

## CONCERNING THE EXPERIMENTAL APPROACH OF INFORMATION AS AN ONTOLOGICAL DIMENSION

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***Summary.** The problem of a possible morphogenetic field, of a “world” of ideas responsible for the materiality of the Universe, of an “engine” that moves everything without it itself being moved, has preoccupied humankind since ancient times and up to the present days. Numerous models have been elaborated, framed in a philosophical approach and less so in a scientific one. Recently, the progress in nonlinear physics, nanotechnologies, quantum physics and neurosciences, together with the capabilities that computational science and artificial intelligence now offer, make possible imagining some methods of verifying/validating the developed models. The paper reviews the primary models that involve reformulating the vision on the genesis and the evolution of the universe from a triad perspective: information – energy – matter, and suggests some attributes that an experiment should include in order to emphasize the reality of an ontological dimension of information.*

***Keywords:** geostasis, noosphere, transdisciplinarity, orthophysics, thesigraphy*

### 1. Introduction

Describing planet EARTH as a LIVING planet [1,2] highlights a hierarchical structure of systems and subsystems found on different organizational and complexity levels among which information, matter and energy are changed, reaching altogether a state of dynamic stability (geostasis<sup>2</sup>). In this ecosystem, which has its own regulating laws as a whole, man has become a particular being, especially due to his ability to build exosomatic extensions (artifacts) that

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<sup>2</sup> Geostasis, dynamic equilibrium generated by interactions taking place between the geosphere and the biosphere, that ensures, on a planetary scale, the stability of the physical and chemical parameters within the limits compatible with life (analogous to the homeostasis of the human organism); it is the result of a bio-geophysiology whose understanding is essential in defining sustainable development politics, especially now, at a time of climatic oscillations on a global scale.

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determine an acceleration of the free energy consumption and, obviously, the production of the associated entropy. Thus, once humans appeared, a new layer of the planet had formed: the Noosphere<sup>1</sup>, the third stage of planet Earth's development, after the geosphere (the inanimate, inorganic matter) and the biosphere (the biological life). In the same way that emerging life transformed the geosphere, the emergence of humanity fundamentally transformed the biosphere. From this perspective, the study of planet Earth as a whole demands to be augmented with some concepts, models and theories that are specific to cognition, to Conscience (a science of the Mind) into an integrative, holistic approach, in addition to the body of knowledge specific to the study of astro-geophysical phenomena (governed by physical-chemical laws) and to cybernetics (used in modelling live structures and automated systems), respectively.

The aggregate of constructions that make up the infrastructure specific to the present civilization has a global character (global transportation networks for electric energy, highways, railroads, transportation vehicles etc.), while the specific lifestyle of a consumer society entails an exponential growth of the need for electric energy, water, food and raw materials. We can thus affirm that the actual socioeconomic evolution, the “diffusion” of artifacts across the surface of the whole Earth, creates a qualitatively different set, defined by the subtle Natural – Artificial conglomeration, with a specific dynamic that can generate unexpected fluctuations in the whole system (geosphere, biosphere, noosphere), with unpredictable consequences for the evolution of life in general and for the human species in particular.

The emergence and the advancement of computer science and information technology, from simple computers to artificial intelligence, has allowed theoretical and experimental approaches of nonlinear processes. New theories such as: *The Theory of Dissipative Systems* [3], *Chaos Theory* [4], *Bifurcation Theory* [5], *Synergetics* [6], *Fractal Geometry* [7], *The Theory of Cellular Automata* [8] and that of *Neural Networks* [9] have assembled in a unifying vision known as **the Science of Complexity** [10]. The existence of a conceptual basis and of some evaluation techniques that are specific to the study of complex systems has generated new directions in science, such as the study of biocomplexity and geocomplexity, respectively.

The term biocomplexity is introduced for the first time by Robert Colwell (1998) and is associated with the study of structures and complex behaviours that come into existence out of the nonlinear interactions between the active biological

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1 Noosphere, the entirety of information, knowledge and appraisal systems specific to the human being; the spiritual layer of Earth, represented by humankind, according to the (Romanian) explanatory dictionary.

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agents (*molecules, cells, organs, organism, groups* and *societies*) and the environment. It is an interdisciplinary study direction that integrates disciplines such as *biology, biochemistry, engineering, geosciences, genetics, ecology* and intensively utilizes techniques and methods specific to *computational science*.

The emergence of chaos theory and fractal geometry had allowed interpretation from a nonlinear dynamic systems' perspective of the phenomena responsible for generating earthquakes. Per Bak's model concerning self-organized criticality [11] has become the best model of producing earthquakes and ultimately defined the geocomplexity field. Therefore, "the existence in active geodynamic areas of some periods of time in the course of which we can identify a periodicity of earthquakes followed by periods when the frequency of earthquakes is irregular means that the predictability degree itself changes with time" (Goltz, 1997, 158). Earthquakes have thus become the expression of geocomplexity (Rundle et al., 2000).

