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Astronomy and Civilization in the New Enlightenment

Passions of the Skies

Edited by

Anna-Teresa Tymieniecka

Attila Grandpierre

Springer

ASTRONOMY AND CIVILIZATION IN THE NEW ENLIGHTENMENT

PASSIONS OF THE SKIES

Edited by

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ACKNOWLEDGEMENTS

We are pleased to welcome in our book series the collection of papers read at the World Congress of Astronomy and Civilization, held at Lorand Eotvos University, Budapest, Hungary on August 10–13, 2009 under the direction of Attila Grandpierre of Konkoly Observatory. After numerous interdisciplinary investigations in phenomenology of life punctuating great perspectives of Passions of the Earth concerning human being and his world, societal interlinking, and higher strivings, we have reached in this collection the counterpart of human's earth-generation, that is the cosmos.

The vast panorama of perspectives and insights gathered from natural sciences, with Astronomy in their center offers a rich harvest of considerations for our philosophical panorama upon issues crucial for our today's culture about the place and future of the humans.

I offer my warmest thanks to our colleague Attila Grandpierre for entrusting us these studies for publication and joining me in the task of editorship. Our authors merit our greatest appreciation.

I thank as usually, Jeffrey Hurlburt and Robert J. Wise, Jr. for their faithful cooperation in editing this volume.

THE PASSIONS OF THE SKIES

THE GEO-COSMIC POSITIONING OF THE HUMAN CONDITION

In the long procession of research conducted by the scholars of the World Phenomenology Institute, now published in the more than 100 volumes of the Analecta Husserliana book series,[1] we have treated extensively "the Passions of the Earth."[2] With this collection of essays, we launch out into a most significant encounter with the Cosmos. An attentive perusal of the themes of the Analecta Husserliana collections and of their intuitive concatenations will trace from the source the varied paths of transformation of the Logos of Life in its vital, intellective, and creative meanderings and reveal the horizons against which our own explorations have advanced and are advancing as our own philosophical dianoesis unfolds and human knowledge expands. And so, with this collection, we now turn from the "Passions of the Earth" to the Human "Passions of the Cosmos."

In this collection of essays we will, therefore, elucidate the range of the mysteries astronomy has penetrated in the last centuries with the progress of science, ponder what it is that animates human fascination with the skies and the cosmos, and develop, what is an urgent pressing need today, our new understanding of Geo-Cosmic transcendental positioning of the Human Condition within the universe, with a particular focus on issues that throw light on the future of life and of humankind.

Informing and invigorating all the branches and fresh twigs of thought in our collection are intuition and actual insight into what we as living human beings draw from the heavens for our existence. This fascination and pragmatic observation has over the millennia matured into the scientific field of astronomy. The theme of Contemporary Astronomy and Civilization unites crucial current human preoccupations and should be a theme of our philosophy. Since the Seventeenth Century, astronomy and in particular cosmology has come to assume a pivotal position in scientific inquiry; in philosophy/phenomenology it is time to duly appreciate astronomy's contributions to a complete vision of life, the world, and matters of the spirit. Achieving a comprehensive view of the human being within his existential milieu is today a neglected aim of philosophy. It is essential long since and past time for both astronomy and philosophy to seek their mutual completion, with philosophy taking the lead in the work of interpretive synthesis.

ASTRONOMY AND PHENOMENOLOGY IN THE NEW ENLIGHTENMENT

Questions: "Who and what are we human beings? How may we know and what can we know or not know? How are we intertwined with and intergenerated within our existential milieu? How did humans evolve and for what are they headed?" Such

questions have never before in history been so pertinently asked as they are now at our phase of civilization. Life's vital force imposes them on us, breaking through the familiar constraints of technique and philosophy. These issues come forcefully together in new insights of metaphysics and creatively stir the scientific inquiries that have dramatically developed in the last century, initiating a New Enlightenment in our civilization. We see these concerns informing astronomical probing today.

The dramatic transformations we have seen in scientific theory and practice dramatically cohere with and inform the primogenital insights of our own *ontopoietic* phenomenology. As will be more thoroughly expounded in our own contribution to this volume, phenomenology is now framing its culminating critique of reason by turning away from the priority that Kant and Husserl gave to consciousness and bringing to the fore the logos at work in life's genesis as evident in the cosmic interlinkage between the living being/man and life's earthly foundations and the whole cosmos' constitutive laws and rules and constructive unfoldings. Thus, with the stupendous development of the sciences, astronomy has come to have a cogency for us that is at once vital, psychological, social, intellectual, and creative.

Understood for millennia in all civilizations as knowledge of the skies above, and sensed as well to be most intimately fused with the cycles and events of the natural world and with human destiny, astronomy has acquired a more precisely defined role in our period of world civilization. While it has lost some of the attraction of "enchantment" that it had in the past, it is a less isolated science as scientific corroboration informs it from all sides so that its pertinence to the questions posed above is ever more strikingly highlighted, questions that have prime life significance in our culture today. The scientifico-philosophic alliance not only formulates these questions more sharply, showing their crucial significance for understanding human nature and existence but it also throws new rays upon our overall vision of the world and life. We have entered into the time of a New Enlightenment shaped by and developing a new awareness of existence. And we may now consider astronomy to have an ultimate scientific significance, to be a crucial link in the unifying skeleton of and framework for the scattered pursuits of scientific inquiry.

With the New Enlightenment, new light is breaking through the crevices of broken scientific frameworks (conceptual systems, methodologies, approaches, and mechanistic stringency) so that the numerous new scientific approaches to the natural world, human beings, and culture can find in astronomy foundations for a new vision of things, for a new framework for research, for fresh answers to the perennial puzzles of human existence.

THE GEO-COSMIC ARCHITECTONIC

We will enter now into a brief presentation of the inner bond between astronomy and philosophy by introducing the phenomenologico-ontopoietic basis for the panorama of a full scientific and metaphysical inquiry.

We will first of all alert the reader that we will in what follows draw throughout upon our own development of the phenomenology of life and the Human Condition,

a condition envisaged *within the unity-of-everything-there-is-alive*.[3] We have in this project been delving into generative beingness and gaining perspectives extending from the genesis of life's individualizing unfolding, through the imaginative-creative swing of the human mind, to our spiritual heights, social as well as sacral; now we extend our horizons further.

Secondly, and most significantly for our present purpose – the philosophical presentation of our present collection—we stress that phenomenology of life and of the Human Condition constitutes a radical revision of the "transcendental" origins of phenomenology by reassessing the critical conditions for the possibility of knowledge (see my own contribution to this collection, infra, pp. 3). Both Kant and Husserl relegate the transcendental to human consciousness. In contrast, phenomenology of life through its thematic meanderings has arrived at *a geo-cosmic architectonic*. It departs from Kant's formal a priori by which the transcendental origins of cognition consist of the categories of human subjectivity that organize inchoate reality into something knowable. It also departs from Husserl's material a priori whereby transcendental subjectivity functions as the foundation for achievements of sense. Instead, in our vision the transcendental itself consists of a *positioning* of human beingness itself whereby meanings (knowledge) are constituted through the progressive development of life in its various stages of organization (transcendental conditions for knowledge) culminating in the creative achievements of human life. As there is a unity-of-everything-there-is-alive, the transcendental reference of cognition consists in the principles of that unity.

Life, however, also includes the organizational level of *physis,* such that the principles manifest in the *geo-cosmic architectonic are constituents of the transcendental function.* This means that geo-cosmic principles are not simply objects of knowledge—and so they are treated throughout the natural sciences, especially in theoretical physics, astronomy, and the earth sciences—but that they function *within the transcendental agency of life.* As the phenomenology of life must proceed by undertaking a genetic archaeology in the human being, our methodology consists in retrogressing through the levels of organization of the human soul in order to recognize those geo-cosmic principles operative within it. This is how their transcendental function and its geo-cosmic positioning are to be apprehended and explored. Since it is at the human station of life that the logos of life manifests itself in self-awareness of the logos, apprehending the transcendental requires that this architectonic be traced through the processes and structures inherent to the individuated human being. Thus our queries go beyond the province of the mind and unfold against the horizons of life and of the cosmos (Tymieniecka, infra, p. 3).

Therefore in our present investigation we face two strategic aspects of the metaphysics of beingness that encounter each other diametrically: the originary genesis of beingness (the ontopoietic route taken by the Logos of Life in its work), on one side, and life's geocentric-cosmic orientation, on the other side. Here we find an orientation that projects the design of an individualizing being not confined to any static ontological framework but sustained within the stream of the ontopoietic unfolding of the Logos of Life, and there at a distance from the constitutive absolute

prerogative of consciousness (as a transcendental reference of constitution), we see life situated within the *existential architectonics* of its geo-cosmic networks.

Thus is launched an inquiry in which the metaphysics of life encounters at essential junctures the parallel concerns and puzzlements of the scientific approach to the mysteries of the spheres of space, which – more than backdrop – are the ground of the story of life.

These great questions that humanity is insistingly asking in our day call for answers that will ring true against multiple horizons. Not a unitary philosophical summary of the data but rather in-depth probing of concrete and varied issues, the enrichment of concepts in danger of being emptied of meaning, directions for the organization of insights, above all, principles of a higher, universal order, these are the projects of the New Enlightenment. Our overarching worldview is in need of a renewed foundation, one at once cogent and concrete, an order in which all the dimensions of reflection find a voice.

ASTRONOMY'S PIVOTAL ROLE

Seeing through the prisms of the specific scientific approaches and within the perspectives of the questions that the New Enlightenment raises, we aim to introduce an order into the chaotic state of science's proliferating directions, one that reflects their interlinkage and coalescence not only in cooperative inquiry but also the collateral constitution of nature, the world, the universe, and man per se that the yields the possibility of that linkage and cooperation.

The very chaotic state of scientific inquiry, that is, its rapid diversification is giving to astronomy a pivotal role among the sciences. A focus on the crucial issues of existence impels us to discover the links between the sciences that will allow for their generative cohesion, and astronomy – given the sweep of her ramified universal realm with its horizons – promises us that order in the universe and coherence in thought is, indeed, to be found. The astronomical panorama simultaneously implies an order among the sciences and in the universe, one that extends from science to philosophy.

