

BIOCOSMOLOGICAL ANTHROPOLOGY AND ARISTOTLE'S FOUR CAUSALITIES. THE METHOD OF ASTRONOMICAL CONTEXTS

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Abstract. The purpose of the paper is to present a study method adequate to the specific object of Informational BioCosmological Anthropology, i.e. an Anthropology in which man and human society are considered as an organic part of the entire Cosmos with which they have informational encoded, archetypal communication. I started from the idea that there is a correlation between man's adaptation phenomenon and the living in general, to the contexts within which life developed on Earth and to the principles of Aristotle's method of thinking. I relied on the results of my personal biophysical and anthropological physiological studies carried out over a long period of time - Guja 1974-2013 and I established four hypotheses referring to the possible conditions that determined organic differentiated adaptation: material, formal, efficient and final for the human species over millennia. Our method associated Aristotle's causalities with the impact of particular astronomical contexts in which life developed on our Earth. Within informational BioCosmological Anthropology, using this method and modality of informational thinking, based on the interface theory one may find answers to the questions: why did man's adaptation take place as it did and not otherwise? Present Anthropology is oriented and progressing in describing how adaptation and human life evolution has taken place.

Key words: astronomical contexts, Aristotle's Causalities, adaptation to context, informational BioCosmological Anthropology.

Introduction

The new field of "BioCosmological Anthropology" is meant to solve certain new important problems determined by the complexity of the socio-cultural context and the present stage of human society (Guja 2008-20013). The international hypercomplex global context and the effects of unpredictable historical evolution have determined the present multiple crisis status. Conflict solving and finding of solutions adequate to ascending evolution surpasses, in many ways, the modalities to approach scientific knowledge and modern social and cultural experience.

The purpose of our paper is to present a study method adequate to the specific object of *Informational BioCosmological Anthropology*, i.e. an Anthropology in

which man and human society are considered as an organic part of the entire Cosmos with which they have informational encoded, archetypal communication (Guja 2008a). The context method is based on **highlighting the correlation** between man's adaptation process and that of the living in general, to the **astronomical contexts** (autonomous and at the same time intrinsically interdependent) within which life developed on Earth and to **the principles of Aristotle's method of thinking** (they refer to the fundamental causes that determine the change and evolution of things and phenomena existing on Earth) (Barnes 1982). Ignoring or minimizing the effects of the fundamental laws of the Cosmos on the micro- and macro-processes of human life and taking into account only the later occurring socio-cultural processes, also undergoing the same laws, prevents us from understanding the real causes of the crisis phenomena we are experiencing (Guja 2011). **The adaptation process** is a fundamental process of evolutive change in the living world, leading to a way with extremely great **material variability and biodiversity of forms of life** (Bavariu 2007; ***Human), and to **optimum efficiency and cosmic organic finality**. For the systematic complex study of the adaptation process I formulated four hypotheses referring to the possible conditions that determined a differentiated specifically organic adaptation of the human species over millennia: astronomical contextual conditions that might have been intuited by Aristotle when formulating the causality method: **material, formal, efficient and final** (Barnes 1982). Our method associates to Aristotle's causalities the influence of particular astronomical contexts and interfaces in which life developed on Earth. Within informational BioCosmological Anthropology using this method and modality of informational thinking, based on the interface theory [Guja 2008] one may find answers to the questions: **why** did man's adaptation and evolution take place as it did and not otherwise? Present Anthropology, like many other fields of modern science, is oriented and progressing in **describing how** human life events and processes have taken place (Guja 1994, 2008b).

We consider that BioCosmological Anthropology may prove its theoretical and applicative utility [Guja, 2008] by finding an **anthropological methodology** that should ensure a coherent unity of thinking and study, valid for as many subfields as possible, starting with: Physical, Biophysical, Ecological, Ethological Anthropology and even Philosophical, Cultural and Cosmic Anthropology (Guja 2008d). It is K. Khroutski's one of the most urgent desiderata for the development of the general framework of Biocosmology-Neo-Aristotelism (Khroutski 2013; Sass 2012).

