

**LEON MILLER**

instructor of Business Ethics,  
Intercultural Communications and International Relations at  
Tallinn University of Technology  
Tallinn, Estonia  
e-mail: leonmonroemiller@yahoo.com



## Complementarity and Pragmatism: Reconciling Western Civ.'s Continental Divide

The theory of complementarity became prominent during the last century (primarily as a result of the ideas of Niels Bohr and quantum physics). It gradually developed into a dominant paradigm underlying research into the nature of existence. Bohr's exposition of the principle also emphasized its epistemological value for providing more accurate information regarding what seem to be paradoxical aspects of reality. The principle of complementarity has proven to have far reaching philosophical implications concerning such basic notions as subject and object, space-time and causality, chance and necessity, and more. However, scholars also acknowledge that it contributes to resolving the problem of the discontinuity between underlying reality and the human ability to conceptualize the ontological nature of existence. It has grown in popularity because it seems to offer a means of addressing dichotomies in other sciences and in philosophy.

When analysts scrutinize the factors that influenced Bohr's understanding of the principle of complementarity they find that one source clearly stems from the influence of American Pragmatism. Although the Pragmatist influence is traced primarily to William James there is at the roots of the philosophy of Pragmatism reference made to concepts that reflect the principle of complementarity explicating how to gain reliable knowledge concerning the nature of existence. From the very inception of American Pragmatism there was the recognition that Western philosophy faced a problem connected with *the dilemma of knowing or the dilemma of knowledge*. This dilemma culminated in Kant's infamous claim of a schism between what is conceivable and what is unfathomable. American Pragmatists addressed this problem by introducing an approach to philosophy that would mediate the schism in the Western philosophical tradition. This article traces the principle of complementarity back to its American Pragmatist roots and explains how Pragmatism plays a role in the development of the concept.

### Introduction

Bertrand Russell argued that "Philosophy, like all other studies, aims primarily at knowledge. The knowledge it aims at is the kind of knowledge which gives unity and system to the body of the sciences, and the kind which results from a critical examination of the grounds of our convictions, prejudices, and beliefs."<sup>1</sup> However, he goes on to state that it cannot be claimed that philosophy has had any great measure of success in addressing the dilemma of knowing or the dilemma of knowledge. The attempt to address the dilemma of knowing, in Western philosophical history, dates back to the very foundations of the Western philosophical tradition. Classical Greek metaphysicians established the prototype of a systematic approach to knowledge. They believed reliable knowledge could be acquired

<sup>1</sup> Russell B. (2005). *The Value of Philosophy // Philosophy: Basic Readings* / ed. N. Warburton. 2<sup>nd</sup> ed. Abingdon, Oxon, Published by Routledge. P. 25.

by means of an inquiry into the nature of being (ontology) conducted in a way that produces reliable knowledge (episteme) plus, articulated in a way that makes our ideas clear (logic).

Karl-Otto Apel points out that in the effort to resolve the dilemma of knowledge or the dilemma of knowing the Western philosophical tradition has undergone several paradigm changes (attempts at a more epistemologically sound approach to knowledge formation): The First Philosophy, Descartes's metaphysics (or his response to Skepticism), and Kant's Critique of pure metaphysics. However, the dilemma not only remained unresolved it eventually resulted in a problematic split in the Western intellectual tradition. Apel argues that the attempt to address and resolve the basic issues of Western philosophy has given rise to another paradigm that "May in fact supersede, or rather suspend and preserve in the Hegelian sense, the preceding paradigms."<sup>2</sup> American Pragmatism, the new paradigm, bridges the gap between what heretofore had seemed incommensurate by employing notions that are ingeniously similar to the principle of complementarity.

