

The Human Ecology

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This publication is an extensive study involving over thousand pages devoted to human ecology as an interdisciplinary concept. It consists of two volumes, the first of which is entitled – »Sensitivity to the environmental factors and biological adaptable changes«, while the second one – »Evolution and the biocultural adjustments«.

The first volume of this study deals with the biological principles of relationship between the human and his life environment. In the first part of this book (chapters one and two), the author explains the meaning of human ecology as a science and the scope of its research field. He presents also the procedures of data collection and analysis and shares his remarks on the problem of correct statistical data analysis based on real life cases. The second part of this publication deals mainly with the mechanisms of adjustment in human organisms to environmental conditions active during ontogenesis and the genetic adaptations described on the level of population. Each of the presented problems is depicted in a comprehensible and interesting way. The author refers to the most current state of knowledge and acquaints reader with his own opinions, provoking some reflection on the discussed matters. The third chapter deals with the human organism sensitivity in different periods of its' development to environmental factors in dependence on their time of duration and strength. The biological strategies and cultural adaptations of *Homo sapiens* to the environment are presented here too.

The author's reflections included in fourth chapter concerning the endogenous factors shaping the human organism deserve reader's special attention. The newest results of molecular genetics researches point to the existence of an additional to the DNA sequence form of heritable information, which is an »epigenetic« information associated with chemical modification of the chromosomes. The active forms of RNA coded by introns (so-called »junk« DNA) can help to regulate this kind of heritable information. Currently, it is already known that some changes in epigenetic information can be inherited by offspring. Therefore, the author's suggestion, according to which the causes of human organism diversity

should also be sought outside of the differences in the DNA sequence that contains blueprints for proteins seems to be well justified. The molecular genetics consider that results of their future researches will enable them to construct a detailed theory that will explain how DNA, RNA derived from so-called »noncoding« sequences of DNA, and the epigenetic machinery (information that resides in the chromosomes but outside the DNA sequence) all fit into self-regulating system. The author's reflections regarding the presumption, that in case of humans we couldn't exclude the possibility that a one-off environmental event could influence phenotype for more than one generation, are in accordance with the most recent trends of molecular genetics researches trying to establish whether this phenomenon is possible in humans. The chapters fifth, sixth and seventh of the first volume deal with characteristics of reversible and irreversible adjustments of human organism to environment and adaptations concerning changes in our species gene pool.

In the third part of this book including chapters eight and ninth, the problem of human biological condition is described. It includes the evaluation of health, nutrition, reproductive abilities as well as various aspects of the climate impact on human organism. The author's suggestion that in case of highly industrialized communities we should use multifactorial measures of the population's biological condition due to the possibility of the over-adjustment to polluted environment, seems to be very important.

The second volume of this book is an extensive description of biocultural human adaptations to environment and is addressed mainly to the persons interested in cultural and social phenomenons. The culture is considered here as a way of adapting to some specific conditions of environment, understood as territory of *Homo sapiens* subsistence, but also as a society, with human as its component. This volume is organized in three substantive parts.

In the first one, author refers to our evolutionary past and emphasizes the meaning of biological basis of human social and cultural behaviors shaped by evolution as a re-

sult of natural selection. He describes the development of settlements systems and their meaning as environments of human existence. The first chapter mainly deals with emergence of *Homo sapiens*, evolution of specific for our species bipedal locomotion, big brain and the problem of acquiring abilities of making tools and verbal communication. Some changes should be introduced to the text concerning for instance the possible habitat where bipedality could have emerged and the way of locomotion in australopithecines. The members of the genus *Australopithecus* showed combinations of primitive and derived traits relating to both terrestrial and arboreal locomotor behaviors; but the mode of their locomotion still remains the subjects of many debates. The corrections should be provided in data regarding the emergence of the ability of organized hunting on the big animals in hominins, the geographic distribution of Neanderthals and their way of life. Some information relating to dating of the earliest fossil *Homo sapiens* remains discovered in different parts of the world should be updated. The part of this publication concerning evolution of the large brains in fossil human beings, could be enriched by the description of »The Social Brain Hypothesis« which is currently regarded as one of the most probable. According to that hypothesis, the degree of complexity of social interactions between the members of our early ancestors' populations was a very important factor influencing the force of natural selection preferring the enlargement of the brain in hominins. This example could be a good illustration of the biological importance of the human social environment. One should point out, however, that the suggested changes apply to only one of many chapters and they do not diminish the significance of this extensive study, which is a very interesting interdisciplinary depiction of the human ecology issue. The chapters two and three of the first part of the volume two mainly deal with different types of settlements systems, with the reasons of their rise and with the family as an environment for human life and development. The author very interestingly describes the urbicenos of a town demonstrating its similarity to a natural ecosystem displayed by the flow of energy, matter and information, as well as an artificial system without the ability of self-regulation (ecological equilibrium) in which human is not a part of a food chain. The comments concerning the risks resulting from human subsistence in urban environment being a system of »disturbed equilibrium« as well as the meaning of prevention associated with shaping the way of living of human populations and the optimal conditions of their places of existence (microclimate of the town – flats, work places, public transports) are especially valuable. The author emphasizes that the human migration to towns contributes to the increase of the marital radius and the heterozygosity of their inhabitants, which, in consequence, manifests in increase of their offspring' sensitivity to environmental factors. He points out that so called »assortative positive mating« of the spouses is like a mechanism protecting against to high heterozygosity of large populations, and that it is probably significantly determined biologically. The results of researches