The progress of quantum physics, doubled by the emergence and development of nanotechnology, has introduced a new ingredient, essential in the understanding and the formal modelling of the interaction between geosphere, biosphere and noosphere, namely **information** (as an ontological dimension alongside matter and energy). The role of the Observer in this reality or the interaction: *Quantum World – Energetic and Material Universe – Conscience* can no longer be overlooked in the studies regarding the geostasis of planet Earth, the socioeconomic evolution of humankind, including the definition of sustainable development politics.

As a conclusion, the need arises for a shift in scientific paradigm, for a conceptual upgrade, the structuring of a multi- and transdisciplinary vision concerning Reality, the amelioration of concepts, theories, models and methods for evaluation in relation to this new vision. Briefly, it is essential for the Mind to evolve to the level of the Complexity of Nature and not to simplify Nature to the level of a fragmented, linear, Newtonian manner of thought. "Simplicity (in the sense of essence, a.n.) is a resolved Complexity", Constantin Brâncuși.

## 2. Information as an ontological dimension

*"The true significance of history in any UNIVERSE is the birth and development of CONSCIENCE". M. Drăgănescu*

If addressing the phenomena from the perspective of the science of Complexity has been intensively used in researching astro-bio-geophysical processes, the question of information as an ontological dimension, the question

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of Conscience, of the Observer – Universe relationship, has been tackled from at most a philosophical perspective.

However, in the last decades, the effort of many researchers has focused on defining information as a profound reality, responsible for generating the laws of energy and matter that have been identified by science. “If we look at information beyond a technical standpoint (therefore the information treated on a statistical basis) such as information from the statistical theory of communication or information from automatic data-processing systems, we must consider the genetic information from biology and the information developed in relation to the human being... To understand information, we should probably take into consideration the whole material world, starting with the physical world and concluding with the psychological activity of the human mind. From all we know, information seems to be first and foremost a certain structure. It can be objective if it is inscribed in the most profound levels of matter, passing from here under a certain form into the quantum world, up to the genetic elements of the live cell and as far as the «wiring» of the human nervous system” [12].

A first step in defining this notion can be found in the book “Essay of Informational Biology” (1973). Here, Victor Săhleanu defines the so-called Informational Link (I.L.), an interaction specific to cybernetic systems, which is responsible for regulating, initiating, commanding and controlling some processes meant to ensure the homeostasis of the organism. It is to be noted that this interaction differs both qualitatively (by the nature of the action) and quantitatively (through intensity) from that which he calls the Causal Link (C.L.). While the C.L. secures the energy and matter flux that determines the functioning from these properties’ point of view, I.L. is more closely related to what we understand by information (codes, messages). The fluxes on feed-back loops have a different structure and a different role in the dynamic stability of the organism, although they are still “dressed up” as energy and/or matter. Their purpose is to modify the functioning of the organism in relation to the fluctuation of the external environment, consequently ensuring its finality. From this distinction (C.L. – I.L.), we can separate at least three aspects:

- There are interactions with nonlinear effects in the functioning of the organism, in the sense that the fluxes on the regulating loops are orders of magnitude smaller in intensity than those that determine the actual functioning of the organism, but they, in turn, condition the latter;

- There is an essential qualitative difference between I.L. and C.L. in the sense that I.L. is ensured by the structure of a “message”, coded in an energy/matter flux that has only a carrier role (the order relation is that which matters and implicitly cannot be identified by statistical methods);

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- The message (code, syntax) is an expression of the organism's structure (architecture), in the sense that it has meaning/action just within it.

Whence there result at least a few general observations:

- The small fluctuations (considered, in the lack of any significance, as being “noise”) matter, since they can be essential message carriers for the organism's functioning;

- Any analysis method specific to C.L. (statistics, deconvolutions etc.) cannot be applied in the study of I.L.; it becomes essential to develop techniques such as pattern recognition (neural networks with and without supervision, clustering techniques etc.);

- The identification of the structure of messages, of codes being used, constitutes a first stage of studying I.L. meant to generate a semiotic specific to communication within the organism's structure/architecture [13];

- If the aforementioned issues apply to some artifacts, to some automated or intelligent, man-made systems, then the problem is simple, since right from the design stage both the system's finality and the specific “language” used in feedback or feed-before loops are known. The same thing cannot be said when a living organism is being studied, an ecosystem or the planet's geostasis as a whole (the GAIA model). Although the necessity of a cybernetic approach is evident, and there already exists a series of modelling attempts in this respect [14,15], the way that these can be experimentally validated is only now taking shape. It becomes crucial to identify I.L.-specific captors/sensors, but even more so, to place them in context in such a way that the signal/noise ratio gets maximized (by “signal” we understand the specific messages with regulation, initiation, command and control roles that ensure dynamic stability and the organism's evolution).

This approach can be considered a first approximation of information as a concept, viewed as an extension of cybernetic systems' theory in biology, medicine, ecology, successfully used in modelling automated systems in engineering.

