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GEOLOGY IN AN ANTHROPOECOLOGICAL CONTEXT

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ABSTARCT
The text of the scientific contribution is an attempt for summarizing a situation of issue, which has been standing in front of geology for the last three decades. The methodological framework is explicated, in the parameters of which geology is searching decisions for the issues claimed by recent scientific knowledge and practice. Possible productive decisions are searched in direction of ecologizatiion, and therefore accelerated theoretic development, demanded by geology today.

Estimations, provided by the most outstanding methodologists of science about cognitive concept in geology have amazingly been coinciding for the last three decades. For that period of time, by means of methods-intermediators shared by other fields of science (physics, chemistry, biology etc.) geology has accumulated an impressive massive of empirical knowledge. At present that methods are applied for realizing more than 80% of its epistemological potential, which on its own behalf supports tendencies for "subdividing" among its derivative and interdisciplinary branches as geophysics, geochemistry etc. More and more often that makes us think about geology not as a homogeneous science but rather as system of scientific branches. Domination of above segmenting processes is explained by the visible retardation of geology from other sciences in the process of theoretic development, in spite of emphatically comprehensive character of knowledge, which it deals. Professionals claim that recently functioning in geology paradigm belongs to the 19th century, and the most pessimistically inclined people compare it to physics before Newton. An eloquent example supporting the above statements is the discussion about issue of time in geology, which refer to the seventies of the past century. That issue most often stands in front of geochronology, historic geology and stratigraphy, usually, when lithological and paleontological rock properties are being analyzed and interpretations of time resemble to Newton physics. If level of theoretic development in geology is compared to other sciences, it retards with nearly 20 years from geography, 50 years from biology and in its cognitive situation it is similar to archaeology. Reasons for slow process of theoretic development in geology are various, both of empirical and theoretic nature. Let us draw the attention on the most often mentioned ones!

In geology, there is no concept for "scientific fact", which brings us to the conclusion that on one hand the fundamental facts are an immense quantity, and on the other hand a very precise selective attitude towards them is needed to determine those to be the basis of theoretical development. For each science one of the compulsory steps toward theoretical development is inventory list of registered statistical dependencies. However, in geology there is no statistical arch, as in many of the cases for both observation and experiment as a method, there is neither recoverability nor inter-subjectivity. Applying of experimental methods into geology is rather limited, as there is no theory of similarity, developed purposefully for the geologic experiment. The theory of similarity is the one used in physics. Similarly to chemistry, geology suffers the same difficulties due to the fact that experimental data and dependencies specified for negligible quantity of substance are adapted and transferred for large geologic forms. Systematic properties of the object go into the "game" and linear equations from the theory of similarity become almost non-applicable. Experiments are often not directed to search of dependencies in behaviour of substance in the geological process, but to recovery of peculiarities of a specific geologic object, which gives an illustrative meaning to the experiment etc. Up to now, mineralogy occupies the leading position in theoretic development of geologic knowledge for a number of reasons, not the last of which is precise observation and instrumental investigation of crystals. There are researchers, who make the uniqueness of geologic objects absolute and believe that only their individual investigation and description is possible. That involves idiographism. Thought constructions in geology, which correspond to strict requirements for a theory are very few, in spite of the abundance of global concepts – for the last two hundred years they are more than hundred3 together with their versions. Special attention should be paid to cognitive functions of classifications. For geology they are the same that equations are for physics and professionals believe that the moment has come for transforming from an instrument for pure empirical investigations into a portion of theoretical apparatus in geology. The issue of concepts and terminological systems applied is nor satisfactorily resolved. V. J. Zabrodin denotes the language of geology as "soft" and the synonymy, polysemy and homonymy are widely applied. (Zabrodin, 1985). For that reason, numbers of outstanding scientists in the field of geology have to incorporate vocabularies in their principal

essays. That issue relates to the extensive development of specific editions of encyclopedic-regulative type about "language" of geology. Here, I dare ask a provocative question – whether some of the disadvantages under certain precondiions will become hidden advantage, which is a prerequisite for the theoretical development of geological knowledge?

The most up-to-date issue of our time, which is directly projected on cognitive situation in geology is the environmental one, and in the focus of their general interest is the impact of anthropogenic factors. Principal features of geological picture exert certain changes under the effect of anthropogenic factors. Even new scientific trends originate – for example "anthropogenic landscaping".

