INTEGRATING SCIENTIFIC DOMAINS: POSSIBILITIES OF THE NOUS-SELF CONCEPT AND FUNCTIONALISTIC SYSTEMATIC PHYSIOLOGY (PART 1)

Kayo UEJIMA[1]

ABSTRACT. *Naturally, for the integration of scientific domains, cooperative work of many scientists and philosophers is needed. But the first question is: How can we integrate scientific domains that are disintegrated (in fact) at present? Evidently, the conceptual framework is needed – for the integration of scientific domains in both social science and natural science. The author's Nous-Self Concept (which is composed of Nous-Self process and Nous-Self system) is advanced to realize this task. Substantially, the origination of the Nous-Self process's notion can be traced in the Platonian philosophy (of Dualist, Idealist essence). In turn, Nous-Self system has its origination in Aristotle's philosophy (of Naturalist, functionalist essence). In this paper, introducing the Nous-Self Concept and aiming at the integration of scientific domains, the author basically refers to the Biocosmological perspective (advanced and developed by the BCA, including the works of K.S. Khroutski). Not less important is the development of the Nous-Self Concept in the light of Aristotle's philosophy (as the type of scientific Functionalism). Likewise, the author relies upon the achievements of general system theory, developing them in the direction of the functionalistic systematic physiology that is based on functionalistic essences in Aristotle's philosophy.*

KEYWORDS: *biocosmological perspective, integration of scientific domains, Nous Self concept, functionalistic systematic physiology*

Contents

[1] Independent scholar, Kumamoto, JAPAN.

Introduction

Excess incidence of chronic diseases and the increase of environmental pollution are the evident bioethical problems which are the challenging issues for modern science. Likewise, this is a direct threat to the sustainability of a modern society. We cannot resolve these problems without the elucidation of mechanisms of not only the individualization process[2] but also systematic physiology for a human-being as the living organism (i.e. its wholeness[3]). However, in fact, modern science (which is based on cosmological dualism and physicalist reductionism) is incapable to elucidate the mechanisms of developmental process of subjectivity (i.e. individualization process from the universe to the level of the individual agent[4] and back – the self-developmental process[5]) and functionalistic systematic (physiological) approach.

Nous-Self concept precisely strives to create the conceptual framework that is capable to contribute to the realization of a sustainable society through the integration of scientific domains[6].

The main goals of Nous-Self concept in realizing the integration of scientific domains are:

1. To provide with conceptual frameworks a cooperative integrative (of scientific domains) work on the topic "Elucidation mechanisms of individualization process and functionalistic systematic physiology of a human being as the whole entity";
2. To develop the adequate terminology for the integrative scholarly activities under study;
3. To arrive at a mutual understanding between experts and their efficient communication, in respect to scientific achievements that naturally belong to different scientific domains.

Hopefully, the advanced analysis both of the Self-developmental process and of the systematic physiology (aiming at the integration of scientific domains through cooperative work) can contribute efficiently to the solution of environmental and bioethical problems.

---

[2] The meaning of the individualization process is close to Carl Jung's analytical psychology and its basic notions of inner archetypes, collective unconsciousness and process of individuation.

[3] "Wholeness" in the Nous-Self concept means the following: Living organism, naturally, is the whole life system. The latter, evidently, cannot function merely as the aggregate of parts (if the wholeness is disunited into its constituting parts and, afterwards, mechanically re-collected back together in the same space). Naturally, wholeness cannot be divided.

[4] In this paper, the individual agent means a human-being who has capabilities to perform actions and functions

[5] In psychology, there are developmental stage theories, like "the Emergent Cyclical Levels of Existence Theory" (ECLET) by Clare W. Grave, spiral dynamics by Don Beck and Chris Cowan, etc. The developmental stage theories can be aggregated to the development of subjectivity from the level of universe to the level of the individual agent. Therefore, the author shows the development of subjectivity as Self-developmental stage. In other words, the self-developmental stage means the individualization process.

[6] The previous version of the Nous-Self concept aimed at the integration of scientific domains (see, Uejima, 2010) has been thoroughly revised.

Nous-Self Concept is composed of the three parts:

Part 1: The exploration of Nous-Self and systematic physiology by means of the functionalist approach that is based on Aristotle's philosophy;

Part 2: Proposal of a model for the individualization process that is treated as the Nous-Self Process;

Part 3: Forming the views of Nous-Self system by means of a visualized conceptual framework for the integration of scientific domains.

1. Research purpose and the significance of Nous-Self concept

Purpose of the work is to provide a conceptual framework within biocosmological perspective for the integration of scientific domains that can contribute to the scientific elucidation of mechanisms of the individualization process (self-developmental process from universe to individual agent) and the principles of functionalistic systematic physiology of human beings as the whole entities.

There are many environmental and bioethical problems causing the crisis of modern civilization. The biggest task of the contemporary science (which is based on physicalist reductionism) is the lack of a metaphysical worldview and functionalistic approach under biocosmological perspective. Therefore, new approaches of integrative (holistic) essence under biocosmological perspective are needed.

A key to the resolution of the current crisis of material civilization lies in creation new methodologies of scientific research. The reductionist scientific approach has a weak point about the elucidation of mechanisms for both the individualization process and functionalistic systematic physiology of living organisms as the whole entities. If to refer to the basic (Plato's and Aristotle's) philosophical concepts – we know that Plato laid the foundations of Western philosophy and science but put dependence in transcendent metaphysical realm of forms (doctrine of ideas). Aristotle ("father of science") kept on elucidating the physiology of living organisms as the whole entities and had reliance in the fundamental functionalistic approach.

Advancing the research method, author focuses on the integrative approach that can utilize both transcendent metaphysical means and the functionalistic systemic approach. Not only the notion of Nous but also the representation of a living organism as the whole entity is the important key concepts for the integrative approach under development.

