

REFORM SCIENCE: ITS LOGIC AND STRUCTURE

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Introduction

For about a century, modern science and technology have been showing their increasing interest in the so-called *systems theory*, the interdisciplinary study of the abstract organization of complex phenomena independent of their nature. As a branch of modern science, systems theory was introduced in the 1940's by the biologist Ludwig von Bertalanffy [1]. He emphasized that real systems are open to, and interact with, their environments, and therefore was very close to understanding the true sense of the concept.

However, it is only the proper interpretation of Hegel's *Science of Logic* [2] in the author's works [3], [4], [5] that revealed the true essence and structure of system theory and opened the way to the reviewing of modern science in general, reorganizing its branches in the true systematic order.

Systems theory is actually *the philosophy of science* stated in a language of a particular science; it is a *logical framework* that can be used for a consistent and systematic reorganization of any body of knowledge with a potential systemic structure. If applied to the theory of thinking, it would produce an analog of Hegel's dialectical logic, the philosophy proper. If applied to economics, it would produce an analog of Marx's research in that field, or a part of it at least. In physics, it has reorganized the whole former knowledge about space, time, matter, particles and atoms, dismissing redundant concepts, correcting false ones, introducing new concepts and formulas, advancing new methods of research and general outlooks, solving all cardinal problems in that field and, thus, initiating a radical reform of modern physics. So systems theory is the proper means of reforming modern science into a new, perfectly organized science – *reform science*. This reform and the new science deserve special attention provided below.

1. Method of reform science

The method of reform science, called '*the method of systematic intuition*', is based on the dialectical logic modified in accordance with achievements of modern science. Although this true scientific method can, in principle, solve any correctly stated problem, it is not a clear-cut one easy to use in all cases; it cannot be formalized and should be applied with the highest extent of creativity after a comprehensive analysis of the problem in question. The method can be applied only to the sciences that have potentially a systemic structure.

According to this method, every stage of research consists of two phases: a paragraph of speculation and a statement of concept, the former suggesting the latter by necessity. The whole research is a series of such stages, where any new statement is analyzed by a further speculation suggesting a new statement and so forth until the end. The first concept is the beginning of the reform science reflecting the origin of the research object itself; that concept is a fundamental contradiction revealed by a comprehensive speculation about the research object. So the development of the reform science follows the development of the research object. Therefore, unlike modern science where the terms 'science' and 'research' have generally different meanings, in reform science they mean the same. Thus, the reform science is actually its unique research, its *source*.

Reform science is a thoroughly *theoretical* science, which corresponds to Hegel's dictum that '*truth cannot be observed, it can only be thought*'. Thus reform science cannot be developed or verified experimentally; on the other hand, it takes into consideration all achievements and the whole experimental base of modern science and can provide a valid explanation to every experimental fact; reform science realizes goals beyond the reach of experimental and formal methods characteristic of modern science.

Unlike modern science that is actually a collection of research works and theories in a particular

field, the reform science keeps only the research works recognized as its sources and, in addition, the records of *the state* of reform science in every particular field.

2. Structure of reform science

Reform science consists of three parts named *Medium*, *Population* and *Associations*, each with a different logic, that of *transition*, *reflection* and *evolution*, respectively. In contrast to modern science, reform science has a *structure* common for all branches of science, which allows to introduce a *classification of concepts*, thus purifying, perfecting and organizing the whole science. That emphasizes the truly systematic nature of reform science, a logically consistent system of concepts. Owing to its structure, reform science is able to sort out the existing concepts, right and generalize them and find the proper meaning to them, and, when necessary, introduce new concepts.

