

Three-Dimensional Classification of the Sciences

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Abstract: The article provides a solution to the three-dimensional classification problem of the Sciences obtained on a new Cognition Theory basis, which is built proceeding from some general physical representations and a new look at the General Psychology basics. The foundation completeness criteria of any cognitive system and any research, which are critical for the Sciences classification, is also formulated and justified. Proceeding from the natural classification principle of the Sciences, Operator Sciences for studying cognition various levels objects are presented in the Two-Dimensional Tables form, which are corresponding cuts of Three-Dimensional Tables of the Sciences, briefly 3-DTS. It is shown that 3-DTS is a reliable tool for forecasting the development of existing and emergence of new Sciences, both Differential and Interdisciplinary. Thanks to 3-DTS, all possible Complexes of Differential Sciences, which can be spatial, flat and linear, are revealed.

Keywords: Classification of the Sciences; 3-DTS; Criterion for Completeness;
Impact; Motion; Rest; Space; Time.

Introduction

Any classification allows us to regularize those or other knowledge and outline ways to further deepen and develop this knowledge. Therefore, classification of the Sciences is not only important for the synthesis of a large array of differentiated knowledge that mankind has accumulated over the many centuries, but and for discretion the development vector of the Fundamental Science in the future.

Many famous philosophers tried to solve the Sciences classification problem, for example, A. Saint-Simon, O. Conte, F. Bacon, G.V. Hegel, F. Engels, B. M. Kedrov et al. But any of them was unable to thoroughly solve this problem, since this problem is unsolvable in the Philosophy framework. For example, in due time the detailed explanation issue on the chemical bonds occurrence reasons was unsolvable within the Classical Chemistry framework, until the physical model of "planetary" atomic structure was not offered, and only after that made possible to assert that the orbital electrons redistribution of interacting atoms is the main reason to chemical bonds formation. Similarly with the Sciences classification problem: need some physical view on this problem. In this article offered a solution to this problem on a new Cognition Theory basis, which is built starting from some general physical representations and heuristic glance at the General Psychology basics. Namely the interdisciplinary approach has allowed solving this problem.

In the existing literature on the Sciences classification problem, which is connected with the works above philosophers, as well as other authors, mostly the case in point is a linear Sciences classification according to one or another attribute. Pursuant to the source [6], the economist M.V. Bagrad proposed a two-dimensional Sciences classification. And concerning a three-dimensional Sciences classification, no literature was found, with the monograph [3] exception, on the basis of which this article is written.

The main purpose of this article is to present a three-dimensional solution of the Sciences classification problem. Since a new Cognition Theory, on the basis of which this solution is obtained, is not this article goal, then about it will be told very briefly (for details see [3]).

1.0. Briefly About New Cognition Theory

The cognition process structure can be represented proceeding from the existence of link between the cognition process and natural numbers from one to five. If the cognition process is associated with number one, then the cognition ways will match number two because there are only two ways of cognition: 1. Empirical; 2. Theoretical. Cognition methods correspond to number three because there are three cognition methods: 1. Scientific; 2. Religious; 3. Intuitive. Cognition levels correspond to number four, since there are four main cognition levels: 1. Physical; 2. Psychical; 3. Informational; 4. Absolute. Cognition Theory foundation corresponds to number five, since only the presence of five conditions allows building a complete Cognitive System (CS): 1. Conformity principle (conformity between any CS assertion and the manifested essence of cognition object); 2. Noncontradictory of the CS foundation (the CS foundation assertions should consist of objective concepts and in doing so satisfy to the conformity

principle); 3. Completeness of the CS foundation (the CS foundation should consist of a minimum number of assertions sufficient for the CS development); 4. Correctness of CS (a connections discretion possibility between the past, the present and the future of the cognition object, which are arising from the very cognition object); 5. The principle of dual compliance (a correct scientific CS and a correct religious CS, each in its field and within the framework of its methods, should not contradict each other on the issues on which they intersect).

1.1. Cognition Categories and Levels

The empirical cognition way, associated with human perception possibilities, has two cognition tools: **observation** (1) and **measurement** (2). And the theoretical cognition way has two related but essentially various manifestations: the thinking, which is associated with the mind, that is, with the ability to logical justifications; and the reflection, which is associated with the reason, that is, with the ties discretion ability. Thus, **logical designing** (3) and **mental simulation** (4) are the theoretical cognition tools. Possible combinations number from four elements is equals to fifteen. Therefore, different combinations of the four scientific cognition tools predetermine fifteen possible scientific cognition forms: description (1), computation (2), logic (3), philosophy (4), practice (1+3), designing (1+4), analysis (2+3), experiment (2+4), empirical generalization (1+2), theory (3+4), engineering (1+2+3), technique (1+2+4), general approach (1+3+4), application (2+3+4), foundation (1+2+3+4). These fifteen scientific cognition forms engender relevant scientific cognition forms and classes, which are specified in Table 1.

Table 1. Scientific Cognition Classes

№	Cognition tools combination	Cognition form	Scientific cognition classes	Class representative
1	Observation	Description	Descriptive Sciences	Geography
2	Measurement	Computation	Quantitative Sciences	Mathematical Physics
3	Logical designing	Logic	Logical Sciences	Logic of Psychology
4	Mental simulation	Philosophy	Creative Sciences	Philosophy of History
5	Observation + logical designing	Practice	Practical Sciences	Metallurgy
6	Observation + mental simulation	Designing	Designer Sciences	Bionics
7	Measurement + logical designing	Analysis	Analytical Sciences	Analytical Chemistry
8	Measurement + mental simulation	Experiment	Experimental Sciences	Experimental Physics
9	Observation + measurement	Empirical generalization	Empirical Sciences	Geology
10	Logical design. + mental simulation	Theory	Theoretical Sciences	Theoretical Mechanics
11	Observ. + measure. + logical design.	Engineering	Engineering Sciences	Strength of Materials
12	Observ. + measure. + mental simul.	Technique	Technical Sciences	Aircraft Construction
13	Observ. + log. design. + mental simul.	General approach	Natural Sciences	General Biology
14	Measur. + log. design. + mental simul.	Application	Applied Sciences	Electronics
15	Obs. + measu. + log. design. + men. sim.	Foundation	Fundamental Sciences	Physics

Since no one but the person himself can objectively determine (measure) the human's faith level, then in the religious cognition method two empirical cognition tools merge into one, which is called an **emotional-sensual self-observation**, briefly **ESS**. Three religious cognition tools predetermine seven possible religious cognition forms and classes, which are specified in Table 2.

Table 2. Religious Cognition Classes

№	Cognition tools combination	Cognition form	Religious cognition classes	Class representative
1	ESS	Ethics	Moral Theology	Teotetics
2	Logical designing	Logic	Logic of Theology	Apologetics
3	Mental simulation	Philosophy	Philosophy of Theology	Eschatology
4	ESS + logical designing	Practice	Practical Theology	Liturgics
5	ESS + mental simulation	Interpretation	Hermeneutical Theology	Exegetics
6	Logical design + mental simulation	Theory	Theoretical Theology	Patristics
7	ESS + logical design. + mental simulation	Foundation	Fundamental Theology	Evangelistics

The intuitive cognition method is connected with the possibility of non-rational discretion of the cognizable object gist, therefore both empirical cognition tools are transformed and merge into one,

which is called a **contemplative estimate**, and the theoretical cognition tool "logical designing" becomes unnecessary. Two intuitive cognition tools predetermine three possible intuitive cognition forms and classes, which are specified in Table 3. It must be emphasized that the intuitive cognitive disciplines do not exist, because this method is subjective, but there may be empirical and theoretical generalizations, which are listed below in Table 4. In addition, both the scientific and religious cognition methods use the intuitive method: let's not forget that many scientific discoveries occurred thanks to the intuitive insight, for example, the analytical geometry by René Descartes, periodic law by D.I. Mendeleev, structure of the atom by Rutherford-Bohr, etc.

Table 3. Intuitive Cognition Classes

№	Cognition tools combination	Cognition form	Intuitive cognition classes	Class representative
1	Mental simulation	Mindsight	Figurative knowledge	Literature
2	Contemplative estimate	Contemplation	Contemplative knowledge	Art
3	Mental simulation + contemplative estimate.	Insight	Insightful knowledge	Music

Now we shall try to determine the possible types of empirical and theoretical cognition in some general format, and the cognition forms ensuing from these types. It's very simple to do, if one recalls aforesaid about Cognition Theory that the cognition process is carried out in two ways with the help of three methods on the four levels. Using simple combinatorial arguments, we conclude that there are potentially twenty-four possible cognition types ($n=2 \times 3 \times 4=24$), which spawn the relevant theoretical and empirical cognition forms presented in Table 4.

