

Goal → New Heuristic Model of Ideality: Logos → Coincidentia Oppositorum → Primordial Generating Structure

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Four Centuries of Wandering → Total Existential Crisis →

*We are no longer satisfied with insights only into particles,
fields of force, into geometry, or even into time and space.*

*Today we demand of physics some understanding
of existence itself. [1]*

John A. Wheeler

Fundamental knowledge endures deep conceptual crisis manifested in general crisis of understanding [2,3], crisis of interpretation and representation[4], loss of certainty [5], troubles with physics [6], crisis of methodology. Crisis of understanding in fundamental science generates deep crisis of understanding in global society.

In 1930 Alexander Vvedensky wrote such lines:

We can not see the world as whole.

All insignificant and fractional.

Sadness takes me from it all. [7]

But how we can see the world in integrality, the world as whole? It is important for physicists as well as for poets and all human beings of the Earth. Beholding of wholeness is impossible if we rely only on intuition, experience and "guessing of the equations".

The origin of modern crisis of understanding lays in the beginning of science of New Time with cognitive attitudes: "Hypotheses non fingo" and "Physics, be afraid of metaphysics". As a result the competition of gnoseological paradigms was limited, and mechanistic paradigm became a dominating mainstream paradigm ("paradigm of a piece", "bricks of the Universe" paradigm, "paradigm of a fragment"). The ontological meta-paradigm, Universum as a whole, was pushed on "philosophical backyards" of science. It was the beginning of a four-century era of intuitive wandering and fixed fight of paradigms, instead of their philosophical strategic interaction. As a result: the fundamental science "bumped" against understanding of "nature laws", fundamental constants, space, time, information, consciousness. It is not only crisis of mathematics and physics but also a general crisis of philosophy - "mother of all sciences". It is deep onto-gnoseo-axiological crisis, crisis of knowledge basis which is transformed to comprehensive existential crisis when the question of existence of Humanity and all live on Earth has become extremely aggravated.

Werner Heisenberg in the report "Role of physics of elementary particles in the development of modern natural sciences" marked the direction of search of recovery from the crisis of fundamental physics: "The physics of particles informs us, strictly speaking, on fundamental structures of the nature, but not on fundamental particles. These structures are much more abstract, than it seemed 50 years ago; however it is possible to understand them. It is justifiable to see expression of human break to get into an essence of things in the grandiose tension with which our era works in this area." [8]

Mathematics - "queen and servant of science" - also faces the problem of search of primordial fundamental structure. It is clearly shown in "The Architecture of Mathematics" of N. Bourbaki.[9] The course of life and scientific searches of mathematician Vladimir Voevodsky - the Fields medal winner - lead him to a deep existential conclusion: "What we call crisis of the Russian science now isn't crisis only of the Russian science. There is a crisis of world science. Real progress will consist in very serious fight of science with religion which will end with their integration. And do not punch my face." [10]

But the question is: are you really sure that such "fight" will take place? The problem of unity of knowledge becomes more and more aggravated. Many great researchers of XX century note a huge role of religion and tradition in informative process: Planck, Einstein, Whitehead, Bohr, Born, Paulie, Compton, Heisenberg, Dirac, and many other outstanding scientists. Max Planck came to very important conclusion: "No matter where and how far we look, nowhere do we find a contradiction between religion and natural science. On the contrary, we find a complete concordance in the very points of decisive importance. Religion and natural science do not exclude each other, as many contemporaries of ours would believe or fear. They mutually supplement and condition each other." [11]

They may be said to help each other.

