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The Theory of Contact as Third Ontological Beginning

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Abstract: *The end of the 20th century shows that the crisis of humanity is universal. It is generated by the dualism and can be identified as “contact insufficiency of humanity”. The way out of the crisis is in the approach replacing the dualism by trialism, focusing on the excluded third ontological beginning. The problems to be solved by mankind, and not the truth, are located between the alternative objects. The bearers of the problems are contacts. The means for solving the problems are the interdisciplinary (contact) sciences and technologies, and, as general methodology of interdisciplinarity, the science of tribology. Following the development of sciences and the social requirements, education will move the focus from the center of the classical sciences on the boundary zones between them, respectively on the interdisciplinary sciences.*

Key words: *Contact, tribology, third ontological principle*

1. Introduction: To ascertain the contact and its role in theory and practice

Humanity managed to survive many crises and catastrophes since they were temporary or local ones, thus the power of human science was not badly needed. Nowadays, we participate in a new situation when human society is integrated not in the area of spirituality, but in the solving of problems. Universal and global ecological, material and spiritual problems, crises and catastrophes threaten the mankind. In order to overcome them, a principally new scientific, material and spiritual power should be necessary. At the same time, that power cannot solve our problems without an adequate strategy and methodology. Moreover, if not properly rationalized, it could raise additional dangers. The inertia of the historical processes involves us in a slow reorientation to the new realities. Local and temporary interests and approaches keep dominating our value system reflecting the bipolar scheme in science and consciousness.

The existing science comprises thousands of particular disciplines divided by deep gaps. Their integration presupposes “filling-in” of those gaps by the structures and functions of the scientific contacts between them. This exactly should be the vocation of the interdisciplinary sciences and in particular of the Theory of Contact as a general theoretical-methodological base for building the complex contact systems.

Unifying the separate scientific fragments, the contacts as a system form the connective link of the scientific mosaic. If we lay a real social problem on that mosaic, we shall see that it “covers” a part of the mosaic including different elements and contacts of it. For overcoming the problems in science, it is necessary the problems and the sciences to be considered continually, integrating the contacts of their parts. This is also the role of contacts in life and the place of their theory in the solving of the global problems.

On the notions “contact” and “entity”

The word “contact” has a Latin origin; it is mostly translated by “touch”. There are also other analogical notions, like: “relation”, “relationships”, “interaction”, “communication”, etc. Each of these words reflects the rich contents of the notion “contact”, as the latest integrates the whole variety of structures, processes and substances of the boundary formations of material and spiritual elements of nature, society and techniques. The contact is the very thing that divides, unifies and realizes all matter and spirit. The contact is the ontological principle, which brings life and progress in our world, and in every individual entity of it (theory, technology and practice). From a global point of view, the world we live in is unified, but from a local point of view it is multiple, i.e. it consists of separate episodes (temporally), fragments (spatially) and processes (in space-time). The contacts are the third that transforms the local in a global, making the unified, multiple and functional world.

Enrichment, stability and disintegration of each functional entity are realized through forming of new contacts and failing of existing contacts. Contacts are those that make the wholeness open and free, sustainably prospering or degrading. The science of contact and contact systems is called triology, and the philosophy, methodology and ideology based on the crucial role of contacts is called trialism. Each contact system (triological atom) consists of three elements provisory designated as „body-contact-counterbody”. The body and the counterbody are alternatives complemented to a

functional entity through a “third body” which is the contact between them. If the alternatives are material ones, the contact is also material; if they are spiritual, the contact is also spiritual, but in case they are heterogeneous (material and spiritual), the contact is complex one (hybrid contact). The contact could be imperceptible as physical formation between the alternatives, however it can excel them as size and functions. For example, the contact between mechanically touching bodies can be minimal as dimensions, but the contact between distantly interacting bodies (optical contact, acoustic contact, gravitational contact, etc.) can outsize the alternatives. The contact can change its place in the functional triad. For example, the “present” in the triad “past-present-future” is the contact in the temporal cross-section, but in the functional cross-section the “future” is the contact between present and past, which are the alternatives. One has to bear this in mind when speaking that “tomorrow begins with today” or “the truth should not only be found, but also cultivated”.