Table 4. The Types and Forms of Cognition in General Format

№	Cognition type	Cognition form
1	Scientific-empirical physical reality cognition	Empirical Sciences about matter
2	Scientific-theoretical physical reality cognition	Theoretical Sciences about matter
3	Scientific-empirical psychical reality cognition	Empirical Sciences about psyche
4	Scientific-theoretical psychical reality cognition	Theoretical Sciences about psyche
5	Scientific-empirical spiritual reality cognition	Empirical Sciences about information
6	Scientific-theoretical spiritual reality cognition	Theoretical Sciences about information
7	Religious-empirical physical reality cognition	Empirical Creationism
8	Religious-theoretical physical reality cognition	Theoretical Creationism
9	Religious-empirical psychical reality cognition	Mysticism
10	Religious-theoretical psychical reality cognition	Existentialism
11	Religious-empirical spiritual reality cognition	Spiritual Practice
12	Religious-theoretical spiritual reality cognition	Religious Philosophy
13	Intuitive-empirical physical reality cognition	Natural Philosophy
14	Intuitive-theoretical physical reality cognition	Metaphysics
15	Intuitive-empirical psychical reality cognition	Arts
16	Intuitive-theoretical psychical reality cognition	Literature
17	Intuitive-empirical spiritual reality cognition	Music
18	Intuitive-theoretical spiritual reality cognition	Fiction
19	Scientific-empirical Absolute Reality cognition	Impossible
20	Scientific-theoretical Absolute Reality cognition	Impossible
21	Religious-theoretical Absolute Reality cognition	True Faith
22	Intuitive-theoretical Absolute Reality cognition	True Knowledge
23	Religious-empirical Absolute Reality cognition	Executed Promise
24	Intuitive-empirical Absolute Reality cognition	Revelation

Further we will try to reveal all possible cognition levels. Besides the four main cognition levels, there are intermediate levels which are arising from the four main levels. To understand the aforesaid, it is necessary to touch upon the cognition levels origin issue. All four cognition levels are interrelated, so the following two ligaments are possible: 1. Top-down: Absolute ↔ informational ↔ psychical ↔ physical; 2. Bottom-up: physical ↔ psychical ↔ informational ↔ Absolute. For clarity we will call the first ligament Grace, and the second one Evolutionism. Which of these two ligaments is true? This question, in essence, is some form of question statement, which is called "the fundamental question of Philosophy". We aren't going into philosophy, but I shall formulate the assertion about insolubility of this question:

insolubility of the fundamental question of Philosophy, and hence, inability to prove the existence of God, as well as of denial His existence possibility is the Universe fundamental principle. This principle can be regarded as an axiom, since it is the objective reality which nobody can refute.

So, when the thing comes to choosing a ligament “Grace or evolutionism?”, then, in my opinion, one should not philosophize on this subject, because it is useless in accordance with the indicated above principle. One must be guided by the common sense. When we accept Grace, we get all the variety of actually existing cognition forms that are reflected in Table 4, by the most natural way. But when we accept Evolutionism, then a lot needs to "adjust", and something completely "drops out". Personally I am for the common sense and call upon the reader to this. Thus, the top-down ligament is being avowed as the correct one, and besides, the levels not arise from one another, but all three others levels arise from the initially existing Absolute Level. Consequently, these four levels although are interconnected, but may exist separately. And if it is so, then they may form combinations the number of which is equals to: $N = 1 + \sum_{n=1}^4 C_4^n = 16$, where C_4^n is the number of combinations from four elements by $n=1\div 4$. Let’s list the appropriate cognition levels with the help of Table 5, previously having entered the following designations: Absolute – A; informational – i; psychological – ψ ; physical – ϕ . When listing the combinations, we will not use "+" sign, but the sign of conjugation "o", signifying a deeper unity.

Table 5. Expanded Checklist of the Cognition Levels

№	Level designation	Cognition level title	Brief title
Levels that are inaccessible to cognition			
1	A	Absolute Beginning	Existing Eternally
2	Aoi	Absolute Reason	The Spirit Holy
3	Aoio ψ	Absolute Consciousness	God the Father
4	Aoio $\psi\phi$	The Physical Manifestation of Absolute	God the Son
5	Ao ψ	Absolute Conscious Beings	Archangels and Angels
Levels available for cognition			
6	ϕoi	Information carrier	The Light
7	I	Informational	Spirit
8	Ψ	Psychical	The Soul
9	Φ	Physical	Matter
10	ψoi	Invisible world	Psi-world
11	$\phi\psi$	Plant world	Flora
12	$\phi\psi oi$	The animal world	Fauna
13	$\phi\psi\phi i+x$	Humanity	Socium
14	A \rightarrow ϕ	Items of supernatural character	Miracle Matter
15	A \rightarrow $\psi\phi$	Manifested Absolute Consciousness	Miraculous Phenomena
16	A \rightarrow io ϕ	Manifested Absolute Information	Holy Scripture

Levels 6-13, which in their totality constitute the Universe, form the sphere of scientific cognition, levels 14-16 form the sphere of religious cognition, and levels 1-5, about which can be partially *to reflect* religiously and intuitively (not study, namely *to reflect*), are outside this article scope. In the framework of this article, we are only interested in levels 6-13. We will consider them very briefly.

The sixth level is the light, which provides interconnection of levels 6÷9 and has a huge value for levels 10-13. Although the official science casts doubt on the 10th level existence, but nonetheless, various psychophysical phenomena, that do not have a proper scientific explanation, are present in our lives, and as shown in Table 5 have the right to real existence. The main conclusion relative of the levels 11 and 12 consists in the fact that the plant world representatives possess a dynamic psychical structure, and the animal world representatives, in addition, possess a dynamic information structure. The bold line means that a person is something special, which is associated with the presence at him of an element "x". What is element "x"? "So God created man in his own image, in the image of God he created him" (Genesis 1: 27). Element "x" is a characteristic of the specified likeness inaccessible for scientific cognition, which is conditioning the additional unit emergence in the above formula. This is what a human differs from an animal, and the sign of conjugation is replaced by the plus sign, because not every person understands and accepts this important distinction. Note that the expanded list of cognition levels is also associated with the number four, since $16=4^2$.

1.2. The Research Completeness Condition

Under the cognition object essence, we will understand the totality of its characteristics relative to manifested properties, possible motions, states, structures and their changes over time. The CS foundation completeness definition sounds as follows: *the CS foundation is complete, if composed of a minimum assertions number, which are sufficient for the CS development with a view to reveal the cognition object essence*. There is a criterion that is related to number **five**. Let me remind the reader following facts. The Classical Geometry ground in Euclid presentation are linked with the five postulates: 1. Required order to from every point to every other point could be draw a straight line; 2. And order to each straight line can be indefinitely continued; 3. And order to from any the center could be described a circle by any radius; 4. And order to all right angles are equal; 5. And order to whenever a straight line when crossing to the other two straight to form with them unilateral angles whose sum is less than two right angles, these straight lines will intersect with the side on which this sum is less than two right angles [1]. The Classical Physics ground makes up five assertions: 1. Galileo's relativity principle; 2. The relationship law on a particle's momentum derivative in time with the force acting on a particle; 3. The action and counteraction equality law of two interacting bodies; 4. The space absoluteness principle; 5. The time absoluteness principle [4]. The ground of the General Chemistry consists of five assertions: 1. All substances consist of a plurality of identical (simple substances) or different (complicated substances) interacting with each other and are in constant motion atoms; 2. The properties of chemical elements, and therefore the properties formed by them of the simple and complex bodies are stand in periodic dependence (i.e. correctly repeated) from theirs atomic weight (the wording of Mendeleev) [5]; 3. The atoms are complex formations consisting of a set of nucleons, which form positively charged nucleus of atom around which revolves the negatively charged orbital electrons; 4. The orbital electrons redistribution of interacting atoms is the main reason to chemical bonds formation; 5. The mass of all substances that have entered into chemical reaction is equal to the mass of all reaction products. As we can see, the grounds of these important cognitive systems consist of **five** assertions. Also, the Torah consists of **five** books. Is it a chance occurrence or regularity?