The whole of the history of science is the process of creation of idealities. Immanuel Kant, considering the problem of idealization in formation of natural sciences, came to the following conclusions: "But in order to make possible the application of mathematics to the doctrine of body, which can become natural science only by means of such application, principles of the construction of concepts that belong to the possibility of matter in general must precede. Hence a complete analysis of the concept of a matter in general must be laid at the foundation of the doctrine of body. This is the task of pure philosophy, which for this purpose makes use of no particular experiences but uses only what it finds in the separated (although in itself empirical) concept [of matter] with regard to pure intuitions in space and time (according to laws which already depend essentially on the concept of nature in general); hence such a doctrine is an actual metaphysics of corporeal nature." [12]

Nowadays the fundamental science hit overload in splitting of matter and after four centuries of intuitive "wandering" and "guessing of the equations" it "has bumped" against metaphysics of "point" → "material point", "mathematical point", "point of probabilistic cloud", "point of the center", "points of a source-sink". "point with a vector germ", "points of the coincidence of contrasts", "point of the coincidence of maximum and minimum", "singularity point", "point of the junction of two worlds" → "res cogitans" and "res extensa". The modern Information era extremely aggravates an old metaphysical problem of understanding of "matter soul".[2]

What way should we choose for overcoming total crisis of understanding in fundamental science? It should be the way of metaphysical construction of new comprehensive model of ideality on the basis of the "modified ontology".[8]

Whitehead's Way → Mathematics → Constructive Metaphysics of Process →

Scientific searches and ideas of the outstanding mathematician and philosopher of the 20th century Alfred North Whitehead are of the fundamental value for creation of new ideality. He made his way from mathematics to metaphysics. In his fundamental philosophical work "Process and Reality" A. Whitehead came to a very important conclusion: "That the actual world is a process, and that the process is the becoming of actual entities". "Concrescence" is a biological term which A. Whitehead used for determination of becoming of actual entities[13] The process of concrescence consists of "graspings". A. Whitehead explains the idea of "grasping": "Holistic existence is not a connection of mathematical formulas and only formulas. It is concrescence of things illustrating formulas. It is an interlacing of qualitative and quantitative elements." [13]

In the process of metaphysics A. Whitehead pays special attention to understanding of "point": "the limit of convergence of a number of objects, for example, of decreasing concentric spheres." A. Whitehead brings many metaphysics concepts showing "capture": "prehension", "grasp", "reach", "sweeping", "seize" and came to a very important conclusion concerning basification of knowledge and "complicated problem of consciousness": "The doctrine about organism is an attempt to describe the world as process of generation of individual urgent entities, each of which has absolute consciousness." [13]

In "Adventures of Ideas" A. Whitehead considers philosophy, science and religion inseparable with the history of European civilization. In 1938 A. Whitehead's published the book "Modes

of Thought", and at 80-year age Whitehead read the lecture "Immortality" in which he emphasized the necessity of more constructive thinking, development of the best scheme of the general ideas and its application to experience interpretation.

A. Whitehead paid special attention to the concept of "law" presuming that "accurate determination of the concept of law with consideration of its attitude to the human goal-setting is a very complicated problem." [13]

Considering the categories of "space" and "time" Whitehead came to the following conclusion: "Space-Time of modern mathematical physics is understood as abstraction of concrete mathematical formulas which are used in relation to the concrete events which take place in it and almost in accuracy repeats the concept of "receptaculum". It should be noted that mathematical physics leave the question concerning the nature of these formulas and how they can be brought out from the concept of space-time opened" A. Whitehead came to a very important metaphysical conclusion: "Mathematical physics translates Heraclitus' saying, "All things flow," into "All things become, all things are vectors." [13]

It was the breakthrough of metaphysics to mathematics and physics at the same time - breakthrough to new knowledge. And the main thing, it was the breakthrough to "the thinking thing", to understanding of cross point of "res cogitans" and "res extensa". Here one can "grasp" metaphysical-mathematic "chain": Ontological "celestial triangle" of Plato as epy measure of any sensual thing and process → Mathematics as a language of the Universe and its signs "triangles, circles and other geometrical figures" (Galilei) → "Thinking thing" (Descartes) → «Cogito, ergo sum» (Descartes) → "Intentionality" (Brentano, Husserl) → "Thing-Vector" (Whitehead) → "Vector of consciousness" (Rogozhin, 1990) → Coincidence in "mathematical point with a vector germ" (E. Cartan) "res cogitans" and "res extensa".