How does ecology refer to those changes? The statement that it originated as a science of biospherical cycle is ordinary (E. Hekel). If dealings with autoecology, synecology, paleocology, evolution ecology, dynamics of populations etc. belong to the boundaries of ranges of biological, but applied ecology approaches to it differently. The first to specialize in studying the role of human in the biospherical cycle are the French School of "geography of man" and the Chicago Social School of "ecology of man" (social ecology). They derive important scientific results at the end of the 2oties, and in the middle of the century the concept that "ecology of human" 9applied ecology) has the subject of interactions between humans and environment is generally accepted (Man's role…, 1956). In his attempts to divide the interaction between human and nature into periods, M. F. Green speaks about a stage of passive adapting, stage of active use of natural resources, stage of transformation and global reconstruction. In the last stage mankind has to recreate the biospherical equilibrium – a precondition for its own existence, which has already transformed the ecological crisis into a global one for the 20tieth century. Today the anthropogenic monitoring is a normal practice not only in industrially developed countries. "Technogeneous" factors of the crisis are in the centre of ecological interest. In their functions the natural sciences are crucified between nature and economic activity of society. Turned to nature they have to speak in a "biotic" language, turned to industry – in "abiotic" one. That condition directly resulted from the following tendency - reasons for the crisis to be reduced to dividing the ecosystems and their fragmentary interpreting and exploitation in industrial scale. There is no doubt, that whether in a comprehended manner or not, important portion of ecosystems are laid down in scientific research itself and in the implementation of scientific product in practice. Usually, that is the result from asynchronous development of separate scientific trends. Outstanding ideas are being developed вto their applied version and put into practice, while means for neutralizing the undesired by-product effects are in the "powers" o another science, which is retarding in that point of development. B. Commoner gives the example with chemists, who synthesize intensively the branched chains of detergents, while at that moment the biochemists do not have a decision for their extreme resistance in the eco-systems (Commoner, 1972). That situation itself involves the requirement that scientific findings have to be assessed not only froma point of view of their interventing functions into nature but also from a point of view of suggested environemntal alternatives. To the term "nature-use", which was put into circulation in the 70ties, and adjective "friendly to the environment" was added. The ambition for friendliness to the environment (biospherization) of technological contact with nature gradually comprised the sphere of scientific research, education and to different extents the human sense. The economical point of view as a point, possible from each human activity also metamorphosed in the direction of friendliness to the environment. The "environmental economy" appeared (Henning, 1974; Kula, 1992), which affords an advantage to environmental advisability icompared to pure economic efficiency, and the concept that we all dwell a common home (oikos) gave birth to the oikonomia (Hessel, 1999). Methodologists recommended that synthetic style of thinking should be applied, in priority, to the scientific research and based on an integration of sciences, optimally applicable to accept integrative functions not only within the range of natural sciences but also in social sciences. The question, whether ecology is able to solve that task alone puts it at a cross-point. Being a young science, its attempts to resolve issues alone bear the risk of nature-philosophic speculations and conflict of interests between it and other scientific directions. At this stage its applying to a universal general scientific approach of regulating functions for development of scientific knowledge seams more productive.

Man authors declare that status of geologic-geographic knowledge is extremely enhanced. As a tradition geography studies the biosphere applying a comprehensive approach haing in mind the natural conditions for recreating activities of mankind. With this function it occupies the central position between the so-called natural and social sciences. The subject of geography covers significant portion of exogenic processes, corresponding to conditions of existence of mankind, however endogenic processes as magmatism, metamorphism, tectogenesis, geomorphogenesis etc. stay outside. In the direction of natural sciences the closest position to physical geography is occupied by geology. It is logically to pose the question – isn't this a chance of "Cinderella" to become a "princess", or as it was formulated above – whether established conceptual disadvantages of geology would prove to be its hidden advantages? It does not have a fragment of the whole. but a specific in its completeness subject of study – the material-energy system of "the Earth" and development of lithosphere in its interaction with hydrosphere, atmosphere and upper mantle. Its subject of study genetically focuses into the common points between different parts of natural sciences of one side, and between natural and social sciences on the other side (geology of the Quaternary). As a result, geologists from the most developed industrial countries, consider as especially prosperous the investigations directed to interaction of geological processes and anthropogenic processes (Watrina, Bottino, Morisawa, 1975). In its unity the gnetic and systematic approach provide a synthetic style of thinking, and the experience of geology in its aplication is extremely wide. It has even maintained the romantic "habit" to keep its subject for observation, if possible. Those are the reasons, which gave birth to the expectation for a forthcoming ecologically initiated growth of geological knowledge, growth suggesting a new type of conceptualization in geology as a science. The environmental issue is not only an ontologic reason, but also a epistemologic framework, where that growth is possible. Ecologization of geological knowledge would rather be limited to its content upgrading on the account on axiomatic categories or categories from other fields of knowledge

"loaded" with new specific for geology meaning and significance. It is expected to provoke purposeful changes in the structure of scientific knowledge, to change the rates of their growth. Thus an immense conceptualization has the chance to overcome centrifugal processes in geological knowledge and make it more human. (Elliot, 1993).

As a conclusion – ecologization of professional thinking and behaviour is the major tendency, claimed for geology as a science, necessity of accelerated theoretical development and individual conceptualization. Resolving of that issues would bring us before a qualitatively new system of geologic knowledge.

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