Here I will provide two assertions from General Physics: 1. Every process is a **motion** that takes place in **space** over **time**; 2. To lead out a body from **rest** state, it is necessary to have a certain **impact** on it. These two assertions contain five important and interrelated concepts: 1. Impact; 2. Motion; 3. Rest; 4. Space; 5. Time. Impact is the cause, which consequence is motion, i.e. the deducing of the resting body from the equilibrium state, associated with a change in the body arrangement order in space. Impact is also the change cause in the body position relative to the initial, and the arising motion allows measuring these changes at predetermined periods of time, forming interrelation between the body various positions in space. Taking into consideration the above said, one can compose the following ligaments: 1. Impact – cause – change; 2. Motion – consequence – measurement; 3. Rest – equilibrium; 4. Space – order; 5. Time – linkage. Thus, one can formulate the following CS foundation completeness condition: *the CS foundation is complete, if it consists five groups of assertions, each of which bijectively expresses its relation to one of the following concepts: 1. Impact; 2. Motion; 3. Rest; 4. Space; 5. Time*.

And it is natural, as, indeed, our whole life consists of a different processes totality, that is, those or other motions that occur in space and time, and every motion begins with an impact, as well as every system tends to the equilibrium state. If the reader will conduct independently a cursory analysis, then a one-to-one correspondence between quoted above assertions of Classical Geometry, Physics and Chemistry with the specified CS foundation completeness criteria will be able to establish. The completeness condition of any research is a particular case of the CS foundation completeness condition, and sounds as follows: *any research is complete, if substantial cognition object characteristics identified during this research in some way correspond to the following research completeness criteria: 1. Impact; 2. Motion; 3. Rest; 4. Space; 5. Time*. This completeness condition and will help us in the Sciences classification issue.

2.0. Three-Dimensional Classification of the various levels Sciences

The above brief provisions of the new Cognition Theory allow us to formulate the three-dimensional classification principle of the Cognitive Disciplines in the following general format. “Operator Fundamental Cognitive Disciplines ensue from the substantial characteristics of the cognition object and its forming parts, corresponding to the research completeness criteria, the essence of which are impact, motion, rest, space, time, and are distributed along the possible cognition forms, which are

determined according the cognition tools used in the framework of the scientific or religious methods of cognition, thus forming a Table of the Operator Disciplines. The object series of a given cognition level, annexed to the Table of the Operator Disciplines, defines a Three-Dimensional Complex of the possible Cognitive Disciplines of a given cognition level." The word "operator" means that these Sciences are not complete, but to them are necessary to annex some cognition object, for example, Physics is an Operator Science, and Atomic Physics is the Science that studies the atom properties, but if the word atom to replace by the word planet, we get Geophysics, etc.

So, we can draw up the following three linear series: 1. Cognition object characteristics; 2. Scientific cognition forms; 3. A given cognition level objects. The cognition object characteristics are ensued from the research completeness criteria, the essence of which is impact, motion, rest, space, time. There are only ten of them: five characteristics, if we consider the cognition object as *a whole consisting of parts*, and five more characteristics, if we consider the cognition object as *parts which form a whole*. Scientific cognition forms ensue from the fifteen different combinations of the four cognition scientific method tools: description, computation, logic, philosophy, practice, designing, analysis, experiment, empirical generalization, theory, engineering, technique, general approach, application, foundation. Objects of the cognition levels will be considered below. If we accept ten cognition object characteristics as the horizontal conditional axis of coordinates, placing them from left to right (substantial series); fifteen different scientific cognition forms as the vertical conditional axis of coordinates, placing them from top to bottom (instrumental series); and themselves a given cognition level objects as the frontal conditional axis of coordinates, which is directed away from us (object series), then we will get a Three-Dimensional Table of Sciences of a given cognition level, briefly 3-DTS. Further Two-Dimensional Tables of Operator Sciences to cognition physical, psychical and informational levels, as well as light, as photons community, and people's communities will be presented. These Two-Dimensional Tables are 3-DTS substantially-instrumental cuts with the object series zero value of corresponding cognition levels.

2.1. Three-Dimensional Classification of the Physical Level Sciences

As noted above, the cognition object essence is the sum of its characteristics relative to the manifested properties, possible motions, states, structures and their changes over time. Then one can observe that the research completeness criteria and cognition object substantial characteristics form the following pairs: 1. "Impact – properties", since without impact on the study object impossible to reveal its properties; 2. "Motion – displacements"; 3. "Rest – stability", bearing in mind the chemical equilibrium state; 4. "Space – structure", since namely the structure specifies on the molecular, atomic-crystalline, quasi-crystalline and etc. spatial substance ordering; 5. "Time – changes over time", having in mind the states chronicle of research object. Adduced characteristics are fair if the object to consider as *a whole consisting of parts*. However, the same object can be perceived as *parts which form a whole*, in doing so the parts which form a whole are in some interrelations to each other. In this case we have the following pairs: 1. "Impact – controllability of system"; 2. "Motion – concerted motion"; 3. "Rest – systemic stability"; 4. "Space – systemic orderliness"; 5. "Time – systemic interconnections". Identified pairs allow making the following assertion: *characteristics of the cognition object and its forming parts, ensuing from the relevant research completeness criteria, determine the foundation for physical level cognition as follows: 1. Properties → Physics; 2. Displacements → Mechanics; 3. Stability → Chemistry; 4. Structure → Struktuology; 5. Changes over time → History (possible to use the word "Evolution"); 6. Controllability of system → Cybernetics; 7. Concerted motion → Synergetics; 8. Systemic stability → X-dynamics; 9. Systemic orderliness → Ezodomics (from the Greek. esoteriki domi, internal constitution); 10. Systemic interconnections → Systemology. The name "X-dynamics" may have some characteristic sound, for example, Nonlinear Dynamics, Thermodynamics, etc.*

All level 9 (physical level) objects, briefly φ_9 , can be represented as follows series: *the fundamental particles (electron, muon, tau and their neutrinos, u, d, c, s, t, b quarks, the corresponding antiparticles, interaction mediators) ↔ atom ↔ molecule ↔ physical macro object ↔ system of physical macro objects ↔ planet ↔ system of planets ↔ Galaxy ↔ the Universe (series 1)*. Operator Sciences for studying φ_9 objects are listed in Tables 6 and 7. If we annex the object series 1 to these Tables, then we obtain 3-DTS, from which it follows that $10 \times 15 \times 11 = 1650$ Sciences are possible for studying φ_9 objects.

Table 6. Operator Sciences for studying φ_9 (part 1)

№	Object subst. charact.	Properties	Displacements	Stability	Structure	Changes over time
	Form of cognition					
1	Description	Systematization of Physics	Systematization of Mechanics	Systematization of Chemistry	Systematization of Struktuology	Chronicle
2	Computation	Mathematical Physics	Mathematical Mechanics	Mathematical Chemistry	Mathematical Struktuology	Chronology
3	Logic	Logic of Physics	Logic of Mechanics	Logic of Chemistry	Logic of Struktuology	Logic of Evolution
4	Philosophy	Philosophy of Physics	Philosophy of Mechanics	Philosophy of Chemistry	Philosophy of Struktuology	Philosophy of Evolution
5	Practice	The physical basis of production	Use of machines and mechanisms	The chemical basis of production	Practical Struktuology	Envisioning the Future (forecast)
6	Designing	Modeling in Physics	Modeling in Mechanics	Modeling in Chemistry	Modeling in Struktuology	Reconstruction events
7	Analysis	Analytical Physics	Analytical Mechanics	Analytical Chemistry	Analytical Struktuology	Analytical Evolution
8	Experiment	Experimental Physics	Experimental Mechanics	Experimental Chemistry	Experimental Struktuology	Experimental Evolution
9	Empirical generalization	Generalizations of Physics	Generalizations of Mechanics	Generalizations of Chemistry	Generalizations of Struktuology	Generalizations of Evolution
10	Theory	Theoretical Physics	Theoretical Mechanics	Theoretical Chemistry	Theoretical Struktuology	Theoretical Evolution
11	Engineering	Engineering Physics	Engineering Mechanics	Engineering Chemistry	Engineering Struktuology	Engineering Evolution
12	Technique	Technical Physics	Technical Mechanics	Technical Chemistry	Technical Struktuology	Technical Evolution
13	General approach	General Physics	General Mechanics	General Chemistry	General Struktuology	General Evolution
14	Application	Applied Physics	Applied Mechanics	Applied Chemistry	Applied Struktuology	Applied Evolution
15	Foundation	Physics	Mechanics	Chemistry	Struktuology	Evolution