encompassing human populations and concerning relationships between major histocompatibility complex (MHC) and the choice of sexual partners could make for an interesting reference to this problem.

The second part of this book concerns human cultural adaptations to living in different biomes. The culture is depicted here as a source of self – regulation mechanisms operating in human populations. On this background the similarities and differences of the human communities living in various parts of the world are described in relation to cultural behaviour of their ancestors. The urban-industrial civilization is characterized as a new system of adaptations to the living conditions of many human communities unfortunately connected with the degradation of natural environment. The author describes the culture as the material and symbolic properties of humanity which allow for non-biological adaptations to environment. He pays attention to the evolutionary mechanism of culture which is based on changes of knowledge and traditions creating the pool of mems (analogous to a pool of genes). Chapters four and five of this work mainly deal with cultural behaviours as showing similarity to the biological adjustments, which protect the human organism from influence of some environmental factors. The author stresses the meaning of cultural adaptations to environment as a phenomenon significantly constraining the biological adjustment. It should be emphasized that even though we observe such a great development of cultural behaviours, the human biological evolution is still an ongoing process. Negative results of social progress including the unequal access to material goods of the representatives of individual social strata are among the most important problems described in this part of the book. There is also a proposition of the optimal strategy of civilization development aiming at survival of our species. In the sixth chapter, author formulates a detailed characteristics of the types of urban-industrial environmental pollutions negatively influencing the human health. He focuses on the necessity of spreading the knowledge about the problem of pollution and the scale of its effects on the human organism. He stresses that anthropo-pressure is the inevitable problem, and therefore we should remember that the changes regarding environment of human existence should not exceed the limits of tolerance for our species.

The third part of this publication contains mainly a description of two biocultural problems of the humanity: food and health. In the seventh chapter, the issue of human population nutrition was depicted in many aspects eg: the needs of a human organism, the relationship between the way of living and nutrition, the influence of the nutrition on the human organism growth. A characteristic of Poland on the background of other countries concerning quality of food and biological condition of human populations is quite interesting.

In one of the subchapters, author refers to the nutrition in hominins, describing among other things the diet of australopithecines, Neanderthals and the dietary behaviours of these fossil human beings. An interesting ad-

dendum to this issue could have been some information regarding the results of chemical composition analyses of the robust australopithecine teeth showing that in addition to plants they consumed meat. It would also be valuable to mention the reconstructions of the Neanderthals' diet – using stable carbon and nitrogen isotopic signatures of their bone collagen. But the main aim of this chapter is to emphasize the changes in human nutrition that occurred within the space of two eras: the pre-industrial and the industrial one, and to point out the risks stemming from these changes. The part of the eighth chapter dealing with the health conditions and the reasons of illnesses prevalent in Poland, presented by the author on the background of others countries can be found very interesting, too. The last chapter of the sec-

ond volume is a peculiar kind of crowning of this publication including predictions concerning changes of our environment in the future and calling for sensible and conscious management of our planet's natural resources, that can be made easier with the knowledge of ourselves.

The Human Ecology by Napoleon Wolański published in two volumes is a very valuable scientific position including a lot of author's reflections and suggestions basing on his long-term experience resulting from his many research works. This publication should be the basic textbook for students of many specialities, especially of Human Biology and of Environment Protection. The book is also highly useful for scientists seeking to understand human being in the aspects of its biological and cultural relations with environment.

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