In Aristotle's philosophy, *nous* is a concept that expresses the active intellect concerning the moved mover. Alfred North Whitehead (1925, p.175) criticized "a Prime Mover – God" concerning *nous* as the moved mover in Aristotle's metaphysics. Whitehead denoted that Aristotle's philosophy had the limitation of causality and pointed that Aristotle's physics is erroneous. Instead of a Prime Mover, Whitehead dealt with organism as the entity of transcendent metaphysical perspective. In Whitehead's philosophy (1925, p.37), the organism is the organized system which each primordial element is organized by the vibratory streaming. Essentially, organism as a philosophical concept derives from the ontology of the Platonic transcendent metaphysical perspective. Alfred North Whitehead (1979)

expressed togetherness among actual entities by the *nexus*.

Nature is the living organism as the whole entity that cannot be (scientifically) reduced to its parts because of *nexus*. Essentially, Nature is not only the vibratory organized organism but also the functionalistic system. Essentially, modern science is able to reduce (atomize) the nature to its constituent parts (and the sections of knowledge). However, modern science lacks means that are able to integrate scientific domains which are obtained through reductionist approach. Therefore, the author tries to develop the sought-for integrative approach. Primarily, however, we are to find the foundations for the integration of the Platonic transcendent (idealist) bases with the Aristotelian functionalistic organicist approach based on the realist biocosmological perspective.

2. Classification of biocosmological perspectives by Konstantin S. Khroutski

Khroutski (2011) has already suggested the comparative analysis of the three main cosmologies (taken as the three all-embracing realms). Table 1 shows the most important contents for classification of biocosmological perspectives that Khroutski suggested.

Table 1.

Classification of the Three cosmologies by Khroutski[7]

Type of cosmology / *Criteria*	**AntiKosmism (Humanistics)**	**AKosmism (Holistics)**	**RealKosmism (Realistics)**
Type of essence	Plato's (Dualist-Idealist) essentialism	Integralism (integration of the two polar essences)	Aristotle's (Organicist-Realist) essentialism
Main type of the scientific approach	physico-mathematical	system-holistic	Individual-Functionalist
Methodology	Based on the dualistic attitude and the use of physico-mathematical method	Integralist (Holistic, Systemic), founded on a Transcendent basis	Based on the Organicist realistic (universalizing) fundamental functionalism

AntiKosmism based on Plato's essentialism is rephrased by the author into a geometric world (the worldview). AntiKosmism provides the transcendental approach for the mathematical (physicalist) cognition of the materialist universe by the geometry based on dualism. In turn, RealKosmism (and Aristotle's essentialism) is rephrased as the functionalistic worldview. RealKosmism provides the functionalistic approach for noesis the Organic universe (Biocosmos), methodologically applying the Bio-scientific approach (based on Organic *phusis*logy[8]). Meanwhile, AKosmism provides the integration both of mathematical physicalism (based on transcendent dualism and idealism) and functionalistic systematic approach (based on

[7] See: Khroutski 2011: p.385, 2013: p.44.
[8] "*Phusis*" – in Greek – means (Living) Nature.

hylomorphism and organicist realism) – i.e. the integration (essentially on an AKosmist own cosmological basis) both the means of AntiKosmism and RealKosmism. Two distinguished scholars can be named as the prominent representatives of AKosmism – Ilya Prigogine and Pitirim Sorokin.

However, although Prigogine showed the scientific verification for the scientific integration between the physical order and the biological order, he has not proposed the conceptual framework that can integrate the scientific achievements both of social science and natural science. The same refers to Pitirim Sorokin. While Russian-American scholar made a phenomenal (of the Copernican overturn) scientific discovery of Organicist essence – Sorokin substantiated the existence of the Three universal dynamic T_SCSS[9] (Types of SocioCultural SuperSystems; each of which embraces all the domains of social and cultural life) – but he did not investigate the aetiological and methodological foundations of these organic and universally dynamic T_SCSS. At the same time, Sorokin's great conceptual framework and substantiation of the dynamic fluctuation of the Three T_SCSS (two polar: Sensate and Ideational; and the third – intermediate – Integral, or Idealistic) has the essential significance for the contemporary development of Integralist studies.

Furthermore, aiming at the scholarly resolution of the issues of Integralism in the light of biocosmological perspectives, Kwon Jong Yoo (2013) proposed the conceptual framework for integration scientific and philosophical means named as the Topology of Mind Models.

Applying the Nous-Self concept, author likewise aims to contribute to the Integralist realm which utilizes the scholarly means both of Platonism and Aristotelism[10]. The author proposes the Nous-Self concept as the conceptual framework that can integrate the scientific domains of both natural sciences and social sciences.

3. Self-concept and systems theory in the perspective of integrating scientific domains

There are two backbones – self-concept and systems theory – that are useful for the creation of a conceptual framework aimed at the integration of scientific domains. These concept and theory apply cross-sectional ideas in society, science and philosophy.

Tradition of self-concept derives from “Know thyself” in ancient Greece. Although the self-concept relates to epistemology since Plato, there is definite distinction between Plato and Aristotle in treatment of the relationship between the soul and the body. Plato is the author of the tripartite theory of soul which (basically) is a separate entity from the body. Plato’s psyche composed of the three parts: a) Logical, b) High-Spirited, c) Appetitive. For Aristotle, the soul is not in the body (leaving it after death, as Plato claimed), but the body is in the soul, including the

[9] This abbreviation is given in the work of Khroutski (2014).