Apel recognized that there is a reliable basis for knowledge (epistemology) by means of employing an inclusive (complementary) methodology that puts together fragments of information that had seemed irreconcilable: the fundamental dichotomy between realism and idealism, the Cartesian split between consciousness (or essence) and substance (forms), the Kantian split between noumena and phenomena, positivism (objective) and existentialism (subjective), and the *Analytic-Continental Divide*. Apel thought that these are not incommensurable paradigms in the sense that Hans Kuhn thought of competing paradigms in the history of science. He believed that the prior philosophical paradigms can be reconciled when the prior outlooks are considered to be complementary plus are regarded as an *ex post factum* of our occidental history of philosophy or as a schema of the triadic, semiotic or relational nature of ontology.<sup>3</sup>

One way of describing Apel's concern is that he recognized that an emphasis on the atomistic autonomous individual does not coincide with the individual's attempt to experience Holistic well-being and harmonious interconnectedness (being better-integrated in terms of a nature-human relationship and human to human relationships). Although there has been significant attention in the history of the Western philosophical tradition paid to the necessity for humanity to be firmly grounded within the fabric of existence this has failed to coincide with the empirical, logico-linguistic philosophical emphasis of logical positivism up through much of the last century. The controversy was also evident in another unfortunate schism between the hard sciences and the social sciences that hindered constructive interdisciplinary research. Pragmatists recognized this apparent dilemma and in response devised a complementary notion of epistemology and ontology. They held the conviction "That alternative interpretations and assessments of past theories that appear to be at odds do in fact converge in respect of some of their deep-seated assumptions."<sup>4</sup>

To completely comprehend the significance of the divergence in the Western intellectual tradition one needs to be reminded of the dichotomies in epistemological and ontological views, how they culminated in Kant, and finally how the full manifestation (or extent) of the problem became evident during the last century. The history of Western philosophy

<sup>2</sup> *Apel Karl-Otto* (1994). *Karl-Otto Apel: Selected Essays. Volume One: Towards Transcendental Semiotics* / ed. E. Mendieta. Atlantic Highlands, New Jersey: Humanities Press. P. 112.

<sup>3</sup> *Apel Karl-Otto* (1998). *From a Transcendental Semiotic Point of View* / ed. M. Papastephanou. Manchester, UK: Manchester University Press. P. 44.

<sup>4</sup> *Ibid.* P. 1.

can be characterized as titter-tottering between idealism (Plato and Descartes) and Logical-Positivism (Aristotle's influence on the Vienna Circle). Kant made some attempt at reconciling this problem with his transcendental idealism, architectonic strategy, his endeavor to reform metaphysics, and by supporting an inclusiveness of positivism. Kant also implied that the principle of complementarity (gleaned from the Western philosophical tradition) could bridge the schism and provide for a more inclusive, interdisciplinary approach to knowledge.

Because of Pragmatism's propensity to ameliorate the problematic condition in the Western intellectual tradition while contributing to addressing some of humanity's most pressing issues prominent philosophers began to be attracted to this stance on philosophy believing that it would bridge the philosophical distinction gap between truth by correspondence to reality and truth as reliable justified belief. In addition, the resurgence of the principle of complementarity — the recognition of its positive impact, the realization that it contributes to resolving seeming contradictions within and between bodies of knowledge, the recognition that it was partially grounded in American Pragmatism and, the recognition of the correspondence between complementarity and basic Pragmatist concepts—gradually attracted increasing interest in both.

Philosopher of Mind John Searle believes that the principle of complementarity contributes to empirical evidence of the long-standing metaphysical claim that natural forces reveal intentionality (teleology) even at the most fundamental level. This impulse (or intention) can be described as a tendency for creation's life generating force (although non-substantial) to manifest in ways that are clearly discernible. Searle goes on to explain that from the "top down" perspective creation displays a complexity that can be described as a full manifestation of its intention. The realization that intentionality is part of how organic forces developed is affirmed by the fact that urges and impulses evolved into sensations and ultimately the emergent phenomena of consciousness.<sup>5</sup> Complementarity allows a more accurate analysis of this phenomenon which even today is designated as being marked by "uncertainty" because from a "bottom up" perspective it seems that it can be reduced to something non-discernible while from a "top down" perspective it is a clearly discernible as enormous complexity. The principle of complementarity offers reconciliation between what heretofore had seemed to be diametrically opposing descriptions of the fundamental nature of existence.

Nobel Prize — winning neuroscientist Gerald Edelman implies that the principle of complementarity explains the fundamental connection between the biological principles of nature, humanity's biological nature and how human consciousness evolved. The principle of complementarity provides the conceptual propensity for bridging the gap between what for researchers have otherwise persisted in being contrasting features of reality. According to Paul K. Feyerabend complementarity can be interpreted, on the one hand, as the intuitive capacity that complements what is needed for theoretical comprehension and, on the other hand, as a heuristic principle guiding empirical research.<sup>6</sup>

Conceptualizing the nature of existence based on the principle of complementarity grew in opularity amongst scholars within and between the various sciences, within and between science and the Philosophy of Science plus, within and between the different East-West traditions during the last century. It gained in popularity because it instigates more reliable knowledge of the connection and interaction between noumenal and phenomenal

<sup>5</sup> Searle J. (1992). *The Rediscovery of the Mind*. Massachusetts, MIT Press. P. 89.