Table 7. Operator Sciences for studying φ_9 (part 2)

№	Object subst. charact.	Controllability of system	Concerted motion	Systemic stability	Systemic orderliness	Systemic interconnections
	Form of cognition					
1	Description	Systematization of Cybernetics	Systematization of Synergetics	Systematization of X-dynamics	Systematization of Ezodomics	Systematization of Systemology
2	Computation	Mathematical Cybernetics	Mathematical Synergetics	Mathematical X-dynamics	Mathematical Ezodomics	Mathematical Systemology
3	Logic	Logic of Cybernetics	Logic of Synergetics	Logic of X-dynamics	Logic of Ezodomics	Logic of Systemology
4	Philosophy	Philosophy of Cybernetics	Philosophy of Synergetics	Philosophy of X-dynamics	Philosophy of Ezodomics	Philosophy of Systemology
5	Practice	Practical Cybernetics	Practical Synergetics	Practical X-dynamics	Practical Ezodomics	Practical Systemology
6	Designing	Modeling in Cybernetics	Modeling in Synergetics	Modeling in X-dynamics	Modeling in Ezodomics	Modeling in Systemology
7	Analysis	Analytical Cybernetics	Analytical Synergetics	Analytical X-dynamics	Analytical Ezodomics	Analytical Systemology
8	Experiment	Experimental Cybernetics	Experimental Synergetics	Experimental X-dynamics	Experimental Ezodomics	Experimental Systemology
9	Empirical generalization	Generalizations of Cybernetics	Generalizations of Synergetics	Generalizations of X-dynamics	Generalizations of Ezodomics	Generalizations of Systemology
10	Theory	Theoretical Cybernetics	Theoretical Synergetics	Theoretical X-dynamics	Theoretical Ezodomics	Theoretical Systemology
11	Engineering	Engineering Cybernetics	Engineering Synergetics	Engineering X-dynamics	Engineering Ezodomics	Engineering Systemology
12	Technique	Technical Cybernetics	Technical Synergetics	Technical X-dynamics	Technical Ezodomics	Technical Systemology
13	General approach	General Cybernetics	General Synergetics	General X-dynamics	General Ezodomics	General Systemology
14	Application	Applied Cybernetics	Applied Synergetics	Applied X-dynamics	Applied Ezodomics	Applied Systemology
15	Foundation	Cybernetics	Synergetics	X-dynamics	Ezodomics	Systemology

As it is known, Chemistry is divided into inorganic and organic. The 9th level objects can be both inorganic and organic, however the physical components of the 11th, 12th and 13th levels objects (briefly φ_{11} , φ_{12} , φ_{13}) can also be inorganic and organic, but in doing so they have a distinctive feature, they are the component parts of living beings: flora, fauna, human. For example, the fullerene molecule is a rather complex formation consisting of sixty carbon atoms, however the DNA molecule is not just complicated, but it is special, because in it coded a lot of information. "Living" substance from which consist organisms can be studied with the help of Sciences, which are similar adduced in Tables 6 and 7, with the only difference that the denomination of Sciences will begin with the prefix "Bio", for example, Biophysics, Biochemistry, Biosynergetics, Biodynamics, etc. Because of the limited article format we will not adduce them. Cognition objects of φ_{11} , φ_{12} , φ_{13} can be represented as follows series: *molecule* \leftrightarrow *cell* \leftrightarrow *tissue* \leftrightarrow *organ* \leftrightarrow *system* \leftrightarrow *organism* (series 2). The same substantial characteristics of cognition object and the parts forming it, as for series 1, can be applied to this series, but with only one proviso: the motion occurs within the organism size limits or its part. In doing so, the objects of series 2 can be broken down into parts, for example, one can study the Biophysics of nerve cell, the Biosynergetics of bone tissue, the Biodynamics of circulatory system. If we annex the object series 2 to the corresponding Operator Sciences Tables, then we obtain 3-DTS, from which it follows that $10 \times 15 \times 6 = 900$ Sciences are possible for studying the substance from which the objects of φ_{11} , φ_{12} , φ_{13} consist (without taking into account the possible partitions of series 2).

Next, we will consider the Scientific Disciplines for studying organisms as a whole, but precisely as a physical whole, that is, so far we are talking about φ_{11} , φ_{12} , φ_{13} . All organisms can be represented as follows series: *plants (acellular, unicellular, multicellular); animals (acellular, unicellular, multicellular); human* (series 3). Indicated living creatures, besides a human, are subdivided into kinds. The individuals aggregate of one kind is called population. Human and the different populations of living creatures do not live in isolation, but they are in some interconnections as with each other and so with the environment, forming biosystems [2], which can be represented as follows series: *organism* \leftrightarrow *population* \leftrightarrow *biogeocenosis* \leftrightarrow *ecosystem (region, sea, continent, ocean)* \leftrightarrow *Biosphere of the Planet* \leftrightarrow *Biosphere of the Galaxy* \leftrightarrow *Biosphere of the Universe* (series 4).

The research completeness criteria and relevant cognition object characteristics form the following pairs: 1. "Impact – interaction"; 2. "Motion – vital activity"; 3. "Rest – equilibrium"; 4. "Space – texture"; 5. "Time – development". For the second group of characteristics we have the following pairs: 1. "Impact – controllability of system"; 2. "Motion – concerted functioning"; 3. "Rest – systemic stability"; 4. "Space – systemic orderliness"; 5. "Time – systemic interconnections". These pairs allow us to make the following assertion: *characteristics of the cognition object and its forming parts, ensuing from the relevant research completeness criteria, determine the foundation for organisms cognition as a physical whole in the following way: 1. Interaction \rightarrow Ecology; 2. Vital activity \rightarrow Physiology; 3. Equilibrium \rightarrow Adaptology (from the word "adaptation"); 4. Texture \rightarrow Morphology; 5. Development \rightarrow Bioevolution; 6. Controllability of system \rightarrow Cybernetics X; 7. Concerted functioning \rightarrow Synergetics X; 8. Systemic stability \rightarrow Dynamics X; 9. Systemic orderliness \rightarrow Ezodomics X; 10. Systemic interconnections \rightarrow Systemology X.* At the end of name the second group Sciences is standing the letter X, which means the object name from the series 3 or 4, and note that the prefix "Bio" is missing. This is done in order to distinguish the Biosciences about substance and Sciences about biological systems, for example, Biocybernetics of the Cage is studying a substance, of which the cage is consists, and the Cybernetics of Cage is studying the cage as a biological system. Operator Sciences for studying φ_{11} , φ_{12} and φ_{13} objects as a physical whole are indicated in Tables 8 and 9. If we annex the object series 3 and 4 to these Tables, then we obtain 3-DTS, from which it follows that $10 \times 15 \times (7+7) = 2100$ Sciences are possible for studying φ_{11} , φ_{12} and φ_{13} objects as a physical whole.

2.2. Three-Dimensional Classification of the Psychological Level Sciences

Physical level objects are discrete, and therefore we have two complexes of five Fundamental Sciences, which study an object as a whole consisting of parts, and as a parts, which are form the whole. But we cannot speak about mind discreteness. Therefore, five Fundamental Sciences are possible for studying the psychological level (level 8), and the psychological component of 11th, 12th and 13th levels objects, that is, flora, fauna and human, briefly ψ_8 , ψ_{11} , ψ_{12} , ψ_{13} . Possible for studying objects with psychological structure can be represented as follows series: *psychical structure of the flora individuals, psychical structure of the fauna individuals, psychical structure of a human, Psycho-sphere of the Planet, Psycho-sphere of the Galaxy, Psycho-sphere of the Universe* (series 5).