THE ORDER OF THE UNIVERSE AND THE UNITY OF THE SCIENCES

The primordial theme in our panorama of papers is the taking up of the issue of the universal order of the cosmos – which immediately informs the project of the universal foundation of the sciences. We find, to begin with (see Grandpierre, infra, p. 19), a complex and differentiated vision of the universe that integrates nature and most philosophy, one in which reality is differentiated into three levels: phenomena, laws, and first principles, which correspond to the different branches of the natural sciences – the physical, the biological, and the psychological. First principles play the decisive directive role in treating the becoming of the universe. Moreover,

and most significantly, the first biological principle simultaneously entails life as it serves as the ontological basis of the universe. It also governs the origins of life, and the psychological principle accounts for unfolding intersubjective and social performance. The three principles of nature accord with ontology, metaphysics, and religion. This unity of the constitutive levels entails a comprehensive view of the universe, men, and life (Grandpierre, infra, p. 19). In this new view of the universe, the natural sciences integrate philosophy, forming together a comprehensive outline.

The quest for the unity of scientific and philosophical reflection intensifies as the contemporary sciences seek out ever more minute elements of reality but cannot fathom "the deep underlying nature of the cosmos of reality" (Kafatos, infra, p. 69).

Our authors offer profound scientifico-philosophical reflections on the order of the universe as well on the unity of sciences.

Within the outlines of the universal order we probe the most enriching and fascinating network of ties between the cosmos and human beings and their world. Hence, within a general philosophic-theoretical perspective (Koechler, infra, p. 43),we enter into richly varied perspectives that introduce us to the breadth, depth, and intimacy of innermost personal experiences and the universal acknowledged, concrete influences of astral space on life, the human being, the world, nature, imagination, and spiritual elevation. This fabric would necessarily cover the entire spread of the existence of human beings on earth in the evolution of human groups from the elemental stirrings of culture through the history of humankind. And so we find all human, innermost concerns reflected in interpretative experience of the heavens, in imaginative reactions to the celestial experiences of humankind. To understand and grasp the human being, the universalizing tendency of philosophy seeks such concrete enrichment for the completion of our individual vision of life.

With roots deep in the earth, we extend our vision to the encircling skies. This fluctuating vision of stars, planets, galaxies impresses on us the basic transformations of nature and of our own natural life. This is essential to our natural existence, to our evolving of life. Naturally, humans have felt emotionally connected in their depths to the motions of the heavens, and in their pondering and imagination have believed there to be a communication between those motions and their moods, emotions, tendencies, even searching out in them the course of events and destinies. Over the centuries the interplay between our vital, concrete groundwork in the earth and the assumed, felt, but enigmatic ties with heavens has belonged to the natural human experience of life. With the progressive growth of human knowledge, the wondrous lore of the heavens as an enigmatic cognate of our existence has developed into sober scientific exploration and intellectual theorizing matching the rest of scientific probing into nature.

Whether in European, Asian, African, Mediterranean, or other cultures, human beings have found the fullness of their existential breadth expressed in the regular, moving, infinite panorama of the star-studded skies, measuring the rhythm of their own existence on earth by their revolutions. What is more natural than to seek also influences of the heavenly bodies upon our intricate, hidden personal motivations and destinies? Or to be inspired by enigmatic signs from above? Prompted by

imagination, human beings exult in the experience of feeling ours destinies to be limned in concordant motions of the firmament.

Numerous studies in our collection emphasize the common threads running through cultural developments in the early history of humankind as well characteristics specific to each culture.

Living in our usual modes of being, we are usually unaware of how we have visceral bonds with the forces of the cosmos. Several of our authors penetrate the deepest grounds of our spheres of performance and discern how elementary terrestrial concerns such as the framing of measurements, the development of the sciences, and discoveries in the arts, etc. have been sidereally influenced (see Cook, Iwaniszeweski, Puskas, V. Raman, etc.). Others find profound links between the science of astronomy and the mysterious conditions of human life (see Davies, Seckbach, Chela-Flores, etc., infra).

And several studies venture directly to show how the high inspirations of mankind partake of celestial influence, treating inspiration for spiritual elevation, religion, theology (Stoeger, Stone, and others, infra).

If we follow the leads of the innumerable intuitions, reflections, and insights proceeding from the astronomic-philosophical conjunction to the culminating point, we will conclude that this ground for philosophy of geo-cosmic life augurs the "brightest and most fascinating shining path for mankind's future" (Minoo and Bathaee, infra, p. 283).

Anna-Teresa Tymieniecka

NOTES

[1] Analecta Husserliana, The Yearbook of Phenomenological Research, Volumes 1–107; now published by Springer Media.

[2] Analecta Husserliana, Passions of the Earth in Human Existence, Creativity, and Literature, Volume 71; Anna-Teresa Tymieniecka, Kluwer Academic Publishers, Dordrecht, 2001.

[3] Analecta Husserliana, Introduction to the Phenomenology of Life and of the Human Condition, Treatise 4, Logos and Life, Impetus and Equipoise in the Life-Strategies of Reason, Volume LXX; Anna-Teresa Tymieniecka, Kluwer Academic Publishers, Dordrecht, 2000.

SECTION I

ASTRONOMY, SCIENCE, PHILOSOPHY FLOURISHING IN THE NEW ENLIGHTENMENT

Astrobiology, Theoretical Biology, Quantum Physics, History of Science, Philosophy of Science

ANNA-TERESA TYMIENIECKA

THE NEW ENLIGHTENMENT: COSMO-TRANSCENDENTAL POSITIONING OF THE LIVING BEING IN THE UNIVERSE

ABSTRACT

Modern science has grown accustomed to viewing a hazy, imprecise, fleeting reality. The fact of chaotic deterministic systems, the mix of discontinuity and stability, of mutation and enduring type, presents both a challenge and opportunity to metaphysics. To pick up the challenge presented by the sciences as well as the vital concerns of humankind and to formulate a novel conception of nature-life along the lines of *life's ontopoiesis* is to indicate philosophy's new parameters. Although the rhythm of *impetus and equipoise* evident in life's ontopoiesis has come to light only recently, it brings us genuine enlightenment about the cosmos, bios, and the human being – a New Enlightenment that constitutes a critical break from the tentative searching of the philosophy of the past. The transcendental realm of the logos is revealed not as confined to human consciousness but is manifested foremost in the *architectonics of the earth and the cosmos*. That is to say that inchoate reality is organized not by the observing mind alone but from within itself, which organization ultimately finds expression in the mind. An archeology and/or genetics that captures the correspondences between the individual and the universe, here is the ultimate foundation that Husserl repeatedly started over again to find. The "phenomenology of phenomenology" that he sought is one that sees how human creativity chimes with the ontopoiesis operative in nature – in both the cosmos and life.

THE MODERN TRANSFORMATION OF SCIENCE AND PHILOSOPHY'S SEEKING FRESH METAPHYSICAL GROUNDING

Contemporary science has seen the shattering of the classical postulates of precision and exactitude by which objects and their mechanistic relations were to be isolated. The objective order of the universe that was once manifest is no longer there for us.

This development is owing to the introduction of the once ignored vector of time into physics. Today the natural sciences begin to resemble the social sciences. The unforeseeable, the unpredictable is now allowed. Determinism and freedom, necessity and chance are no longer sharply dichotomous.

We have moved to viewing a hazy, imprecise, fleeting reality. Even the geometry by which reality is modeled has changed. Benoit Mandelbrot's fractal geometry is more suited to capturing the turbulence, the dislocation and irregularity, found in

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nature. The traditional formalism of mathematics has been surpassed by an approach that allows human intuition to contribute to the representation of nature.

This approach was pioneered by Poincaré. In pondering the geometric properties of the functions of differential equations, he drew on Nikolai Lobachevsky's non-Euclidean "hyperbolic geometry," which denied Euclid's postulate that two parallel lines will remain parallel to infinity. Then, surprisingly, Poincaré found that through his new visualization of differential equations he could explicate the stability of the solar system, providing a resolution of the "three-body problem" in the plotting of orbits. Poincaré grasped the distribution in "phase space" of points of stability and instability that yet make up a coherent whole. He became the first person to discover a chaotic deterministic system. This has found further application in the study of all chaotic deterministic systems.

Poincaré thought this mix of stability and instability to be beyond visualization when it came to more complex systems. But with the power of computers, Mandelbrot's fractal geometry is now allowing that visualization. And mathematician René Thom built on the concept of phase space to paint a universal morphology that takes into consideration nature's relatively stable points as well as the various types of its constructive becoming in the "regular" and "irregular" ("catastrophic") occurrences that introduce discontinuity into the morphological progress and lead to some mutation within the type (see his *Stabilité structurelle et morphogénèse* [1972]).

For Poincaré, Mandelbrot, and Thom visual intuition is key to our capturing reality. We may even speak of an aesthetic expansion of the discipline of mathematics. The abstract science of mathematics "humanizes" itself.

Today the role of the subjective in scientific inquiry is, therefore, much appreciated. But the historical studies of phenomenologist Alexandre Koyré showed how much the element of the subjective was always there. Alexandre Kojève, having absorbed Koyré's work and having absorbed too Niels Bohr's interpretation of Heisenberg's finding that being observed changes the state of whatever is observed rendering the apprehension of exact causality impossible, further elucidated the most significant factor of the "subject," the living concrete individual who as an inquirer envisages everything around him/herself. The role of the subject is now universally recognized in physics and the rest of science.

Strikingly, in his *L'Idée du déterminisme dans la physique classique et dans la physique moderne* (1932; Paris: 1990), Kojève saw that we should not identify the subject with a mathematical, abstract point, uniform and unchangeable, nor with its biological corporeity, nor as a psychological agent. Here we are at the threshold of our own phenomenology of life and its ontopoiesis, which has as its focus the creative condition of the investigator, whether experimenting or observing or speculating. The Creative Human Condition provides us with the Archimedean point from which the unfolding flux around us may be probed, for there is correspondence between that unfolding and our own. Indeed, our inquiry takes us beyond correspondence to convergence. It is from the point of investigation into human creative genius that it is appropriate to enter into exploration of reality.

Given that the subject is to be seen as belonging to the same ontological realm as the world and as interacting with it, we cannot continue to consider cognition to be the main factor in scientific experience. What is key is the creative virtualities subtending the mind – the creative imagination inspiring it and the creative act bringing that imagination to its unique fruition. For in our investigation we unroll and circumscribe the creative compass of all the spheres of reality/life in which the living creative subject has to participate in order to assume the role of the observer or experimenter, or discoverer, inventor, creator. I submit that only the creative mind of the human being can fulfill all the conditions set by Kojève, first, and most significantly, by legitimating its extraordinary vantage point and second by introducing us into the hidden spheres of reality itself.