Thus the sum of the philosophical ideas of A. Whitehead channelizes accurate search → construction of new heuristic model of ideality:

*"It is by a mathematical point only that we are wise,
as the sailor or the fugitive slave keeps the polestar in his eye;
but that is sufficient guidance for all our life.
We may not arrive at our port within a calculable period,
but we would preserve the true course." [14]*

What logic and concepts can one take with himself in a way to achieve the goals, to understand Nature language, to understand the reality?

λόγος → Coincidentia oppositum →

Alexander Zenkin in the article "Scientific Counterrevolution in Mathematics" draws important conclusions for understanding of origin and reasons of crisis of understanding, loss of definiteness: "About thirty years ago, for the sake of "sports interest" I began to collect various "logics" used in modern logical-mathematical treatises. When their amount exceeded the second hundred, it has become clear: if the logic can be selected "on a taste" (or even can be constructed "on a need"), such notion as "science" becomes here simply inappropriate. Perhaps, the situation somewhat reminds the famous "Babylon" epic: the sounds – symbols of abstract speeches are almost the same, but the sense, if that is present, of everyone is peculiar. What was the end of the First Babylon is described in The Holy Bible.. " [15]. Alexander Zenkin offers the way of recovery from the crisis: "the truth should be drawn... " [15]

Term «Logos» / λόγος is mainstream in science and philosophy. This term is an accumulator of meanings, an attractor. It is a mainstream term in philosophy and science. It was suggested by Heraclitus. In Ancient Greece primary sense of word "logos" was connected with collecting (as well as "lego"). [16] In Ancient Greek language dictionary by I.H. Dvoretzky word "λόγος" has 34 nests meanings [17] On the one hand, "λόγος" is the speech or recognition of the law, meaning, basis and structure of a thing. On the other hand, "λόγος" is a metaphysical reality, the law of things, and in this aspect it is a cosmological form. [18].

By Heraclitus the first origin of Nature - "Logos" - is interpreted in different meanings. But mainstream meaning is "omnitemporal divine law" to which every living thing follows.

"Logos" is also the Speech which the Nature addresses separate things and operates them with. Sometimes Heraclitus calls Logos "reason which governs the Universe". Logos by Heraclitus doesn't exist separately from things, it is present in everything. Logos by Heraclitus is an ontological category. It forms both structure of the Universe being, and its frame, borders. [19] Logos by Heraclitus is the law of unity of contrasts defining space cycles. It regulates human nature (cycles of a dream and wakefulness, life and death), craft and art. Logos by Heraclitus is also understood as "measure", "volume", "doctrine". [20].

With development of philosophy Logos changes its ontological status. Language which is the property of the native speaker becomes the home of "Logos". Plato uses the term "Logos" in the following meanings: "doctrine", "speech", "word", "explanation", "mind", "essence". At the same time "Logos" by Plato as a disarticulating speech, counterposes eidos as theoretical integrity, semantic reality with ontological dominant. [21].

Term "Logos" in Aristotle's interpretation has even more meanings: "mental", "understanding", "denomination", "form", "essence of a thing", "expression", "name", "definition", "basis". Logos by Aristotle approaches the difficult concept "entelecheia". Entelecheia (Greek ἐντελέχεια "completeness", from ἐντελής - "complete"). Entelecheia is the force withholding the material, formal, operating and objective reasons in dialectical unity i.e. the internal force which is potentially comprising the purpose and final result. For example, force which makes new apples from the apple seed. Being is impossible without entelecheia. Aristotle calls soul the entelecheia of the body. In one of interpretations the entelecheia is "the basis (logos) of any being in the opportunity". As well as Logos the concept "entelecheia" receives a number of definitions: eidos, form, soul, energy, essence. Aristotle defines "matter" and "form" as follows: "Matter is an opportunity, form is an entelecheia." [22].