A more subtle sense of information, seen as an ontological dimension alongside matter and energy, is formally structured beginning with the '70s, with the ortho-physical model, elaborated by Mihai Drăgănescu, as a forerunner. The model postulates the existence of a profound reality called **ortho-existence**, considered both source and substrate of a Universe. On this level of existence coexist a profound potential matter (**ortho-matter** or **lumatia**) and **informatter**, defined as an informational matter wherein the information manifests itself primarily phenomenologically. The pairing between informatter and ortho-matter gives birth to the matter of the Universe which, in the domain of life, acquires

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specific properties: *the phenomenological properties of meaning, the psychological continuity and the process of making spatio-temporal reality continuous*. Thus the Ring of the material world: *Ortho-existence* → *Quantum Reality* → *Macroscopic World* → *Mental Reality* → *Ortho-existence* (fig. 1) is defined. In this model, the emergence of Life and Conscience becomes a condition for a universe to come into existence.

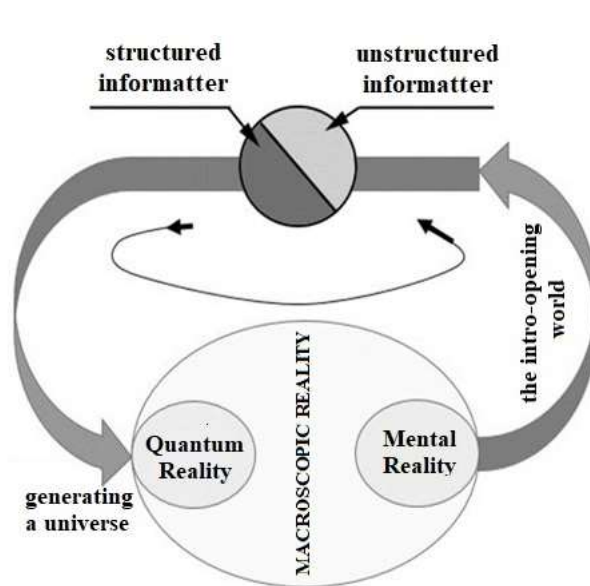


Fig. 1 The ortho-physic model of Universe

The life that has acquired the attribute of Conscience is called *archaem* (an architecture with non-formal functions surrounding a nucleus with functions pertaining to a system). The *archaem* has access to informatter through a specific interaction called *intro-opening* through which the living organism is phenomenologically connected to profound reality. From this perspective, Man is a *structural-phenomenological entity* and fundamentally differs from any entity from the plant or animal kingdom. Furthermore, Man becomes a *participatory observer*

because the observation act (under certain circumstances) “gives meaning” and stability to Reality. From this point of view, Drăgănescu's ortho-physical model is reinforced by J. A. Wheeler's vision, who believes the Universe to be a self-excited circuit; “A participatory universe is a self-excited circuit in the sense that it implicates observers in (perceptual, ontological) feedback. It is a «logic loop» in which «physics gives rise to observer participancy; observer-participancy gives rise to information; and information gives rise to physics” (1989 – Complexity, Entropy and the Physics of Information).

The intro-opening process is carried out in ortho-existence, a profound reality that does not recognize time and space to be understood in the sense of the energetic and material reality. Likewise, the intro-opening process is assimilated with an act of global perception, mandatorily manifested as the subjective experience (qualia) that can sometimes be reduced to a structural (formal) level and can be labelled (semantic processing). This process of subjective experience, less studied from this provided perspective, can constitute the basis of scientific

explanation for actions such as *biodetection*, *biolocation*, *clairvoyance*, *teleperception*, *telepathy*, *psychokinesis* etc., as well as a means of scientific exploration of the profound, unseen part of the Universe, responsible for planet Earth's genesis itself and geostasis.

In informatter, Man can imagine abstract forms, without dimensions or put otherwise, man's mathematical ability has its source in ortho-existence. The limit of formal languages expressed by Gödel's theorem is hereby opened towards profoundness through intuition. "Gödel's theorems do not make out a case for the existence of an inaccessible mathematical truth, rather for the fact that human understanding and intuition lie beyond formal arguments and computable procedures." (Sir Roger Penrose)

Moreover, the model postulates that, at a certain level of Conscience, man can locally modify physics' laws and generate matter: "creating an active device in relation to the informatter from the ortho-existence through which structures could be fixed and thus be able to produce an effect in the universe or for a microuniverse to be created when the process wouldn't be «attuned» to the universe from which the organism originates. It would require a device for intervention in ortho-existence, without conscience, an instrument in the hand of man and society. We call such a device an orthotronic device or orthotron". [15]

The notion of "information flux" also shows up in Basarab Nicolescu's imagined model, described in his book "Ce este Realitatea?"<sup>1</sup>. [18] In addition to defining a hierarchy of layers of reality, to integrating the logic of *The Included Tertiary* (Lupaşcu) as an engine for transiting between levels, Basarab Nicolescu postulates the existence of a flux of conscience. This way, the Observer and the Observed Reality are traversed by fluxes of different natures, an informational one, specific to the material world, and one specific to the Conscious Observer. Thus one defines that subtle mental process of understanding called *The Hidden Tertiary*. In other words, the decoding of reality and the insight into meaning entail a subtle resonance between the reality level and the conscience level.(fig. 2)