Our vision accords with that of Leibniz, for whom each living being, through a monad, reflects the entire universe. The human mind is positioned to descend into the inner workings of becoming and in the disorder there confronted recognize the wealth of rationalities projected as chance and necessity conjoin in a constructive game. The human creative act may progressively penetrate into all the spheres of existence, of life, the reality in which this station is not always openly rooted but out of which it has developed, maintaining permanent ties. Thus we may connect and harmonize the elusive, discrete, seemingly worlds apart factors of becoming.

That said, ours is a different type of monad. Key here is elucidating in virtue of what the creative act of the human being may penetrate into the innermost workings of nature, existentially partaking of the interaction that the living being maintains with them. Thus, there follows here the required fresh critique of reason that is launching a New Enlightenment. In essaying this project, I am countering the tendency of analytic philosophy to turn the real around without touching it. I here take a lead from René Thom, who stressed that in the changing reality with which scientists deal there must be assumed to be some permanent givens having "a certain generativity." Thom affirmed that "even in science ontology is necessary; metaphysics is not dead" (see his "Preface," in Jean Largeault, *Systèmes de la nature* [1985]). Thus, I will not suppress the perennial metaphysical concerns of the mind. I will introduce my own metaphysical panorama.

Awareness of the temporality of events, processes, transformations in the inorganic as well as organic spheres has provoked great puzzlement over the nature of "development," that is, of the irreversible process that carry life forward. This is now the central issue of science. For as mathematician Ivar Ekeland observes, Thom's catastrophe theory looks at the entity-in-progress only from the outside, leaving its assumed intrinsic reasons to be guessed at (see his *Le calcul, l'imprevu: les figures de temps, de Kepler à Thom* [1984], pp. 96–101).

Addressing this issue is the grand concept of ontopoietic unfolding, which constitutes the ontologico-metaphysical axis of becoming as such as well as of becoming in its lineaments. This is the fulcrum by which the phenomenology-philosophy of life gains purchase on reality.

This involves a vision of reason that breaks out of the narrow traditional framework and opens up creatively toward appreciation of the host of new rationalities

now expounded to deal with the changeable currents of existence, to generate criteria of validity, predictability, prospects, measures. We present then the scientific investigator as an immersed conscious subject, immersed in the lifeworld, within the human-condition-in-the-unity-of-everything-there-is-alive.

To pick up the challenge presented by the sciences as well as the vital concerns of humankind and to formulate a novel conception of nature-life along the lines of the above-outlined ontopoiesis of life is to indicate philosophy's new parameters. Although the rhythm of impetus and equipoise evident in life's ontopoiesis has come to light only recently, it brings us genuine enlightenment about the cosmos, bios, and the human being – a New Enlightenment that constitutes a crucial break from the tentative searching of the philosophy of the past.

The transcendental realm of the logos is not confined to human consciousness but is manifested in the architectonics of the earth and the cosmos. That is to say that inchoate reality is organized not by the mind alone but from within, which organization ultimately finds expression in the mind. The unity-of-everything-there-is-alive has unifying principles. Hence, geocosmic principles are not simply "out there" to be discovered or mapped, but inhere in the researcher as well. An archeology and/or genetics that captures the correspondences between the individual and the universe, here is the ultimate foundation that Husserl repeatedly started over again to find. He was able to extend intentionality down to the human body, to "instinct" and "drive," which he formerly had bracketed. But the "phenomenology of phenomenology" that he sought is one that sees how human creativity chimes with the ontopoiesis operative in nature – in both the cosmos and life – and is also open to the sacral horizon that is ours to scan.

THE ULTIMATE CRITIQUE OF REASON

Whether we simply appreciate the beauty of the sky above us or observe the motions of the stars in the changing firmament through a telescope, drawing precise conclusions, it is the experiencing subject who receives the fruit of the experience and who transforms its yield into the form of an "observation." It is thus upon the experiencing subject's capacities that these results depend.

In the classical approach to scientific inquiry, the observed is seen as being "neutral," to stand aloof from circumstantial conditions, to be "disinterested." This "objectivity" of observations has seemed to be the privilege of scientific inquiry. Recognition of our experience, of how it processes the form of an observed object belongs to appreciation of the conditions of human cognition.

"Neutrality," "disinterestedness" meant in practice indifference to the inquirer, to the experiencing subject. Precisely, the research protocol determined the conditions of the inquiry's procedure such that the inquirer as an experiencing subject had to be ignored. "Abstracted from" life, research results were meant to be "neutral." However, this abstraction, the elimination of the inquirer in his epistemological situation, meant that the living out of the inquiry and its subject fell into a void with respect to the universal condition of human cognition.

But this approach underwent significant transformation in the expansive unfolding of scientific research in the last century. I refer the reader to my previous presentation of the in-depth transformations that scientific inquiry underwent in the second part of the last century and which is continuing (see "The Ontopoiesis of Life as a New Philosophical Paradigm," *Phenomenological Inquiry* 22 (October 1998), pp. 12–59). Here I will directly approach the transformation in appreciation of the "scientific subject" that we owe in particular to Alexandre Koyré, Alexandre Kojève, and the physicist Niels Bohr.

To begin with, whether it be natural, naive observation of the skies, of nature around us, or sophisticated instrumental scanning of space, the observed is viewed in correlation with the physical position of and climatic conditions around the observer. There is besides his/her individual endowment or "powers of observation." And the horizon of observation shifts according to the distance we assume, advancing or receding from our objective. Whether it be by our naked senses or through instrumentally augmented capacities, that is, whether the viewer uses our natural organs directly or intermediary technical devices, it remains, first of all, the case that the horizons of the object of scrutiny change, which specifies and completes the view in which it appears. And these horizons seem to be infinite in extent. And secondly, the results of observation depend on the "powers" of the observer, not only on his/her natural endowment (keenness of sensory, experiential organs, etc.), but also on the qualities of technical devices, with how the setting up, regulating, etc. of the instrument correlates with, first of all, the actual receptive capacities of the agent. In short, both natural capacities and the most developed technical tools ultimately depend on the powers and circumstances of the living conscious observer, who, in the second instance, not only obtains the measured yield of the mechanical "intermediary" but has also to estimate and appreciate them according to his/her individual powers.

As pointed out, the horizons of experience are movable and infinitely extendable, depending on viewpoint, situation in space and time, and on the powers of the experiencing subject, his/her reception and appreciation. In brief, the observer is the conscious mind of a living individual. Further, his/her powers strictly depend on (are correlative to) the entire network of the experienced object, which correlation spreads through the entire sphere of experience – of cognition. Secondly, the great question arises, "Wherefrom comes this so intimate junction of experience with its object if not from the networks of constitutive reality?" Reality, which is constitutive as such, is to be correlatively cognized. Anticipating our later argument, let us declare here that between the powers of the experiencing mind and the accessible constitutive system there lies an entire constructive system of nature, earth, and universe within which this operative complex of beingness, life/soul, and consciousness/mind unfolds. That is to say that, ultimately, we have to answer this great puzzle by surmising that cognition, experiencing, soul and mind have a hidden key to their very existence in the architecture of the universe.

It is, in fact, owing to an essential transformation of science (together with contemporary sociocultural changes) that we are witnessing such an enrichment of our experiential, intellectual, and spiritual resources in our time, such an expansion

of the horizons of our spirit, that I descry in it all nothing less than a New Enlightenment, one that the phenomenology of life and its ontopoiesis, heralds.

Vast extensions of our experiential reach are opening our vision. But the promise of future human experience in all its spheres, whether naturally or scientifically approached, lies in the Archimedean point of the human creative subject within the entire system of our existential coordinates. As the cognizing subject stretches through the system of its linkages, coordinates, it corresponds adequately to the system of the object it is coordinated with.

The key question is that of how to find what constitutes one's most intimate correlation with the object focused upon – what is the groundwork of their "congeniality"? In other terms, what is the groundwork of subject-object correlation, which is to ask, "What is the basic existential condition of cognition?"

In brief, science with the modification of the observer's experience and the processing of the yield of observation is going back to the basic processes and networks of human cognition so that we might get to the crux of this enigmatic correlation between the subject and object, between the life of the human mind and the ultimate cosmic horizon.

COSMIC-TRANSCENDENTAL COGNITION AND CONSCIOUSNESS WITHIN THE UNIVERSAL NETWORK AND THE ALL

The great question raised by modernity was formulated by Kant, and by Husserl after him, as the question of the possibility of knowledge/cognition. Both of these thinkers attribute the power to structure the import of empiria, of experience, to a specifically human consciousness that is understood as being "transcendental" and to exercise a dominion over the world of life that it establishes. And yet if we do not limit our cognition to the realm of the manifested world of life – the structured realm of the human mind – but consider also the vaster and more inclusive region of life enveloping it, we have to ask, "To what may we ultimately refer the possibility of cognition/constitution of reality?" Then, we would further ask, "What bounds of the transcendentally projected dimensions – planes or extensions – of the gradated evidences of the cognitive horizons may we consider to be accessible to experience, what limits may we reach beyond, and in virtue of what factors?"

Here we have to put on trial the great answer given to these questions by Kant and Husserl in their focusing on the transcendental role of human consciousness. We will treat these questions anew upon the ground of our phenomenology/ontopoiesis of life.

However, what we should consider first is that ultimately – and within the perspective of our *first phenomenology of the ontopoiesis of life* – we have to unravel the "positioning" of the living being in its existential functions, in which come together all the forces, linkages of its generation and becoming in articulations with its circumambient conditions, all of which together make up the great network of life. That is to say, we have to discover the subject's positioning in life's appropriately

focusing forces, as well as its participating in their outlay, within the circumambient conditions – which extend to geo-cosmic, spiritual, and sacral horizons. To be the centralizing logos that is an individual is to express this positioning of life's functional existence along the byways of becoming.

After we have perused in fragments the ontopoietic conditioning of the universe by the logos of life in its intrinsic projection of life so as to glimpse the vision of the All, we have first to further pursue the question of the "positioning" of the self-individualizing beingness within the conundrum of the logos of life – the arteries of the All – and then to pursue the existential roles of the innermost powers, forces, and dynamic evolutionary perspectives that our individualizing resources contain in a virtual state, ready to be actualized. We will proceed on the territory of the survival-oriented as well as creative metamorphoses worked by the logos of life.