Table 1. Medium (Transitions)

A Thesis	B Antithesis	C Synthesis	Q Quality
SC-1A1 (Origin)	SC-1B1	SC-1C1	SC-1Q1
SC-1A2	SC-1B2	SC-1C2	SC-1Q2
SC-1A3	SC-1B3	SC-1C3	SC-1Q3
SC-1A4	SC-1B4	SC-1C4	SC-1Q4
SC-1A5	SC-1B5	SC-1C5	SC-1Q5
SC-1A6	SC-1B6	SC-1C6	SC-1Q6 (Essence)

The structure of Part 1 (Medium), with its classification of concepts, is represented by Table 1. In this table, columns A, B, C (Thesis, Antithesis, Synthesis) are intended for the concepts, their symbolism and their brief description, while the column Q is for the qualitative characteristics of the corresponding *entities* of column C. Every concept of Table 1 is classified as SC-1ik, where SC is for SCIENCE, the common two-letter abbreviation of the name of a particular science (PH for physics, BI for biology, etc.), i – the column letter (A, B, C), k – the row number (1-6).

The structure of Part 2 (Population) is similar in many respects to that of Part 1 and is represented by Table 2 similar to Table 1; its concepts are classified similarly as SC-2ik. Instead of transition to the opposite, from thesis to antithesis, there takes place here their mutual *reflection* leading to their synthesis, the birth of a new *creature* which settles *the conflict* between its two constituent entities and is characterized by its specific quality. The synthesized creatures and their qualities are registered in columns C and Q, respectively.

The classification of concepts in Part 3 is presented by Table 3 which illustrates the evolution of the *species* from the simplest one to the most complex. The classification of the species is given in the first column as SC-3-i, where i=1, 2, ...7 is the number of the row. Columns A-G are intended for the description of *substructures*, which are classified as SC-3ik, similar to the classification in the preceding tables.

Table 2. Population (Reflections)

A Thesis	B Antithesis	C Synthesis	Q Quality
SC-2A1	SC-2B1	SC-2C1	SC-2Q1
SC-2A2	SC-2B2	SC-2C2	SC-2Q2
SC-2A3	SC-2B3	SC-2C3	SC-2Q3
SC-2A4	SC-2B4	SC-2C4	SC-2Q4
SC-2A5	SC-2B5	SC-2C5	SC-2Q5
SC-2A6	SC-2B6	SC-2C6	SC-2Q6 (Project)

Table 3. Associations (Evolution)

Substructures Species ↓	A	B	C	D	E	F	G	Q Quality
SC-3-1	SC-3A1							SC-3Q1
SC-3-2	SC-3A2	SC-3B2						SC-3Q2
SC-3-3	SC-3A3	SC-3B3	SC-3C3					SC-3Q3
SC-3-4	SC-3A4	SC-3B4	SC-3C4	SC-3D4				SC-3Q4
SC-3-5	SC-3A5	SC-3B5	SC-3C5	SC-3D5	SC-3E5			SC-3Q5
SC-3-6	SC-3A6	SC-3B6	SC-3C6	SC-3D6	SC-3E6	SC-3F6		SC-3Q6
SC-3-7	SC-3A7	SC-3B7	SC-3C7	SC-3D7	SC-3E7	SC-3F7	SC-3G7	SC-3Q7 (Realization)

3. Research in reform science

As suggested above, in Part 1, the researcher must fill in all the cells of Table 1 with the proper concepts and qualitative characteristics. The research starts with a paragraph of speculation to suggest an entity introduced by the statement of its concept SC-1A1. This step may prove most difficult, because this concept has no predecessor and, as is mentioned above, should be determined by a speculation about the research object itself.

Then the research proceeds with a speculation about entity SC-1A1 to suggest its *transition* to its *dual* entity marked by concept SC-1B1. After that the research proceeds with a speculation about the two preceding entities, *the thesis* and *the antithesis*, to suggest their *synthesis*, a new entity marked by concept SC-1C1. The latter has its specific *quality* to be registered in cell SC-1Q1. The speculation about entity SC-1C1 generates entity SC-1A2 to be transited by a new paragraph of speculation to entity SC-1B2, and so forth until determining entity SC-1C6 and its quality SC-1Q6. Entity SC-1C6 is *the essence* of the science, its concept being central for the whole theory. Every step is a *discovery* revealed by *intuition* rather than found by a formal work of intellect.

