural Heritage, Nomadic Peoples Studies, Physical Anthropology and Molecular Anthropology, Psycho-anthropology, Religious Studies, Sport Anthropology, Theoretical Anthropology, Tourism Anthropology, Urban Anthropology, Urgent Anthropological Research, and Yunnan Studies.

As the organizer of the 16th IUAES World Congress, The Chinese Union of Anthropological and Ethnological Sciences (CUAES) decided to edit and publish “Anthropology and Ethnology Today Series”—the paper collection series of the above sub-disciplines or research fields, for example, Physical Anthropology, Molecular Anthropology, Migration Anthropology, Museum and Cultural Heritage, Nomadic Peoples Studies, Linguistic Anthropology, Medical Anthropology, and Ethnic Culture Studies. We hope that the scholars from different parts of the world can share with all the achievements in the book series of this congress.

**Zhou Mingfu, Executive Vice-president
Chinese Union of Anthropological and Ethnological Sciences**

**Huang Zhongcai, Secretary-general
Chinese Union of Anthropological and Ethnological Sciences
July 14, 2009**

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Prelude

Quo Vadis Homo Sapientissime? Transdisciplinary Perspectives of Human Ecology

Napoleon Wolanski

Honorary Chairman, Commission of Human Ecology, IUAES

The first and the most important questions are: (1) What is human ecology, (2) How we understand human ecology, (3) What are contemporary goals and needs for human ecology. Without answer such questions we can not understand each other.

In this presentation I understand human ecology as a science about *Homo* as the biological genus and his culture as the dynamic component of ecosystems. The species of *Homo sapiens* is characterized, between other things, by his unique and peculiar culture. Culture has differentiated us from other animals, has made us *humans* and finally *sapiens*. The above definition includes biological and cultural unity of humans.

The subject of research in HE is a human organism and/or human population in their interaction with environment in which they exist; especially biological, social and cultural interrelations of humans with their living conditions. In this sense human ecology is understood as transdisciplinary science based on systems' theory. Human population is the centre of the system under study.

HE describes the term *interdisciplinary* as activities existing between disciplines, but not necessarily uniting them. This may not contribute to a common synthesis. In this context the term *transdisciplinary* HE is more appropriate because the prefix "*trans-*" suggests transition or transporting in the sense of connections.

The main difference between bioecology and human ecology is that (bio) ecology does not include research on (1) adjustments on organism level and (2) cultural adjustments

to environment, which are the immanent subjects of human ecology. These two problems are the basic for environmental protection and environmental problems of health care, nutrition, family planning, and well being of human populations and societies.

Human ecology *per se* is not about nature changes, even though anthropopressure makes some species of fauna and flora extinct, as well as HE is not about the natural protection and environmental management. If human populations change environment, this is a subject of research in *(bio) ecology, geology, economics, and even political sciences*, with humans as the species existing in this ecosystem. The main interest of HE concerns adaptive changes of human organism, population and society on environmental transformations (not only caused by anthropopressure as a feedback mechanism).

Does human ecology is a science or a point of view? For ecological sciences and environmental biology human ecology is the point of view. Human ecology is also a paradigm, assumption and a way of solving problems of man-environment interactions with reference to the general system theory. This “point of view” is very important for future of humankind and our planet. This is why *(bio) ecology* should be also understood as *humanistic ecology*. Whereas *human ecology* is a specific science.

Human ecology is divided into four main parts: (1) Philosophical problems of human beings and humanity-related to environment; (2) Natural and socioeconomic problems of human environment; (3) Ecological problems of human biology; (4) Cultural adaptive behaviour, which takes also into consideration ecological consciousness and education for environment.

Living organisms are associated with their environments through their vital needs. These needs result from physiological and morphological adaptations, which are relatively stable through time. In order to satisfy their needs, organisms exploit their environments in particular ways. This defines material, energetic and information relationships between organisms and environment. This part of environment could be understood as ecological niche.

Adaptation of living organisms to the environment occurs at two levels: an individual and a populational. In the first stage random variation is created. This variation provides raw material for the second stage—non-random selection.

The entire process of human development is a result of adaptations to the environment. Human genome is a result of natural processes (descent, mutations, selection). The adult phenotype of human being is a result of this genetic information unravelling itself in a particular set of environmental conditions that prevailed during this person's growth and development.

Humans successfully cope with the environment for survival at least in two ways: (1) By biological adaptation of their own body, which allows for sufficient existence and procreation, (a) survival of the adequate in particular environment, (b) adjustment to living conditions and mode of life; (2) By cultural behaviour, which is realized using the following ways: (a) protection of the organism against detrimental environmental factors, (b) changes of these harmful environmental conditions into beneficial ones, (c) migration into the areas having better living conditions.

Since relations of humans with their environment and with each other have cultural as well as biological character, HE reaches beyond confines of biological sciences. It uses sociological, psychological and ethnological observations in order to study human needs in the spheres of material and spiritual culture.