Table 8. Operator Sciences for studying φ_{11} , φ_{12} and φ_{13} as a physical whole (part 1)

№	Object subst. charact. Form of cognition	Interaction	Vital activity	Equilibrium	Texture	Development
1	Description	Systematization of Ecology	Systematization of Physiology	Systematization of Adaptology	Systematization of Morphology	Biochronicle
2	Computation	Mathematical Ecology	Mathematical Physiology	Mathematical Adaptology	Mathematical Morphology	Biochronology
3	Logic	Logic of Ecology	Logic of Physiology	Logic of Adaptology	Logic of Morphology	Logic of Bioevolution
4	Philosophy	Philosophy of Ecology	Philosophy of Physiology	Philosophy of Adaptology	Philosophy of Morphology	Philosophy of Bioevolution
5	Practice	Practical Ecology	Practical Physiology	Practical Adaptology	Practical Morphology	Practical Bioevolution
6	Designing	Modeling in Ecology	Modeling in Physiology	Modeling in Adaptology	Modeling in Morphology	Modeling in Bioevolution
7	Analysis	Analytical Ecology	Analytical Physiology	Analytical Adaptology	Analytical Morphology	Analytical Bioevolution
8	Experiment	Experimental Ecology	Experimental Physiology	Experimental Adaptology	Experimental Morphology	Experimental Bioevolution
9	Empirical generalization	Generalizations of Ecology	Generalizations of Physiology	Generalizations of Adaptology	Generalizations of Morphology	Generalizations of Bioevolution
10	Theory	Theoretical Ecology	Theoretical Physiology	Theoretical Adaptology	Theoretical Morphology	Theoretical Bioevolution
11	Engineering	Engineering Ecology	Engineering Physiology	Engineering Adaptology	Engineering Morphology	Engineering Bioevolution
12	Technique	Technical Ecology	Technical Physiology	Technical Adaptology	Technical Morphology	Technical Bioevolution
13	General approach	General Ecology	General Physiology	General Adaptology	General Morphology	General Bioevolution
14	Application	Applied Ecology	Applied Physiology	Applied Adaptology	Applied Morphology	Applied Bioevolution
15	Foundation	Ecology	Physiology	Adaptology	Morphology	Bioevolution

Table 9. Operator Sciences for studying φ_{11} , φ_{12} and φ_{13} as a physical whole (part 2)

№	Object subst. charact. Form of cognition	Controllability of system	Concerted functioning	Systemic stability	Systemic orderliness	Systemic interconnections
1	Description	Systematization of Cybernetics X	Systematization of Synergetics X	Systematization of Dynamics X	Systematization of Ezodomics X;	Systematization of Systemology X
2	Computation	Mathematical Cybernetics X	Mathematical Synergetics X	Mathematical Dynamics X	Mathematical Ezodomics X;	Mathematical Systemology X
3	Logic	Logic of Cybernetics X	Logic of Synergetics X	Logic of Dynamics X	Logic of Ezodomics X;	Logic of Systemology X
4	Philosophy	Philosophy of Cybernetics X	Philosophy of Synergetics X	Philosophy of Dynamics X	Philosophy of Ezodomics X;	Philosophy of Systemology X
5	Practice	Practical Cybernetics X	Practical Synergetics X	Practical Dynamics X	Practical Ezodomics X;	Practical Systemology X
6	Designing	Modeling in Cybernetics X	Modeling in Synergetics X	Modeling in Dynamics X	Modeling in Ezodomics X;	Modeling in Systemology X
7	Analysis	Analytical Cybernetics X	Analytical Synergetics X	Analytical Dynamics X	Analytical Ezodomics X;	Analytical Systemology X
8	Experiment	Experimental Cybernetics X	Experimental Synergetics X	Experimental Dynamics X	Experimental Ezodomics X;	Experimental Systemology X
9	Empirical generalization	Generalizations of Cybernetics X	Generalizations of Synergetics X	Generalizations of Dynamics X	Generalizations of Ezodomics X;	Generalizations of Systemology X
10	Theory	Theoretical Cybernetics X	Theoretical Synergetics X	Theoretical Dynamics X	Theoretical Ezodomics X;	Theoretical Systemology X
11	Engineering	Engineering Cybernetics X	Engineering Synergetics X	Engineering Dynamics X	Engineering Ezodomics X;	Engineering Systemology X
12	Technique	Technical Cybernetics X	Technical Synergetics X	Technical Dynamics X	Technical Ezodomics X;	Technical Systemology X
13	General approach	General Cybernetics X	General Synergetics X	General Dynamics X	General Ezodomics X;	General Systemology X
14	Application	Applied Cybernetics X	Applied Synergetics X	Applied Dynamics X	Applied Ezodomics X;	Applied Systemology X
15	Foundation	Cybernetics X	Synergetics X	Dynamics X	Ezodomics X;	Systemology X

The psychical part of perception of the existing is possible to briefly characterize in the form of the following chain of steps: 1. Perception; 2. Preservation with the possibility of conscious recreating secondary images fixed in the neural memory; 3. Title, i.e. fixation of an existing in the knowledge form; 4. Conceptual ordering by means of the mind; 5. Awareness. Proceeding from this chain, we can discern a connection between the research completeness criteria and the relevant cognition object characteristics: 1. "Impact – perception", since the cognition process begins with perception; 2. "Motion – awareness", since awareness is the psychical motion process; 3. "Rest – notion", since the notion establishes equilibrium between an object and existing knowledge about object; 4. "Space – ordering of the knowledge", since, indeed, the mind helps to ordering of the acquired knowledge; 5. "Time – preservation", since without the possibility of preserving and recreating information at the right time, cognition process is impossible. Taking into account these pairs, we have the following assertion: *cognition object characteristics, ensuing from the relevant research completeness criteria, determine the foundation for psychical level cognition as follows: 1. Perception → Psychophysics; 2. Awareness → Psychology; 3. Notion → Linguistics; 4. Ordering of the knowledge → Logic; 5. Preservation → Neuromnemology.* Operator Sciences for studying $\psi_8, \psi_{11}, \psi_{12}, \psi_{13}$ are indicated in Table 10. If we annex the object series 5 to table 10, then we obtain 3-DTS, from which it follows that $5 \times 15 \times 6 = 450$ Sciences are possible for studying object series 5.

Table 10. Operator Sciences for studying $\psi_8, \psi_{11}, \psi_{12}, \psi_{13}$

№	Object subst. charact.		Perception	Awareness	Notion	Ordering of the knowledge	Preservation
	Form of cognition						
1	Description		Systematization of Psychophysics	Systematization of Psychology	Systematization of Linguistics	Systematization of Logic	Systematization of Neuromnemology
2	Computation		Mathematical Psychophysics	Mathematical Psychology	Mathematical Linguistics	Mathematical Logic	Mathematical Neuromnemology
3	Logic		Logic of Psychophysics	Logic of Psychology	Logic of Linguistics	Critical Logic	Logic of Neuromnemology
4	Philosophy		Philosophy of Psychophysics	Philosophy of Psychology	Philosophy of Linguistics	Philosophy of Logic	Philosophy of Neuromnemology
5	Practice		Practical Psychophysics	Practical Psychology	Practical Linguistics	Practical Logic	Practical Neuromnemology
6	Designing		Modeling in Psychophysics	Modeling in Psychology	Modeling in Linguistics	Modeling in Logic	Modeling in Neuromnemology
7	Analysis		Analytical Psychophysics	Analytical Psychology	Analytical Linguistics	Analytical Logic	Analytical Neuromnemology
8	Experiment		Experimental Psychophysics	Experimental Psychology	Experimental Linguistics	Experimental Logic	Experimental Neuromnemology
9	Empirical generalization		Generalizations of Psychophysics	Generalizations of Psychology	Generalizations of Linguistics	Generalizations of Logic	Generalizations of Neuromnemology
10	Theory		Theoretical Psychophysics	Theoretical Psychology	Theoretical Linguistics	Theoretical Logic	Theoretical Neuromnemology
11	Engineering		Engineering Psychophysics	Engineering Psychology	Engineering Linguistics	Engineering Logic	Engineering Neuromnemology
12	Technique		Technical Psychophysics	Technical Psychology	Technical Linguistics	Technical Logic	Technical Neuromnemology
13	General approach		General Psychophysics	General Psychology	General Linguistics	General Logic	General Neuromnemology
14	Application		Applied Psychophysics	Applied Psychology	Applied Linguistics	Applied Logic	Applied Neuromnemology
15	Foundation		Psychophysics	Psychology	Linguistics	Logic	Neuromnemology

2.3. Three-Dimensional Classification of the Informational Level Sciences

Informational level objects are also not discrete. Therefore, five Fundamental Sciences are possible for studying the informational level (level 7), and the informational component of 6th, 12th and 13th levels objects, that is, light, fauna and human, briefly i_6, i_7, i_{12}, i_{13} . Possible for studying objects with

informational structure can be represented as follows series: *informational structure of the light, informational structure of the fauna individuals, informational structure of a human, Noosphere of the Planet, Noosphere of the Galaxy, Noosphere of the Universe* (series 6). A significant contribution to the development of concept "noosphere" made V.I. Vernadsky (1863-1945).