At present, based on the present stage of scientific and knowledge development, it is possible to *reconsider man and mankind and conceive a new model, organically integrated into the Cosmos known today*. On the other hand modern sciences fail to offer an adequate, specific, comprehensive, universal basic methodology for acquiring anthropological knowledge of the world, an aspect called '*global anthropological paradox*' (K.Khroutski 2006, 2013). It is imperative to overcome the difficulties of the present biological reductionism and evolutionism (Saniotis 2013, Chapoutier 2009).

From our point of view, i.e. of *Biophysical and Physiological Anthropology, of the Individual's Anthropology, Informational Anthropology, Biocosmological Anthropology* and of my personal studies carried out over the years (Guja 1980 – 2013) I have formulated the following *working hypotheses* that help make up an organic anthropological vision and the context method. They are also supported by the modern scientific theories and conquests and help us understand in a more concrete way the interdependence of „the Whole with the Whole” and *the consequences of the mutual actions in the entire cosmic organism related to the human terrestrial actions*.

- **Hypothesis I.** We consider that, within the context method, *the material cause* for man's evolution and for everything achieved in history is the planet *Earth* (E. System) *with its atmosphere* (Atmospheric Interface), an evolution which took place within a complex cosmic context.

- **Hypothesis II.** We consider that, in the astronomical context method, *the formal cause* (multivariate) for the great variability of the archetypal form of the living beings and species may be attributed to the *lunar context*, to the existence of the unique natural satellite of the Earth, the Moon, included in the global cosmic context. Within the human species one reached even the uniqueness of the human individual's universe and of the society of the human species. The context Earth-atmosphere-Moon induced the peculiarities of the cyclic, rhythmical, periodical, metabolic and adaptive phenomena of the context of the present globalized civilization.

- **Hypothesis III.** We consider that, in the astronomic context method, the *efficient cause* (informational) may be attributed mainly to our presence in the *planetary solar system*, which induced a seasonal annual complex cyclicity within its astronomical context, which is also cyclic and evolutive. The Sun is our *main source of energy*, practically inexhaustible; it has been and will be the source of the entire geological bio-psycho-sociological activity under the atmospheric dome (interface) in our house the Earth (the system)

-**Hypothesis IV.** We consider that in the astronomical context method the *final cause* (universal) may be attributed to the *cosmic context*. The possibilities to adapt to the cosmic dimensions were offered by finding a modality to reach the Cosmos in spite of time and space restrictions. Thanks to the brain, by means of

thinking, acquiring knowledge and self-consciousness, we have succeeded in building material and means to explore it. (E.g. Voyager).

The purpose of the present paper is to demonstrate the validity of the proposed method, applying it to the study of the human adaptation process. This adaptation resulted in outlining several *human types* discovered time, probably induced by the hypercomplex interdependence of these contexts, by their inclusion, there fore by bio-cosmic causes. This could be an important subject matted for BioCosmological Anthropology.

Material and Methods

In order to find a way to characterize the complex evolutive process that led to the appearance of man and human society, we started from Aristotle's way of thinking, the four causalities referring to the fundamental causes that determine the change and evolution of things and phenomena on Earth. We correlated them with the fundamental astronomic conditions in which life on Earth appeared, as I mentioned from the very beginning of the paper. In order to better understand our method, we further synthetically defined some of the most important concepts used in this paper.

The system theory with the *system method* (Bertalanffy 1968) is applicable to objects and phenomena in nature that have determinable, measurable *stability* in time. Any object, phenomenon or process in nature, society, cosmos, which is *relatively stable in time and space* may be studied as a **system**.

Any *communication process* between at least two systems is an *interface* (Guja 1997a, b).

The interface theory with the interface method (Guja 2008d) is applicable to the *processes of communication between systems, which are unstable in time and space*. Any process of communication that is unstable, dynamic, adaptive, evolutive in a determined time may be studied as *interface*.

The interdependent systems in nature and society together with the corresponding interfaces make up different *contexts*.