In the words of the author: „The information flux that coherently traverses the different levels of reality of the object has a correspondent in a conscience flux that traverses the different levels of reality. The two fluxes are in an isomorphism relation thanks to the existence of the same sole zone of non-resistance. The zone of non-resistance plays the part of the Hidden Tertiary, which allows for the unification, in their differentiation, of the transdisciplinary subject and the transdisciplinary object. It allows and solicits the interaction between the subject and the object". [18]

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1 "What is Reality?"

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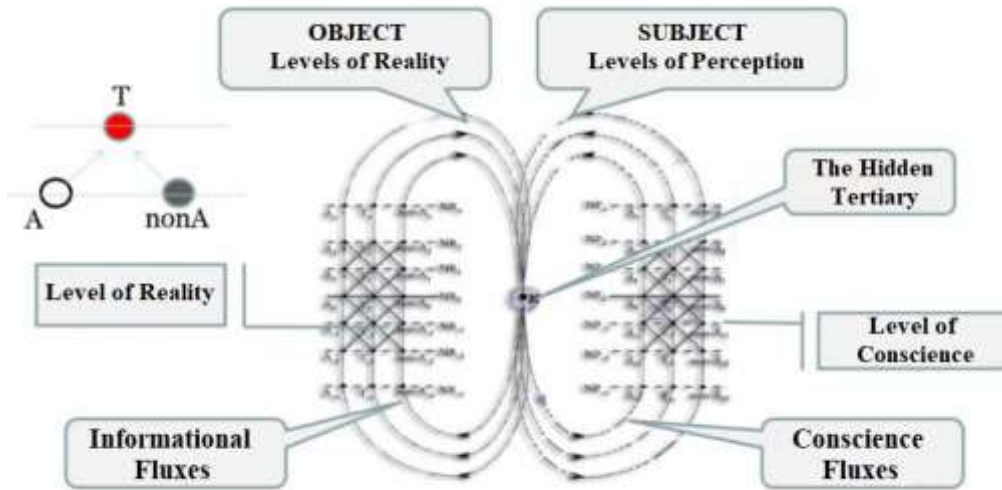


Fig 2. Basarab Nicolescu's model of the Hidden Tertiary

### 3. Several useful elements in the experimental approach to the issue of information as an ontological dimension

In the spirit of an approach specific to exploratory research, we formulate a few statements meant to constitute a useful basis of thought in outlining an experimental approach to information. From this perspective, a series of known experiments have been selected and restated that could be connected to the addressed problematic and that haven't been given a well-founded explanation until the present time.

1. Information as an ontological dimension is responsible for the construction of the structure/architecture of any living and non-living entity, in a manner capable of ensuring the internal coherence in relation to the information/energy/matter flux that animates and gives sense/stability to the entity;

2. Along with trying to define some properties specific to information such as: information "density", information quantity etc. – that complement the energy/matter approach – it is also necessary to elaborate some methods of quantitative evaluation associated to the degree of the organization, structure/architecture of living and non-living entities;

3. We associate the morphogenesis process with a process that initially takes place in ortho-existence by the structuring of a "germ" (informational



matrix) that defines the entity from a structural and functional point of view, a germ that is responsible for the finality and the stability of the entity in its growth/development/evolution period, in its transposition to material reality;

4. In the growth/development/evolution stage of an entity we define periods of construction/modification of its architecture, dominated by major informational influences, periods of quantitative development respectively, processes that ensure the growth and development of the entity without affecting external shape and internal architecture (a homothetic growth);

5. The study of shapes, textures, in short of patterns, from different living and non-living entities can generate a new semiotics, capable to decode the sense and finality of studied entities, thus outlining the field of study of information as an ontological dimension and of composition, concatenation and interaction of informational matrices;

6. The morphogenesis of inorganic structures can be considered a gradient structuring, the patterns thus obtained being the response of the forces, fields that exert themselves upon the constituent material elements towards equilibrium (Diffusion-Limited Aggregation processes, Bénard cells etc.);

7. The living structures are subarchaems; they are fundamentally different from the inorganic ones, which are modelled by theories of an essentially energetic and material nature; Man as an entity with conscience is archaem and implicitly has access to informatter through intro-opening;

8. The informational complexity required to ensure the dynamics and the evolution of living structures in the context of the proximal environment (which is, for its part, hierarchical and formed by different levels of complexity) grows and is differentiated per kingdoms: plant, animal, Human;

9. Looking at reality as a hierarchical structure, controlled by feed-back and feed-before loops, one can state that there are informational specificities (structures, "languages") associated with each level; at the same time, the level of higher complexity controls and informationally modulates the level beneath it.