[10] The elucidation of the notion and neologism “Aristotelism” (instead of the generally accepted neo-Aristotelianism) is given in Khroutski’s work (2014, p.6).

function of sensation. Likewise, he substantiated the organic unity of a living being and its natural (functionalist) integration into the whole Organic world (Kosmos). Naturally, in Aristotle's approach – the developmental (ontogenetic) process can be understood as the functionalistic self-actualization of the subject's (its/her/his) immanent *entelecheia* – which is given to the subject (individual) by Kosmos (Nature), and the potential of which is returned to the universe (for its evolution) in the form of entelecheia's self-actualization and actual contribution of functionalist (inherent) wholesome effects and results. Thus, we can find some interrelation between the self-concept and Aristotle's philosophy, especially in respect to his functionalistic approach that is expressed in *De Anima*. At the same time, system theory also is interrelated with Aristotle's functionalistic organicism.

3.1. Sensation in Aristotle's philosophy

Aristotle's philosophy finds the universal in particular things (while in Plato's philosophy, the universal exists apart from particular things), and that the essence of things lies in their (*hylomorphist*) abilities to realize the dynamic change – *self-developmen*t – arriving at the effective production and contribution (to the universally Organic world – Kosmos) the functionalistic wholesome results and products of their activity. Notably, Aristotle distinguished the difference between sensation and intellect of the soul. He argued:

> Soul is a place of forms or ideas: except that this is not true of the whole soul, but only of the soul which can think, and again that the forms are there not in actuality, but potentiality. But that the impassivity of sense is different from that of intellect is clear if we look at the sense-organs and at sense. (1907: chapter 4, p.131)

In other place, Aristotle describes:

> The soul, therefore, is the actuality of the body above described. But the term 'actuality' is used in two senses; in the one it answers to knowledge, in the other to the exercise of knowledge. Clearly in this case it is analogous to knowledge: for sleep, as well as waking. Implies the presence of soul; and, whilst waking is analogous to the exercise of knowledge, sleep is analogous to the possession of knowledge without its exercise; and in the same individual the possession of knowledge comes in order of time before its exercise. Hence soul is the first actuality of natural body having in it the capacity of life. (Aristotle (1907: chapter 1, p.51)

Aristotle distinguished the difference between sensation and intellect of the soul. He writes:

> Thus, sensation originates in particular objects, while recollection, starting from the soul, is directed towards the movements or traces of movement in the sense-organs. But intellect would seem to be developed in us as a self-

> existing substance and to be imperishable". (Aristotle 1907: Chapter 4, p.33)

Aristotle states the unity of sensation, i.e. the unity of senses (sense-organs) and the surrounding natural world (objects of sensation). For Aristotle the physical (*phusis*logical) objects and subjects (things) of the natural world are united within sensation, i.e. within (intrinsic to) the individual's psychic activity (while in modern science, since Descartes, these are external relations imposed on sensations). Aristotle's account is that the sensible perception forms the coupling between the object and individual agent through the active operation of sense-organs[11]. In short, there is a coupling between the individual agent and the environment which incorporates the objects of sensation for the individual. In this, for the perceiving individual, the qualitative change from potentiality to actuality in sense-organs takes place[12]. Similarly, the object (that is in the coupling with the sensing individual) transforms the qualitative change from potentiality to actuality. These are the common characteristics of the qualitative change and motion from potentiality to actuality.

By motion, Aristotle understands any kind of change. In turn, the motion is locomotion or an augmentation or diminution or an alteration. At the same time, for Aristotle, a living thing is always one and indivisible, in spite of the distinctions between its potentialities for activities such as reproduction, sensation, locomotion, and thinking. In the De Anima Aristotle used the word and notion "nous", in this retaining but developing its ancient meaning (in Greek philosophy that is closely connected to *psyche*). In English, *nous* is usually translated as "mind" or "intellect," but there is no one English word that can properly translate it.

In the De Anima, Aristotle retains two basic (for Greek philosophy) characteristics of the soul – movement and the senses (and devotes to them distinct parts of the De Anima), but he adds two more – *nutrition* and *nous*. As mentioned above, to translate "nous" usually the English words "intellect" or "mind" are used. However, the latter refer to a process that takes place only in the human being (thus, relating to person- or subject-centric essence). On the contrary, Nous relates to the Organic wholeness of the world (Cosmos) – thus being substantiated in all things (equally, in the individual) to impart motion to the Universe. Consequently, Nous is Cosmos-centric, but not subject-centric, or, rather – AnthropoCosmo-centric. For Aristotle (and his forerunner Anaxagoras), Nous originates and is the order of the Universe, and universally exists in the specific (functionalistic basic) organic order in each thing (the individual).

In his *De Anima*, Aristotle writes, "A thing is always moved in one of two ways;

---

[11] Aristotle (1907: Chapter 4, p.33) described, "Thus, sensation originates in particular objects, while recollection, starting from the soul, is directed towards the movements or traces of movement in the sense-organs."

[12] Aristotle (1907:Chapter 4, p.70) described, "sensation consists in being moved and acted upon, for it is held to be a species of qualitative change.….the faculty of sensible perception exists not in activity, but also in potentiality."

that is, either indirectly, through something else, or directly of and through itself." (Aristotle 1907: Chapter 3, p.19). At the same time, the philosopher from Stagira treats the soul as unchanging and motionless. This is an essential moment, Aristotle states,

> For, unless I am mistaken, the definition of soul as the self-moving, or as that which is capable of self-motion, misrepresents its essential nature: nay, more; it is quite impossible for soul to have the attribute of motion at all. To begin with, it has been already stated that a thing may cause motion without necessarily being moved itself. (Aristotle 1907: Chapter 3, p.19)

3.2. Noetic Organic Cosmos

Aristotle's De Anima (On the Soul) is just a part (subdivision) of his general (all-embracing) science of nature, which equally includes Physics, On Generation and Corruption, On the Heavens, On Sense and the Sensible, and biological writings. In this, nous is the soul's capacity for thinking and understanding, and nous-activity is peculiar to the soul. In all his long books Aristotle represents the basic principles and concepts, and substantiates the Organicist bases for understanding how living bodies exist and perform their functions.