The information component of perception can be characterized in the form of the following chain of steps: 1. Perception; 2. Preservation with the possibility of recreating secondary images at the level of imaginary consciousness; 3. A mapping, i.e. fixation of the perceived existing in the form of information; 4. the ordering of iconic information at reason level; 5. Comprehension. Proceeding from this chain, we can discern a connection between the research completeness criteria and the relevant cognition object characteristics: 1. "Impact – perception"; 2. "Motion – comprehension"; 3. "Rest – sign"; 4. "Space – ordering of information"; 5. "Time – preservation". Taking into account these pairs, we have the following assertion: *cognition object characteristics, ensuing from the relevant research completeness criteria, determine the foundation for informational level cognition as follows: 1. Perception → Anagnology* (from the Greek. *anagnórisi*, recognition); 2. *Comprehension → Noology* (from the Greek. *nóos*, the reason); 3. *Sign → Semiotics*; 4. *Ordering of information → Informatics*; 5. *Preservation → Mnemology*. Operator Sciences for studying i_6, i_7, i_{12}, i_{13} are indicated in Table 11. Empty cells over Noology it is no happenstance: **unlike the mind, the reason cannot be algorithmize**. Therefore, we can study the reason only with help of reason, and this is important for the cognitive process. If we annex the object series 6 to Table 11, then we obtain 3-DTS, from which it follows that $5 \times 15 \times 6 = 450$ Sciences are possible for studying object series 6.

Table 11. Operator Sciences for studying i_6, i_7, i_{12}, i_{13}

№	Object subst. charact.	Perception	Comprehension	Sign	Ordering of information	Preservation
	Form of cognition					
1	Description	Systematization of Anagnology		Systematization of Semiotics	Systematization of Informatics	Systematization of Mnemology
2	Computation	Mathematical Anagnology		Mathematical Semiotics	Mathematical Informatics	Mathematical Mnemology
3	Logic	Logic of Anagnology		Logic of Semiotics	Logic of Informatics	Logic of Mnemology
4	Philosophy	Philosophy of Anagnology		Philosophy of Semiotics	Philosophy of Informatics	Philosophy of Mnemology
5	Practice	Practical Anagnology		Practical Semiotics	Practical Informatics	Practical Mnemology
6	Designing	Modeling in Anagnology		Modeling in Semiotics	Modeling in Informatics	Modeling in Mnemology
7	Analysis	Analytical Anagnology		Analytical Semiotics	Analytical Informatics	Analytical Mnemology
8	Experiment	Experimental Anagnology		Experimental Semiotics	Experimental Informatics	Experimental Mnemology
9	Empirical generalization	Generalizations of Anagnology		Generalizations of Semiotics	Generalizations of Informatics	Generalizations of Mnemology
10	Theory	Theoretical Anagnology		Theoretical Semiotics	Theoretical Informatics	Theoretical Mnemology
11	Engineering	Engineering Anagnology		Engineering Semiotics	Engineering Informatics	Engineering Mnemology
12	Technique	Technical Anagnology		Technical Semiotics	Technical Informatics	Technical Mnemology
13	General approach	General Anagnology		General Semiotics	General Informatics	General Mnemology
14	Application	Applied Anagnology		Applied Semiotics	Applied Informatics	Applied Mnemology
15	Foundation	Anagnology	Noology	Semiotics	Informatics	Mnemology

2.4. Three-Dimensional Classification of the Sciences about Light

In the 18th century, it was believed that light is a corpuscles stream. At the 19th century beginning, the works of Thomas Young and Jean Fresnel appeared, from which it followed that light is a transverse wave. At the 20th century beginning, Max Planck put forward the hypothesis that light is emitted and absorbed by quanta. Thus was born the wave-corpuscular theory of light. Today one can talk about

tripleness of the light, since light is simultaneously a particle, wave and information. For example, by studying spectra from various space objects, astrophysicists can gather a lot of useful information about given space object. According to Table 5, light is the component part of both the physical and information levels. Physical component of the light can study with the help of ten Sciences Complexes, presented in Tables 6 and 7, and information component of the light can studies with the help of five Sciences Complexes, presented in Table 11. However, because light has information structure, it means that photons possess a certain reason form, and necessary Sciences must be created to study the photons reasonable community. Light sources (photons) can be represented as follows series: relic radiation (cold photons), thermal radiation (thermic combustion, electro-thermic glow), luminescence (sono-, cathodo-, photo-, electro-, radio-, chemi-, bio-), various media glow (Cherenkov radiation, cavitation glow, gases glow – various lightning and discharges), stellar radiation (near – solar, far – other stars), galactic radiation (aggregated glow of galaxy various sources, observed from the outside) (series 7).

Cognition object characteristics, ensuing from the relevant research completeness criteria, and comparable to them Scientific Disciplines about light as photons community can be represented as the following pairs: 1. *Properties and interaction* → *Optophysics*; 2. *Concerted spreading* → *Optogeometry*; 3. *Coherent stability* → *Optoholography*; 4. *Orderliness* → *Optoformatics*; 5. *Change and development* → *Optoevolution*. Why does an interference pattern occur when single photons pass through a double slit? How do photons communities with different frequencies concerted spreading? Why does a stable interference pattern, a hologram, occur at superpositioning light wave from coherent source, reflected from a certain object, with a direct wave from the same source? How exactly and why light beam photons are ordered? Is it possible to assume that light, like all that exists, evolves? Are there differences in the relic radiation structure, the light from the distant galaxy star, which reaches to us in the millions Earth years course, and the light from our Sun? In order to correctly answer these questions, it is necessary to create and develop the specified Sciences about light. I think that for the beginning it is necessary to create at least one Sciences Complex for study the series 7 as a whole. Operator Sciences for studying light as a photons community are indicated in Table 12. If we annex the object series 7 to Table 12, then we obtain 3-DTS, from which it follows that $5 \times 15 \times 6 = 450$ Sciences are possible for studying light as a photons community.

Table 12. Operator Sciences for studying light as a community of photons

№	Object subst. charact. Form of cognition	Properties and interaction	Concerted spreading	Coherent stability	Orderliness	Change and development
1	Description	Systematization of Optophysics	Systematization of Optogeometry	Systematization of Optoholography	Systematization of Optoformatics	Systematization of Optoevolution
2	Computation	Mathematical Optophysics	Mathematical Optogeometry	Mathematical Optoholography	Mathematical Optoformatics	Mathematical Optoevolution
3	Logic	Logic of Optophysics	Logic of Optogeometry	Logic of Optoholography	Logic of Optoformatics	Logic of Optoevolution
4	Philosophy	Philosophy of Optophysics	Philosophy of Optogeometry	Philosophy of Optoholography	Philosophy of Optoformatics	Philosophy of Optoevolution
5	Practice	Practical Optophysics	Practical Optogeometry	Practical Optoholography	Practical Optoformatics	Practical Optoevolution
6	Designing	Modeling in Optophysics	Modeling in Optogeometry	Modeling in Optoholography	Modeling in Optoformatics	Modeling in Optoevolution
7	Analysis	Analytical Optophysics	Analytical Optogeometry	Analytical Optoholography	Analytical Optoformatics	Analytical Optoevolution
8	Experiment	Experimental Optophysics	Experimental Optogeometry	Experimental Optoholography	Experimental Optoformatics	Experimental Optoevolution
9	Empirical generalization	Generalizations of Optophysics	Generalizations of Optogeometry	Generalizations of Optoholography	Generalizations of Optoformatics	Generalizations of Optoevolution
10	Theory	Theoretical Optophysics	Theoretical Optogeometry	Theoretical Optoholography	Theoretical Optoformatics	Theoretical Optoevolution
11	Engineering	Engineering Optophysics	Engineering Optogeometry	Engineering Optoholography	Engineering Optoformatics	Engineering Optoevolution
12	Technique	Technical Optophysics	Technical Optogeometry	Technical Optoholography	Technical Optoformatics	Technical Optoevolution
13	General approach	General Optophysics	General Optogeometry	General Optoholography	General Optoformatics	General Optoevolution
14	Application	Applied Optophysics	Applied Optogeometry	Applied Optoholography	Applied Optoformatics	Applied Optoevolution
15	Foundation	Optophysics	Optogeometry	Optoholography	Optoformatics	Optoevolution

So, we have thirty Fundamental Sciences for studying light: ten Sciences about photons as fundamental particles that are not yet well work out; ten Sciences about biophotons, which as such is not; five Sciences about photons as information structure owners, that is, some reason form, about which the scientific world still does not even think about; five Sciences about light as photons community. In total, taking into account the fifteen cognition forms, we have 436 Operator Sciences for the light study! It can be said that this is outrunning forecast on the Sciences development about light. The creation and development of all the Sciences about light will make it possible to at least somehow come up to the 10th level scientific cognition.