Yet, before we enter into this further exfoliation that will in turn reveal the root of the logos in its creative imaginative metamorphosis, something we have already provisorily sketched, we will raise some essential questions concerning our already outlined inquiry.

First of all, we will turn to the "positioning" of the living agent within the unity-of-everything-there-is-alive and within the orbit of life. We have to ponder our human cognitive situation, for it plays an essential role, one in which it has to ascertain itself existentially, to orient itself within the current of life with its logocentric compass. That means appreciating the laws, the generative rules, the logoic network of life, which allows us to posit that the self-individualizing beingness is its own "center" standing in the "light" as well as within the circumambient horizons retrieved from the "darkness."

To handle these questions we will return to the classic inquiry into the transcendental situation of conscious beingness so forcefully maintained by Kant and Husserl. We see that although we may consider the horizons of experience to be transcendental, those horizons are also to be seen in a special *existential* sense that contrasts with the understanding of the philosophers. We emphatically will still see the crucial role of transcendental horizons, but "transcendentality" and its operation now emerge in a different setting and with respect to further existential conditions in our full experience and vision of life, which goes beyond human intentional consciousness.

Secondly, and in relation to this first inquiry, we have to peer into the innermost resources of this individualizing beingness, which in their virtual state may grow, unfold along with the constructive evolving of the individualizing self and which may throw into relief higher experiential/evidential horizons that correspond to the innermost congenital yearnings of the sentient soul. To distinguish these experiential evidences I will use a traditional term, "transcendentalia," and will speak more particularly of *existential* transcendentalia. These carry evidential forces of the soul that correspond experientially to the expansions of the transcendental horizons of existential beingness, which they now maintain. While we clear the ground, we will aim at an outline of the generative existential positioning of our key notion of *self-individualization within the unity-of-everything-there-is-alive*, one encompassing the existential orbit of the logos.

THE POSITIONING OF THE SELF-INDIVIDUALIZING BEINGNESS WITHIN THE PURVIEW OF COGNITION VIS-À-VIS THE GENERATIVE CONSTRUCTION OF BECOMING

For Kant and Husserl, philosophy's basic question is that of the possibility of knowledge, a question that concerns the ultimate condition of the subject-object correlation upon which they see knowledge relying, which question goes further, therefore, to the origins of constitutive subjectivity in the world. In their terms, put into question is the ultimate transcendental origin that constitutes subjectivity. Ours, in contrast, is a primordial concern with the *transcendental existential horizons* that open up to subjectivity, as well as with the surging forth and range of the *existential transcendentalia*, that is, of the virtual resources accompanying evolving beingness in its growth and available in its experiential spheres.

This positioning of the living agent as the central agency of processing life follows first from its receiving (*passio*) and responding (*actio*). Going back to Husserl and his predecessor Kant, we may agree that their conception of the transcendental possibility of knowledge/cognition relies on the basic principle of the correlation between the subject performing cognition and constituting reality, thus presenting and manifesting it, and the object on which the act of cognition-constitution is focused and the content of which that act aims to grasp. In other words, there cannot be an act of cognition without an object at which it is directed, as there cannot be a subject without its having an aim, a focal point, an object it holds in view. This is the subject-object correlation, which is codeterminant. This is the case for all possible functions of cognition: from ongoing empirical experience through all the levels of the genesis of consciousness up to the highest functioning of the creative mind and of judgment.

The experiential genesis advances while offering the basis for a twofold perspective: first, constitution (construction) of the *existential* progress, and second, the objectification of a stepwise advancing constitution of content – with the logos being distilled stepwise in fragments and then synthesized, that is, advancing in a manifestation of reality, with cognition of it by the subject then occurring in a presentified objective form. The second perspective – that of *existential* constitution – makes the steps of the logoic functional constructive advance, while the first perspective takes note them as a synthesizing constructive logos evident in the completion of their sense, manifesting it as "real."

One perspectival side seemingly differentiates the other, therefore, completing it in life's functioning; simultaneously the other side is enlarged in the manifestation of its progress. The experiential side of the logoic performance – the subjective side – makes the cognitive objective side expand by manifesting reality in its objective panorama, and vice versa.

THE CROSSING

The crossing from the performing attention of the subject to the figurative coalescence of the experiential objectifying of elements into a sui generis

universalized "object" freed from subjective ties is of special significance. The question of the figurative reference of this moment is decisive. Does the figurative complex of a distinctive object as seen by Kant and Husserl depend on its ordination by the self-regulative mind and its assumed a priori categorial forms – that is, on "pure" consciousness independent of empiria and distinctly belonging to the conscious apparatus of constitution? Does this ordination hang upon the supremacy of the constitutive mind, with experiential material being directly subsumed under the intellect, even as it brings experiential cognition toward the presentation and manifestation of reality, of the common world? Does it directly subsume experiential material under the unconditioned mind or does it accompany the functional life of the genesis unfolding in the empirical material?

All these questions indicate a passage from the modality of logoic constructivism to another modality. Kant with his formalism and even Husserl in his differentiation of genetic constitutive synthesis overlook constitution's complete run.

They have indeed overlooked two essential points. To begin with, we can say on the basis of ontopoietic analysis that the work of this synthesis is not an ordination of the genetic process by a supreme intellective mind applying its categorical models and principles (the noetic-noematic laws constituting eidoi, the categories, etc.) – which means in Kant the a priori status of pure reason and for Husserl the operations of pure consciousness. Second, as seen in our previous inquiries, the genetic process of originary becoming decisive for the form of this synthesis stands in contrast to formal transcendental constitution. The modalities of the synthesis are, in fact, the consequential outcome of the logos of life's ontopoietic genesis.

THE ORIGINATIONS: CONSCIOUSNESS-LIFE

First of all, for Husserl, the "awakening" of consciousness is the move that constitutes its first achievement. For me the starting point is the outburst of the logos of life with its propensities and resources, which are manifest in life's virtual design. Already at this point, our perspectives are at a remove from each other.

In the ontopoietic perspective, life and consciousness are interchangeable. We may consider the incipient moment of self-individualizing life as consisting in the bursting forth of the "spark of life," as the entrance into play of the logos, pregnant with its resources, endowments; here is a project of spontaneous unfolding that acts as an incipient carrier providing a sentient vehicle for a logoic outline. This spontaneous unfolding of logoic potential is, as I have numerous times emphasized, the existential manifestation of the logos of life. In it there conversely runs an outward/inward oriented press of gradated, progressively sentient/affective/fusing-diffusing, constructive genesis, which unfolds step by step with the constructive concretization of the logoic sequence while unfolding the genetic line of living beingness within this seemingly two-force line of the inward constitution of the living center. This living center, the living agent – the subject of reception from the "outside" while acting from the "inside" – designs an objective circumference of existential conditions. This subject-object differentiation intensifies with the unfolding and growth of the living being in a *linea existentiae*, while the

existential steppingstones are laid down for the emerging progress of a conscious center of *actio-passio* – of experience – into a self-consciousness within which the logos brings together the conscious elements in a specific synthesis that ties a knot giving the acting agent the character of a center amid outwardly oriented involvements. Focusing on its progressively advancing objective environment, this center aims at the *sense*, the *logos of the objective content* of this experience-in-progress. This is a special device of the logos for conducting the origination and growth of the living agent from within in order to maintain the continuity of the objectified process aiming at its universalized objective manifestation. This center is the specific cognitive face of the process in which the objective content of the logos is formed.

THE TWINNED PHASES OF THE ORIGINARY CONSTRUCTION OF LIFE IN ITS LOGOS AND THE COGNITIVE LOGOS UNIVERSALIZED AS THE INTENTIONAL OBJECTIVE DOMAIN OF THE MIND

It is at the point at which the processes of experience advance along the steps of the logos, following its constructive devices from one step to the next, timing their deployment according to its constructive completion, that these processes reach the point of tying the knot in a synthesizing objectifying act of the logos. This is, indeed, a kairic achievement of the logos. In this moment we find the accomplishment of the logos' experiential route.

This achieving of the constitution of focal objective content lies at the brink between the natural endeavors of the logos' ontopoietic thread as it ties itself onward from step to step while processing experiential data, on the one side, and the kairic move of the already creative logos of the mind bringing about a *novum* in an objectified form, a universally objective logos detached from the subjective process of performance, on the other side. And yet this "novelty" in its autonomous complexity does not emerge independent and unconditioned, setting itself apart from nature as a separate autonomous self or self-reposing entity; it is, rather, a form of the living agent, with its decisive performance completing its present route of life and drawing on all its existential ties. It is through the radiating circuits of the agent's life route that this object reaches in its complexity its universalized grasp.

THE TURNING OVER OF SUPREMACY FROM MIND TO LIFE

It is actually in the first "phase" – that of the pragmatic involvement of attention carried by the sentience of the logos of life as we fixate on functional tasks at hand – that the experiential genesis carrying the functional ontopoietic course of experience proceeds; it is aimed primarily at achieving its existential ontopoietic functional constructivity. It is, however, a significantly polyvalent logos that is involved in the subsequent constitutive cognitive phase. This constitution aims at the progressively

figurative-"objectified" form of the ontopoietic existential construct thus being constituted. *This objectified content of the experiential genesis belongs essentially to the existential course of the ontopoietic undertaking*, which plays a vital functional role.

In rectifying our view on the genetic conditions of experience, we have to recognize that *although the cognitive logoic perspective is indispensible, it does not preside over the construction/constitution of reality.* Further, cognitive attention and cognitive figurative principles, models, rules are not ordained by an instancing distinct from nature, separate from empirical experience. *The cognitive/conscious constitution of objectivity is convertible with the natural functional root of existential generation.* In fact, these movements are inseparable, even if in abstraction they are distinct. That is to say, the distinctive figurative functions of consciousness – of the intellective creative mind – themselves stand under the ordination of ontopoietic empirical experience and its ontopoietic constructive logos, they being directed by a nucleus of sense embedded within its logoic network. It is there, then, that lies the field of a horizon that opens and spreads through the correlated evidences of the subject as they expand and intensify.

The ontopoietically growing subject contains, indeed, resources for further evidences growing with its unfolding. These evidences extend the horizons of experience, force, and intuition, what I have called before "existential transcendentalia," to which we will return shortly.

To synthesize:

(i) Beginning with originary generic experience, we reach through the subject-object correlated schema a process-like thread of objectifying reality that expands as new horizons are opened with each type of act.