Nous is a word of the ancient Greek philosophy and was used before Aristotle. Patricia Curd (2007) noticed that the meaning of *nous* firstly was suggested by Anaxagoras, who defined that "Nous has control over all things that have soul, both the larger and the smaller." In general, in ancient Greek philosophy, the word "nous" is closely connected to "psyche" (soul) and treated as the cause of everything. Already Anaxagoras (as emphasized by Aristotle) said that nous sets the whole in movement and declared the moving cause of things to be soul. Thus, Nous's function is to impart motion to the universe. Therefore, once again, the word "nous" cannot be a synonym to English words "intellect" or "mind" – "nous" always (for Anaxagoras and Aristotle) is located within (inwardly) the Organic whole (Organism), but not without (outwardly) the given world or living body.

Taken for the given work, Nous means the intelligence of the Organic universe (i.e. *noetic* Organic Cosmos). Therefore, the proposed Nous-Self concept refers to the Organic Cosmos (the evolving cosmic – all-embracing, universal – organism), but is not reduced to the mechanical universe.

Essentially, Aristotle developed the meaning of "nous" but he did not change the basic (in Greek philosophy) significance of this notion – Nous exists in the whole Organic universe (Biocosmos) and also in a human soul (in the certain functionalistic mode). Especially, Aristotle states the significance of *nous* to achieving prudence (*phronesis*) – applying the intelligence and wisdom in grasping what is virtuous. In general, Aristotle agrees with Anaxagoras that Nous moves, orders and controls everything (considering Nous as the first principle), relating as to the Cosmos (Universe) as to the human soul (i.e. the human organism as the whole).

In the De Anima, Aristotle proposed a brief but very essential substantiation of the two type of intellect: passive intellect (*nous pathetikos*) which "is what it is by

becoming all things"; and active intellect (*nous poietikos*) that elucidates (explicates) what the potential knowledge means and how to put this knowledge into act. Aristotle's two polar notions but which are essentially integrated (of passive and active intellect) still leads to dispute among scholars. At any rate, a need is to emphasize that the dichotomy of potentiality and actuality is the fundamental principle in Aristotle's philosophy for the analysis of motion, causality (aetiology), physiology, ethics, etc., and applied in his Physics, Metaphysics, De Anima (i.e. studying the human psyche), and Nicomachean Ethics. Likewise, Aristotle's passive (potential) intellect and active (agent or productive) intellect are based on his fundamental principle of *hylomorphism*. Naturally, therefore, soul (and nous) are synchronously passive (potential) and active (productive) thus realizing (in the phases of domination) the motion of the function and the organism as a hierarchical whole. In this, two statements of Aristotle are appreciable: "soul is substance in the sense that it is the form of natural body having in it the capacity of life. Such substance is actuality."(1907: chapter1, p.50); and "soul is the first actuality of natural body having in it the capacity of life." (Ibid.)

3.3 Nous-Self – centre of the functionalistic Organicist system

Nous-Self is associated with the Organicist world outlook – of perceiving the world as the Organicist whole (the living Organism). Therefore, likewise, Nous-Self is correlated with the significance of Aristotle's *entelecheia*, for, Nous-Self has the potential and acts as the central substance of an Organicism (every real thing in the world-Kosmos). Thus, essentially, Nous-Self is the entelechial Centre of a physiological functionalistic system. Author proposes the term of Nous-Self (and not uses the original notion of *entelecheia*), for, in general, the author's aim is to construct a holistic conception, precisely by integration the means of both currently dominating modern mathematical physicalism (that is reduced to Plato's dualism and idealism), and Aristotle's *phusis*logy (i.e. realistic Organicism).

In Aristotle's philosophy, Soul and Nous that are essential for all living beings relate to (determine) the whole functioning (goal-driven life activity) of the organism (body), and thus, to the field of modern physiology. We are to remember that precisely Aristotle's exploration of functioning (teleodriven) systems at hierarchically different levels (for plants – *vegetative*; for animals – *animal*; for human-beings – *rational*) became the basis for the emergence and phenomenal development of modern biology. At the same time, due to the holistic approach undertaken – author substantially introduces the notion of Self, to take into consideration both the *realistic* – subject's (individual's) immediate experience and intrinsic dimension of the phenomena (empirical evidence); and the *idealistic* reflexive perception of oneself (the person and her/his thoughts, perceptions, emotions) – in pattern of the objects of consciousness (that include technical developments of the modern technological society).

Though modern natural sciences and biology apply physiology for the study of materialistic body basing on the reductionist approach (in turn, based on Plato's dualism and the use of mathematics), Aristotle focused on the functioning systems

(organs, wholes). Now, we need both grand types of knowledge (types of cosmologies – of AKosmism and RealKosmism) – to put forward a holistic approach. Herein, the main focus is on the physiology of functionalistic systems that constitute the living organism and its life activity as the integrative functionalistic whole (i.e., due to Aristotle's philosophy – to study the main intrinsic functionalistic results, but applying the extrinsic – objective – means of modern mathematical-physicalist "scientific method", derivative of Plato's philosophy). In this, the author recognizes the higher significance of the Nous of each being (living thing, subject of life activity) and the ultimate Nous that is the intelligence of the Organic universe (i.e. *noetic* Organic Cosmos). Therefore, in order to emphasize the importance of Aristotle's functionalist approach (his *phusis*logy) for the modern natural sciences, the author calls her holistic physiology (designed to study the whole entities – i.e. functioning systems) as the functionalistic systematic physiology.

4. Functionalistic systematic physiology, its premises and main characteristics

Basing on the above said and the potential of the holistic approach (that is put forward), author suggests the two main divisions of functionalistic systematic physiology: its external physiology and internal physiology.