As conclusions to the above, we can affirm that:

There is a difference of principle between the morphogenesis of the inorganic matter and that of the living structures. The living structures are intro-open and consequently related/controlled by phenomena that are specific to ortho-existence. A possible experiment that could emphasize the fundamental difference between the inorganic and the living could be based on the identification of an **interference** between processes of forming inorganic matter (crystallization, agglutination, clustering) and processes that ensure the homeostasis of living organisms (life implies a permanent restructuring, a pairing in ortho-existence);

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The characteristic of a participatory observer that Man (as archaem) has, a characteristic that ensures access to informatter through intro-opening, determines a subtle pairing between him and the experiment. Depending upon intentionality, upon the capacity of transmitting/mentally modulating the act of living (intro-opening), he can induce small fluctuations in informatter, with consequences in the modification in the material plane of some behaviours, structures. From this perspective, the chaotic processes' capacity of suffering abrupt transitions to order can be used as *a favourable environment, which is destined to make the intro-opening reach objectivity*. The same observation can highlight the fact that certain processes can be dependent on the observer/the experimenter, a fact that raises a matter of principle – whether this direction of study qualifies for what it is being understood today as a scientific approach. This demands reproducibility and independence from the subject (objectivity); still, in an ortho-physical context, we are dealing with subject-dependant processes and a reduced reproducibility, insufficient to ensure a statistical validation.

Modern theories related to dynamics and the evolution of complex systems also offer a set of statements useful for the attempt of rationally, experimentally addressing processes with a low degree of reproducibility. Therefore:

1. Complex systems in general and living ones in particular evolve far from thermodynamic equilibrium and by extension require a specific approach. [21]

2. The nonlinearity manifested in the dynamic of complex systems determines their susceptibility to their initial conditions, determines a chaotic behaviour that manifests universality (the constants of chaos), chaotic resonance, abrupt transitions between a periodic behaviour and a non-periodic one.

3. The self-similarity specific to fractal structures allows the objective, quantitative evaluation of some qualitative properties associated with the shape, structure and texture of living or non-living entities.

4. The bifurcation theory and the catastrophe theory provide the foundation of running a process in the proximity of critical points where the sensitivity to the small fluctuations of the environment grows exponentially, thus determining abrupt restructurings (mutations) of the system's internal structure/architecture; the role of the fluctuation of the environment (of the noise) [22, 23] occurs in the dynamic behaviour of some chemical, biochemical, metabolic reactions; the restructurings can be seen as entropy/negative entropy jumps (information).

5. Complex systems cannot be analysed by fragmentation into their component parts; the system's properties manifest themselves as a result of the

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interaction between the component subsystems, within the context of interacting with the environment in which it is immersed.

These few observations derived from the study of complex systems are useful in configuring a potential captor/sensor which should be sensitive enough and primarily able to emphasize processes of an informational nature, such as those suggested by the ortho-physical model of the Universe.

#### **4. Tesigraphy (sensitive crystallization) – technique which emphasizes potential informational phenomena**

Rudolph Steiner postulates within his theory concerning biodynamic agriculture that developing a structure entails two opposite forces, a centrifugal one, having at its origin the seed, the crystallization (aggregation) germ, and a centripetal one, generated by the properties of the space and time in which the structure develops/grows. This interaction gives birth and modulates the growth rhythms, resulting in the entity's structure/architecture itself. This same idea is more broadly expressed in terms of modern physics by John Archibald Wheeler: "Space acts upon matter, telling it how to move. In turn, matter reacts back into space, telling it how to bend". This entails a strong relationship between the forces of germination, growth, and those of the space-time in which the entity develops, essential in defining its structure. The interaction interior – exterior, entity – environment (context) calls for a new approach that should be carefully examined, adequately formalized and subsequently validated through experiment.

The biological quality appears as a necessary concept in expressing the capacity of integrating the parts of a bio-structured system as a functional whole, having at the same time the properties of a living organism. This can constitute the maximum expression of the specific information that a subsystem gives, in the context of the information that it possesses and the natural tendency of integrating it in the cosmic environment. [24] In the aforementioned context, the biological quality becomes dynamic, defined by both the internal rhythm/vibration of the analysed system and the cosmic rhythm/vibration.

Starting with these premises, Ehrenfried Pfeiffer [25] had imagined an experiment called *the method of sensitive crystallization (tesigraphy)*, one that has then been picked up by several researchers including Oleg and Alla Sellawry, Frida Bessenich etc. The modern technology of pattern recognition and the use of artificial intelligence have brought back into the spotlight this investigation method that seems to emphasize the existence of an informational "field", of an informational matrix, of a more profound code than the genetic one.

