

# ISSA Proceedings 1998 - On The Role Of Ethical And Axiological Arguments In The Modern Science



Can the modern science remain “neutral” with respect to ethics and values? The last decades have shown this question to become an object of intense discussions. The involvement of a man in understanding such complex objects as atomic energy, unique objects of ecology, gene engineering, microelectronics, informatics, cybernetics and computer technology which a man himself is involved into as well as wide introduction of robots and computers in manufacturing and various life spheres of a man and society make the thesis of “ethic neutrality” of modern science questionable. The natural scientific knowledge nowadays is much more closer to humanitarian sciences in terms of investigation strategy than in the previous periods of the history development. The fabric of the modern natural scientific knowledge search is enriched with categories of duty, moral, good, values, etc. unusual to traditional approach.

The mechanisms transforming the ideals of the scientific knowledge argumentation enter the science more intensively in the second half of the XXth century by developing the noosphere concept and ideas of non-linear “highly unbalanced” thermodynamics, synergetics, modern cosmology and by expanding the system and cybernetic approaches, ideas of global evolutionism and the so called “antropic cosmological principle”. Some of these concepts are considered hereafter in order to highlight the modern science specific features.

The application of “man-centered” arguments and parameters is distinctly observed first of all in the noosphere concept of a well known Russian scientist Vernadsky that is based on the integrity idea of a man with the outer space as well as on the modern science integrity where the borders among its individual branches are obliterated and the specialisation takes part rather by problems than by certain sciences. Vernadsky wrote in 1926 in its work “Thoughts of the modern meaning of the history knowledge” that “the XXth century brings increasing radical changes in the understanding of a new time”, that it is a time of “an intensive reconstruction of our understanding of the World, ourselves, our

environment, search for the sense of being". These processes connected to the revolutionary changes and developments in physics, chemistry and astronomy change not only our notions of the matter, energy, space and time, but they represent also a specific turn of the scientific creative work in the other area - in the area of "place understanding of a man within the World order created on the scientific basis". What consequences and regulation means which go beyond the scientific notions are formed within the noosphere concept and form new ideals of World understanding and search for the sense of being. First of all, the task to build a world by renouncing a man himself and attempting to find any world understanding independent on the man nature is above the man's power, it is illusion. An observer himself, a subject, is obviously incorporated in the picture of the reality under study, in the Nature itself.

The noosphere is only a new qualitative state of biosphere where the man's intellect is called to play the decisive role. By bringing the intellect, reforming activity, thought and science, a man becomes a geological factor capable to effect the planet geological processes. Since the biosphere like the planet as a whole were formed under the joint action of both the earth and the space forces, a man himself is a creation of the earth and space forces capable for taking the whole-planet decisions in their scientific, cognitive and practical activities. Following this notion, the idea of a man domination over the Nature, the consideration of the latter as a subject independent on a man is naturally replaced with harmony idea between a man and the Nature, a man and the space and with the mankind responsibility increase for the Earth's subsequent evolution - in the favour of survival and faster formation of the noosphere within the whole planet and in every area.

Thus, the "object-based" understanding of the scientific knowledge is insufficient and even impossible from this point of view. It is "build over with" a subject-based, value-based component. The arguments themselves used in forming the modern scientific picture become axiologically filled since a man must think and act in the planet aspect. "Pride and independent" ideal of the scientific rationality of classical science where every object steps out as given by itself and not depending on an observer's (cognition subject) point of view is transformed into the non-classical ideal within which a man (cognition subject) is incorporated "into" the Nature, biosphere with its value-based and world outlook concepts.

All this results into the humanisation of science and its argumentation ideals since

a man himself, way of his living activity, his existence within the biosphere, influence on the latter and its preservation become the most "valid" arguments and acquire the whole-planet, space character. A man's intellect implemented in the scientific thought is intended for the substantiation of the integrity idea of a man and the biosphere, their harmonisation and mutual independence, purposeful development of biosphere. All this must provide further development of our planet, otherwise the civilisation will disappear from its surface.

Let us notice that Vernadsky's teaching of the noosphere is largely bound by the "Russian cosmism" heritage which is clearly and convincingly expressed the humanistic values forming the very basement of European civilisation. Many representatives of Russian thought caught the rupture between the rational "cold" seeing of the World and the existence of a man's "Me" and his presence in this World.

The introduction of "man-centered" approaches and arguments into the modern science and culture occurs due to investigations carried out in the area of unbalanced process thermodynamics and the term of "arrow of time" was introduced into the scientific knowledge structure. H. Haken suggested the term of "synergetics" for a new science that studies a joint action of many sub-systems with different origins. The result of such an interaction is the formation of a structure and a certain functioning.