1) Internal physiology

The internal physiology is the functional interaction among the living things like cells or organs inside the individual agent.

Generally speaking, the scope of modern biology and medicine (as the divisions of natural sciences) is precisely the development of *internal* physiology thus studying the issues *inside* the individual agent and using the dualistic (mathematical-physicalist , i.e. of "scientific method") approach. However, from the author's standpoint, the internal physiology naturally ought to be related to the psychosomatic wholeness (of the mind and body) inside the individual agent and dealing with her/his individual self.

2) External physiology

The external physiology studies the functionalistic interactions between the individual agent and the environment, including the pursuit of the knowledge of is/her/his qualitative changes from potentiality to actuality. This type of (*external*) physiology is centered around the parameters of homeostasis[13] of the living thing, that essentially include the control mechanisms (systems of feedback) which maintain the interval of stable and constant conditions (which are called by modern physiology as "normal" or "healthy"). At the same time, in the external physiology, there is naturally a vast condition between the individual agent and the environment, which includes matter (comprising all levels), energy (including vibratory streaming and fluctuation levels) and entropy. In this boundless condition, the homeostasis of a living organism is maintained. The functionalistic systematic physiology equally

[13] In respect to the theory of homeostasis, the names of the French physiologist Claude Bernard (1813- 1878) who coined the term "*milieu interieur*", now known as *homeostasis*; and the American physiologist Walter Bradford Cannon, who expanded C.Bernard's concept of homeostasis – are in the foreground.

forms the contemporary scientific activity and ought to be realized in terms of the adequate scholarly means.

Though modern scientists do not distinguish the external physiology and its functionalistic interactions between the individual agent and the environment, we are to recognize the existence of external physiology and its essential cognitive potential. For instance, a relevant issue herein for the study is the hormone noxious chemicals that are the result of environmental pollutions.

As the example of scientific ideas which connotes to the external physiology, the environmental scientist Neil Cherry gives the following (systematic) characteristics of "the body":

> "The body has a highly regulated and strongly integrated system that has developed to produce healthy living in the face of diurnal and seasonal climatic variations. Melatonin plays a central role. Environmental factors that alter the melatonin/serotonin balance have the ability to influence all of the functions and organs that the circadian melatonin/serotonin cycle uses for thermal homeostasis. This includes blood pressure, breathing, altering the immune system, cardiac, neurological and reproductive processes." (2001: p.6)

This statement of N.Cherry demonstrates the functionalistic interactions between the environments and the individual agent and points out that the interrelations of the individual with the environment are essentially boundless. Likewise, we clearly see the existence of the two types of physiology: *internal* (that naturally study the internal tangible constituents of individual organisms); and *external* physiology which is interconnected with internal physiology for the maintenance of homeostasis. Essentially, we do need to develop both types of physiology (integrating both the reductionist and Organicist foundations) and putting forward the functionalistic systematic physiology aiming at the contribution to scientific pursuits that comprise also the environmental and bioethical problems[14].

The self-concept and system theory are cross-sectional approaches held both in science and philosophy. They are substantially the useful backbones for the creation of conceptual frameworks aimed at the integration of scientific domains. The Self-concept is the backbone for the epidemiological exploration of phenomena and processes that have the general direction from the universe to the individual agent (and essentially apply the biocosmological perspective). In turn, the system theory is not only the effective methodology, but precisely the backbone for the compilation of scientific domains.

Self-organization is the common notion and scholarly goal in tackling the issues of evolution in the system theory. Origins of the modern system theory include Aristotle's (Organicist) science and philosophy. Russian physiologist Pyotr Anokhin

[14] For example, there are the development of medical care for recovery from illness that derives from the environmental pollutions, the creation of assessment for social choice of public policy and the development of the technology for decontamination of polluted environment.

(1898–1974) is the author of the General theory of functional systems; he stated the first basic principles of his Functionalist approach in 1935. P.Anokhin's theory is precisely aimed at the integration of physiological (biological), psychological and social knowledge. The main (cornerstone) notion of his conceptual framework is the "result if activity" (of goal-driven essence, i.e. which directly refers to the Aristotelian telic causes: *c.finalis, c.efficiens, c.formalis-entelecheia*) [Anokhin 1961, 1963, 1974]. Anokhin made important contributions to cybernetics and psychophysiology.

Norbert Wiener (1894–1964) – an American mathematician and philosopher – is considered the originator of cybernetics He was influenced by Bertrand A.W. Russell and Alfred North Whitehead. N.Wiener is known for his formalization of the notion of *feedback* and it further implication for the information theory, systems control, engineering, computer science, biology, neuroscience, sociology, philosophy.

The works of an Austrian-born Ludwig von Bertalanffy (1901–1972) occupy a special place. Familiar with the works of Aristotle, Kant, Leibniz and Pitirim Sorokin, Bertalanffy founded the general system theory that includes an essential notion of self-organization. He proposed that the classical laws of thermodynamics refer to closed systems, but not necessarily to "open system", i.e. not to living things. Likewise, Bertalanffy developed the principle of *equifinality* (after Hans Driesch) - that in open systems a given "end state" (i.e. goal) can be reached through many different paths.