In Part 2, the research starts with a paragraph of speculation about concept SC-1C6 and ends with concept SC-2C6 which, as suggested earlier, is called *Project*. Every statement must again be

preceded and necessitated by the proper speculation about the statement of the preceding step. As a result, this stage of research generates a series of six creatures, from SC-2C1 to SC-2C6, of increasingly higher order and quality populating the Medium.

In Part 3, the research starts with a paragraph of speculation about the creatures SC-2C5 and SC-2C6 to suggest their *merger* into a species SC-3-0, the fundamental component of *the substructures*. A speculation about the latter should suggest a species SC-3-1 consisting of substructure SC-3A1. Further speculation should expose an internal contradiction of SC-3-1 necessitating its development, *evolution*, by generating a new substructure, SC-3B2, which adds to SC-3B1 to make a species SC-3-2. The research proceeds further until generating a substructure SC-3G7 which adds to the preceding six substructures, SC-3A7, SC-3B7, SC-3C7, SC-3D7, SC-3E7, SC-3F7, to make the most perfect species SC-3-7, *the Realization*. To complete in rough the research, it is necessary to show the species SC-3-7 to be indeed the realization of the project implied by the entity SC-2C6.

Thus the whole research in reform science, in its every branch, is a great endeavor concerned with finding the Origin of the branch, revealing its Essence, working out its Project and fulfilling its Realization.

As mentioned above, reform science publishes both the state of science and the sources, the research works themselves. To this end, there should be two kinds of media: *The Bulletin of Reform Science*, publishing the state of different branches of reform science in the form of above three tables of concepts with references to the sources, and *The Journal of Reform Science*, publishing the research works recognized as sources of reform science to be kept in a specialized library, *The Reform Science Archive*. The total volume of research works in reform science to be kept in the Archive is thousands of times less than that in modern science, which will result in a radical revolution of the present librarian technology and practice with additional great benefits for humanity.

4. Application to physics

Application of the method of reform science to modern physics has proved possible in the field dealing with subatomic and atomic theories and resulted in its reform and the creation of a new line in theoretical physics called *reform physics*. The latter consists of three parts dealing with the theory of ether, subatomic particles and the nuclear structure of atoms.

4.1. Research in reform physics

The research in reform physics starts with a speculation about the universe as a whole suggesting the pair of virtual electron and positron to be its origin and therefore the first two concepts of the theory. Interaction of those particles, which have no physical properties, gives birth to virtual positronium characterized by energy. Then we learn that there exists ether consisting of such virtual positroniums exchanging photons and characterized by the constant c , the so-called velocity of light in a vacuum, on the one hand, and the correlation function of ether, *its essence*, on the other.

Then the research proceeds with a speculation about the properties of ether revealing the phenomenon of spontaneous generation of subatomic particles, from the muon and mesons to the neutron and the H-atom, with their adequate mathematical description; the structure of H-atom proves to be of special importance for the whole theory, *its Project*.

The last part of the research proceeds with a speculation about the structures of the neutron and H-atom suggesting their synthesis, the D-atom. Further speculation shows inconsistency of the D-atoms with ether, which prompts them to unite in pairs into He-atoms; the He-atom becoming the center of nuclear structure of all the more complex atoms. Further speculations reveal necessity of additional six shells, all seven shells presented in the complete and perfect nuclear structure of the U-atom, *the realization* of the Project and the most perfect physical model of ether.

4.2. Summary of the main results

As a whole, the new method has enabled us to obtain the following new results:

- (1) the pair of virtual electron and positron is the origin of the universe;
- (2) there exists ether, the primary physical medium consisting of virtual positroniums;
- (3) in ether there takes place spontaneous generation of mesons and neutrons; cosmic rays and the Microwave Background are the proper radiations of ether; the evaluation of its parameters showed, in particular, the mean radius of the electron to be about 0.01 fm , that is over two hundred times less than what was predicted by its classical model;
- (4) in respect to ether excitations, the neutron is a linear system with continuously distributed parameters consistent spatially with ether; because of its time-space contradiction, the neutron transforms into the H-atom;
- (5) the H-atom is a linear system with lumped parameters, its structural function being consistent in time with ether; the H-atom contains three '*internal organs*', so-called quarks, described by real symmetric matrices; the agents of their processes correspond to so-called gluons;
- (6) the essence of nuclear interaction is the conservation of energy by alternate transformation of electric energy to magnetic one and vice versa in D-atoms;
- (7) excited by photons, atoms and neutrons respond with neutrinos – organized groups of photons;
- (8) the nuclear structure evolves by shells, the D-atom being its basic element; there are seven shells: He-shell (2-shell), octahedral shell (8-shell), icosahedral shell (18-shell), double-icosahedral shell (36-shell) and three inverse shells of 18, 8 and 2 D-atoms; the additional neutrons perform inter-shell interaction; the electron shells are integral components of the nuclear structure;
- (9) the nuclear structure of the whole atom can be modeled by electric LCR-networks; the atom with an atomic number m consists of m D-atoms, is represented by a network with m degrees of freedom and, when excited, emits m -neutrinos; the development of nuclear structure is actually the realization and exposition of the implicit structure of the H-atom;
- (10) the stellar medium simulates conditions of ether, so that the atoms produced in it become different models of ether, achieving their perfection in the U-atom.

5. Application to politics

5.1. Research and the main results

The method of reform science, when applied to politics, has enabled us to develop the framework of the true science of politics, a systematic body of knowledge called *reform politics*, revealing new fundamental results. The research consists of three parts: 1- Human society, 2-Government, 3- Self-government. Part 1 investigates the human being, family, ethnic community and its development into the world community characterized by its ideal model, *the World-Consistent Nation* (WCN), governed by the International Law. *the essence of politics*; the WCN is supposed to have developed *the universal religion, philosophy and science*.

Part 2 investigates logical connection and specific features of different types of government, from monarchy to republic, the latter proving ideally to be the best government, the Project of the WCN.

Part 3 shows the merging of republic and democracy into *demo-republic*; the latter, when taken separately, presents an unstable form of self-governance, being at the same time the basic constituent of more developed and stable self-governing associations – empires. There appear two empires with different ideological orientations, social-religious (SR) and religious-social (RS), dividing the whole world into two spheres of influence. Other nations, when developed to the status of demo-republic, join one of the empire with different extents of affinity and create different associations called solidarity, preference, neutrality, culture, commerce and global union, thus promoting the development of the empire from its initial form, Empire-1, to its most perfect form, Empire-7, the Realization of the WCN project.

The evolution of the empire is actually that of its three institutions: the Assembly responsible for

domestic affairs, the Senate responsible for foreign affairs, and the Church or another religious institution responsible for ideology; each of them having a tripartite structure to represent the other two.

The SR-empire and the RS-empire, the first of Western type, more extravert and aggressive, the second of Eastern type, more introvert and conciliatory, engage in solving global problems while competing and adapting to each other and making social issues increasingly more religious and religious issues more social. The research implies that, for a smooth transition to self-governance and its further evolution, it is necessary to reform modern science and develop universal philosophy and religion, all of them harmonized with each other.

5.2. Structure of reform politics

Structure of the reform politics is represented by three tables below corresponding to the respective parts of the research.

Table 5.1. Human society (Transitions)

A Thesis	B Antithesis	C Synthesis	Q Quality
Man Spirit-body	Woman Body-spirit	Family Embodiment of spirit	Life Self-consciousness
Private intercourse Corporal side of life	Social intercourse Spiritual side of life	Social status Quality of life	Sustainable life
Separation of families Family names	Attraction of families Faith, traditions	World community Communicability	Birth of religion
Multitude of communi- cating families	Single family Ethnicity	Ethnic community	Ethnic religion, culture
Chief of community Ethnic affinity	Border of ethnicity Geography	Nation Geographical borders	National religion, culture
National laws National restrictions	Interaction across borders. Mediation	World-Consistent Nation (WCN) International law	Universal religion, philosophy, science

Table 5.2. Government (Reflections)