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The experiment is based on the analysis of a pattern obtained through a crystallization process in the presence of a substance taken from living organisms: blood, saliva, vegetables' extracts etc. These patterns are considered an indicator of the qualities and characteristics associated with the analysed mixture, which is why tesigraphy is known as an evaluation method for food quality. [26]

Growing the crystals from a thin layer of solution in the presence of biological substances is a process that can be formally described through concepts and theories pertaining to studies of complexity (fractal theory, chaos theory, bifurcation theory, cellular automata). Using this nonlinear approach, we hope to find an explanation for the sensitivity that tesigraphy has for the global qualities of the biological substances and to define a methodology that is able to highlight the hypothetical morphogenetic field. [27] The reaction of the sensitive crystallization hereby becomes a research method, an objective test by means of which qualitative properties such as the vitality, the biological activity, the state of health etc. of the examined organisms can be investigated.

Concretely, the technique that Pfeiffer proposes is as follows:

In a 10 cm diameter Petri dish, 10 ml of copper chloride solution with a concentration from 5% to 20% is poured uniformly. As a result, the dish is covered with solution between 0,5 – 1 mm thickness. The dish is placed in an enclosure that allows control of the temperature (28° C) and humidity (30 – 50%), as well as the attenuation of the mechanical vibrations generated by the environment. Due to the gradual evaporation of the solvent (water), the crystallization occurs, generating in this way a certain spatial distribution of the crystals. Using a solution of copper chloride, the aspect of the crystallized structure is acicular, with rectilinear growth directions.

If a few drops taken from a living entity (saliva, urine, extracts from human tissue or blood etc.) are added to the copper chloride solution, the shape and the arrangement of the  $\text{CuCl}_2$  crystals are significantly altered. The change consists in the emergence of curved trajectories of the crystallization directions, a chiral tendency induced by the addition of bio-structured elements. By differently “modulating” these curves, a specific pattern is generated, which can be correlated with qualitative properties of the organisms from which the test solution was sampled.

If the extract is added a few days after being collected from the living organism, the crystals' distribution becomes the one that is specific to the crystallization of the copper chloride solution. We can thus state that the presence in the inorganic environment subjected to crystallization of some bio-structured fragments, sampled and immediately added to the analysis, has the capacity of significantly modifying the spatial distribution of the crystals. The “drawing” thus

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obtained can be seen as a result of the interference between the gradient structuring of the inorganic substratum and a process specific to the living, which we associate with an informational interaction.

This hypothesis is also justified by the hundreds of thousands of sensitive crystallizations carried out beginning with the '30s, having as a biological component fluids taken from healthy individuals, as well as from patients suffering from certain illnesses. The comparative study has allowed a differentiated diagnosis by the differences in pattern of the crystallized structure. The fact that, for example, just a few drops of blood can be able to modify the crystallization process of the copper chloride in a specific manner, correlatable with the state of health of a patient, as well as with the location of the disease, suggests the existence of some morphogenetic processes that are informationally coordinated.

To analyse a pattern correlatable with the state of health of a patient, a system of orthogonal coordinates having the origin in the center from which there radially start out the crystallization directions is traced on the image of the tesigram. (fig. 3) [25]

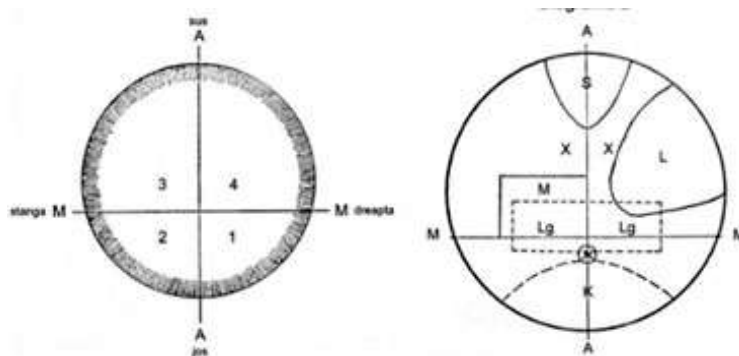
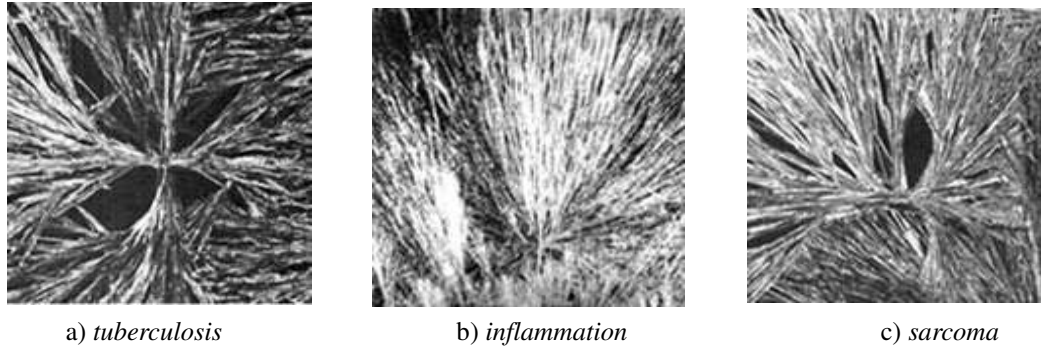


Fig. 3. Map of the distribution of the crystallization anomalies correlated with the affected organ.  
*S – Sexual organs; M – gastric area; Lg – Pulmonary area; X – Kidney area;  
 K – Head area; L – liver area.*

Like that, 4 quadrants are obtained wherein different forms of the crystallized structure are being studied. A map of the distribution of crystallization “anomalies” according to the affected organ had been obtained. The form of the anomaly (fig. 4, a, b, c) manifested in that area is correlated with the nature of the illness.