Notably, in the aspect of system theories, as it is concluded by Ken Baake, "Russian philosopher, economist and political revolutionary Alexander Bogdanov in the early 1910s postulated the idea of organized systems in biology, capturing very much the sense that meaningful complexity is when agents adapt to information…. Arguably, then, Bogdanov could be seen as the founder of postmodern complexity science" (Baake 2003, p.190). However, even in Ludwig von Bertalanffy's General System Theory, published in 1968, which includes a section on the history of systems theory, there is no reference to Bogdanov whatsoever. From the ordinary point of view, it is difficult to understand how Bertalanffy could not notice and miss this event. The point is that Bogdanov's three volume Tectology was firstly published in Russia between 1912 and 1917, but afterwards translated into German in the 1928. Nevertheless, Ludwig von Bertalanffy did not even mention Bogdanov in his works, which Fritjof Capra (1997) finds "surprising". "Above all, Bogdanov develops a fairly comprehensive conceptual apparatus for dealing with the very problems later explored by the disciples of GST and cybernetics" (Mattessich 1978, p.285). This "paradox" can be explained in the following way: Scholars (Bogdanov and Bertalanffy) used the different cosmological (although subconsciously) approaches; therefore Bertalanffy was unable to grasp the whole essence of Bogdanov's system theory conceptual proposal.

In general, there is an essential difference between the Functionalist approach to system theory (Sechenov 2011, Ukhtomsky 2014, Anokhin 1961-1973, Simonov 1982, Sudakov 1984, etc.) and the classical modern comprehension of systems by the proponents of the general theory of systems. V.G. Red'ko (et al) emphasises that

"functional systems are self-organizing non-linear systems composed of synchronized distributed elements"; and defines eight "main stages of the functional system operation" (2004, p. 1788). K.V. Sudakov defined that "Functional systems are dynamic, self-organizing and autoregulatory central-peripheral organizations the activity of which is aimed at achieving adaptive results useful for the system and the organism as a whole". In this, Sudakov (who is the disciple of Anokhin) stressed the cornerstone point – that Anokhin's notion of a functional system differs radically from the notion of a classical system, stating that «Precisely the being of a system-formative factor – result of activity – radically distinguishes functional systems from the system organizations of the classical type formulated by L. Bertalanffy» (Sudakov 1997, p. 48). It is worthy to underline, once again, that this is the direct analogy with Aristotle's basic aetiological notions of *causa finalis*, *c.efficiens* and *c.formalis-entelecheia* (Aristotle's *entelecheia* – in Greek, from *en* (in), *telos* (end, or purpose) and *echein* (to have) – denotes "having one's end within" and signifies the actualization of the individual agent's essential (inherent) potential that is capable (of) and determining its own spontaneous (but in the due time and milieu) full self-actualization.

However, still, precisely the General System Theory of L.Bertalanffy is recognized as) the classical system theory (for studying the open systems). At the same time, we welcome at present the active development of Integralist (holistic) systemic approaches. Humberto Maturana and Francisco Varela (1972) proposed the concept of Autopoiesis, referring to a living system natural capability of reproducing and maintaining itself. Chilean scholars started from the self-maintaining chemistry of living cells. Further on, the concept of Autopoiesis has been applied to the fields of systems theory and sociology. Therein, it became the conceptual variation of the thermodynamic concept of self-organization. In turn, Hungarian-American Albert-László Barabási, author of the network theory (2002), aimed at the explanation of the widespread emergence in natural, technological and social systems.

Another important point is the appearance of works by Ilya Prigogine (1917–2003) and the discovery of dissipative structures, complex systems, and irreversibility. Significantly, I.Prigogine pointed to the direction of transcendence (overcoming) the current limitations in physics development – focusing on the fundamental role of indeterminism in nonlinear systems on both the classical and quantum levels (thus applying the integration of both thermodynamics and quantum mechanics). Prigogine is a true Integralist scholar. In his work, he successfully integrated the means of opposing systems of knowledge, for instance, Plato's and Aristotle's approaches. He wrote:

> We see the progressive organization of a biological space in which every event proceeds at a moment and in a region that make it possible for the process to be coordinated as a whole. This space is **functional, not geometrical**. We are quite close to the **Aristotelian view of the cosmos**, the description of which was clearly influenced by biological observations.

> Although the application of Aristotle's biological views to physics has had disastrous consequences, the modern theory of bifurcations and instabilities allows us to see that the two concepts: the geometrical world and the organized, functional world are not incompatible. This advance will, I think, have a lasting influence. (1980, pp. xiv-xv)

Among other modern time breakthroughs, Fritz-Albert Popp's discovery of *biophoton* and *biophoton field*, and, together with Jinzhu Zhang (2000), disclosure of the mechanism of interaction between electromagnetic fields and the animate beings, are worthy of attention. The interference and coherence by biophoton with biofield can contribute not only to the verification of the scientific mechanism of the functionalistic systematic physiology, but also to the scientific evidence for the integration between the *actual entity* (in the term of A.N. Whitehead) and the *functionalistic system* (in Aristotle's aetiological approach).

Harold E. Puthoff (1989) who is the CEO at a privately funded research organization that is dedicated to the exploration of new frontiers in the physics of spaceflight energy and propulsion. Puthoff and his organization center their activities around investigations of Zero Point Energy Field (ZPF). Notably, they showed the cosmological self-generating feedback loop by an interaction between the particle and the matter in the universe. While the motion of particles is derived from the fluctuations of the waves of ZPF; in turn, ZPF also is generated from the motion of all particles in the universe. There is the possibility that the individual agent and all material objects interact to each other through the fluctuations of waves in ZPF. The stabilized state depends on the interaction of wave fluctuations between the particles through Zero Point Field.

In turn, F. Grass, H. Klima, S. Kasper (2003, pp.171-172) observed the brain as the holographic computer for the cells, which realizes the communication with biophotons for the brain and the spinal cord. Karl H. Pribram (1980) indicated that the brain (at the stage of processing) performs its analyses in the frequency domain. Pribram described that there are many gravitational and electromagnetic forces composed of the interactions among the material objects and particles, so that the perceptions and other mental phenomena are composed of the interactions between the brain (senses and body) and the objects surrounding the brain.