The long dominated idea of self-organisation belonging to living systems only lost gradually its position under the pressure of the data accumulated, thus indicating the origin of the order from the chaos, the formation under certain conditions of new structures and self-organisation in non-organic systems too. At present, various scenaria of self-organisation are considered in a wide range of non-balanced physical, chemical, biological and social systems: in physics (hydrodynamics, lasers, non-linear oscillations), electrical engineering and electronics, chemistry, biology (morphogenetics, dynamics of populations, evolution of new kinds, immune systems), general theory of computing systems, economy, ecology, sociology. The modern science shows that exposure of such regularities in different areas leads to a substantial reconstruction of our conceptions of the world, of ideals and means of the scientific knowledge substantiation and signifies the dialogue renewal of a man with the Nature and society.

The main features of self-organised systems are their non-linearity, stochasticity, irreversibility, irrecurrability, availability of numerous sub-systems, openness. The

thoroughness of these features revealed in different areas, biological and cosmic facts as well as the data on irreversible processes in the sphere of elemental particles change revolutionary our concepts of the world. Let us consider the behaviour description of such systems in terms of “unbalanced thermodynamics” and synergetics in order to clear up why in studying the complex self-organised systems it appears the need for real conceptual changes, for revision of accepted schemes of the scientific knowledge argumentation. The open character of an overwhelming majority of systems in the Universe and the presence of a large number of sub-systems within their structures lead to continuous fluctuations, i.e. occasional deviations of parameters from their average values. Sometimes individual fluctuations or their combinations may be so strong that the existing structure doesn't withstand and decomposes. It is impossible to forecast at such turning moments (bifurcations) what direction the further development will move in, what state the system will pass into, what structure version will be “selected” by the system.

Based on the functioning analysis of self-organised systems, the modern science has made the conclusions as follows: The transfer from the past to the future (“arrow of time” manifestation) happens through the sufficient manifestation of chance and by passing from instability to stability, “order”; Determinism manifests itself in such instable systems in some cases only to counterbalance the rational model of dynamics where determinism is considered the inevitable consequence; In the situation when the former order and the structure based on it is “impaired” enough and the system is far from being balanced, even very weak fluctuations (i.e. occasional deviations or perturbations) are able to amplify the wave that can crush the previously formed structure; In accordance to functioning principles of self-organised systems, the modern man faces the need to “play through” properly possible ways of complex systems development, to analyse the reasons of their instability, to realise consequences of a man's intervention into the development mode of many natural (ecological, for example) and social (for instance, arising on national or religious basis) processes; The analysis of arising questions and possible answers is also required in studying the unbalanced systems. What will happen if ..., what price will to be paid for restoring the order from chaos, what will be the influence on the system of such a “weak” effect as ..., what is the importance of what will be lost and what will appear if ..., — questions of such a kind indicate the necessity to reject position of implicit “manipulation” and strict control over the study systems (both natural and social); “The freedom of choice” and chance are the inalienable concomitants of complex objects as if

consolidating the structure of the latter.

The specific properties of complex statistical systems appear in it as a result of the increase of “degrees of freedom” and interaction among the system elements. Since a chance is an obvious and sufficient development factor of natural and social objects, the freedom of choice is determined by understanding the extent of its possible and occasional ways of formation rather than by realisation extent of unrealised yet reality (i.e. future). And even through the areas where all processes are traditionally considered prearranged by the initial conditions, chance and uncertainty act as necessary parameters of physical objects, their significance in social and humanitarian environment is even higher since here we deal with a man whose language “makes him capable to perceive an infinitely large number of versions of the past and the future which he may be afraid of or wait with hope”. The development of thermodynamic and synergetic approaches leads to synthesis or integration of physical, chemical, biological and social components as self-organised systems displaying their own “histories”, trends and transformation irreversibility into the interconnected and interconditioned system.

The interconditionality ideas of a man and Universe, the data synthesis of elemental particle physics, molecular biology and cosmology of a “young” Universe have led to the origin of “antropic argumentation” and “antropic arguments”. Formulated in 1973 by B. Carter, the “antropic cosmological principle” analyses realisation conditions of the Universe real history, i.e. it deals with the system origin and conditionally of the Universe regularities which determine its structure and evolution. Thus, if all the laws controlling the process of the matter self-organisation within the Universe were different we just shouldn't appear in it. Everything happens in the World as it is due to our presence in it only. That “delicate” situation which shows that almost impossible logical possibility of Homo sapiens appearance and that the conditions of the Universe historical evolution were “assured” by the system of physical laws and by the knowledge of natural conditions to a high degree of accuracy has found its reflection in formulating two versions (weak and strong) of the antropic cosmological principle. What is its essence?