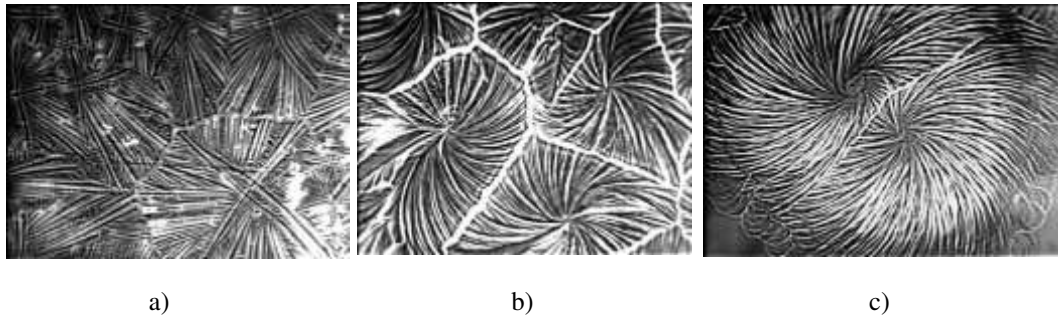
In the absence of a theory that would explain this process and especially in the absence of an automated technique of objective evaluation of the tesigram, the method had not been generalized in clinical practice. However, starting with 1990, renewed interest for this non-invasive and inexpensive diagnostic method can be

observed, an interest justified by the development of complex analysis of images' techniques (neural networks, artificial intelligence, fractal analysis). [28]



*Fig. 4. The structure of anomalies.*

The studies we have developed followed the change in protocol in the sense of crystallization within very thin layers (a few tenths of millimetre) where crystallization takes place in a short time. It was considered that the period of crystallization plays an important role in the pattern's morphology in particular, taking into account the different purpose of the research: to create an objectifiable sensor for a possible morphogenetic (informational) field. The goal was to obtain some “snapshots” of the result of the dynamic interaction between the crystallization process and the informational flux of the location in which the experiment takes place, in the presence of the informational field brought on by the living (the substance for analysis).



*Fig. 5. Experimental results (thin layer tesigraphy).*

The results have confirmed the geometric difference of crystallization under the influence of some biological components sampled from living organisms. (fig.5, a – without addition, b – with addition) A remarkable pattern had also been obtained (fig. 5, c) which suggests correlations of the sensitive crystallization process in the presence of life with defined processes of vortex theories [29] and scalar waves theories (as information carriers). [30, 31]

The future research activity will be centred on refining this method with

the aim of a possible experimental validation of the models that define information as an ontological dimension, alongside energy and matter.

### **5. Conclusions**

Developing a formal model presupposes the existence of a set of prerequisites, of a previous formalization experience, of corresponding tools generally supplied by mathematics. It is to be noted that the entire body of utilized notions, concepts and tools have their roots in the paradigm that is currently “in charge”.

Validating a theoretical model requires the conception of an experimental setup, the use of measuring instruments and, obviously, a specific protocol. A quantitative evaluation takes place which validates, or not, the model by verifying its degree of reproducibility and its prediction capacity. The design of the experimental context, the basis of functioning of the measuring instruments and even the nature of the experimental protocol are in their turn dependent on the used paradigm, validated by the scientific community at that time. From which there derives the difficulty of addressing the experimental validation of some models that go beyond said paradigm.

A few conclusions that emerge out of the conducted studies:

- The environment is not homogeneous and isotropic, inert, but informationally participatory to the germination, the dynamics and evolution of the living and non-living entities.

- The study of the process of planetary geostasis cannot be done outside of an ortho-physical vision that implies the ontological triad: information – energy – matter.

- The use of artificial intelligence in the discrimination/classification of forms that develop by nonlinear growth processes (crystallization, agglutination) allows for the elaboration of a specific semiotics, associated with informational processes.

- The theoretical and experimental study of scalar waves is needed in order to validate the statement according to which these waves are information carriers.