<sup>6</sup> Feyerabend P. (1981). *Realism, Rationalism and Scientific Method // Philosophical Papers*. Vol. 1. London, Cambridge University Press. P. 221.

existence thus, reducing the subject-object dichotomy (proposing interconnectedness or interrelatedness).<sup>7</sup> As a result, gradually, scholars began to recognize the potential of the principle of complementarity for reconciling what had seemed to be discrepancies in the sciences, within philosophy and between science and philosophy.

Richard Rorty, for example, though reared an Analytical philosopher and trained at one of the finest philosophical institutions by one of the leading Analytical philosophers of the time, began to believe that Pragmatism offers a solution to the problems that had caused a split in the Western philosophical tradition as well as to controversies regarding the theory of knowledge, what constitutes humanity's personal and social well-being, and the nature-human relationship. Rorty believes that to get beyond the dichotomies that have hindered a more open-minded approach to knowledge philosophers and scientists must intentionally minimize the amount of argument that has heretofore been expended on distinctions and focus on the complementary nature of scientific and philosophical knowledge.<sup>8</sup> He argued that Kant's implied method of complementarity (which Kant eventually began to think of both in terms of intuition and aesthetics) "Is a device that will get us off the linguistic-historical-anthropological-political merry-go-round which intellectuals have become accustomed to riding, and onto something progressive and scientific — a device that will get us from philosophy to Philosophy."<sup>9</sup> In other words, Rorty developed a belief in the complementary nature of knowledge that resonates with the ideas of Karl-Otto Apel.

What follows in the next section of the article is a description of the extent of the problematic divisiveness these issues created in Western civilization: within philosophy, between the hard sciences and the social sciences (concerning which approach to knowledge is most beneficial to the human experience), a tendency to draw a line of demarcation between science and philosophy, and the conditions that were created in Western civilization that culminated in "The Continental Divide." In this respect the following section of the article points out the features of the Western intellectual climate that gave rise to a schism in the Western intellectual tradition that culminated in the last century becoming one of the most painful centuries of history. This includes an explanation of why the emergence of the principle of complementarity was so important for science and philosophy. The third section of the article traces the principle back to notions stemming from American Pragmatism (explaining why Pragmatism was a source for the insight and inspiration that prompted the principle of complementarity). The concluding section of the article explains why the Pragmatist perspective on complementarity is significant for science and philosophy.

### **The Last Century Split in the Western Intellectual Tradition**

The full manifestation of an apparently non reconcilable split in the Western intellectual tradition became evident during the early part of the Post First War period. At that point the divergence widened as a result of differing positions on Kant's effort at critical reform.

---

<sup>7</sup> *Saunders S.* (2005). Complementarity and Scientific Rationality // *Foundations of Physics*. Vol. 35. Issue 3. P. 425.

<sup>8</sup> *Rorty R.* (2000). *Philosophy and Social Hope*. London: Penguin Books. P. xxii.

<sup>9</sup> *Rorty R.* (1987). *Platonists, Positivists, and Pragmatists // After Philosophy: End or Transformation?* / ed. K. Baynes, J. Bohman & T. McCarthy. Cambridge, MA: Massachusetts Institute of Technology. P. 55.

The issue centered-around controversies concerning various perspectives on the human effort to construct an accurate depiction of reality. Kant attempted to reconcile the problem by acknowledging the value of positivism for complementing the established approach based on the application of pure reason. He also indicated an appreciation for the role of the human intuitive faculty (or the realm of the human experience where values are important), and the role of aesthetics or imagination as a mediating factor between intuition and reason.<sup>10</sup> If we view the last century split in Western intellectual thought as revolving around Kantian issues then it certainly concerns the question of what Kant's *critique of metaphysical exclusivity* offers in terms of advancing a theory of knowledge inclusive of science, what Kant offers as a means of reducing the dualistic dichotomy between reason and sense experience plus, regarding his attempt to lay a new groundwork for metaphysics.