2.5. Three-Dimensional Classification of the Social Sciences

From Table 5 it follows that plant world representatives possess a dynamic psychical structure, and animal world representatives, in addition, also possess a dynamic information structure. Therefore, there are conscious communities at level 11, and consciously-reasonable communities at levels 12 and 13, for the study of which five Fundamental Sciences are possible for each of them. Communities of people can be represented as follows series: *family+genus+nation, ethnic community, planetary community, galactic community, universe community* (series 8). Applied to communities of people, the research completeness criteria and cognition object characteristics form the following pairs: 1. "Impact – social self-governing"; 2. "Motion – social mutual agreement"; 3. "Rest – social stability"; 4. "Space – social organization"; 5. "Time – social evolution". Indicated pairs allow us to make the following assertion: *cognition object characteristics, ensuing from the relevant research completeness criteria, determine the people communities' cognition foundation in the following way: 1. Social self-governing → Sociology; 2. Social mutual agreement → Sociosynergetics; 3. Social stability → Sociodynamics; 4. Social organization → Socioformatics; 5. Social evolution → History*. Operator Social Sciences are represented in Table 13. If we annex the object series 8 to Table 13, then we obtain 3-DTS, from which it follows that $5 \times 15 \times 5 = 375$ Sciences are possible for studying different communities of people.

Table 13. Operator Social Sciences

№	Object subst. charac. Form of cognition	Social self-governing	Social mutual agreement	Social stability	Social organization	Social evolution
1	Description	Systematization of Sociology	Systematization of Sociosynergetics	Systematization of Sociodynamics	Systematization of Socioformatics	Systematization of History
2	Computation	Mathematical Sociology	Mathematical Sociosynergetics	Mathematical Sociodynamics	Mathematical Socioformatics	Mathematical History
3	Logic	Logic of Sociology	Logic of Sociosynergetics	Logic of Sociodynamics	Logic of Socioformatics	Logic of History
4	Philosophy	Philosophy of Sociology	Philosophy of Sociosynergetics	Philosophy of Sociodynamics	Philosophy of Socioformatics	Philosophy of History
5	Practice	Practical Sociology	Practical Sociosynergetics	Practical Sociodynamics	Practical Socioformatics	Practical History
6	Designing	Modeling in Sociology	Modeling in Sociosynergetics	Modeling in Sociodynamics	Modeling in Socioformatics	Modeling in History
7	Analysis	Analytical Sociology	Analytical Sociosynergetics	Analytical Sociodynamics	Analytical Socioformatics	Analytical History
8	Experiment	Experimental Sociology	Experimental Sociosynergetics	Experimental Sociodynamics	Experimental Socioformatics	Experimental History
9	Empirical generalization	Generalizations of Sociology	Generalizations of Sociosynergetics	Generalizations of Sociodynamics	Generalizations of Socioformatics	Generalizations of History
10	Theory	Theoretical Sociology	Theoretical Sociosynergetics	Theoretical Sociodynamics	Theoretical Socioformatics	Theoretical History
11	Engineering	Engineering Sociology	Engineering Sociosynergetics	Engineering Sociodynamics	Engineering Socioformatics	Engineering History
12	Technique	Technical Sociology	Technical Sociosynergetics	Technical Sociodynamics	Technical Socioformatics	Technical History
13	General approach	General Sociology	General Sociosynergetics	General Sociodynamics	General Socioformatics	General History
14	Application	Applied Sociology	Applied Sociosynergetics	Applied Sociodynamics	Applied Socioformatics	Applied History
15	Foundation	Sociology	Sociosynergetics	Sociodynamics	Socioformatics	History

Flora and fauna communities can be represented as follows series: *family; population; populations community of the region, sea, continent, ocean, planet* (series 9). I think that for the beginning, series 9 can be viewed as single unit. Due to the limited article format, I will not adduce Tables for phyto- and zoo-communities (they are similar to Table 13), but I will adduce the names of relevant Fundamental Sciences. For phyto-communities: Phytosociology, Phytosynergetics, Phytodynamics, Phytoformatics, Phytoevolution (525 Sciences total). For zoo-communities: Zoosociology, Zoosynergetics, Zoodynamics, Zooformatics, Zooevolution (525 Sciences total). It should be emphasized once again that we are not talking about the Sciences for studying biocenoses, but about the Sciences for studying conscious phyto-communities, and conscious-reasonable zoo-communities (ants, termites, wasps, bees, etc.).

In conclusion of Operator Sciences Tables review, I'll note that the certain elements of presented Tables can be changed and refined, for example, in Table 13 there is a Science under the title "Practical History", and is nothing short of Archeology. So then, 7425 Differential Sciences for studying the cognition levels objects from the 6th to the 13th (except 10th level) are indicated, without taking into account the possible partitions of some object series, and their possible extensions due to the deepening and expansion of the scientific knowledge in the future. Also, Interdisciplinary Sciences are not taken into account, about which we will briefly talk in the next paragraph.

3. Complexes of Sciences and Complex Sciences

3-DTS allows us to reveal all possible Complexes of Sciences, which can be spatial, flat and linear. 3-DTS with a given object series is a *Spatial Complex of Sciences* of a given cognition level, which, if necessary, can be represented in a linear form. The aggregate of Spatial Complexes of the Sciences of all cognition levels forms *Differential Sciences Multitude*.

Three possible 3-DTS cuts form three *Flat Sciences Complexes* types, which, if necessary, can be represented in a linear form: 1. substantially-instrumental; 2. substantially-object; 3. instrumentally-object. Substantially-instrumental cut of the object series zero value forms *Flat Complex of Operator Sciences*. Substantially-instrumental cut of the object series non-zero value forms *Flat Fundamental Complex of Object Sciences* with relevant value. Substantially-object cut of the instrumental series non-zero value forms *Flat Complex of Instrumental Sciences* with relevant value. A Flat Complex of Instrumental Sciences with "foundation" value is a *Flat Complex of Fundamental Sciences*. Instrumentally-object cut of the substantial series non-zero value forms *Flat Fundamental Complex of Substantial Sciences* with relevant value. The aggregate of all Flat Complexes with identical 3-DTS cut forms the Differential Sciences Multitude of a given cognition level. Since any Differential Science simultaneously belongs to three different Flat Complexes, that is, it can simultaneously be considered as Substantial, Instrumental and Object Science (except Operator Sciences), then at organizing a particular systematization of the Sciences, in order to prevent repeatability, it is necessary to choose one of three possible 3-DTS cuts, the most suitable for the set goal.

The intersection of any two orthogonal Flat Complexes of Sciences forms a *Linear Complex of Sciences*, which can be substantial, instrumental or object. Any horizontal series of 3-DTS is a *Linear Complex of Substantial Sciences*. The Linear Complex of Substantial Sciences for the value of instrumental series "foundation" is: a *Linear Complex of Operator Fundamental Sciences*, in case of the object series zero value, and otherwise, a *Linear Complex of Fundamental Sciences* with object series relevant value. Any vertical series of 3-DTS is a *Linear Fundamental Complex of Instrumental Sciences* with given values of substantial and object series. The Linear Fundamental Complex of Instrumental Sciences in case of the object series zero value is a *Linear Fundamental Complex of Operator Sciences* with given value of substantial series. Any frontal series of 3-DTS is a *Linear Complex of Object Sciences* with given values of substantial and instrumental series, which, for the value of instrumental series "foundation", is a *Linear Complex of Fundamental Object Sciences* with given value of substantial series. We will draw attention to the word collocations "*Complex of Fundamental Sciences*" and "*Fundamental Complex of Sciences*". In the first case, the complex (flat or linear) consists solely of the Fundamental Sciences, and in the second case, the complex contains one or more Fundamental Science. The aggregate of all identical Linear Complexes of Sciences of a given cognition level forms the relevant Flat Complex of Sciences of a given cognition level. Aforesaid for Flat Complexes of Sciences concerning repeatability prevention also applies to Linear Complexes of Sciences.

So, let's not confuse two similar concepts: *Complexes of Sciences* and *Complex Sciences*.

Definition 1 (Differential Science): The Science intended to study one substantial characteristic of cognition object by a given tools complex of scientific cognition is called **Differential**. Differential Science, which in cognition process uses all four tools of scientific cognition, is called **Fundamental**, otherwise Differential Science is called **Instrumental**.