Each entity can be considered as a structural-functional atom on the fundamental level; e. g. the world as wholeness: ‘material-contact-spiritual’; the human being as “body-culture-spirit”; the journal bearing as slider-mechanical contact-rail track”; the family: „husband - familiar contact – wife”, etc. This is the basic level of the entity represented by the functional triad. It can however not satisfy the needs of the human consciousness and practice, hence other levels and cross-sections are also established. Some examples: „movable-contact-fixed” – mechanical cross-section; „solid-liquid-gaseous” - physical cross-section; „positive-neutral-negative” - axiological cross-section; „pure-normal-polluted” - ecological cross-section; „facts-laws-principles” - epistemological cross-section; „thing-contact-nothing” - ontological cross-section.

Independent on the level of the triad of the wholeness and its „cross-sections”, each of them can be presented as follows:

- verbally, by the abstract formula „body, counterbody, contact, wholeness”;
- arithmetically, by the rational numbers „1, 2, 3, 4 ”; and
- geometrically, by the elemental entity „tetrahedron” determined by four points in space.

The individual levels and cross-sections give the actual structure of the wholeness in its functional space. Theoretically, the number of contacts in each entity is unlimited, depending on the depth and width of its investigation and its objective significance. Having in view the special (quantitative) characteristic of the contacts, they are internal, external and eigencontacts. Internal are the contacts between alternatives belonging to the entity. External are the contacts of the entity or its elements with alternatives out of the entity. Eigencontacts are formed between the elements of external and internal contacts. An example is the entity “human being”. His internal culture is determined by the contacts between his own alternatives “body” and “spirit”. His external culture is determined by the contacts of the human being and its elements create with the environment. His eigen-culture is determined by the contacts between his internal and external culture.

The qualitative (qualimetric) characteristic of contacts on the fundamental level is determined by the triad „material-combined-spiritual”. The example with the entity “human being”: material ones are the contacts between the special elements of human beginning with the cells, passing through the organs and reaching his systems and entity as physical body. Some of these contacts have their own names, e.g. cellular membranes, stroma (connective tissue), joint connections, etc. The material contacts are spatial formations. Spiritual are the contacts between human ideas and notions, which are mostly designated by complex words formed by their alternatives. Such are the notions of the interdisciplinary formations like “tribomechanics”, physico-chemistry”, „thermodynamics”, etc. Spiritual contacts and their alternatives have no spatial characteristics. Combined contacts are all elements in human behavior and culture connected with the unifying of material and spiritual. For example, human poetry, paintings, science, architecture, etc. Combined contacts are spatial-temporal formations.

The fundamental role of contacts in nature, society and techniques are expressed by the triad “activity-dynamics-reactivity”. As per their reactive role, the contacts differentiate the world to separate parts; the active role is in world integration through unifying the individual parts, and the dynamic role – in the mechanisms of contact interactions between these parts. Stableness, adaptivity and spontaneity are characteristic for the contacts. Contacts are stable because of their determinateness, sustainability and predictability. Their spontaneity is related to the chaotic state, unpredictability and uncertainty. Their adaptivity is involved by the expedience, neutrality and tolerance.

Following example illustrates the sustainability the expedience in the behavior of contacts: All objects around us have stableness in their location at rest. Why? It is known from mechanics that every body is at rest if the acting upon it moments and forces form closed contours. The latter are known as polygons of forces and moments. Let the body is at rest and hence the polygons of forces and moments are closed. Perturbations arrive however constantly from the foundation, earth, atmosphere, gravitational and electromagnetic fields. How do the polygons of forces and moments remain closed? The answer is: because of the spontaneity and expedience of the contacts between the bodies. In the language of mechanics it will sound like this: the contacts create automatically a particular reaction to each active perturbation and neutralize the perturbation, keeping thus the conditions of equilibrium of bodies.

Next question appears: Are the possibilities of contacts to counterbalance external perturbations unlimited? The answer is not unambiguous and this makes our world simultaneously sustainable and uncertain. It is important to know that both sustainability and variability of our world are achieved through cultivation, destroying and keeping of the corresponding contacts.

2. Principles of the contact body

Four questions can be solved by the principles of the model of the entity presented above. The first one is “What is the entity?”; the second one: “How much is the entity?; the third one: “How is this entity possible?”, and the fourth one: “Why is the entity like this?”

The first question determines the entity as quality; the second one – as quantity; the third one – as state; and the fourth one – as sense.

The answers to these questions are in the four principles of the wholeness, namely:”Principle of unity”, “Principle of

diversity”, “Principle of change” and “Principle of entity”.