The first version asserts: our position in the Universe is undoubtedly favoured in the sense that it must be compatible with our existence as observers. The second version says: the Universe (and therefore, the fundamental constants which it

depends on) must be such as to allow the existence of an observer at a certain stage of its evolution.

The modern science within the limits of “anthropic cosmological principle” faces the following questions: either a “thin interlayer” of physical parameters is a “happy chance” providing the necessary conditions for the formation of highly organised structures, life and intellect? Either the “reason-based argumentation” explaining the connection between the presence of rational creatures in the Universe and the physical parameters of our World is sufficient or not? Is the Universe unique or does a number of worlds exist with different physical arrangements which define the potential “modality” of choice and ways of the Universe physical arrangement? These and other questions within the “anthropic cosmological principle” break not only the usual canons of the scientific knowledge argumentation, enrich the latter with integrating variety, choice, logic of narration (history), but aim the scientists at further theoretical search.

The “anthropic” arguments make their specific historical contribution into the Universe global evolution since any history matches the conditions of irreversibility, probability, possibility for new links to appear. The fundamental transformation of cosmology toward the openness, “playing through” the possibilities and choice is a common trend of the modern science manifesting itself by the deviation from the classical science ideal which didn’t have “either memory or history” and the language itself was cut off its past and thus off the possibility to invent future.

The consideration of different parameters effecting a system, refusal of strict means of the scientific knowledge substantiation and the appeal to the concept of occasional, probabilistic processes are demonstrated at the present stage in many medical sciences. The soviet clinical psychiatry crisis is largely explained, as some researchers point out, by its passion for the linear principle according to which any illness (psychical) must include the uniform reasons, manifestations, progress, outcome and anatomic changes (i.e. the same reason results into the same effect). Such a strictness in the thesis formulation (making a clinical diagnosis) has no ground as evidenced by the modern medical science since a fact must be taken into account that different individuals have their own physical and spiritual characters due to which the illness manifestation and progress will be different among them. The argumentation based on “impeccable”, “objective” and “unprejudiced” clinical method and expound without “personal interpretation” is not only logically groundless since the illness treatment is addressed not a

person, as clinical psychiatry declares, but the illness, i.e. the treatment is applied to "illness but not to person". The refusal of an inflexible and strict approach, the appeal to the theory of occasional processes will lead, as considered by some specialists, to the psychiatry renovation since the illness concept will be probabilistic and its origin will be principally unpredictable in a number of cases. The psychiatry will receive the freedom of will in its thermodynamic aspect. This will result into changes of opinion of the "norm" and illness and into the levelling of "boundaries" between the norm and illness by a wide spectrum of adaptational reactions. The opinion of "normal" will change along with the society depending on a medicine model.

The ethical and axiological arguments "penetrate" necessarily through other medical disciplines too. Such medical and biological science as tanatology that studies the reasons, manifestations and mechanisms of death advances especially sharp the problem of "ethical argumentation" in transplanting organs (how to avoid the ethical discrepancy: prior the donor's "alive" organ can be taken the donor himself must be "dead"); in extending the life of an ill person by means of apparatus (what arguments will be ethically grounded to turn off the apparatus, i.e. "to make this ill person dead"); in deciding the problem of life maintenance of persons doomed to death due to untreatable illnesses (to what extent are ethical the medical ethic ideals when an ill man prefers "easy death") etc.

The science enrichment with "man-centered" guides and axiological parameters, the "exacerbation" of reflection and more and more loud thesis sounding of scientist responsibility for the science results which applications may either bring the benefit to the mankind or lead to the extermination of the latter are observed already in the second half of the 40th of the current century. The real science and ethics has experienced, as M. Born wrote, the changes which make impossible to keep the old style of knowledge service in favour of this knowledge itself. We were assured that it could never bring any harm since the search for the truth is the good by itself. It was a nice sleep which we were awoken from by the World events. A. Einstein warned that there was a danger of the mankind total self-extermination that could not be disregarded. This warning sounds even more loudly on the threshold of the XXth century.

Thus, ethical and axiological arguments are used more and more widely in the modern science.

Such "from man", "reason for man" argumentation differs sharply from the

traditional scheme of the scientific knowledge substantiation in the classical science when a fact is considered true if it can be justified without referring to a man, his activity and cognition manners. The arguments used in understanding the unique evolution systems can't be ethically indifferent and the scientific investigation aimed at obtaining the true knowledge in any way is too narrow and dangerous in some cases. A necessity appears to engage the arguments setting the control over the scientific truth understanding itself. The value hierarchy which the scientific truth undoubtedly belongs to is or must be equally accompanied by such values as the good of a man and mankind in their unity and interaction, good and moral, prosperity and safety. The search for the scientific truth is "highlighted" by the axiological imperative: will a new knowledge increase the risk of existence and survival of a man, will it serve the mankind good and its interests.

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