(ii) Although the performance of the subject, in virtue of which and with the resources of which the subject is actualized, is involved in and involves further (virtually) the context of all its vital, functional engagements – its kinesthetic and wider contexts of experience, particularly those involving a rapport with other beings – nevertheless this process is oriented simultaneously toward recording and objectifying its logoic content.

(iii) The line of the logos guiding the subject binds or releases according to the proximity of the aim, of the objectified intellective presencing of that aim. It is upon the point of the "maturation" of this process that all the logoic threads of experience gather into a knot, at which point the conscious apparatus actuates a further constitutive device of the logos. This is an apparatus of the logos that – in contrast to the outlook of Husserl, for whom this instance means the entrance of pure consciousness into the game – is not an independent agency of the mind unconditioned by empiria and following a presencing/objectifying intentional system whereby pure consciousness posits universalized objective contents through which the human mind brings about the spectacle of the networks of things, beings, processes, etc. that we know as reality, as the real world with its familiar rounds and its innumerable horizons. In contrast, this logoic apparatus posits itself as being existentially solidary with the vital-empirical genetic net of the logos of life.

(iv) If we follow the ontopoietic unfolding of the experience of life – instead of shrinking its thread to cognitive achievement and leaving to the side the entire host of functions that carry it and without which that achievement would not be possible – we find, first of all, that cognitive achievement, as essential as it is for the course of the experience of life, is directed not by an autonomously devised, sui generis, constitutive schema of intentional consciousness in which the noesis-noema constitutive correlation plays the essential role, but by *the architectonic-constitutive system of existence*, that is, by *the logoic project of life.*

We have thus far discussed and brought out, in classical phenomenological terms, the subject-object correlation as being the crucial point of reference by which to distinguish the generative vital logos from the cognitive logos, realizing that the latter is a sort of abstract skeleton that does not take into consideration the concrete experiential synthesis in which the concrete experiential process is clad and seeing how this centralizing skeleton, whether vitally or cognitively significant, is an abstraction. And, indeed, while the generative run of the vitally significant-empirical process consists in a centralizing absorption of experiential material within one's own constructive and cognitive perspective, this process proceeds precisely by distilling "essential" moments and abstracting them from others. To put it in other terms, each conscious act confronting essentially distilled content withdraws from other elements that could be focused on; with this long-range attention there moves a "horizon" with hazy contours. That is to say, we agree with Husserl that each conscious act draws upon/entails material that does not come into focus in our attention. This amounts to saying that the design of the objective content that is sketched is never complete. See Edmund Husserl, *Formale und Transzendentale Logik*, par. 59 (Husserliana XVII, p. 96).

POSITIONAL HORIZONS AND EXISTENTIAL TRANSCENDENTALIA

Our conclusion from the above is that the transcendental situation of the living being consists not in cognitive apprehension but in the vital positional situation of the living agent as the center of a band of vital attention as it pursues functional concerns – with all of its functions stemming from and oriented outwards by a "center" – a center open to receiving reactions, nourishment, etc. With this basic thrust residing within, the living agent plots its surroundings – its existential round of *actio* and *passio* – as its world. Its vistas, its psychic, intellective functioning of varying degrees of complexity all occur within the circumference of what is being focused upon, which circumference extends further our functional possibilities for *actio* and *passio*, with all being enveloped by and lying within the dim sphere of the undetermined, the agent's horizon. We have then to recognize not only the horizons of our cognitive performances – which Husserl emphasized – *but also the horizons of the whole of experience of living beingness and of all its vital functions*.

At this point the question occurs of the central position assumed to be operative in the ambit of the functional and experiential realm of living beingness. Centrality, which is differentiated in the innumerable complexes of the dynamic operations of life, is an essential characteristic of the beingness of the entire logoic schema. As the process of individualization hangs existentially upon there being posited focusing beings within the logoic network, this network organizes itself in virtue of individual centralization of basic functions.

POSITIONAL HORIZONS AND THE MAIN SPHERES OF THE EVIDENTIARY FORCES PROMPTING AND SUSTAINING THEM

I have thus far emphasized the vitally significant horizons of the individualizing/generative/evolutionary phases of life. These horizons define the orbit of living beingness in the unity-of-everything-there-is-alive, differentiating into the innumerable spheres of human experience. And yet we cannot forget that they are not the "final" or "definitive" horizons of human life. On the contrary, as I have discussed in various contexts of sense, the logos of life in its intrinsic metamorphosis during the evolutionary course of the individualizing genesis of beingness unfolds numerous modalities that reach realms beyond those geared to survival and which culminate in the full-fledged unfolding of the human creative virtualities. Constantly advancing in its progress, the logos is ever strengthened and invigorated anew by existential or presentational acts from which surge new virtually present resources of force and direction. Having reached beyond the existential/evolutionary parameters of vitally significant (survival-oriented) horizons to the spheres of communal/societal life, the creative logos now throws up spiritual and, lastly, sacral horizons of experience that actually surpass the now narrow confines of the existential horizon.

It is of great significance, indeed, to emphasize that perception, experience of any type of intentional performance of consciousness or mind, is never complete, but that in either its presentation or in its functional tie, in linking with the object it is aimed at, it extends beyond. The logoic context of this object, which the subject provides in its evidence, is always enveloped within a larger context, the hazy contours of which lie beyond the sphere that comes into focus in the given evidences. Nevertheless, this sphere, which extends further and further away from the focused on nucleus of the object, as its evidences wander further, remains within the radius of the subject's "objective" constitutive system. In the ontopoietic perspective, this holds for all acts of existential functioning as well. Following Husserl, I call this context the "horizon."

THE OVERTURNING OF THE TRANSCENDENTAL SUPREMACY OF MIND OVER LIFE

At each step of the experiential genesis of the *linea existentiae* there progressively open numerous horizons of vitally significant experience that expand the

vast ontopoietic realm in the numerous perspectives of its constructive functioning. The subjects of experience carry their evidences prompted by their own functioning. Pursuing the ontopoietic current backward, we dig down into experiential/preexperiential realms of the individualizing thrust and discover the geo-generic sources of life's individualization and their intergenerative conditions. But these generative realms of the milieu of mother earth themselves lay out rules and conditions for the origination and progress of life in their intertwining, interlinking, interconditioning with cosmic laws and atmospheric and stratospheric structural coordinates. Taken together, these all constitute the enormous network of the logos of life in its dynamic strife.

In brief, life in its existential spheres (as well as in its cognitive presentational realms) passes from one to another of its functional constructive phases even as it proceeds dynamically from the coordinating instrument of the logos of life, which is assumed by each living agent in its full expansion, including the highest intellective spheres of the mind. As such, life is existentially conditioned and suspended upon the cosmo-existential, geo-generic network; operating within that web, life has an ordination upon which its architectonic outline depends. Still, the sentience of the logos of life permeates its entire concrete dominion and lifts it to a unique horizon that leaves the entire orbit of the architectonics of life behind. To summarize:

(i) Beneath the primordial ordination of life's praxis in its generation and evolution and its cognitive presentational coordination, there lies the pragmatic ordination of life's functions. However, this level of coordination at which the living subject/the living agent encounters its "objective" counterpart in the existential transaction relies on a constructive ordination that posits the agent as both a subject of *actio* and *passio* and the "object" of that ordination's attraction, attention, objectives within the web of the unity-of-everything-there-is-alive and ultimately within the network of the logos of life.
(ii) Within the constructive outlay of the logos of life at the perceptual/experiential level, there lie individualizing generative laws that the self-individualizing sequences engaged in harnessing the flux of becoming "obey" according to their modalities. These laws coordinate their dynamic moves while dealing with the available resources, which themselves are prepared according to life's organic/functional laws.
(iii) Yet this interlinkage of the elementary preeordinations of the logos hangs upon laws and rules, that is, upon an existential architectonic that indicates, determines, circumscribes their *existential positioning* – the conditioning of the subject/object dynamic circuit. In short, it is the geo-cosmic system of rules, interrelations, disposition of forces that ultimately governs the specific distributions of individual beingness.

The features of living individuals that we recognize as being essential to them are a genetic outcome of a constructive/constitutive progression extending back to the pragmatic levels of vital functioning, to the proto-architectonic rules positioning life within the geo-cosmic system.

Laws of nature, the system of life, and the geo-cosmic architectural blueprint present the network of the logos of life within which the living individual may act and receive as a center of its own but one that is itself immersed in an immense dynamic network within which it is *positioned* as it shares, coordinates, structures at the crossroads of the primordial logoic forces, rules, and laws of the existential web wherefrom it draws its prime directions whether pragmatic (functional) or presentational (cognitive).

From our brief inquiry we may state that the human mind or pure consciousness – or the living agent – is not a self-instituted independent entity. Being an integral functional processor of life, it is modeled by the logos, it having attained this level of constructivism upon the basis of the rules, the prerequisites of the logos, the furthest architectonic of life. This so powerful mind, the center of our world, is but *transcendentally positioned* within this dynamic network of life preordained by the forces, laws, and flow of the logos. There is no doubt that human mind/consciousness occupies a central position within our individual world and partakes as well of the world of all living beings, but in all that it is the integral fruit of this immeasurable network, it taking ordination and positioning from that network's logos-prompted moves. The world of life that man projects around himself is indeed transcendental but not in its fundamental origins in constitutive consciousness/mind – with its specific centrality – but rather with respect to its *positioning within the dynamic web of the geo-cosmic architectonics of life*. It is *life-transcendental.*

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ON THE FIRST PRINCIPLE OF BIOLOGY AND THE FOUNDATION OF THE UNIVERSAL SCIENCE

ABSTRACT

We propose to replace the present, 400 years-old scientific world picture with an updated, essentially complete model describing the architecture of the Universe. We show that three levels of reality, namely: phenomena, laws and first principles, together form the Universe. Moreover, on the basis of observable behaviour, phenomena, laws and principles can be classified into three fundamentally different branches of natural sciences: physical, biological and psychological. It is shown that the first principles have an ultimate role in the Universe, concentrating the governing potential of the Universe in a most elegant, comprehensive and fundamental manner. We define life and introduce the first principle of biology, i.e. the Bauer principle and show that it is the most fundamental of all the three first principles of the Universe. We consider the similarities and differences of our biological principle in comparison to the onto-poietic principle of Anna-Teresa Tymieniecka. With the help of the three first principles of natural sciences, we present arguments indicating the ultimate basis of the long awaited universal science that has a determining role for the development and perspectives of sciences, philosophy, religion, art, and the future of civilization.