The answer of the first question is: The entity is triunique and is formed following the formula „body-contact-counterbody”, the contact defining the nature of the entity. For example, depending on the contact created between the partners, the entity formed by two people is defined as “friends”, “colleagues”, “enemies”, “family”, etc.

The answer of the second question is: Each functional entity is many-sided, because it is multi-contact. One and the same entity, if regarded in depth, width and functionally, in different cross-sections, levels and aspects, can be defined as mosaic entity, in which the contacts play the role of the linking tissue between the individual components.

The answer of the third question is: Each functional entity is possible, because its contacts are in the process of constant change, adaptation and self-organization, thank to which a stable coexistence is realized between its unity and variety.

The answer of the fourth question is: In order to exist, function and evolve, the entity is triunique, many-sided and changeable.

3. Application

An illustration of the first part of the presentation is done by the practicable and qualimetric cross-section of the fundamental role of the contact regarded as a third independent statute.

This role is represented through the triad „the contact as creator - the contact as mediator - the contact as destroyer”. In the practicable cross-section, „the contact as mediator” will be presented through the triad „the contact as wall - the contact as door - the contact as bridge”. In the qualimetric cross-section, „the contact as mediator” will be presented through the triad „the contact as subject - the contact as benchmark - the contact as methodology”. Examples follow below to illustrate some of the roles of the contact.

The contact as mediator

Alternatives (communicator and recipient) do not communicate directly, but through the third body manifesting as mediator. Depending on the qualities of the mediator, communicator and recipient realize either good, or faulty, or partial communication. In the first case the contact is non-perceptible, i.e. there is very high conductance and permeability between the alternatives (like the politics of open doors and unfenced yard); in the second case the contact is insurmountable, i.e. with very high resistance (the Wall in Berlin); and in the third case the mediator is dynamic, with changeable conductance. This case allows implementation of flexible, dynamic and adequate politics. Example: If thermal, acoustic or electrical conductance of two conductors in contact is measured, it is necessary to take into account the contact conductance, which can vary from zero to infinity, i.e. from insurmountable to non-perceptible contact.

The conclusion is: Functionality and effectiveness of a system depend on the character and the state of contacts as mediators between its elements. In other words, a system can include much more or less than the contents of its elements, depending on the nature, state and structure of the contacts as mediators between them. The miracle of the creation is rather related to the composition and connection of the elements of the built entity, i.e. to the contacts between them, than on the elements themselves. It is known, for example, that the same elements and techniques can form both art and kitsch. A family consisting of husband and wife is much more or much less than the qualities of the husband and the wife separately or together. This is due to the family contact as mediator between them. Let remind the thought of Ludwig von Bertalanffy: “Knowing what is one, and knowing that one plus one make two, we still don’t know what is two, because we should know the contribution of the “plus”.” Nowadays the element “plus” is not included in the “two”, and that is the very thing of the crisis of the classical science based on the logics excluding the third as mediator. Triology and in particular tribology, not only include the role of the mediator but also assign to it a crucial position among the alternatives of the entity.

The contact as qualimetric benchmark

A benchmark is needed in order that the property, process or behavior is qualified. This benchmark should be the contact, which is a complex dynamic system; however its equilibrium state is neutral, even if movable. The current dynamic equilibrium state of the contact is called contact qualimetric benchmark. The current contact state and the state of the alternatives of the entity are assessed compared to the benchmark. The entity itself is assessed by the addition of the assessments of the three bodies forming the entity. The ancient expression „Human is measure of everything” should also contain the qualimetric benchmark of human as neutral contact formation.

The character of the classical science is limited because the qualifying of the investigated phenomena, structures and states is related to absolute benchmarks taken regardless the man as observer, motivator and consumer. The modern trend to consider humans as central contact formation in the cognitive process is identified as science humanization.

When the contact between two bodies is fixed and is reduced to qualimetric benchmark, it is transformed to a demarcation center, line or surface for these bodies. It is called “the contact zero”. For example, the center divides left and right; the horizontal plane divides above from below; zero divides positive and negative numbers; neutral divides good and evil; middle class divides poor and rich; the contact level divides macro and micro world, etc. Reducing the contact to „demarcation line” involves the definition of two types of values in axiology: positive and negative, which in fact excludes the role of contact as third beginning of world.