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**BIBLIOGRAPHY**

- [1] *Planeta Pământ – planeta vie*, Vol. 1, editors D. Zugrăvescu, F. Munteanu, Eagle, 2011.
- [2] *Planeta Pământ – planetă vie*, Vol. 2, editors D. Zugrăvescu, F. Munteanu, AGIR, 2014.
- [3] I. Prigogine, *Introduction to Thermodynamics of Irreversible Processes*. Springfield, Illinois: Charles C. Thomas Publisher, 1955.
- [4] K. T. Alligood, T. Sauer, J. A. Yorke, *Chaos: an introduction to dynamical systems*. Springer-Verlag. 1997.
- [5] V. S. Afrajmovich, V. I. Arnold, et al., *Bifurcation Theory and Catastrophe*, Encyclopaedia of Mathematical Sciences, Vol. 5, 1994.
- [6] H. Haken: *Synergetics, an Introduction: Nonequilibrium Phase Transitions and Self-Organization in Physics, Chemistry, and Biology*, 3rd rev. enl. ed. New York: Springer-Verlag, 1983.
- [7] B. Mandelbrot, *The Fractal Geometry of Nature*. W. H. Freeman and Company, 1982.
- [8] S. Wolfram, *Cellular automata*, Los Alamos Science, vol. 9, 2-21, 1983.
- [9] S. C. Kleene, *Representation of Events in Nerve Nets and Finite Automata*, Annals of Mathematics Studies (34), Princeton University Press, 3–41.10, 1956.
- [10] P. Erdi, *Complexity explained*, Springer (Complexity), 2008.
- [11] P. Bak, *How Nature Works: The Science of Self-Organized Criticality*, New York: Copernicus, 1996.
- [12] M. Drăgănescu, *Profunzimile lumii materiale*, Politica, 76, 1979.
- [13] M. Thellefsen, T. Thellefsen, B. Sørensen, *Information as signs: A semiotic analysis of the information concept, determining its ontological and epistemological foundations*, Journal of Documentation 74(1), 2017.
- [14] J. Lovelock, *The Ages of Gaia: A Biography of Our Living Earth*. New York: Norton, 1995.
- [15] S. H. Schneider, *Scientists debate Gaia: the next century*. Cambridge, Massachusetts: MIT Press, 2004.
- [16] M. Drăgănescu, *Ortofizica*, Ed. Științifică și enciclopedică, 1985.
- [17] M. Drăgănescu, *Informația materiei*, Ed. Academiei Române, 1990.
- [18] B. Nicolescu, *Ce este Realitatea?*, Junimea, Iași, 2009.
- [19] A. A. Moran-Reyes, *Contribution to the Ontological Status of Information: Development of the Structural-Attributive Approach*, Library Trends, Vol. 63, Nr. 3, 2015.
- [20] F. Munteanu F., C. Suteanu, C. Ioana, E. Crețu, *The 'Smoothing Dimensions' - a new fractal analysis method*, in M. M. Novak (ed.), *Fractal Reviews in the Natural and Applied Sciences*, London, Chapman & Hall, 259, 1995.
- [21] F. Munteanu, C. Ioana, D. Zugrăvescu, C. Suteanu, *Study of complex systems - methods for the approach of critical phenomena în geodynamics*, 30th International Geological Congress, Beijing, 4-14 August 1996; section: Seismogeology - earthquake prediction, abstract 1394, Vol. 3,
-



182, 1996.

[22] Z. Liu, Y. Lai, J. M. Lopez, *Noise-induced enhancement of chemical reactions in nonlinear fluxes*, American Institute of Physics, Chaos, Vol. 12, nr. 2, 2002.

[23] A. Hubler, A. Belkin, A. Bezryadin, *Noise induced phase transition between maximum entropy production structures and minimum entropy production structures*, Complexity. 20 (3): 8–11 P. John Wiley & Sons, Inc. New York, NY, USA.

[24] P. Papacostea, C. Simota, Cecilia Zelenschi, *Calitatea biologică și metode de evidențiere a acesteia*; Revoluția Biologica, Ed. Academiei, 1985.

[25] E. Pfeiffer, *Sensitive crystallization process – a demonstration of formative forces in the blood*, Library of Congress, Catalog Card Nr. 68-31125, 1936, second edition, 1975.

[26] Kahl J., Busscher N., Doesburg P., Mergardt G., Huber M., Ploeger A., *First tests of standardized biocrystallization on milk and milk products*, Eur Food Res Technol (2009) 229:175–178.

[27] C. Udriște, F. Munteanu, D. Zugrăvescu, I. Tevy, *Ontological view on the Triad Information - Energy – Matter*.

[28] N. N. Krasnogorskaya, E.F. Legushs, N. J. Tsvileneva, *Fractal Structure Theory Application in Crystallography*, Researches Proceedings of the 2nd International Workshop on Computer Science and Information Technologies CSIT'2000, Ufa, Russia, 2000.

[29] A. K. Tomilin, *The Potential-Vortex Theory of Electromagnetic Waves*, Journal of Electromagnetic Analysis and Applications 05(09), 2010.

[30] C. Udriște, D. Zugrăvescu, F. Munteanu, *Nonclassical Electromagnetic Dynamics*, WSEAS TRANSACTIONS on MATHEMATICS, Issue 1, Vol. 7, January 2008.

[31] K. Meyl, *Scalar Waves: Theory and Experiments*, Journal of Scientific Exploration, 199-205, 15, 2 (2001).

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