INTRODUCTION. BESIDES PHYSICAL PHENOMENA AND OBJECTS, PHYSICAL LAWS AND FIRST PRINCIPLES ALSO EXIST

At the turn of the third millennium, we have a 400-year-old scientific world picture telling that the Universe is a thing to be described by physical cosmology. The universe is regarded as "the whole cosmic system of matter and energy of which the Earth is a part" (*Enc. Brit.*, 2007, Ultimate Reference Suite, entry Universe). In this physical world picture everything is claimed to be physical, at least fundamentally, and, as the argument tells, everything consists from elementary particles and physical fields of force governed by physical laws. Yet we point out that the real practice of physics in problem solving demonstrates that the two most fundamental elements of physical reality are *initial conditions* (representing particular states, i.e., instantaneous slices of the observable phenomena, corresponding to the initial state) and *physical laws* (representing, approximately, the laws of Nature). Therefore, we can deduce an important conjecture, namely, that not only physical phenomena exist, but physical laws of Nature (which are only approximated

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by the presently known physical laws), too. Physical laws are not merely abstract entities but really exist in the Universe (in more details see Grandpierre, 2011a). Our conjecture has a fundamental significance for the fact that all the fundamental physical laws can be derived from one, deeper law of physics: from the principle of least action (Feynman, 1994; Moore, 1996, 2004; Taylor, 2003, 2010). "The action principle turns out to be universally applicable in physics. All physical theories established since Newton may be formulated in terms of an action. The action formulation is also elegantly concise. The reader should understand that the entire physical world is described by one single action" (Zee, 1986, p. 109). The least action principle is all-encompassing and universal, representing in itself the essence of physics in the most compact and elegant manner. Therefore we call it a first principle, defined as follows:

Definition of 'first principle': A fundamental law can be regarded as a 'first principle' if and only if all of the fundamental laws of the given branch of natural sciences (in physics, that of classical mechanics, hydrodynamics, electromagnetism, thermodynamics, theory of gravitation, and quantum physics, including quantum field theories and string theory) can be derived from it.

The so obtained new model of the Universe tells that the real Universe is built up from (i) phenomena, (ii) laws and, ultimately, from (iii) first principles (Grandpierre, 2011a). The fundamental consequences of this new picture are illustrated here with one example. Today it is a frequent view that the origin of the idea of infinity is an unsolvable enigma, since infinity cannot arise from a finite brain. Our model offers a natural explanation: our brain consists not only from a finite number of finite atoms, but also from laws and principles of Nature. Since the laws and first principles of Nature are unconstrained regarding their domain of application, therefore our brain consists not only from finite atoms but also from infinite laws and principles. Now since the brain works by those laws and principles, it has a natural source of infinity. In this way, the origin of the idea of infinity can be explained.

Our Universe does not exhaust in physical phenomena. Instead, our Universe consists basically from phenomena, laws and principles. This result is so important that it demands a fundamental revision of the present scientific world picture, and offers new perspectives to build up an exact, quantitative theoretical biology and psychology. This means that, besides the promising new perspectives, there are some apparently embarrassing difficulties, presenting some conflicts between our present-day scientific world picture and the least action principle.

THREE DIFFICULTIES WITH THE LEAST ACTION PRINCIPLE

The first difficulty is that the least action principle is teleological, in a standard meaning of the word. Teleology is defined in the *Encyclopedia Britannica* (1998, entry: teleology) as "explanation by reference to some purpose or end". Therefore, the least action principle is teleological, because it establishes a direct connection between an end state (to be reached at the final moment of the given process) and the initial state. In physics the end state is not selected by the physical object; instead, it is given by the situation on the basis of the physical laws. It belongs to the very

nature of the least action principle that it refers to an end state. Regarding this basic fact, it can be regarded as surprising that most physicists think that teleology is alien in physics. Certainly, this type of physical teleology is different from teleology that is characteristically present in biology. In biology, teleology is characterized by action in which the end state corresponds to biological needs or ends, and the living organism can contribute to the determination of its endpoints. The biological endpoints are not determined by the physical, least action principle, but by biological needs corresponding to the biological principle.

Definition of the biological principle. The biological principle tells that biological processes are driven by the principle of greatest happiness.

Happiness is measurable unequivocally. The empirical tests falsify all the theoretical dejections against the greatest action principle (Veenhoven, 2007; Grandpierre et al., 2011d). Happiness is not a momentary term, but has a long timescale, and, ultimately, refers to the life-long timescale. Definitely, the greatest happiness can be achieved through maintaining the largest distance from the thermodynamic equilibrium (death). Therefore, the physical aspect of the biological principle is the principle of greatest action, expressing the physical aspect of biological behavior, which means, somewhat simplifying, to maintain as much biologically useful energy above the level of equilibrium as long as possible. We will clarify this important issue later on (section "The Biological Principle as the Ontological Basis of the Universe").

At present, the important thing for us is that a living organism can participate in determining its endpoints, and such biological endpoints are characteristically different from the endpoint corresponding to a similar physical object or to the dead state of the same living organism. Certainly, biological teleology is very different from the third type of teleology, namely, human teleology, which can include a characteristically higher degree of autonomy, and a carefully planned intent or purpose.

The second difficulty is that the physical meaning of action is unknown. "It is a truism that *the physical meaning of each symbol contained in any principles of physics has to be specified before the theory can be applied in practice"* (Yourgrau and Mandelstam, 1955, p. 139). The fact that the physical meaning of action is unknown presents a second inconsistency. Indeed, the same authors Yourgrau and Mandelstam also acknowledge – on their next page! – that *The action function is rather an invaluable mathematical aid than a means of interpretation* (ibid., p. 140).

The third difficulty is that the actual meaning of physical action has fundamental biological meaning. "The computation of the action is similar to that done by an accountant determining the total profit of a business for any given production strategy. The businessman naturally tries to maximize the total profit by following the most advantageous history" (Zee, 1986, p. 107). Actually, the most fundamental meaning of the action principle is that *the action is a cost function* (Rosen, 1967, pp. 4, 155). Indeed, the action is the sum (more precisely, the integral) of the product of the time investment and the energy investment, or the product of the energy investment of all consecutive elementary time intervals in the process, summed up from the initial state until the end state. Such a cost function is plausible in biology

(Lengauer, 2000) since for a living organism energy expenditure and time investment are both valuable, and in reality their product is what should be engineered to be optimal. But the presence of a cost function as a central governing factor of the behavior of physical objects, when regarded as completely independent from living organisms and humans, is very unexpected and moreover alien to present-day physics, indeed.

These three difficulties are the more significant since they occur at the very core of physics, in its first principle. It is even more remarkable that all these three difficulties correspond to biology.

THREE ARGUMENTS INDICATING THAT THE REALM OF BIOLOGY LIES BEYOND PHYSICS

We now present three arguments indicating that the realm of biology lies beyond the basis of physics.

As a first of these related arguments, we mention that the Universe is the par excellence interdisciplinary and creative entity, continually creating novelties, not only in the physical domain, but in an all-comprehensive, trans-disciplinary way. The example of the protosolar nebula shows that the initial state of the contracting nebula led to the development of the Solar System, in which Homo Sapiens is present on the Earth, developed science and philosophy in questioning the nature of the Universe. This basic fact shows that physics and biology are intimately interwoven, and in actual reality they represent two aspects of the same cosmic reality.

As a second such argument, we note that in the history of philosophy, it has been recognized that *Natura Naturans* (i.e. creative Nature) precedes *Natura Naturata* (created Nature) (e.g. Aristotle, 350 BC; Augustine, 410; Aquinas, 1265–1274; Spinoza, 1677; More, 1679, p. 222). Similarly, Tymieniecka (1999, p. 27) argued that the Archimedean point that is the ground for inquiry into all existence is the creative condition, and considers the convergence between the "physical subject" of scientific experimentation (like the central role of the observer in the "reduction" of the quantum wave function into observable states) and the creative human net and the more fundamental ontopoiesis of life.

This second argument is substantiated by the von Neumann interpretation of quantum physics. "nineteenth century classical physics is now known to be fundamentally incorrect: it was replaced during the twentieth century, at the fundamental level, by quantum mechanics, which denies the basic precept of "physical determinism", or "causal closure of the physical" ... von Neumann's "Process 1" (the mental process formulating the question to be answered by the quantum physical experiment) is not controlled by "quantum randomness". It is, instead, the *necessary logical predecessor* to the entry of the element of quantum randomness. It specifies *the otherwise-ill-defined (physically undetermined – GA) set of discrete possibilities between which the logically subsequent (physically – GA) random choice will be made.* The entry of this physically undetermined but causally efficacious Process 1 into brain dynamics constitutes a failure within quantum mechanics of the classical precept of *physical* determinism; and a failure that is *logically prior* to the entry

of quantum randomness" (Stapp, this conference). Indeed, Gregory (2004) demonstrated experimentally that cognitive phenomena violate physics-based physiology.

As a third argument, we emphasize that in the practice of physics the two basic elements of reality are the initial conditions and the physical laws. Most fundamentally, in the context of the philosophy of sciences, we can claim that physics is the science working between given initial conditions that together with the physical laws define the physical problem satisfactorily. Characterizing the fundamental significance of biology we point out here that, in comparison, biology is the science which corresponds to the determination of the initial conditions within which the physical processes occur. In this way, biology can harness physics, in agreement with everyday experience. Moreover, physics is a special case of biology, valid when the systematic modifications of the initial conditions are negligible. In other words, characterizing the rate of biological modifications of the input conditions to physical laws with a parameter ε, physics arises from biology when ε converges to zero. From this last argument it is evident that biology is the science beyond physics, and physics in actual reality is based on biology (Grandpierre, 2011b).

PHYSICAL PROCESSES ARE THE SHORT-TERM, NARROW-CONTEXT ASPECTS OF BIOLOGICAL PROCESSES

Looking at reality from this vantage point, physics shows up as a necessary part of reality: its surface. Everything that is already realized is physical, corresponding to the realized aspects of Nature, *Natura Naturata*. Yet there is a physically not realized, yet in itself real factor beyond physics, the biological principle, corresponding to the creative aspects of Nature, *Natura Naturans*. Of course, *Natura Naturans* in itself cannot be measured, since all what we can measure is *Natura Naturata*, i.e. the already realized processes. It seems to be general to think that therefore *Natura Naturans* cannot be regarded as scientifically provable. We point out that, in contrast, *Natura Naturans* has fundamental aspects that are scientifically proved, and thus are in this way similar to the physical laws. Physical laws are not directly observable things, since they are immaterial; yet their existence is scientifically proven by the most careful, thorough and extensive process of verification. Similarly, we can deduce also the biological laws from the observed behavior of living organisms. All biologically initiated and realized processes can be described by physics in a short enough timescale, in a narrow context. This occurs when the modifications of the conditions within which physical laws act are negligible. Therefore, for a viewpoint committed to see only the surface of reality, it may seem that the only reality is the physical reality. In actual reality the conditions within which the physical laws act can arise from a deeper and subtler biological activity.