Definition 2 (Interdisciplinary Science): Science, which is intended for the complex study two or more substantial characteristics of cognition object, each of which is separately studied by the corresponding Differential Science, is called **Interdisciplinary**. Interdisciplinary Science, which includes at least one Fundamental Science, is called *Complex Interdisciplinary Science*, briefly **Complex Science**.

So, Interdisciplinary Science, built on the Sciences basis, at least one of which is Fundamental, becomes Complex Science, because the whole Instrumental Sciences Complex of given Fundamental Science passes to this Science. In six of the nine above object series there is an object with the value "human" (organism). It means that there are $3 \times 10 + 3 \times 5 = 45$ Fundamental Sciences related to human study, and altogether, taking into account all cognition forms, we have $45 \times 15 = 675$ Differential Sciences about human. Various combinations of these Sciences determine the Interdisciplinary Sciences about human. However, these combinations number is too large; for example, combinations number from 675 elements by two is equal: $C = C_2^{675} - 45C_2^{15} = \frac{675!}{2!673!} - 45 \frac{15!}{2!13!} = 222750$. And if to take into account all other possible combinations from 3 to 675, then we will get a huge number. It is clear that such Interdisciplinary Sciences quantity about human are not needed, but here need to orientate on particular practical goals that are important when creating some Interdisciplinary Science. Interdisciplinary Sciences contribute to the synthesis of this or that knowledge, that is, in essence, they are *Integral Sciences*.

It is necessary to emphasize that it is senselessly to talk about Interdisciplinary Sciences classification: here, rather, it needs to talk about their systematization. What should be understood by "classification of Sciences" and "systematization of Sciences" concepts?

Definition 3 (classification of the Sciences): Classification of the Sciences is the Sciences primary ordering on the basis of natural principle and criteria, from which these Sciences ensue.

Definition 4 (systematization of the Sciences): Systematization of the Sciences is the secondary ordering of already classified Sciences on the basis of certain criterion.

It is usually considered that systematization by rank is higher than classification, but this is true only, so to speak, for the non-man-made elements of certain set, for example, for a set of chemical elements, a set of plants, etc. And for man-made elements of a certain set, in particular, for Cognitive Disciplines, classification by rank is higher than systematization, because before talking about systematization of Sciences, it is necessary to reveal these Sciences by classifying them.

4. General Scientific Knowledge and Instrumental Theories

What is General Scientific Knowledge? To correctly answer this question, let us use the fact that cognition process is connected with a numerical natural series from one to five, and this connection can be represented as the following chain: cognition \leftrightarrow two ways of cognition \leftrightarrow three methods of cognition \leftrightarrow four main levels of cognition \leftrightarrow five fundamental concepts of the Theory of Cognition. As it is seen, adduced chain can be closed, because it starts with the word "cognition", and ends with the same word. In that case, proceeding from this closed chain, we can formulate the following definition.

Definition 5 (General Scientific Knowledge): General Scientific Knowledge is a composite part of the Fundamental Cognition Theory, which is formed by the whole complex of the possible cognition ways, methods and forms.

Thus, Cognition Theory is not a philosophical or psychological theory, but it is the Fundamental Theory. Therefore, Cognition Theory as cognition foundation necessary to elaborate with taking into account all cognition forms. Namely this generality turns a relevant Fundamental Cognition Theory part into the General Scientific Knowledge.

Next, we will sort out with the "Sciences", which are usually called "Formal Sciences". This name is not entirely successful, because those scientific constructions, which are so called, perhaps, are formal, but they are not Sciences. I will try to explain the said. Let's consider 3-DTS vertical series with

substantial and object series zero values. In fact, we are talking about the instrumental series. The arsenal of the scientific cognition forms, which is ensued from the fifteen combinations of the four scientific cognition tools, is, in essence, the “instrumental factory” of Science. What is the connection between the factory for agricultural machinery production and Biology? One of the Biology branches, called Agricultural Sciences, has in its composition the Science called Agronomy, which is the Complex Science, and this means that it includes the Instrumental Science called Practical Agronomy. So then, the factory for agricultural machinery production manufactures a variety of equipment for the Practical Agronomy needs: harvesters, mowing machines, seeders, etc. Similarly, the “instrumental shop floors” of Science prepare the necessary tools for relevant Scientific Disciplines. Mathematical Physics is Science, and Mathematics is the “instrumental shop floor”, Philosophy of Sociodynamics is Science, and Philosophy is the “instrumental shop floor”, etc. Thus, here it is more correct to speak not about the Sciences, but about the corresponding *Instrumental Theories*, of which there are altogether fifteen. We will list them: systematization theory, computation theory (Mathematics), logical designing theory, mental simulation theory (Philosophy), production organization theory, designing theory, analysis theory, experiment theory, theory of empirical generalization, theoretical constructions organization theory, engineering constructions theory, technical constructions theory, theory of general disciplinary construction, technological constructions theory, fundamental constructions theory. As it is seen, *Mathematics and Philosophy are not Sciences, but they are Instrumental Theories*. Taking into account told, one can formulate the following definition.

Definition 6 (Instrumental Theories): Each of the fifteen scientific cognition forms, which are ensuing from the fifteen combinations of the four scientific cognition tools, predetermines necessary Instrumental Theory for the Sciences development of the corresponding 3-DTS substantially-object cut.

One of the Operator Fundamental Sciences of table 10 is called "Logic". Slightly in more details need to say about this Science so that there is no confusion with scientific cognition form under the same name. The name of scientific cognition form “logic” is short for the scientific cognition tool called “logical designing” (logical designing \equiv logic), that is, here we are talking about the organizing technique consistent judgments and inferences. And the Science "Logic" is associated with the nervous system activity in terms of mind, which is a mechanism for the conceptual reflection of objective reality. This Science ensues from the research completeness criterion "Space" and the cognition object characteristic “Ordering of the knowledge”, which is the shortening from phrase "conceptual ordering of knowledge with the mind help". The Fundamental Science "Logic" deals with the problems of knowledge conceptual ordering. So, the word “Logic”, together with the research object, forms the Science name, which relates to the Science “Logic” Fundamental Complex, for example, Logic of Human; and the word “Logic”, together with the research subject, forms the Science name, which relates to the instrumental series with “logic” value, for example, Logic of the Bees' Applied Psychophysics. And where these two series intersect, we obtain a critical logic, for example, Critical Logic of Human. To avoid these difficulties, it would be possible to call the Science “Logic” differently, but, first, logic, indeed, is ordering knowledge, and secondly, here has the meaning the object and subject logic intersection appearance, that is, the critical logic formation, which is important for the cognitive process.

5. Brief Conclusions

1. The solution to the Sciences classification problem, obtained on a new Cognition Theory basis, made it possible to present all Differential Sciences in the Three-Dimensional Table form, proceeding from which sixty possible Operator Fundamental Sciences are elicited, and taking into account Instrumental Sciences, we have altogether eight hundred and eighty-six Operator Sciences ($59 \times 15 + \text{Noology}$).
2. The three-dimensional solution of the Sciences classification problem allows us to discern the vector of Fundamental Science development in the future. On the 3-DTS basis, one can propose reliable forecasts for the development of existing and emergence of new Sciences.
3. 3-DTS allows us to purposefully create Interdisciplinary Sciences for solving various practical problems, thereby contributing to the knowledge synthesis. 3-DTS also makes it possible to elicit all possible Sciences Complexes.
4. 3-DTS, on the one hand, is a Differential Sciences Table, and on the other hand, is an unity expression of fifteen possible scientific cognition forms of the object substantial characteristics relative to its

properties, motions, states, structures and their changes over time, considering it and separately, and as composite element of a given cognition level, and as composite element of the Universe, thereby revealing its past, present and future temporal interconnections.

5. Today the world community has found itself in a difficult situation in many life activity areas: social, economic, political, environmental, spiritual and moral, etc. In my opinion, a breakthrough in the cognitive process development will allow us to get out of this difficult situation without serious disasters. Represented in this article three-dimensional solution of the Sciences classification problem allows outlining the paths of such a breakthrough. For example, 3-DTS has allowed eliciting the Fundamental Science entitled Sociodynamics, which is associated with study of the social stability problems. The Third Law of Sociodynamics defines the arrow of society evolution, and all other Laws of Sociodynamics allow correct estimate the society behavior and natural tendency of its development. However, few people know about the Laws of Sociodynamics.

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