A Thesis	B Antithesis	C Synthesis	Q Quality
Devotion to god, universal deity	Devotion to ruler, national deity	Monarchy – government based on devotion	Religious elevation and unity
Proxy-circle of families. Civil security	Security guard Special security	Tyranny - government based on coercion	Unity enforced by discipline
Government by common functionaries	Aristocrats – enlightened and	Aristocracy - government based on	Education and

	trustworthy	trust	enlightenment
Circle of enlightened wealthy people Heritage of property	Circle of wealthy functionaries Heritage of power	Oligarchy – government by sustainable circle of functionaries	Power of collective organization
Organized government Personal authority	Organized people Collective authority	Democracy – government by organized people	Manifestation of people's sovereignty
Hierarchy of offices Collective responsibility	Hierarchy of organizations Personal responsibility	Republic – collective government with personal responsibility	Ideal embodiment of WCN. Ideal model of government

Table 5.3. Self-government (Evolution)

Affinity→ Empires ↓	A	B	C	D	E	F	G	Q Quality
Empire-1 (PL-3-1)	PL-3A1							Self-governance (PL-3Q1)
Empire-2 (PL-3-2)	PL-3A2	PL-3B2						Solidarity (PL-3Q2)
Empire-3 (PL-3-3)	PL-3A3	PL-3B3	PL-3C3					Preference (PL-3Q3)
Empire-4 (PL-3-4)	PL-3A4	PL-3B4	PL-3C4	PL-3D4				Mutual interest (PL-3Q4)
Empire-5 (PL-3-5)	PL-3A5	PL-3B5	PL-3C5	PL-3D5	PL-3E5			Culture (PL-3Q5)
Empire-6 (PL-3-6)	PL-3A6	PL-3B6	PL-3C6	PL-3D6	PL-3E6	PL-3F6		Commerce (PL-3Q6)
Empire-7 (PL-3-7)	PL-3A7	PL-3B7	PL-3C7	PL-3D7	PL-3E7	PL-3F7	PL-3G7	Responsibility (PL-3Q7)

6. Application to economics

Application of the method of reform science to economics was initiated by Karl Marx, but that his great work was not and could not be completed. So we track the main results of Marx's work ordering them in accordance with our system concepts and proceed further in developing the framework of economics as a logically consistent body of knowledge - *reform economics*. The work consists of three parts: 1-Market production, 2-Capitalist production and 3-Monopolistic production, the first two following mainly Marx's work.

Part 1 shows how the individual labor develops into the market production with its Standard Market Pattern (SMP) characterized by the Law of Value, the essence of the whole theory. Part 2 shows how the market production develops into the increasingly sophisticated forms of capitalist production from the handicrafts production to the industrial factory and the industrial supplier, the

latter being the Project of SMP, an ideal but not yet articulated form of market production.

Part 3 shows the appearance of firms, the initial self-financing production entities; to become stable, firms should join in pairs to form branch centers or join existing centers. Every branch contains ideally two centers with different orientation of interests: commercial-social (CS) and social-commercial (SC). The CS-center and the SC-center compete with each other and divide the market accordingly. The centers expand their markets by contracting unions with firms, thus creating trusts, syndicates and cartels with the firms of their own orientation of interest, as well as mixed CS-SC and SC-CS associations with firms of the opposite orientation.

At first, centers of different branches of economy function independently. However, all centers of similar orientation find themselves interconnected and interdependent through banks and the market. That interdependence leads to unification of all branches of similar orientation and the creation of two *Global Centers* (GC) of dual orientation, GC-CS and GC-SC. Any such Global Center is a society of producers that work for themselves and finance themselves, a self-manageable, *socialist* economy.

While competing, the GC-CS and GC-SC centers streamline production, reducing prices and adapting to each other, thus presenting an increasingly perfect dual realization of the SMP and transforming the market economy into a *communal economy*, with the commercial interests becoming increasingly social and the social interests commercial.

Conclusion

The paper shows the centuries-long search for the general systems theory to have successfully achieved its goal heralding great changes in modern science, philosophy and society.

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