The contact as creator

A pile of stones do not form a house, a pile of facts A pile of stones do not form a science and a pile of machine elements do not form an equipment, as well as a pile of letters do not form poetry. What is it necessary to do in order that those piles become respectively house, science, equipment or poetry? The answer is simple: to arrange and fix in the appropriate manner the corresponding elements. Next question is: “How to do that?” The answer is simple too: By means

of the appropriate links (contacts). The third question is: „What is the meaning of creation?” The answer is: To add new elements to the existing ones through external and internal contacts, and improve their functionality through eigencontacts.

So, we arrived to the creation as process characterizing the deepest essence of man and mankind. The creative process is connected with generation of new alternatives and contact elements, and of new contact systems, i.e. of new structures. The contacts have particular place in this process; it is because the more complicated alternative elements generated in human civilization, and the final product of the creative process are realized rather by multiplication through contacts between the basic constructive elements than by increasing their number. For example, syllables are formed from the letters, words from the syllables, etc.; Mechanisms are formed from the machine elements, systems and aggregates from the mechanisms, etc. Similar is the situation in the social sphere: Families are formed from people, tribes, ethnic groups and nations from the families, etc.

The central question of creation is the invention, discovery and cultivation of the contact formations between basic and derivative constructive elements. The combined contacts between material and spiritual alternatives are highly constructive. There is significant difference between discussing with someone, thinking about something and writing on it. The difference can be explained with the type and the nature of contacts in each concrete case. This is also valid especially for the creative contacts, which are supposed to generate something new.

The existence of lasting contact between human sub conscience and conscience, between chaos of facts and order in the logics, with transition from the periods of incubation, guessing and reflecting the thoughts in ideas, models and theories, is necessary for the development of creative thoughts. When thinking, the creator is in contact mainly with his sub conscience, when speaking in front of listeners he is in contact with the audience, but when he is writing he is in contact with the white sheet of paper, and through the traces on the sheet – with the whole human culture. The art of realizing as creator lies in the ability to generate, maintain and vary the proper contacts with him, the neighborhood and the world as wholeness. It is extremely important to be able to form contacts with the spiritual part of the world. The spiritual – that is the richness of the “unexpressed” thing, which is potentially in the global and local “nothing”. The spiritual is unlimited in time filling out the whole universal space with the aura, with the dynamically changing density following unknown up to now laws, however with the active participation of man and his communities. The creators in science and culture are those subjects, which have high sensibility to the spiritual and manage to alive the spiritual potentials of the world through their own actions and words, as well to implicate them in the conscience and activity of the generations. The classical science and education are directed to discovering and using of the things, i.e. to the material part of the world, towards the past. Modern interdisciplinary science, including also tribology, has to bring the accent to the creative present taking into account the past, in the name of the sustainable future.

4. Conclusion

Several issues follow after summarizing above representation. The end of the 20th century and the second millenary shows that the crisis of humanity, being ontological, is universal. It is generated by the dualism and can be identified as “contact insufficiency of humanity”. The way out of the crisis is in the approach replacing the dualism by trialism, focusing on the excluded third ontological beginning, that is: the formula $E = A + B$ to be replaced by $E = A + C + B$. So, the people will replace the values of the physical space with those of the functional space, i. e. they will appreciate rather the very thing they create, maintain and develop, than the thing they have in possession. The problems to be solved by mankind, and not the truth, are located between the alternative objects. The bearers of the problems are contacts. The means for solving the problems are the interdisciplinary (contact) sciences and technologies. As general methodology of interdisciplinarity, tribology should be designated as triology.

Following the development of sciences and the social requirements, education will move the focus from the center of the classical sciences on the boundary zones between them, respectively on the interdisciplinary sciences.

References

- [1] Manolov N., The Theory of Contact, TEMTO, Sofia, 2014 (in Bulgarian)
- [2] Manolov N., Kandeveva M., The Interdisciplinary Paradigm of Tribology, Technical University - Sofia, 2012 (in Bulgarian)
- [3] Manolov N., The Contact Approach: Atomizing, Harmonization, Integration, TEMTO, Sofia, 2007 (in Bulgarian)
- [4] Kapra F., The Tao of Physics: An Exploration of the Parallels between Modern Physics and Eastern Mysticism, Shambhala Publications, 1975.
- [5] Poincaré H., The Value of Science: Essential Writings of Henri Poincaré. Random House LLC, 2012.
- [6] Prigogine I., The End of Certainty. New York: The Free Press, 1997.
- [7] Haken H., "Synergetics, an Introduction: Nonequilibrium Phase Transitions and Self-Organization in Physics, Chemistry, and Biology", 3rd rev. enl. ed. New York: Springer-Verlag, 1983.