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MAIN QUESTIONS OF THE THEORETICAL BASIS OF THE HUMAN EVOLUTION INVESTIGATIONS

ABSTRACT. — *The original comprehension of the hominization process as of a process limited only to the origin and evolution of the species Homo sapiens has been nowadays defined with more precision and extended to the whole evolutionary process from the origin of anthropoid apes over the origin and evolution of hominids till the modern man. However, the problem to be solved became so complex that it requires an extensive co-operation of specialists not only from biological disciplines, but also from other natural and social sciences, including philosophy. Together with the increase of the complexity and exactness of the research also the need to solve basic methodological problems is enhanced. The most important shortcomings can be seen in the structure and methodological correctness in the construction of hypotheses; they result first of all from the fact that the relation of the organism and environment and the role of internal properties of the organism (properties or complexes of features general in the framework of the given species or higher systematic units) in the evolution of the given line are not clear. For further, more detailed, studies of the hominization process it is essential to comprehend and correctly analyse the importance of the role of definite complexes of factors, which are the basis of the following four main factors of the hominization process: the bipedal locomotion, the brain of the hominid type and the hand-brain complex, material culture, hominid social organization developing into the human society.*

The process of anthropogenesis, i.e. the process of separation of man from the rest of the nature, was first studied on a general philosophical basis by Friedrich Engels (Engels 1876). The disadvantage of the Engels' period was the shortage of data on the evolution of man and other hominids. The gradual development of the still valid Engels' ideas and the deep understanding of the basic factors of the process of hominization should be based on data provided by paleontology, archeology, primatology and the advanced biological research of the contemporary human populations. Since the Engels' times and since the first finds of fossil hominids (the Neanderthal man, Pithecanthropus), when only the last stage of the process of hominization has been known (i.e. the evolution of the contemporary man), our knowledge on the duration and the character of the process of hominization considerably changed. The concept of hominization started evolving only with the beginning of the rapid development of paleontology some fifty years ago (Olivier 1973, Wolpoff 1971, Isaac 1978). Today, the concept of hominization includes evolution of all hominids and their

direct ancestors; this evolution lasted at least 14 million years (Simons 1976, Pilbeam 1980).

Hominization represents a complex process the investigation of which necessitates cooperation of specialists from many fields of natural history and social sciences. The most serious obstacle of a sufficiently effective cooperation of specialists from these two basic fields of science seems to be the entirely different approach to the solution of the problem. From this follows the poor level of the philosophical, psychological and sociological studies dealing with the process of hominization. On the one hand, the studies are based on inadequate and often obsolete data, and on deep-rooted erroneous theories which have already been rejected by the contemporary science. On the other hand, many studies represent detailed analyses of some very special findings of, e.g., the contemporary paleo-anthropology; these synthetic studies usually exhibit shortcomings of the methodological character.

The contemporary anthropology provides a large body of information. However, the obtained data are used for the formulation of either some partial

theories, which are out of context with the general ones, or general theories which treat inadequately both the key aspects of the problem and the available data. This situation can be illustrated by some theories of the contemporary anthropology.

The character of the available paleoanthropological data renders possible formulation of several hypotheses which may be antagonistic each to other (Pilbeam 1980). Using only a given set of data one may not be able to select the correct one. This situation cannot be solved by a formation of superstochastic models in which all hypotheses are treated as equivalent. The superstochastic models can be used only at a certain stage of the formulation of different theories, and may serve as an intermediate basis for the further research. We should, however, select the hypothesis which is from the point of view of the general logic of the evolutionary process (including the process of hominization) the most probable. After all, not all of the formulated hypotheses are realistic. With the inflow of new data some theories will be rejected, while other ones will converge to a commonly accepted theory.

A common shortcoming of the contemporary anthropological theories is an overestimation of some features exhibited by the fossil material. Such faults may be found even in some relatively good and logically constructed theories. For instance, Jolly (1970) overestimated the significance of the most often found parts of skeleton (i.e. teeth and jaws) and formulated theory on the crucial role of the type of food in human evolution. However, food represents a factor of the selective pressure (i.e. factor of a given ecosystem which gives direction to the further evolution), not the basic factor of hominization (i.e. not the internal factor represented by certain protoadaptations). The basic factors consequently rendered possible evolution of specifically human factors in a very varied scale of ecosystems. The properties of organisms undergoing the process of hominization were, of course, formed by the preceding evolution of primates. It is methodically advantageous to treat certain properties of an organism as set of internal properties (or internal factors). This should be done in spite of the fact that the organism represents a product of the preceding evolution, i.e. the product of a continuous process under the effects of external factors of the process of hominization. The internal factors of hominization therefore represent certain morphofunctional units which are substrates of potential functions, and which interact both mutually and with the external factors of the environment. In the logical reconstruction of the process of hominization the initial morphofunctional state could be denoted as a necessary protoadaptation.

We do not know which of these complexes of analogical features of pongids and hominids are due to their common origin, and which are due to the convergence under analogical evolutionary selective pressures.

The basic factors of the process of hominization may be arranged into four categories:

1. The bipedal locomotion as the locomotor type;
2. The hominid-like brain and the hand-brain complex;
3. The material culture and
4. The hominid social organization developing into the human social organization.

The following studies by the authors of this paper expand the ideas of the original study (Vančata and Přivratský in press) and analyse both the factors of the process of hominization and the mechanisms of their effect as well as methodological approaches to the investigations of human evolution.

NOTE

The term of protoadaptation is used in the morphofunctional sense in order to distinguish it from the term of preadaptation used in the mutational or genetically-ecological sense (Georgiyevskiy 1974, Tsaragorodtsev 1975).

REFERENCES

- ENGELS F., 1876: *Anteil der Arbeit an der Menschwerdung des Affen*. Read in Czech edition K. Marx, B. Engels, Spisy 20, Svoboda, Praha 1966, pp. 452–463.
- GEORGIYEVSKIY A. B., 1974: *The Problem of Preadaptation*. Publishing House "Nauka", Leningrad (in Russian).
- ISAAC G. L., 1980: Casting the Net Wide. In: Lars König Königsson (ed.) *Current Argument on Early Man*, Pergamon Press, Oxford: 219–254.
- JOLLY C. J., 1970: The Seed-Eaters: A New Model of Hominid Differentiation Based on a Baboon Analogy. *Man*, 5: 5–26.
- OLIVIER G., 1973: Hominization and Cranial Capacity. In: M. H. Day (ed.) *Human Evolution*, Taylor and Francis Ltd, London: 87–101.
- PILBEAM D., 1980: Major Trends in Human Evolution. In: Lars König Königsson (ed.) *Current Argument on Early Man*, Pergamon Press, Oxford: 216–285.
- SIMONS E. L., 1976: Relationships between Dryopithecus, Sivapithecus and Ramapithecus and their Bearing on Hominid Origins. *9e Congres UISPP, Nice 1976, Colloque 6* (Prétirage), Paris: 36–59.
- TSARAGORODCEV G. I., et al., 1975: *Philosophical Problems of the Theory of Adaptation*. "Mysl", Moskva (in Russian).
- VANČATA V. and PŘIVRATSKÝ V., (in press): Some Important Trends in the Process of Hominization. In: P. K. Seth (ed.) *Perspectives in Primate Biology*, Academ. Press.
- WOLPOFF M. H., 1971: Competitive Exclusion among Lower Pleistocene Hominids: The Single Species Hypothesis, *Man*, 6: 601–614.

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