Genes are the factors which direct human development, but development itself occurs in the particular environment. This concerns components which are received together by food intake, inspired air, etc. in particular climatic conditions. It also concerns social organization and style of life which influences on metabolism and on settling in components and elements of the environment. As well as certain cultural habits can cause that nutritional components are used in different way. This may influence on the gene expression. This is why human ecology and auxology should continue the common research.

Active parts of the genome still control development in changing environmental conditions. Gene structure is invariable during individual ontogeny. Somatic cells whose DNA underwent random changes in its coding portions (somatic mutations) mostly are eliminated. Expression of normal genes, however, changes as an organism develops. The mode of gene expression is a part of the process of phylogenetic adaptations consisting of activation of some, and deactivation of other genes.

Human organism is autonomic, but behaves as an open system, because a part of chemical processes necessary for its existence takes place in the surrounding environment. Civilization changes its environmental conditions of humans, culture acts as an extrabiological (extraorganic) factor. Without cooperation between natural, cultural and social factors the intergenerational changes (secular trend) can not be explained, and it would also be very hard to explain the perspectives of human development in species and society. Whether changes which take place in the secular trend phenomenon are the consequences of endogenic factors, e.g. structural changes in the human genome (caused by mutations), or this is the result of gene expression in particular environmental conditions still needs to be established. If the second probability exists, living conditions (especially nutritional

patterns) play here the most important role. Nutrition and mode of life can probably activate genes which are physically present in all people but they are usually inactive. There is a risky supposition that environment can influence on gene expression. At least food substrates may influence on genetically determined metabolic processes.

The nutritional status is evaluated by measurements of body composition, and concerns proteins, fat and mineral components of the organism, and its supply with energy and vitamins. Reproductive fitness is evaluated by fertility of each family and survival till the mean age of reproductive period. The synthetic index of reproductive fitness at the populational level uses data concerning differential mortality and fertility.

There are two phenomena observed: further social stratification caused by differentiated education and occupations and a more profound difference between rich and poor people. Instead of looking for causes of such anomalies, it seems to be more important to establish the basic needs for particular families. It is possible, that the percentage of population with basic needs covered in the whole population would be a better indicator of wellbeing. It is also possible, that the global indicator presenting living conditions, on the one hand, and biological status of the population, on the other hand, would present more objective picture showing the quality of the new generation of children and youth.

Some ethnic groups show special predisposition to particular sport achievements. This may depend on body build or its metabolism which had probably been permanently changed because of a long-lasting continuation of nutritional habits and/or style of live. If a long-lasting training starts in early childhood it may change gene expression, so the other genes are active than in individuals who don't attend this kind of training.

Developmental plasticity (the Baldwin effect) means developmental adjustment (or acclimatization) of an organism to long-lasting and/or extreme environmental conditions, which can be genetically consolidated (established). Natural selection concerns genes, but on the basis of phenotypic expression of our biological characteristics. Those expressions are responsible for our adequacy to particular life conditions (external environment). Thus, genes controlling their existence can be the base for so called preadaptation. This phenomenon creates possibility of existing "reliable systems" within "unreliable elements" (according to the von Neumann theory).

There have not been studies on human ecosensitivity, which is closely related to heterosis phenomena. Current studies have revealed that heterozygotic individuals are more sensitive to environmental factors. However, these results need to be verified. Some researchers have expressed doubts concerning existence of heterosis and homosis in humans, pointing out that the observed effect does not have the genetic origin but is rather

caused by socioeconomic conditions. Another problem, whether biological sensitivity is modified by cultural behaviour, is also very important. If so, how is this sensitivity regulated? What is the role of environmental (exogamic) factors? Lack of this knowledge disables us to direct the growth process. We do not know to what extent nutrition and physical activity may influence this phenomenon, understood as physical and psychological development.

Growth processes, in particular stages of ontogeny, are differentially controlled by the neurohormonal system. On the other hand, different stages of ontogenesis are characterized by a varying reception of environmental factors. This may depend on ecosensitivity which is differentiated between individuals and changes with age. It is also possible, that natural, social and cultural environments create separate complexes of growth conditions in particular societies and populations.

Growth processes are not monotonous. In particular stages of ontogeny they are various, even irregular for different tissues, systems and organs. The circadian secretion of growth hormone is pulsating, but rather stable, whereas increments of bones are irregular (saltatory). Child grows one day, and then stasis is observed which can last several days. Thus, the question arises how the process of growth is regulated since general biorhythms belong to endogamy phenomena? Growth is controlled differentially by the neurohormonal system, not by the cyclical GH secretion. There may exist incidental sensitivity of receptors of cells producing IGF or other target cells. During the individual development, there are problems between genetically determined biorhythms and cyclic fluctuations determined by climate or by the mode of life.

The cyclic fluctuations of natural conditions are well known. Likewise, socio-economic conditions undergo cycles of changes related to food consumption and the mode of living. All these cyclic changes became stabilized in a form of neurohormonally controlled phases of ontogeny. They are a result of both natural living conditions and the social environment of family, school, and work regulated by cultural norms and practices. Social environment changes are related to a phase of ontogeny because social rules of infants, children and adolescents differ depending on the rate and character of growth.