The dichotomy between these differing convictions on philosophical methodology began to grow more intense in regards to social, political, scientific, technological and philosophical issues at the beginning of the last century and consequently influenced a philosophical split that was evident throughout the last century. One strand of that split was represented by the philosophical methodology reflected in the works of Phenomenological, Existential, and Critical Theorist approaches to philosophy. On this side of the philosophical schism Heidegger's philosophy of Phenomenology is considered canonical and has had tremendous impact on the early approaches to Continental Philosophy. Heidegger's position reflected the mood of a generation whose hopes that science (and technology) could solve the social, economic and political problems of humanity were shattered by ideological warfare, violence, and destruction on increasingly larger scales until it gradually began to threaten any appreciable sense of (human) existence.

On the other side of the philosophical split Rudolf Carnap initiated a counter position to what he detected to be Heidegger's anti-logic and anti-technology stance.<sup>11</sup> From the outset Carnap was also critical of Heidegger's obscurity which he believed was due to his denial of the philosophical centrality of logical positivism. Thus, Carnap contributed to establishing the position that philosophy is an endeavor to make our ideas clear and our knowledge factual. As we continue analyzing this issue it will become important to remember that Carnap was relieved to leave what he felt was a metaphysically ridden continent to go to America where he was pleased to find America's unique brand of philosophizing more appealing.

The fact is that what was true regarding the philosophical concerns that prompted the Davos Debate (an event that is considered to mark the schism in Western philosophical thought) reflected a divide that would mark Europe with an eventual continental split. The issues of the debate were partially heightened given the fact that World War One was the backdrop for the debate (in other words the debate occurred in the midst of a period marked by feelings of crisis in politics, economics, as well as in science, morals and ethics which would only increase as a result of the onslaught of the Great Depression and of WWII). The debate was planned in hope of generating a greater sense of cooperation between the people of Post-World War One Europe. However the debate ended up being a dividing point in the history of Western intellectual thought with the demarcation drawn between differing understandings of the role of Kantian epistemology, ontology, and ethics plus, of the Kantian effort to reform metaphysics.

---

<sup>10</sup> Friedman M. (2000). A Parting of the Ways. Carnap, Cassirer, and Heidegger. Peru, Illinois: Open Court Publishing Company. P. 27–29.

<sup>11</sup> Ihde D. (2010). Heidegger's Technologies: Post phenomenological Perspective. New York: Fordham University Press. P. 96.

The devastation of World War One made strikingly evident the fact that the unresolved nature-human dichotomy with its anxiety producing tension (which humanity has attempted to mediate by means of science, reason and technology) had put humanity on a path that culminated in unparalleled destruction. Because the philosophical issue of the debate centered-around the effort to manage humanity's earthly existence (by means of transforming humanity's natural existence) the acquisition of and application of knowledge would prove to be a major concern-given the meaning, significance and transformative power of science and technology in the human experience. The issues in dispute are important because they related to the link between conceptions of the human experience and conceptions of the method, goals and methodology of philosophy.

The problem as perceived by Kant was the fragmentary nature of human knowledge (stemming from an unresolved dilemma of knowing) that began to be evident in the fragmentary nature of the human experience. He realized that if unresolved this would undermine the ethical basis for interpersonal and social relations as well as become detrimental to interstate relations, to peace, and to collective security. Kant proposed that the quality of human judgment could be enhanced by consideration of the broader dimensions of the human perceptual capacity. Kant proposed a method for making sense out of the impact of phenomena on the human experience that was inclusive of analytic logic, naturalistic evidence, and aesthetics (the role of imagination or a more creative faculty for mediating the relationship between nature and the human experience). He claimed that human judgment could approach a level of genius when it reflects a talent able to creatively shape a complementary connection between experience and judgment.<sup>12</sup>

In this sense, Kant indeed posited a method for eliminating the gap by suggesting that there is a complementary interplay between intuition and understanding.<sup>13</sup> However, unfortunately, Kant failed to fully develop this thesis. Without clarifying the link between aesthetics and reason we are left with a set of problems which are set for us by our rational natures and which is otherwise unsolvable.<sup>14</sup> If the thing itself (the actual nature of things) cannot be known what is it that we are claiming that we have formed concepts about? That is to say that, if our conceptualization of reality is not grounded on an actual sensing of reality then our knowledge is actually groundless. For, if conceptuality is confined to the sphere of the conditioned it leaves philosophy with the incapacity to ground its knowledge.<sup>15</sup> What is needed, if humanity is to be able to experience its desired complementarity, is to move beyond the uncertainty by means of a philosophical inquiry that offers greater credibility to Kant's proposed role of the human aesthetic capacity.