Nowadays, the nature of this biological activity may seem to be mysterious because it lies well outside the scope of the conceptual framework of the present-day natural sciences. But it is easy to illustrate it by an example. The trajectory of a bird dropped from the Pisa Tower from point A can be described by physics in each and every millisecond, from one moment to the next one on the basis of the

build a particular bridge is minimized. Similarly, the principle of greatest action can be carried out only with the help of the least action principle. This example indicates that the physical principle is suited to be the ideal tool of the biological principle.

THE BIOLOGICAL PRINCIPLE AS THE ONTOLOGICAL BASIS OF THE UNIVERSE

In this way, the recognition of the significance of the greatest action principle sheds new light to the ontological structure of the Universe. By our result, biology in an ontological sense "precedes" physics. In other words, instead of common expectations, it is not the case that biology is a special branch of physics. Instead, these novel fundamental arguments indicate that, in an ontological sense, physics is based on biology. Our theory suggests that the physical principle is "created", "supervised" and "harnessed" by the biological principle. Biology acts on the input conditions of physical laws, and varies these inputs in order to achieve a biologically optimal output. At the same time, our argument also indicates that the biological principle cannot be realized in the absence of the physical principle.

Our results shed light on new perspectives for the development of biology. For example, it is possible to work out in detail an exact theoretical biology, similarly exact and mature as physics. It is possible to obtain general equations for the energy transfer processes of biology, as well as general equations (Grandpierre, 2007) corresponding to spontaneous targeting (Grandpierre, 1997) or biological homing (Meggs, 1998). Regarding the paramount importance of our corollary that the biological principle precedes the physical one, we can realize that biological processes ultimately can precede and determine virtual quantum processes occurring in the vacuum. Therefore, biological processes represent a level of reality beyond quantum physics. Beyond the level of quanta we find: the biological principle at work. The next step after quantum physics will be biology.

HOW CAN BIOLOGY ACT BEYOND PHYSICS?

By our theory (Grandpierre, 2008b, 2011b) the initial conditions are modified first by virtual interactions governed by the biological principle. The jump between the nonmaterial biological principle and its physical effects is through spontaneous processes and the vacuum's virtual interactions. These virtual interactions, within suitable conditions, can generate biological couplings between different possible physical processes. As a result of these subtle virtual interactions and coupling processes, physically spontaneous processes arise; for instance, spontaneous emission, absorption, spontaneous energy transfer; and, due to the freshly generated biological couplings between energy-liberating exergonic and energy-requiring endergonic processes, active transport processes set up, such as the recharging of electric- and concentration-gradients, etc. These biological couplings between

endergonic and exergonic processes generate biocurrents from virtual interactions, and these bioelectric phenomena can elicit, e.g., muscle responsivity, which leads to modifications of the physical conditions of the bird dropped from the Pisa Tower.

A SHORT NOTE ON CONSCIOUSNESS, SELF-CONSCIOUSNESS AND THE PSYCHOLOGICAL PRINCIPLE

The recognition of the greatest action principle can also shed light on the nature of consciousness and self-consciousness. Consciousness can be conceived as the practical aspect of sensible life. The idea that consciousness corresponds to the material aspect of sensible life has already appeared in the work of Clifford (1886, p. 274). In contrast, self-consciousness appears to be of a different order, as a highly developed aspect of consciousness that can deliberately control an aspect of behavior.

Now let us propose a few thoughts regarding the nature of the psychological principle. First of all, a short note may be necessary to distinguish natural psychological behavior and putatively unnatural ones. The former is meant as interpreting the principle of greatest happiness in a concrete situation, selecting its context, its communal sphere or domain of application and the corresponding time-scales. The fundamental communal spheres of the actions of the self include the sphere of our cells, of our individual organism, of our family, nation, of mankind, of the terrestrial biosphere, of the cosmic biosphere (Grandpierre, 2004, 2011c). This means that natural psychological behavior is that which selects contexts that correspond to the principle of greatest happiness for all these scales and communal spheres: cell, individual, family, nation, race, biosphere, and the cosmic communion of all living beings. In contrast, unnatural psychological behavior is that which acts adversely against the biological interests, against the "greatest happiness," of one or more of these communal spheres.

Definition of the psychological principle. The psychological principle tells the self-conscious beings to select and interpret the context of applying the biological principle, weighing the corresponding viewpoints and time-scales.

Definition of the fundamental communal contexts of the psychological principle. The fundamental communal spheres of the psychological principle are the sphere of our cells, the individual, the family, the nation, the biological race (mankind), the biosphere, and, last but not least, the cosmic kingdom of all livings.

We found that the basic task of the psychological principle is to interpret the biological principle in the given situation; to select the social context of action (individual, communal, racial, biospheric, or cosmic); and then to select the suitable time scale that optimizes the corresponding processes (Grandpierre, 2004, 2011c). Moreover, the principle of greatest action is only the physical aspect of the biological principle, since the first principle of biology acts first of all on biological properties and not merely on physical properties like energy and time. Indeed, the principle of greatest action is expressed in the language of physics – that is, in terms

of energy, time and their integrated quantity, which is action. In the actual life of a living organism, the biological principle is richer than this, and applies to the most fundamental biological property, which is happiness. Happiness is ultimate, because it stands on its own basis. We seek happiness for its own sake; the quest of money, power, success, etc., is derivative, not primary; for all such things are sought for the sake of happiness. Therefore, happiness is something like the substances we find mentioned in Aristotle, and like God as the theologians understand him: It stands on its own foot, *in se*, self-validating and self-containing; it contains its own final cause which is its own fulfillment. This means that in biological terms the greatest action principle is the principle of greatest happiness. The principle of greatest happiness is the first principle of biology, which we call the biological principle. Its physical aspect will be referred to as the principle of greatest action.

SOME CONSEQUENCES OF OUR NEW SCIENTIFIC WORLD PICTURE FOR PHILOSOPHY

Interestingly, our picture offers a scientific basis to the claim of More, who speaks of a spirit of Nature as an incorporeal substance that is the source of life and the physical laws of motion (More, 1679, p. 222). Indeed, we found that the biological principle has an immaterial, principal nature, and it is the source of life. Moreover, we found that the physical principle is the source of the physical laws of motion.

Regarding a consequence of our new world picture for philosophy, we note that on this basis philosophy can be re-united with the natural sciences; and so, natural philosophy becomes possible on a scientific basis. Husserl considered that the main problem of philosophy is that it is not scientific, and regarded the reassessment and reestablishment of philosophy on more scientific grounds as his main task. Our result offers an unexpectedly elegant and rigorous example of the fruitfulness of such a procedure: The first principles represent the most general aspects of physical, biological and psychological existence.

Another consequence of our new world picture which affects philosophy corresponds to a fundamental integration of metaphysics. In the *Encylopedia Britannica* ("Metaphysics" entry, 2007), four views on the nature of metaphysics are outlined. Metaphysics is: (1) an inquiry into what exists, or what really exists; (2) the science of reality, as opposed to appearance; (3) the study of the world as a whole; (4) a theory of first principles. We note that our new model of the Universe offers scientific answers unifying all these different approaches of metaphysics. Our approach tells that what really exist are phenomena, laws and principles, and there are three fundamental types of them, physical, biological and psychological, putting (1) into a scientific context. The science of first principles, laws and phenomena is itself the science of reality, offering a strict scientific interpretation for (2). Phenomena, laws and first principles together are suitable tools for the study of the world as a whole, corresponding to (3). Moreover, our approach is the theory of first principles, offering to (4) a more precise, scientific basis. In this way, our substantially complete approach to the Universe has a fundamental significance, elevating metaphysics to a

strict scientific basis, thereby offering unforeseen, wide perspectives of potentially enormous value to the development of natural sciences.

Let us now consider how our approach can shed new light on one of the, most realistic version of philosophy, the Husserlian phenomenology. Our model tells us that the Universe does not consist only from perceptual phenomena, but also from laws and principles. On that basis, we have to rephrase Husserl's famous phrase "back to the things themselves" into "back to the phenomena, laws of Nature and, ultimately, to the first principles themselves".

The evolution of philosophy also points to the central significance of the biological principle in our scientific world picture. In the twentieth century, one of the most significant schools of philosophy was the Husserlian phenomenology. Husserl seriously hoped to supersede all the limitations of the contemporary philosophical schools and to attain the goal of a rigorous *scientific philosophy* by means of phenomenology. Today a leading exponent of Husserlian phenomenology, Anna-Teresa Tymieniecka, has worked out the idea that the central element of philosophy is the phenomenology of life based on the Logos of Life, on the ontopoietic principle interconnecting self-individualization and the working of Nature (Tymieniecka, 2000). The logos of life is "the first and last ontopoietic fact of beingness at large", "life's prompting force and the shaper of its course" (Tymieniecka, 2009, p. xix), the "prompting force (that) carries becoming onward" (ibid., p. xx). We point out that, apparently, there is a significant overlapping between the concepts of the logos of life and the biological principle. Indeed, since biology is the ultimate foundation of physics, generating the initial conditions within which physical laws act, as well as the final cause of living beings and the Universe, therefore the biological principle can be regarded as the first and last ontological fact.

Actually, it is the biological principle that organizes the virtual interactions, the spontaneous processes and the biological couplings (Grandpierre, 2007, 2008a, b). Therefore the biological principle is "life's prompting force and shaper of its course". The biological principle acts without being a physical force, since it acts by virtual interactions organizing micro-and macroscopic spontaneous processes, such that biological couplings seem to happen "by themselves"; i.e., their occurrences do not require the imposition of physical forces, and elude all explanation as the result of physical forces. Acting through virtual interactions is not an unusual thing for a first principle, since the first principle of physics acts also through virtual interactions. At present, the best interpretation of the least action principle is Feynman's, who worked out the idea that the action of the least action principle on matter can be conceived of as virtual interaction. In the double-slit experiment, before the quanta start on their course, they map the whole experimental situation by virtual interactions, and select their path by summing up all the quantum probabilities of each possible trajectory. Feynman's path integral approach indicates that *quanta explore all possible paths between the initial and end states by virtual interactions* (Feynman, 1942; Taylor, 2003; Moore, 2004), and the resulting path is the integrated sum of all these paths. Similarly, the biological principle also acts by virtual interactions; yet in biology the quantum probabilities are weighted on the basis of biological needs. In this way, it is the biological principle that determines the timing

and localization of biological processes, carrying out the "penultimate coordination" and the "spontaneous unfolding plan" (ibid., p. 67) of biological phenomena.