In the phylogenetic aspect, adaptation occurs through random mutations and recombination in the genome, but the random selection does not exist. It can also occur through alterations in activation of various segments of DNA. Even if the entire genetic material remained the same, the certain segments of DNA would be active whereas others remain inactive (or exists as junk DNA). This is sufficient for phenotypes to be different. Individuals whose active genes allow them to reproduce more effectively than other

individuals would be supported by natural selection. This leads to stabilization of various sets of active genes in various tissues in different stages of ontogeny.

Changes in the variation of body size, brain mass, etc. in the genus *Homo* during its evolution and ontogeny indicate adaptation to environmental conditions. They can be studied by observing changes in values of the coefficient of variation (CV). Although it may seem paradoxical, evolution is more efficient when more variation is generated and while environmental conditions remain stable over a longer period of time. In these conditions more material for natural selection is produced and within specific environmental conditions the process of adaptation takes place.

There is a saying that "anything can be poisonous and thus nothing is poisonous". It may have its meaning in the fact that something that is bad for one organism can be good for another. It depends on conditions in which a particular organism evolved and what was its usual nutrition. For example, some mushrooms are poisonous for humans while others are not because they synthesize chemical compounds to which humans are adapted. We are now facing a problem of transgenic plants. If they do not synthesize chemicals that humans are not adapted to, there should be no danger in eating these plants or their products. Since, however, transgenic plants can produce substances to which we are not adapted, the results of digesting them can be unpredictable, and thus also, possibly, detrimental. There is a probability of allergic reactions. It is also a risk that some new genes can be included to the human genome, but the possibility of permanent existence is rather low.

The background for the presented phenomena concerns mostly the changes in the surrounding environment caused by the anthropopressure. The main aim of science is discovering and summing up all technological achievements, which serve in the verification of knowledge processes. The process of cognition realized by scientific methods can not be a tool only for a professional researcher. Increasing of leisure time means that scientific inquiry can be a way of self-realization of each intelligent human being.

How should we use scientific knowledge called human ecology to the best advantage of humanity? We cannot say probably, we must be sure! In an animal body a culture creator evolves. I would like to ask: *Quo vadis homo sapientissime?*

Because we are progressively exposed to environments altered by human activities or created by humans in their entirety (technological environments) and to highly processed, including transgenic foods, it is of utmost importance to study the influence of socio-economic factors upon human individual organisms and upon human populations. Earlier humans did not, probably, realize the continuity of time, but rather thought it to be cyclical as evidenced by diurnal and seasonal rhythms. Thus human life was perceived as a closed cycle from

birth to death, increase and decrease. Linear concept of history is relatively new.

There are seven of the most important contemporary directions of research: (1) Energetic economy of human populations from the point of view of survival and reproduction, (2) Adaptive changes in phenotypic and genetic variability in the phylo- and ontogenetic perspective, (3) Phenomena of demographic and epidemic transitions, and their relation to environmental changes, (4) Environmental pollution and its influence on human health and wellbeing, (5) Transformations of living conditions, antagonisms between city-village dwellers and between social strata, and their influence on biological status of human populations, (6) Evolutionary and behavioural problems of human ecology, (7) Bioethics.

In my opinion, the most urgent goal of future research in human ecology is to find answers for following questions: (1) What is the cause of diurnal, occasional steep changes (saltations)? (2) Can gene expression change during individual life and to what extent such changes can be inherited? (3) How environmental pollution and accumulation of gene mutations may influence on future of humans and humanity? (4) To what extent genetic load would be eliminated without medical care?

The only objective way to register the influence of environment (living conditions) on humans is evaluation of their biological status. The health is not only the lack of diseases, but should be understood as fully psychophysical wellbeing. We can measure the health status using negative (ill health) and positive (good health) indices. Existence of diseases (registered as frequency of illnesses, or causes of deaths) is included into the negative indices of health. The positive indices of health (psychophysical status and fitness) are more objective.

To understand processes described above, studies beyond cross-sectional surveys of biological characteristics are necessary. Demographic changes that occur on the population scale where social, economic and political factors play an important role, are also very decisive. They are important for adaptation to the environment of modern humans. Knowledge about these phenomena should be proliferated through all levels of the society, starting from university education.

There are several educational programs in human ecology on the university level. One of them has been realized since 2000 in the Cardinal Stefan Wyszyński University, Warsaw, Poland includes:

Part A. The subject and area of human ecology (definition and history of human ecology, methods in human ecology).

Part B. Biological adaptive changes (Life strategies. Conditions and factors of human

life. Reversible adjustments. Nonreversible developmental adjustments. Adaptation at the population level. Biological status of human populations).

Part C. Performances of existence (Human origin and evolution as adaptive effects. Anthropogeography. Environmental physiology. Human settlements. Urbicenos. Region, settlement and family as environment for human development).

Part D. Cultural adjustments (Cultural adjustments to various biomes. Civilization as the adaptive strategy. Urban-industrial civilization and environmental problems).

Part E. Biocultural problems (Ecology of nutrition. Ecology of health and disease. Future [Environmental consciousness—Education to environment—Ecological aspects of bioethics]).

Part A

Rate of growth: occasional or cyclical
(oscillatory) fluctuations