Early in the last century scientists, as a result of their efforts to investigate deeply into the unfathomable mystery of existence, began to draw conclusions that had far reaching implications for philosophy and science. In addition to Einstein's influence on a paradigm shift-that afforded a greater understanding of the fundamental nature of existence-other scientists and philosophers began to draw conclusions suggesting that nature is not merely a passive

---

<sup>12</sup> *Kant I.* (1987). *Critique of Judgment* / transl. W. Pluhar. Indianapolis, Hackett Publishing Company. P. 174.

<sup>13</sup> *Kant I.* (translated copy 1996). *Critique of Pure Reason* / transl. W. Pluhar. Indianapolis, Indiana: Hackett Publishing Company Inc. P. 39-40.

<sup>14</sup> *Gardner S.* (2007). *Philosophical aestheticism*. *The Oxford Handbook of Continental Philosophy* / eds. B. Leiter and M. Rosen. (75-121). Oxford: Oxford University Press. P. 87.

<sup>15</sup> *Ibid.* P. 87.



recipient of human exploration. Niels Bohr, building on the paradigm shift that Einstein initiated, proposed a view of complementarity that gradually became the way in which we view fundamental reality today (but, a view that Einstein would find difficult to accept).

Bohr's complementarity was an attempt to reconcile the empiricist conviction that sense experiences are the foundation of all knowledge of nature with the anti-realist conviction that there is an underlying essence to phenomena (Being) that had to be metaphysically acknowledged. Bohr's notion of complementarity offered an alternative to the Kantian conceptualization of experience (the source from which the Analytic and Continental Philosophies diverged). Bohr's notion of complementarity offered a perspective on the relationship between conceptualization and reality that contributed to ameliorating the entrenched schism in Western science and philosophy.

When analysts scrutinize the factors that influenced Bohr's understanding of the principle of complementarity they find three sources that deeply influenced or nurtured his position. Bohr was influenced by his early teacher Harald Høffding plus Eastern philosophy and science. Also, as a result of his own studies and through the influence of Høffding Bohr became impressed with American Pragmatism (this is based on evidence from the Bohr's archives managed by Finn Aaserud). In other words Bohr, "His mentor Harald Høffding and many of their contemporaries were 'pragmatized Kantians' in the sense that they were all partisans of the common cause which saw the scientific description of nature as involving the imposition of categories supplied by the knowing mind on the raw material of which experience is made."<sup>16</sup> Thus, Bohr's ideas reflected a blend of Pragmatism and Constructivism. Although the Pragmatist influence on Bohr is traced primarily to William James the roots of the philosophy of Pragmatism made reference to concepts that reflect the principle of complementarity. That is to say that the founding of Pragmatism is based on the conviction that the human experience of existence is improved when reality is viewed from the perspective of triadic interactions and explained on the basis of semiotic interactions.

### **Pragmatist Approach to Mediating the Schism in the Western Intellectual Tradition**

At the very roots of the Western philosophical tradition is the admonition that self-knowledge is the most important life and philosophical pursuit. The foundation of the Western intellectual tradition is based on the conviction that by devoting one's life to *Sophia* one could obtain well-being, happiness, flourishing, integrity, and good fortune (to use Aristotle's description). In Plato's account of the philosophy of Socrates, given in *Phaedrus*, Socrates is credited with proclaiming that for him the foundation of philosophy is self-knowledge.<sup>17</sup> The benefit of achieving this higher level of discernment is called *prudence* and disciplines related to the attainment of *gnosis* (the Greek word for knowledge but, also has some connotations that refer to *to know*) are intended to help the individual fulfill the quest for self-knowledge.

<sup>16</sup> Folse H. (1994). Bohr's Framework of Complementarity and the Realism Debate // Neils Bohr and Contemporary Philosophy / ed. J. Faye, H. Folse. The Netherlands: Kluwer Academic Publishers. P. 120 and 121.