The context method (Guja 2012a,b) is applicable to the objects and phenomena together with their interfaces. Any assembly of interacting systems, therefore, together with their interfaces, can be studied by means of the context method.

Using these methods we tried to *rethink*, analyze and even imagine (within the context of the corresponding astronomic time) the development of the adaptation and complex transformation processes connected with mankind in order to "check" the possible validity of our hypotheses (to the extent this procedure is possible at terrestrial and astronomical level!). We had in view general phenomena known to have acted in the non-living nature and, inevitably, having an impact on the living biological, psychological and social matter such as the gravitational force, terrestrial,

lunar, solar and cosmic cyclicity. They grant individuality to our terrestrial life, being inscribed in the profoundness of its fundamental processes: metabolism, cyclicity and self-regulation at all levels of organization. They differ in any other cosmic context and bear the mark of our universal identity in a possible cosmic symbolism (some of them have been sent as indicators into the cosmic space with Voyager, launched by NASA on 5 September, 1977 in order to study the planets and the interstellar space-Figure 1). The force of attraction and cyclicity ***must be present in the entire memory of life evolution on the Earth (in the DNA or/and in the laws of terrestrial historical and socio-cultural evolution. Biocybernetic systemic self-regulation*** in the living organisms actually reflects multiple, complex cyclicity in our astronomical contexts. ***The gravitational force*** (corresponding to the Earth, not to other planets!) must have imposed and induced its universal action (at both macroscopic and microscopic levels) in everything having ***material structure*** on Earth, being a fundamental law of matter (geological, biological mental, socio-cultural, historical, etc structures). ***Multiple cyclicity*** is obviously a given phenomenon, ***whose material causality is still ignored*** when, studying the socio-cultural phenomena. Cyclicity is something given by our life and lies at the basis of any law we try to understand. We cannot conceive life without repeatability, rhythm, periodicity or cyclicity. The information underlined before will add answers to the question: ***WHY*** (what is the reason for) this entire happened and not only ***HOW?*** Science nowadays answers only the latter question. In most cases the two categories of answers are mistaken one for the other.

Results and Discussions

The results of our study presented in this paper are based on applying the above proposed method of astronomical contexts, correlated with Aristotle's causalities when analyzing physical, biological, psychic, behavioural ***diversity and variability*** of the human being and society in order to discern their ***adaptive*** phylogenetic and ontogenetic ***determinism***. The types of people and their particular behavioural modalities determine the types of actions and decisions and, implicitly, the impact of these decisions upon the types of events in their individual lives and especially upon the types of processes in the socio-cultural life.

In order to answer the question ***why*** people are not the same, why do they not act similarly to the same event, why are we so different, actually unique, in spite of the number 7 billion people nowadays? Why are there so many ethnic groups, nations, and civilizations? I wonder if the answer: because we have a ***different personal genome*** and we act in different socio-cultural conditions, is satisfactory? In Fig. 1, Tables no. 1 and 2 I have systematized some of the traits specific of the thinking and study method of ***astronomical contexts***, according to the four hypotheses proposed in the paper.