ON THE ANIMATING NATURE OF LAWS AND FIRST PRINCIPLES

It is important to point out that all laws and principles of Nature have the strange ability to initiate processes. Physical laws are able to initiate physical processes in a given situation. Physical objects do not contribute to the determination of their behavior, because it is determined by physical conditions and physical laws. We call physical objects "inanimate", yet, in a restricted sense, it is possible to regard them as "animated", since their actions are due to the laws of physics, and their behavior is initiated and governed by the physical laws. Initiating and activating processes reach a characteristically higher eminence and autonomy in biology. Now regarding our corollary that the first principle of physics arises from the biological principle, the animating capability of the physical laws rests on a natural basis. The biological principle represents in itself animation; and since the physical principle is derivable from it (by omitting the ability to select endpoints different from the physical one), therefore even the physical principle can be regarded as an animating principle. Thus we find the first principles are in this respect similar to the instincts of living organisms.

In the depths of our inner world natural principles are in action. We can experience these natural powers through our inner perception. All processes, unconscious or conscious, occur due to these internal cosmic powers. These physical, biological and psychological principles animate the bodies of living organisms. These are the first principles that initiate the motions of physical, biological and psychological behavior. Actually, we do live with these natural, cosmic principles; we think and create with their assistance. This fundamental circumstance offers an explanation of the great enigma of how the human mind within is capable to understand natural processes outside. This is why the laws of our thoughts can represent the cosmic laws of physics, biology and psychology. We obtain also an explanation of the fact that really creative thinking is based on intuitions. Indeed, we intuitively perceive these natural principles continuously acting within our inner universe. Yet while we observe these natural laws and principles in our inner world in their animated, alive state as intimate, as active processes, as animating principles; in the external world we are faced rather with the external aspects of processes occurring in the outer world, observing phenomena – which are the results of the activity of the natural laws and principles – through our outer senses.

Not only our internal world can be regarded as subjective, but also the external world as well, since this latter arises as external only for us, human observers having external senses, which are late products of evolution of the Cosmos. In reality, the external and the internal worlds are only two aspects of one and the same reality. The cosmic creative powers when experienced in our inner worlds do not show up as

representing the ultimate reality of the life principle. We can see that life and cosmic logic are intimately intertwined.

Moreover, Endre K. Grandpierre has pointed out (Grandpierre, 2000) that the Universe is a gigantic thread of physical, biological and psychological interactions, including all known and yet unknown kinds of interactions. He also demonstrated that these cosmic interactions represent actual perceptive interactivity, and so a kind of cosmic sentience. All these results may be conceived as consistent with Tymieniecka's result that the quintessential core of life is logoic sentience.

THE SIGNIFICANCE OF THE SCIENTIFIC WORLD PICTURE FOR THE FUTURE OF CIVILIZATION

Not only the evolution of the natural sciences, but also of the social sciences indicates the significance of biology and its first principles. The increasing rate of alienation, the problem of climatic change, and the threats to civilization all urge the formation of a world picture in which, instead of inanimate matter, life is in the very center (see e.g. Korten, 1999; Grandpierre, 2003a, b). Indeed, Korten (1999, pp. 13, 274) suggested that the problems of mankind can be solved only on the basis of a new world picture of the living Universe.

What we are proposing here is a new shift in our scientific world picture, one that complements the present physicalistic world picture by an essentially complete, biofriendly one, to serve as the basis of a universal science that integrates physics, biology and psychology in an elegant and exact manner, on the basis of first principles. Perhaps surprisingly, this integrated natural science proves to be the universal science that has fundamental applications for the human sciences, including sociology as well. The proposed shift of our scientific world picture can have an enormous effect for future human societies. The significance of the previous shift in our world picture can be illustrated by the following thoughts: "Those men who created the upheaval which we now call the 'Scientific Revolution' called it by a quite different name: the "New Philosophy". The revolution in technology which their discoveries triggered off was an unexpected by-product; their aim was not the conquest of Nature, but the understanding of Nature. Yet their cosmic quest destroyed the mediaeval vision of an immutable social order in a walled-in universe together with its fixed hierarchy of moral values, and transformed the European landscape, society, culture, habits and general outlook, as thoroughly as if a new species had arisen on this planet" (Koestler, 1959, p. 13).

The scientific-industrial revolution of the seventeenth century transformed society and led to unprecedented technical developments. But it gave rise to an incomplete picture of the world, for it had little to say about humans and life. The physical world picture led inevitably to the rise of the consumption-centered society, which, in spite of its material wealth leads to an alienation of people. The completion of the scientific world picture with biology will lead to the unshackling of life's genuine values, and open new vistas different than the present focus on consumption,

vistas that open towards a more compassionate and uplifting civilization. The biological view will transform our civilization into a life-completing direction with a healthier future in which humans have a deeper relationship with the Universe. The safeguarding of the future of mankind requires a wider, more complex and deeper understanding of the Universe.

We are facing a new Copernican turn; at that time the direction was not against morality; rather it uplifted morality and provided it with a valid and robust basis. Obtaining an essentially complete picture of the world, in the process founding a universal science, is a vital task of science and philosophy, because an essentially incomplete world picture, as history teaches us, leads to an unbalanced, unhealthy society. In the same way as the materialist world picture led necessarily to materialist, consuming societies, to money-centered capitalism developing material technologies, the new, biofriendly world picture will lead to life-uplifting societies developing mankind's life-enriching, emotionally uplifting ability, developing mankind's moral, aesthetic, social technologies, scientific and philosophical methods, increasing the width and depth of our understanding of ourselves. A healthy world picture leads to healthy societies. The world picture serves as guideline to science, to philosophy, to religion, to art; it shapes our communal life.

All knowledge must serve mankind's common good. It seems that aggression arises from the lack of knowing, appreciating and developing our best human values. Therefore, recognizing life's central value for mankind's future societies offers a new perspective to transform our history from "history of wars" (Machiavelli: "War and preparation for war is the normal condition of mankind") into the history of life-building societies. Biofriendly societies are natural societies building harmony with living, sensible Nature within, between and around us. The present-day mechanical societies can be replaced by natural societies, respecting natural feelings. We can learn that it is not reasonable to charge ahead for a success if, on the way to reach it, we create bad feelings. People can learn to respect feelings, and learn to avoid hurting anybody. Aggression is not based on humans' assumed "killing instincts", since aggression between human individuals and groups become widespread only a few thousand years ago.

If mankind can find the essentially complete world picture, it will be essentially true. The present-day dominating materialistic world picture has been making an invaluable contribution to the development of sciences, yet its validity must be questioned at least in the most fundamental aspects of biology, psychology and sociology. All the essentially incomplete world pictures – when used beyond their limited domain of application, i.e., when used as actual pictures of the world as a whole – are misleading and false. It is a well-known saying that the best lie is the partial truth, because its (partial) truth lends the appearance of credibility to the part of the statement that is untrue. False world pictures lead necessarily to false societies. The birth of the first essentially true picture of the Universe, founding the universal science, indicates the possibility of a shift to a healthier society. Our perception of the world, of life, of man, of each other, of ourselves, of our cells can become more rich and complete. We can see the Sun and the stars with a more complete attention, recognizing them as our fellow beings.

There is a direct connection between the development of modern civilization and civilization-related illnesses: physical diseases like cancer, heart-attacks etc; biological like depression, panic etc; and illnesses of reason like crimes, corruption, wars, money-cult, tension between different nations, ethnics, religions etc. An ill world picture, as we noted, leads to ill societies. In the essentially complete world picture, the cure of illnesses and harms of civilization receive new perspectives. On the scientific basis to which we shed some light here, we think that the first principle of natural societies is to respect life and the emotional integrity of individuals, groups, nations, mankind as a whole, the biosphere and the cosmic living kingdom, the Living Universe, the ancient Mother Nature. The fundamental laws of natural society are in harmony with the completion-seeking natural, human, empathic, natural and cosmic feelings. We think that music expressing natural feelings can play a much more uplifting and significant role in the natural, biofriendly societies than in the present materialist, warring and consuming society.

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THE RELATION BETWEEN MAN AND WORLD

ABSTRACT

Human identity has traditionally been defined by way of juxtaposing man and world in a static and substantialist manner. This approach implies a false *idealism* in terms of ontology and creates a misleading sense of *exclusivism* in terms of anthropology. The relation between man and world can only be properly understood on the basis of *transcendental realism*, a position that acknowledges the interdependence of self-experience and world-experience in the sense of *Realdialektik*. Anthropology and ontology are indeed two sides of the same coin. Referring to discourses of phenomenology and transcendental philosophy, the paper analyzes the ontological dialectic of man and world, including the cosmological dimension, offers a critique of the traditional "anthropocentric" approach, and reflects on the civilizational impact of a comprehensive "ontological anthropology."

THE ONTOLOGICAL DIALECTIC OF MAN AND WORLD

In the Western philosophical tradition, the question as to the essence of man has mostly been asked as if the human being existed in a kind of philosophical version of "splendid isolation." Man was set apart from "nature" as the realm of mere "objects" of his reflection and volition. The entirety of material objects and living creatures was perceived as "the other" from which the human being was considered "shielded" – in a rather abstract manner – by virtue of his consciousness in which, according to this conception, the "outside world" is mirrored and which alone provided its *raison d'être*. This *false anthropomorphism*, and the *voluntarism* attached to it, is based on the erroneous ontological assumptions of philosophical *idealism*[1] and on a peculiar – and literal – interpretation of the *Genesis*. This position is at the roots of Western anthropocentrism with its artificial, almost "synthetic," *teleology* that subordinates everything natural, in fact the entire κόσμος, to the human being's will. It is also an assumption that is totally ignorant of the basic logical error of teleological thinking, which reverses the chain of natural causality (as Nicolai Hartmann has convincingly demonstrated long ago) (Hartmann, 1966), and that also leads to a utilitarian position in terms of *ethics*.

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