<sup>17</sup> Plato. (1952). Plato's Phaedrus / transl. R. Hackforth. Cambridge, U.K.: University of Cambridge Press. P. 24.

Socrates' proclamation corresponds with the basic Western belief that one's sense of individuality, subjectivity, or self, plus an understanding of the appropriate connection with the total scope of reality (intersubjectivity, the nature of being and, the connection between the self and the phenomenal world) are all based on obtaining self-knowledge.<sup>18</sup> When "Socrates asked the Delphian Oracle, what is the highest knowledge? The answer came, 'Know Thyself.'"<sup>19</sup> The self in classic Greek terms (especially for Socrates and Plato) is formulated by means of what can be described as a type of Hegelian triadic dialectic interaction (the contrast between the self and the other is bridged by conceptually synthesizing the difference into a better perspective on existence).

Aristotle adds an emphasis on the teleological significance of human interactions with the environment and the value of empirical ontological investigations. According to "Aristotle's teleological construction the structure of the universe, as well as that of society, has been created to achieve a purpose (social life was considered as part of nature, and governed partly by its laws)."<sup>20</sup> Self-knowledge was the obtainment of an understanding of how to be well-integrated with nature and other individuals in such a way as to achieve happiness, well-being, and prosperity. Aristotle used ethical terms to explain that an increase in self-knowledge corresponds with an increase in prudence and the experience of eudemonia.

Descartes starts with the self as a reference but not the self in a Holistic sense. He aligns with Platonic idealism (in asserting the priority of essence over form) making his epistemology a means of providing certainty to an isolated, autonomous individual, consciousness. Kant attempts to liberate this isolated atomistic individual who is cut-off from the material realm (from body and from nature) resulting in personal and social fragmentation plus, environmental problems. Kant does an admirable job of bringing dignity to the rational individual who, he argues, is necessarily in interaction (the basis of his ethics promotes an ethic of mutuality by means of transcendental rationality).

Kant explained the teleological significance of interactions with the environment by employing a notion of complementarity as a means of filling the gap between the rational individual and things within themselves. However, he does not fully develop this thesis thus, does not fully liberate the individual from Cartesian Dualism. Pragmatists recognized the need to include an explanation of the constructive continuity in human interactions (the way conceptualization influenced intersubjective and nature-human interactions). Pragmatists recognized this as a problem connected with self-formation (a problem stemming from an inability to recognize the continuity between life's fundamental biological forces, the biological composition of the human organism, and the human cognitive capacity). They also realized that there were attempts to address and resolve aspects of this issue that date back to the very roots of the Western philosophical tradition. Pragmatists initiated a Holistic approach that would prove to mediate the split in Western intellectual thought.

This section of the article explains the contribution Pragmatism provides to a new sense of the properties of real-world phenomena and the human conceptualization of phenomena. It will trace the Pragmatist influence on Niels Bohr back to William James and James' emphasis

---

<sup>18</sup> *Abhedananda S.* (1905 [2005]). *Vedanta Philosophy: Self Knowledge (Atma-Jnana)*. Whitefish, MT: Kessinger Publishing. P. 36.

<sup>19</sup> *Ibid.* P. 37.

<sup>20</sup> *Diamantopoulos Ch.* (2007). *Thoughts on Logical Positivism, Simon's Decision Theory and the Aristotelian Teleology*. Athen, Greece: Published by the Institute of European Integration and Policy. P. 6–7.



on self as constructed in interaction, then to Peirce's semiotic/triadic view of self-formation or knowledge formation, and finally to Dewey who synthesizes the social with an emphasis on the individual in relationship to nature. In a Pragmatist sense (especially the way it was conceived by Peirce) interaction between the person (the Third) and nature's life-generating force (the First) shapes our experience of phenomena (the Second). In other words for Pragmatists ontological categories are constructed (for James they are socially constructed however, Peirce allows for a much broader notion of the properties of real-world phenomena). This is explained in terms of the Pragmatist conception of complementarity (connectedness, symbolic interactionism, synechism, continuity and unbrokenness).