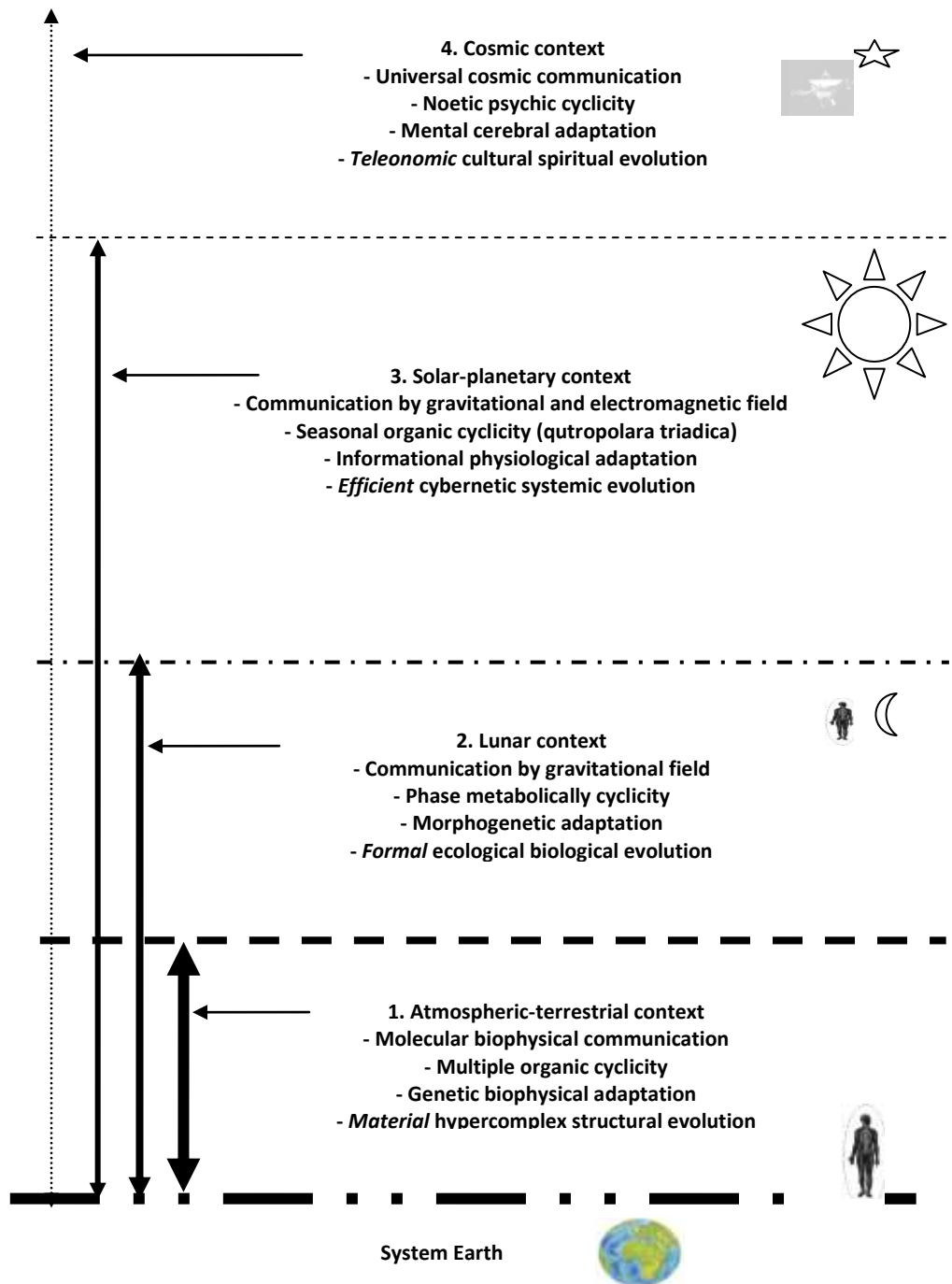


Figure1. The diagram showing the interdependence of the four fundamental astronomic contexts in which life on Earth developed and got adapted (transformed in evolution): 1.Terrestrial-atmospheric – 2.Lunar –3.Solar – 4.Cosmic, which generated the four fundamental causes: material – formal – efficient – final.

Stage 1 of method application. In order to answer the above question more completely, we have proposed the diagram in Fig. 1 in which we will place the event, phenomenon, process (the individual, group or society) under study. We will try to *rethink the entire evolutive process* based on the formulated hypotheses, i.e. to associate Aristotle's causalities to the four fundamental contexts. These contexts are *dynamically autonomous and, at the same time, contextually interdependent*, being included one into another (Jech 2002). In this way we will further have in view a few processes considered by us adequate to informational BioCosmological Anthropology and essential for human life: dominant *communication* between life systems and processes, namely in their *interfaces* (Guja 2008c), dominant *cycle* processes in which the respective event takes place, dominant adaptation possibilities, adequate to the given socio-cultural, historical and astronomical contextual conditions, the dominant evolutive type induced by the following contexts: 1. Atmospheric-terrestrial context; 2. Lunar context; Solar-planetary context; Cosmic context (Guja 2001-2013) – Figure 1.