All history of knowledge development is gradual decrease of the ontological status of "logos". Taking into account the accumulated knowledge and existing problems it is necessary to find the utmost intrinsic interpretation and representation of dialectics of "logos" and "eidos" (visualization-idea) is necessary for "catching" of qualitative and quantitative definiteness of structure of the Universum being as the holistic generating process in their ontological unity: "logos - matter – entelecheia - form".

Ἐν ἀρχῇ ἦν ὁ λόγος → ProstranstvoPonimanie / SpaceUnderstanding → Primordial Generating Structure→

Almost one hundred years ago philosopher Pavel Florensky drew a conclusion which turned out to be extremely important for understanding of sources of modern crisis of understanding in fundamental science: "The problem of space lies in the center of the worldview in all arising systems of thought and predetermines the development of entire system. And, the more solid any system of thought is the more specific is determination of the space as the kernel of this system. Remember: worldunderstanding - spaceunderstanding." [23]

P. Florensky entered new compound concepts and shown their identity: "worldunderstanding - spaceunderstanding". It is necessary to notice that the concept of "space" can be translated from Russian literally as "pro-wandering".

What does it mean to understand the space? In his "Ontology of Mathematical Discourse" Grigory Gutner made the following conclusions: "The event of grasping structure means understanding." ... "The understanding is, eventually, the establishment of the point." [24] The understanding of the space which is the basic ideality of the fundamental science, is "grasping" of its ontological structure.

In ancient times the idea of trinity was the cornerstone of the worldview of our ancestors: The Earth is based on three pillars, three elephants, three turtles. Thanks to triune "basis", the entire depth of being was understood in generalized unique form.

In the Middle Ages there was a tradition to use geometrical circle (sphere) for clearing of ratio of three divine hypostases (Gr. hypostasis – essence, basis); this tradition had come from antiquity and the era of early Christianity. R. Guardini in his research "The End of New Time" shown the perception of the World by antique and medieval person as follows: "...both have no common for us view of the infinite space-time continuum. For both the world is a limited entity, having outlines and form - figuratively speaking world is a sphere." [25]

The mechanist paradigm of New Times, "paradigm of piece", is a revolution in basic idealities of the worldview: the gnoseological space - "cube" ("Cartesian box") - forces out gnoseological space - "sphere".

Nowadays different ideas of gnoseological spaces without ontological justification are represented in physics: "curve", "slanting", "fluctuating", "extending" and "toroidal" spaces. [26] The mathematics is responsible for this "gnoseological bacchanalia" in fundamental knowledge. The centenary problem of an ontological basification of mathematics and knowledge in general, has become extremely sharp. It is connected mainly with understanding of ontological structure of basic ideality – space. The methodology of "grasping" primordial structure of space was traced by E.Husserl in "Origin of Geometry": "...at idealization to consider the general maintenance of the existential sphere, invariant in all imaginable variations." [27]

Thus, the solution of the problem of basification of mathematics (knowledge) and therefore the understanding of world and worldview is the solution of the problem of ontological structure of space and creation of new model of basic ideality ("idea of ideas", "eidos of eidoses") establishing ontological framework, carcass and foundation of knowledge.

The tradition gives us the generalizing ontological axiom, funding the mindfulness center of religion and knowledge, the Superextreme Axiom → "In the Beginning was the Logos ..." / Ἐν ἀρχῇ ἦν ὁ λόγος ...". where "Logos" is the "divine eternal law", the "law of laws", the origin of understanding, concept-attractor. From "logos" the knowledge of being went in two directions → to the Absolute - Creator and his Creation – to the Nature, society, person.

The basic generalize principle of ontological construction, "The principle of principles", the Superextreme principle, the Nature and Tradition prompts - it is "The principle of triunity". The ontological Principle of the triunity funds all other ontological, gnoseological, methodological and axiological principles of knowledge: compliances, simplicity, causality, symmetry, anthropic and others.

Method → ontological construction: Ontology goes to meet mathematics, and mathematics goes to ontology. Mathematics develops into Constructive Ontology, and Ontology transforms to Ontological Mathematics. Each newly entered mathematical symbol receives the deepest ontological interpretation.