Hyun-Hee Jung, Won-Myung Woo, et al. (2003) provided that the acupuncture treatment reduced dramatically the left-right asymmetry of biophoton emission rates. Furthermore, Katherine Creath and Gary E. Schwartz (2005) verified bio-communication between the plants and the healer, as well as bio-communication between the cells and other objects with interference by biophoton. Thus, it was demonstrated, biophotons from the hands of healers (like Reiki) can affect the metabolism of leafs as a biological organism.

Roger D.Nelson and his colleagues (2002), due to their experiments with microelectronic random event generators (REGs), demonstrated that consciousness of human-beings can interact with true random event by the use of REGs. On this basis, they managed the Global Consciousness Project. In this, the scholars investigated

subtle effect of collective unconsciousness by monitoring the synchronicity as non-localized coherence of unconsciousness through the field. This could mean the beginning of scientific pursuits in regard of the information field.

In outlining the premises of the developed functionalistic systematic physiology, the concept of Akashic field – scientific construct of Ervin Laszlo (2004) – cannot be passed over. Akashic field is not the mechanical universe, in principle. Ervin Lazlo stated, essentially:

> The zero-point field of the quantum vacuum is not only a superdense energy field; it is also a super-rich information field – the holographic memory of the universe. (2004: p.56)

Conclusion

In this part 1 author strives to express some basic outlines and background of the original Nous-Self concept that is proposed and under construction. Basically, the notion Nous-Self essentially refers to the whole entities (living organisms, the individuals), and, at the same time, Nous is the intelligence of the Organic universe (i.e. noetic Organic Cosmos). Nous-Self is substantially the functioning system and the life developmental process (ontogenesis) driven by the (ontogenetic) entelecheia. The Aristotelian system of knowledge is the essential basis, but together with the premises of Plato's philosophy, which (both means) lead to the Nous-Self concept and construction of the functionalistic systematic physiology (that refers to a biological organism as the whole entity). The same we have in Aristotle's physiology wherein soul (nous) and tangible structures (body) are not separated from each other, but form the one *hylomorhist* whole.

In the work, two constituents – of *internal* physiology and *external* physiology – are proposed for functionalistic systematic physiology. In general, for the contemporary integration of scientific domains (which is the author' main aim) – the idea to integrate (for scientific pursuits) both the transcendent metaphysical means and the functionalistic systematic approach is put into the base. Another key point (for the construction of the Nous-Self concept) is the scientific manifestation of the individualization process which is substantiated as the whole developmental (ontogenetic) entity. In the part 2 and part 3 of the planned development of Nous-self-concept, the author is going to substantiate Nous-Self Process (part 2) and Nous-Self system (part 3) proposed as the conceptual frameworks for the integration of scientific domains.

Acknowledgements

The author expresses her sincere gratitude to Dr. Konstantin Khroutski for his assistance in preparing the material, especially in relation to the Biocosmological issues and the aspects of Russian physiological science. In general, a significant moment is that our cooperation successively develops during the last five years.

References

Anokhin, P.K. (1961), "A new conception of the physiological architecture of conditioned reflex." *Brain Mechanisms and Learning*, Oxford, Blackwell, (pp. 189–229).

Anokhin, P.K. (1963), "Systemogenesis as a General Regulator of Brain Development, Progress in Brain Research," Vol. 9, *The Developing Brain*, Amsterdam, Elsevier (pp.54–86);

Anokhin, P.K. (1974), *Biology and Neurophysiology of the Conditioned Reflex and Its Role in Adaptive Behavior*. Oxford: Pergamon.

Aristotle. (1907). *De Anima*. Trans. R.D.Hicks. Cambridge University Press. URL: https://archive.org/stream/aristotledeanima005947mbp#page/n151/mode/2up

Aristotle. (1933). *Metaphysics*. Trans. Hugh Tredennick. Cambridge, Harvard University Press.

Aristotle. (1949). *Movement of Animals*, Trans. J.A. Smith and W.D. Ross. Clarendon Press.

Baake, K. (2003). *Metaphor and Knowledge: The Challenges of Writing Science*. Albany: State University of New York Press.

Brazier Mary A.B. (2014) *Ukhtomsky, Alexei Alexeivich*. In: Complete Dictionary of Scientific Biography. URL: http://www.encyclopedia.com/doc/1G2-2830904408.html (Last retrieved: December 26, 2014).

Barabási, Albert-László (2002). *Linked: The New Science of Networks*, Perseus Books Group.

Bertalanffy, Von L. (1969). *General System theory: Foundations, Development, Applications*, Penguin University Books.

Bohm, David Joseph. (1980). *Wholeness and the Implicate Order*, Routledge: London.

Brandenberger, R et al. (1992). "Entropy of a Classical Stochastic Field and Cosmological Perturbations", *Physical Review Letters*, Vol.69.No.25, (December 1992), pp. 3606–3609.

Capra, F. (1997). *The Web of Life: A New Scientific Understanding of Living Systems*. Anchor.

Cherry, Neil. (2002). "Schumann Resonances, a plausible biophysical mechanism for the human health effects of Solar/Geomagnetic Activity", *Natural Hazard*, Vol.26, No.3 (July: 2002), pp.279–331.

Cohen, Sophie, Popp, Fritz-Albert. and Yan,Yu. (2003). " Nonlocal effects of biophoton emission from the human body," international institute of biophysics.

Colborn, Theo et al. (1997). *Our Stolen Future: How We Are Threatening Our Fertility, Intelligence and Survival*, Plume.

Creath, Katherine and Schwarts, Gary E. (2005). "What Biophoton Image of Plants Can Tell Us about Biofields and Healing", *Journal of Scientific Exploration*, Vol. 19, No. 4, pp. 531–550.