Re. Hypothesis 1: the fields of physical or biological Anthropology, as they are frequently called today, study man and his origin laying emphasis on knowledge in biophysics and biochemistry, which refer to the *atomic and molecular material structure of life*. Communication, cyclicity, adaptation and evolution of systems approached this way refer mainly to the *terrestrial causal factors*, which belong to the particular context given by the dominant geophysical system, the Earth, with its atmospherically interface that ensured communication by means of substances and chemical elements within biogenesis. The variability studies of Homo sapiens species mainly refer to the materiality of the human being and of the society he lives in (constitutional typologies, somatypes, (Sheldon 1969), material civilization (Dant 2006). *Bi-cyclicity day/night* of the planet had an impact on the *material functional biostructures of the living, i.e. of man*. As an example we can mention biochemism of photosynthesis (diurnal) with plants and the physiological processes connected with wakeful and sleeping states and man's different diurnal/nocturnal behavior, etc. (Carter 1990; Day 2013).

Re. Hypothesis 2: the study fields of *physiological, medical, ecological a.s.o. Anthropologies* are oriented towards the *functionality* of the structures by which variability of adaptation modalities are expressed, where the *lunar context* played an important part. The presence of the Moon determined complexification of cyclicity and the multitude of cyclic efforts in the force field in which the living developed. Consequently it was necessary to adapt to a greater variability of the *form* of the effort owing to the resultant of intricate terrestrial bi-cyclicity and the lunar phasic one, in the respective atmospherically conditions. These influences acted from the atomic and molecular microscopic level up to the biological and social macroscopic level (Bejan 2000, 2012). They are more or less perceptible by

direct human senses, but determined a great variability of the responses and therefore of the *forms* of the adaptation process of the living and of man. From the point of view of this functional aspect, the reaction form was placed at a ***dominant energetic level of communication***, i.e. by means of the types of metabolism and of communication and regulation at molecular level. This took place by structuring the information in the genome and in the systems of the human organism (Kretschmer 1931; Nussbaum 2007). For instance, in the endocrine system they determined possibilities of phasic reactivation, such as that of ***reproduction*** correlated with the lunar cycle. It is interesting to see here the interdependence of the formal cause with that between organs function and shape (Thibodeau 1995). The types of human reactions at lunar phases succession varies from a minimum, weak or non-reactive to a maximum with the endocrine and psychic hyperactive. Most of them range in the intermediate types that make the transition between the extremes. Functional typologies generally refer to these aspects of human variability (Kretshmer 1931; Sheldon 1969).

These variations that are due to cyclicity of the lunar phases – ***extreme variations with two opposed intermediate phases-*** may be identified with all the manifestation forms of life in general and of man, from metabolic, organically and biologically functional cellular cycles to psychic, behavioral, social, cultural ones. There are cyclic variations that were imprinted on the genetic code and in social conduct and were implied in human physiology and psychology. In the absence of one satellite, the Moon, life on Earth would have been ***much more uniform***. In the presence of two or more satellites this context may go beyond our imagination.

Re. Hypothesis 3: the study fields of ***Biocybernetics*** and ***Bioinformatics*** are oriented towards the study of informational communication, towards the aspect of optimum and evolutive cybernetic adaptation process efficiency of our species (Grincenko 2006, 2013). These changing and transformation modalities have a specific trait-that of self-regulation, of feed-back and feed-before, i.e. of a certain cyclicity, hypercomplex periodicity at molecular, cellular and organic level of the system of organs up to socio-cultural and historical cyclicities. They mainly refer to the way energies are handled, to their ***efficiency*** with special reference to the vital one which we get from the Sun within the Solar-planetary context. Cyclicity induced by astronomical cyclic dynamics both at the level of the organism and at the level of the human society is a possible cause of the ubiquitous cybernetic processes in the living world. The necessity to adapt to periodical, cyclic changes ensured efficient adaptation at energetic informational level. ***The Matrix of bioelectrical types*** highlighted electrografically (Guja 2013a,b) built up and checked in laboratory investigations has indicated 4 types of extreme human bioelectrical types. One of them corresponds to a ***minimum energetic***, another to a ***maximum*** and the other ***two are complementarily***

opposed, intermediate and ensure the whole range of variability for bioelectrical adaptation in order to create bioelectrical homeostasis in the seasonal variable solar electromagnetic field (Guja 1985, 2008a).