Concretizing concepts, statements and mathematical objects which are clearing up the methodology of creation of basic ideality, "the idea of ideas" on the basis of Superextreme Axiom and Principle:

- "Eidos" (pattern-idea), "matter" (according to Plato), "ontological (absolute) space", "absolute (limit, extreme) state of matter", "vector of absolute state", "bivector", "absolute vector of states", "source -drain", "limiting transition", "increment", "form", "structure", "invariant", "topos", "measure" ("qualitative quantity", "form of forms"), "tention → intention", "attention", "attractor", "catching", "attractor of meanings", "way" - "dao", "primordial structure", "primordial tension", "basic symbol-attractor":
- principle of "coincidentia oppositorum / coincidence of opposites", "coincidence of maximum and minimum" (N. Kuzansky);
- dialectical triad: being – otherness (nihil) - becoming;
- "Mother structure" - "les structures mère" (N.Burbaki),
- "Cogito, ergo sum" (R. Descartes) as statement of identity of being and thought, utmost dialectic synthesis of rational and irrational, linear and nonlinear, continuous and discrete, final and infinite, "cogito" and "madness" (absence "I"), qualitative quantum of thinking, increment knowledge;

- ontological "celestial triangle" (Plato) composed of three bivectors representing "Logos" - "The law of laws", measure ("qualitative quantity", "form of forms") of any sensual matter and process. Vectors represent absolute (limit, extreme) forms of matter existence (absolute states), triangle tops - points of coincidence of maximum and minimum of absolute (limit, extreme) states of matter;

- "point with a vector germ" (E. Cartan) as the center of coincidence of "source" and "drain" of absolute forms of a matter existence;

Basic symbol ("symbol of symbols") constructed on the basis of ontological construction – three aligned non-overlapping invariants of ontological "celestial triangle" representing three absolute conditions of matter and their ontological ways. It is the symbol of required "La Structure mère" - primordial (absolute, ontological) generating (bearing) structure, synthetic proto-eidos of ontological basis of the Universum as process of generation of meanings and structures, generation of absolute complexity, the structure of eternally existence ("time prior to the beginning of times", "eternity time"). "La Structure mère" symbol is the "9-top star", "the star of justice".

The ontological triune (absolute) space is the existential-extremum of the absolute forms of existence of matter (absolute states): linear state (absolute Continuum) + vortex state (absolute Discretuum) + wavy-vortex state (absolute DisContinuum), ontological triune (absolute) field. His geometrical representants: "cube" + "sphere" + "cylinder" constitute absolute (natural) system of coordinates of the Universum as the holistic process - the ontological framework of knowledge. The triune (absolute) space of the pillar process of generation ("time before the beginning of times" - cyclic time) has three ontological measures and 9 gnoseological measurements: three "linear" + three "vortex" + three "wavy" measurements.

Primordial generating (maternal) structure leads thinking to a super concept - ontological (structural, cosmic) memory - "matter soul", measure of the Universum being as the holistic generating process, qualitative quantity of absolute (limit, extreme) forms of the matter existence (absolute states). Matter is the from generating all other forms - "nurse", "godmother" (Plato). Ontological (structural, cosmic) memory is something that generates, keeps, develops, transforms, directs everything, i.e. funds causal, semantic and eidetic definiteness of the Universum being (Greek "entelecheia" + nous"). The birth of new structure, actual essence, is the birth of "the arrow of time" representing "vertical" (hierarchy) of the Universum being (hierarchical "arrow of time" → last → real → future→).

Thus, the method of ontological construction of the primordial generating structure of the Universum as holistic process brings to uniform ontological (onto- gnoseo- axiological) basis of knowledge: ontological framework (ontological limit - absolute forms of existence of matter), ontological carcass (ontological, natural, absolute system of coordinates) and ontological core, the foundation of being and knowledge - Ontological (structural, cosmic) memory.