Curd, Patricia. (2011)." Anaxagoras", Stanford Encyclopedia of Philosophy, (Aug 30,

2011). URL:http://plato.stanford.edu/entries/anaxagoras/
Eberl, G. (2010). "A new vision of immunity: homeostasis of the superorganism", *Mucosal Immunology*, Vol.3, No.5, (May 2010), pp.450–460.
Grass, F et al. (2004). "Biophotons, microtubules and CNS, is our brain a "Holographic computer?", *Medical Hypotheses* Vol.62,No.2, pp.169–172.
Humberto, Maturana R. and Varela, F J.(1980). *Autopoiesis and Cognition: the Realization of the Living*, D. Reidel Publishing Company.
Jung, C.G. (1968). *Psychology and Alchemy, Collected Works of C.G. Jung, Volume 12*, Princeton, N.J.: Princeton University Press.
Jung, C.G. (1996). *The psychology of Kundalini Yoga : notes of the seminar given in 1932*, Princeton University Press.
Jung, Hyun Hee et al. (2003). Left-right asymmetry of biophopton emission from hemiparesis patients, *Indian Journal of Experimental Biology*, Vol. 41, (May 2003), pp. 452–456.
Khroutski, Konstantin S. (2011). "From the three-dimensional reality in the integral sociology of Pitirim A. Sorokin – to the construction of the triune universalizing (Bio)cosmological approach," *Biocosmology – neo-Aristotelism*, Vol. 1, No. 4 (Autumn 2011), pp. 369–395.
Khroutski, Konstantin S. (2013). "Forming an evolutionary vector to the aristotelian pole of scientific Organicism (Biocosmology)", *Biocosmology – neo-Aristotelism*, Vol. 1, No. 4 (Autumn 2011), pp. 369–395.
Khroutski, Konstantin S. (2014). "Rehabilitating Pitrim Sorokin's grand triadologic concpt: A Biocosmological approach", *Biocosmology – neo-Aristotelism*, Vol. 3, No. 1 (Winter 2013): pp. 28–51.
Laszlo, Ervin. (2004). *Science and the Akashic Field: An Integral Theory of Everything*, Inner Traditions International.
Look, Brandon C. (2007). "Aristotle's De Anima", *History of Philosophy I*, University of Kentucky. URL: http://www.uky.edu/~look/Phi%20260%20Aristotle's%20De%20Anima.pdf
Mattessich, R. (1978). *Instrumental Reasoning and Systems Methodology – An Epistemology of the Applied and Social Sciences*. Dordrecht-Boston.
Nelson, Roger D. *et al.* (2002). "Correlations of continuous random data with major world events", *Foundations of Physics Letters*, Volume 15, Issue 6, pp. 537-550, (December: 2002).
Owens, Joseph. (1988). "The Self in Aristotle", *The Review of Metaphysics*, Vol. 41, No. 4 (Jun 1988), pp. 707–722.
Plato (2014). *Phaedo*, Trans. Jowett Benjamin, University of Adelaide.
Pribram, Karl H. (2006). "What makes man human: thirty-ninth James Arthur lecture on the evolution of the human brain", 1970", *Journal of Biomedical Discovery and Collaboration*, Vol.1, No.13.
Prigogine, Iiya. (1984). *From being to becoming ~ Time and Complexitiy in Physical Science*, W H Freeman & Co.
Popp, Fritz-Albert. and Zhang, Jinzhu. (2000). "Mechanism of interaction between electromagnetic fields and living organisms", *Science in china*, Vol.43, No.5,

pp.508–518.
Puthoff, Harold E. (1989). "Source of vacuum electromagnetic zero-point energy", *Physical Review*, Vol.40, No.9, (November 1989), pp. 4857–4862.
Red'ko V.G., Prokhorov D.V., Burtsev M.B. *Theory of Functional Systems, Adaptive Critics and Neural Networks*, in Proceedings of International Joint Conference on Neural Networks, Budapest, 2004, pp.1787–1792. URL: http://www.keldysh.ru/pages/mrbur-web/publ/IJCNN04.pdf (last retrieved on December 26, 2014)
Simonov, P. V. Need-informational theory of emotions. *Voprosy Psychologii*, Vol 6, 1982, 44–56.
Sorokin, Pitirim A. (1957). *Social& Cultural Dynamics A study of Change in Major Systems of Art, Truth, Ethics, Law and Social Relationship*, Porter Sargent Publisher, Boston.
Sudakov KV. (1984). "Decision-making stage in the systemic organization of the purposeful behavioral act," *Neurosci Behav Physiol*. 1984 May-Jun;14(3):194–200.
Sudakov, K.V. 1997. *Reflex and the Functional system*. Novgorod, Novgorod University Press.
Sudakov, K.V. 1995. "The Theory of Functional Systems as a Basis of Scientific Ways to Cope with Emotional Stress" URL: http://www.rsias.ru/eng/scientificdivision
Talcott, Parsons. (1950)." The Prospects of sociological theory", *American Sociological Review*, Vol.15, No.1, pp. 3–16.
Uejima, Kayo. (2008)." The creation of a harmonized society by the holistic approach: Lab Link suggests free think tank for the integration of all science and thought as challenges of modern philosophy", *Eubios Journal of Asian and International Bioethics*, Vol.18, No.5, (September 2008), pp.130–137.
Uejima, Kayo. (2010)."Proposal of the Nous Self Concept as a worldview for the symbiotic integration of modern science", *Eubios Journal of Asian and International Bioethics*, Vol.20, No.3, (May 2010), pp.82–95.
Whitehead, North Alfred. (1920). *The concept of Nature*, Cambridge University Press.
Whitehead, North Alfred. (1925). *Science and The modern world*, A Pelican Mentor Book, Published by The New American Library.
Wiener, Norbert. (1948). *Cybernetics: Or Control and Communication in the Animal and the Machine*, The Technology Press/Wiley.
Yoo, Kwon Jong. (2013). "The Geography of Asian Mind and Comparative Studies on Mind", Presentation in conference of The 4 the ICCSM (November 1-2, 2013).