Our human life, in its entire complexity, is marked biologically and physiologically by the energy we permanently receive and absorb from the Sun and by the organ of sight as form of informational communication.

Re. Hypothesis 4: the fields of Psychology and Philosophy are directed towards exploitation of a modality of mental, conscious, adapted and advanced communication to go beyond the three contexts mentioned above. The presence of the cosmic context required the evolution to overcome the difficulties of material, energetic and informational communication by overstraining the system that ensures the direct connection with the environment, *the nervous system*. The cosmic context determined man's brain to seek an adequate means of communication that should reach the Cosmos easily: it developed thinking and conscience. By the specific cerebral development a universal connecting modality was created in universal cultural archetypes and symbols. *Human conscience* appears as *a form of adaptation of the living matter* to the permanent requirements of everything surrounding us, including the cosmic context, in order to find out the *"final causes" and possibly to communicate with other consciences existing in the Universe*.

Nowadays this evolutive adaptation of the human brain through its conscience brings us closer to finding the part played by Cosmos in our daily life. It is this line of thinking that brings *Biocosmology and Biocosmological Anthropology* together.

The second stage of the astronomical context method. In order to specify in more detail the causes of the great variability and biodiversity, in other words the causes that led to the existence of various categories of process types and events, we resorted to a special modality – *the matrix*, which is a table representing the value of truth in a statement based on the truth value of its component elements. The matrix helps to reciprocally correlate the multitude of *determined, causal* factors implied in the evolutive adaptation process and in life on Earth in general-Table 1.

Table 1 – The matrix indicating the hypercomplex interdependence of the cyclic, metabolic and adaptation processes corresponding to *fundamental causalities-contexts* that lie at the basis of human evolutive changes and possibly at the basis of human typologies and the great variability of the living on Earth.

CONTEXTS - causes \ Fundamental evolutive factors	1. TERRESTRIAL- ATMOSPHERICAL material	2. LUNAR formal	3. SOLAR- PLANETARY efficient	4. COSMIC final
I. Cyclicity	I / 1 Metabolic cyclicity (bipolar)	I / 2 Lunar-phasic cyclicity	I / 3 Annual seasonal cyclicity	I / 4 Evolutive cosmic cyclicity
II. Metabolism	II / 1 Metabolism-material (biophysicochemical)	II / 2 Metabolism- formal (biochemical- energetic)	II / 3 Metabolism- efficient (informational)	II / 4 Metabolism final (psychic)
III. Adaptation	III / 1 Biochemical Adaptation,	III / 2 Energetic Adaptation	III / 3 Informational Adaptation	III / 4 Cognitive Adaptation
IV. Variability (Human types)	IV / 1 Constitutional physical types	IV / 2 Functional physiological types	IV / 3 Performant efficient types	IV / 4 Spiritual types

The cause of *diversity and variability* of anthropological events (bio-psycho-socio-cultural) either favourable or destructive occurring nowadays in our society is implied in the *cyclicity, metabolism and adaptation* types.

Self-regulation and organization are induced by the cyclicity and dynamics in the cosmic space. Periodicity, returning to the same conditions, displaced in space though, leads to the process of juxtaposition, organization, reorganization and integration of components, functions and activities of the living systems, i.e. of man (Chapoutier 2009).

We also made up a matrix of Aristotle's causalities corresponding to astronomical contexts - Table 2. Using this method one may rethink variants of evolutive scripts of the living world and of man.

Table 2 - Causalities contexts Matrix. Hypercomplex dependency (4x4) between Aristotle's causalities (1x4) and astronomical contexts (1x4). One may find 16 types of causalities for the complex of contexts specific to the Earth. Aristotle's four causalities are placed along the diagonal.