Result of quarter-century wanderings → Sum of ideas, concepts and eidoses

The beginning of wanderings in "The ocean of knowledge" in order to see and understand the world as a whole is 1990. The result → sum of ideas, concepts and eidoses of the system of constructive philosophy of limit values of the Universum being as the holistic process of generation of structures (OntoTopology):

1. Basic concepts of three-stage methodology of the solution of a "hard problem of consciousness": vector of consciousness; consciousness is a vector value; consciousness is an absolute attractor of meanings. Meaning is the foundation of being. Meaning is vector ("vector" → "carrier" in Latin)

2. Method of ontological constructing of a symbol-attractor of the primordial generating process of the Universum being as a whole. The total unification of matter at all levels of the Universum.

3. Basification of mathematics (knowledge) is the ontological construction of intrinsic framework, carcass and foundation, and representation in basic (ontological) mathematical symbol.
4. Primordial (ontological, absolute) generating structure (superstructure, "general framework structure") is the triunity of absolute forms of existence of matter (absolute, utmost, extreme states): absolute rest + absolute movement + absolute becoming. Each absolute state has its ontological way – vector (dao). The dialectics of absolute forms of existence of matter substantiates status, hierarchy, numerical definiteness of fundamental constants, linearly - wave - vortex language of the Universum being.
5. Ontological space is triune (absolute) "space-mattermemory-time" of 12 measurements: 9 gnoseological measurements of space: three "linear" + three "wavy" + three "vortex" plus three gnoseological measures of time (hierarchical "arrow of time" → last → real → future→).
6. Basic symbol of primordial generating structure - synthetic eidos of structure of the Universum as eternal process of generation of structures - "9-top star", "star of justice" (generalizing vector epistemological figure).
7. Ontological (structural, cosmic) memory of the Universum is a measure of being as a whole, "soul of matter", qualitative quantity of absolute forms of matter existence (absolute states). Ontological memory is something that generates, keeps, develops, transforms, directs everything, i.e. it has causal, semantic, eidetic definiteness of the Universum being – meta-noumen (the integrative reason, "reason of reasons" = "entelecheia" + "nous"). Ontological memory creates the initial ontological tension of the Universum shown in hierarchical "forces" and "energy" of the Universum. Ontological memory is a semantic core of conceptual structure of the Universum as holistic process of generation of new meanings and structures.
8. Information is a polyvalent phenomenon of ontological (structural, space) memory, funding qualitative definiteness, orderliness, intrinsic unity of the Universum as the process of generation of structures and meanings.
9. Time is a polyvalent phenomenon of ontological memory, funding quantitative definiteness of the Universum as the process of generation of structures and meanings. Time is dialectics of generation of number and sense. Ontological time = cyclic ("horizontal" of being) + linear ("vertical" of being, hierarchical, "arrow of time"). The birth of the "arrow of time" is the birth of light. Number is the sense of time, and time is life of the number. [28]
10. Consciousness is a univalent phenomenon of ontological memory, shown at the certain level of the Universum being as holistic process of generation of structures and meanings. Consciousness is an cognitive process of "grasping" of meanings. Consciousness is an absolute attractor of meanings. Meanings are primordial in the Universum. Establishment of the ontological status of consciousness is possible only on the basis of solution of the problem of the basification of mathematics (knowledge) – establishment of the ontological framework, carcass and foundation of knowledge. [29]
11. Fundamental knowledge has approached the empirical limits therefore the methodology of knowledge demands the implementation of the Ontological standard of basification (justification) along with the Empirical standard. Development of fundamental science demands conscious support of competition of several gnoseological paradigms.
12. Primordial generating structure funds new heuristics of philosophical foundations of "General Theory of Measure", "General Theory of Number", "Vector Theory of Everything". And again we are moving on a small raft along "The Ocean of knowledge" in wanderings to the new goal. Physicists and poets should have a unified image of the world full of life's meanings .

On small unsteady raft

Through storms and rains and thunders... [30]

"Vector of consciousness" is a reliable ice pilot. Polar Star points the way → The Self-aware Universe [31]

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