CONTEXT \ Cause	1. TERRESTRIAL atmospherial (Ta)	2. LUNAR (L)	3. SOLAR- planetary (Sp)	4. COSMIC (C)
I Material (M)	I 1 Material - Ta	I 2 M - L	I 3 M - Sp	I 4 M - C
II Formal (For)	III 1 For - Ta	II 2 Formal - L	II 3 For - Sp	II 4 For - C
III Efficient (E)	III 1 E - T	III 2 E - L	III 3 Efficient - Sp	IV 4 E - C
IV Final (Fin)	IV1 Fin - T	IV2 Fin -L	IV3 Fin - Sp	IV4 Final - C

4. Preliminary Conclusions

1. The four fundamental contexts, their interactive forces and cyclicities have left their mark independently, autonomously and simultaneously on the whole evolution of man and of entire life on Earth.
2. The astronomical context method indicates that we can distinguish $4 \times 4 = 16$ causality types - Table 2.
3. Complex cyclicity of fundamental contexts induced cyclicity of cyclic processes in our life from molecular level to socio-cultural level reflected in the self-regulation and homeostasis processes that fixed the reiterative, periodical, daily, monthly, yearly or multi-yearly processes.
4. Communication induced by astronomical cyclicity processes is an archetypal informational communication of feedback type that lies at the basis of homeostatic, cybernetic adaptive reactions.
5. Our human nature is earthly. The Earth has always been (and for how long will it continue to be?) the '*material source and cause*' which supplied the

substratum, the substances characteristic of terrestrial living matter that led to the appearance of the present species *Homo sapiens*. The Earth, together with its atmospherically interface and its satellite, the Moon, simultaneously in axial rotation, and on the solar ecliptic, represents the particular forever moving cosmic context to which the living, respectively man *adapted materially, formally, efficiently and finally*. Being specific owing to the chemical elements and substances making it up, everything that developed here culminated with the human being and the present civilization. *On other planets the proportions, the material structure are different from that on the Earth and therefore the advanced matter may have taken shapes that we are not prepared to recognize, as we consider ourselves unique up to the present.*

6. It follows that from the complex of contexts in which the Earth exists, like the seed in a fruit or the foetus in the uterus, we are the product of a universal process, nevertheless unique for our existence. We should not regard the astronomical aspect as a reductionist, physicalist vision. On the contrary, we should consider it as a cosmic, evolutionist adaptive organic, thinking. We should permanently have in view the initial conditions, the history and permanent, continuous action of evolutive complex cyclicality.
7. By means of this method we get answers to questions such as : Why is the cyclic DNA bi-helical (Nussbaum 2007), why does day/night cyclicality become physiologically three-cyclic: wakeful conscious state, intermediate semi-conscious, sleep-unconscious, why do three-cyclicality and triadicity have 4 causes? Why does the ratio 3/4 characterize a basic principle of Biocosmology? (Khrouski 2006).
8. We underline the fact that the researchers studying biological, medical, social, cultural or political fields minimise or even ignore these astronomical, cosmic influences considering that the socio-cultural factors play the determining part in the present crises. This astronomical context method correlated with Aristotle's causalities helps us find the organic fundamental laws that lead to these general disorders and to understanding the way we can solve them taking into account these intrinsic astronomical or cosmic laws. These laws exist at all levels of organization in Nature and Humanity, reflected in their genetic code and in the psycho-social-cultural behavior. They are found and are determining in our way to react spontaneously and in our daily thinking. We are permanently influenced by the weather, season, annual and anniversary conditions mainly at socio-cultural level (Guja 2012a, b). The ones at biological and ecological level are already inscribed in our individual genomes.

9. The resultant of the whole causal factors includes the astronomic contextual vectors that have had a critic role in the advent of life and man. The emergence the other factors due to of the evolutive character of the Cosmos, of the life and of the human can to give important variations but cannot change the laws of the Universe. There are dominants causes and minor, interdependent and interchangeable in time, but according with the complexity theory and of the law of informational communication, will act and must not ignore.

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