William James is noted for describing the understanding of self as "a stream of consciousness" or an awareness of phenomena (some of which the person experiences as self and some of which the person senses as "not self").<sup>21</sup> He realized that because of the fact that what is sensed as self and what is sensed as not self are both aspects of the interconnected web of existence the sense of self involves distinguishing aspects from the whole fabric of existence which have significance to the individual. He asserts that the knower (consciousness) selects bits and pieces of reality and shapes them into a unity (or continuum) that gives reality a meaning (defining both the nature of existence and the self). It is in this sense that the self (the sense of distinctiveness) stands out to consciousness as a particular perceptual perspective that is created in the process of interaction between the person and the environment.

James proclaimed that we come to know ourselves by means of interactions that determine how we fit into the fabric of existence (James is thinking of this in social-psychological terms but Pragmatists also think of continuity as *synechism* or as a way of describing ontology). James would say that personal identity is the conscious representation of the continuity of experiences and feelings that a person has as a result of encountering the phenomenal world.<sup>22</sup> James thought of self-knowledge as derived from a process that is interactive and communicative.

Based on James' own testimony bits of the substances of existence are organized into unique structures of complex interactions that evolve together to constitute the human organism (one's material form and the sense of the self). These units of cooperative interaction can also evolve in ways displaying even more highly developed units of complex, organized, cooperative interaction that are defined as culture.<sup>23</sup> James envisioned this as a complementary connection between thoughts and things — a connection which he believed had been undermined with Kant's introduction of the transcendental ego and ever since then the bipolar relation has been very much off its balance.<sup>24</sup> In James own words, the ground for explaining the sense of self-other distinctiveness is that thought is a different sort of existence from things, because thoughts are not tangible; whilst in the thoughts that do resemble the things they are of (percepts, sensations), we can feel, alongside of the thing known, the thought of it going on as an altogether separate act and operation of consciousness.<sup>25</sup> What James is asserting here is that human consciousness is able to hold side-by-side the connection between the particular and the Universal.

---

<sup>21</sup> James W. (1890/1998). Principles of Psychology. Vol. 1. London: McMillan and Company. P. 291 & 304.

<sup>22</sup> James W. (1984). Essential Writings. Albany, New York: Published by State University of New York Press. P. 104.

<sup>23</sup> Ibid. P. 292.

<sup>24</sup> James W. (1912). Essays in Radical Empiricism. New York: Longman Green and Company. P. 1.

<sup>25</sup> James W. (1890/1998). Principles of Psychology. Vol. 1. P. 297.

James, himself, articulated a version of the complementarity principle (or probability theory) that is strikingly similar to the way it was used in quantum physics. James argues that nature provides a myriad of possibilities, “Of two alternative possibilities that one conceives, both may now be really possible; and the one becomes impossible only at the very moment when the other excludes it by becoming real itself.”<sup>26</sup> James describes the formation of self as initiated by interactions with environmental possibilities added to the way the individual conceives of the encounter(s). A person makes choices in response to the environmental stimulus on the basis of biological or conceptual value preferences. The individual’s response determines experience (what becomes realized, conceived, or actualized by the person). The human interpretation of phenomena, the construction of culture and the notion of the self are conceived in this way. Selectivity (what some scholars call intentionality) is a matter of a selective preference where some part of what is enmeshed into the whole fabric of reality becomes the chosen focus of perception thus, becomes foreground and is distinguished.<sup>27</sup>

For American Pragmatist C. S. Peirce the basis of how the notion of the self is formed is described best as resulting from an interaction between the way in which the interpretant (the Third) perceives the connection with the ontological ground of being (the First) as mediated by the manifestations of the phenomenal world (the second). Peirce provides a clue to how the principle of complementarity facilitates insight into this interaction by proposing an explanation of the ontological nature of existence based on the notion of continuity (*synechism*). Peirce described existence in terms of continuity between aspects of Being where each mirrors the other or reflects the other.

1. The First — Peirce thought of *The First* as the original signifier and all else is an interpretant. The First can also be defined as creation’s primordial life-generating force which is manifest as phenomena.

2. The Second is the way the essence of Being is manifested, presented or represented. Peirce calls this aspect a sign (or a symbol) thus, for Peirce the manifestations of existence are signs reflecting *The First* or pointing back to “The Source” (to use Taoistic terminology). Language and cognition are types of signs.

3. The Third is the meaning, interpretation or understanding produced. *The Third* as an interpretant can be on the basis of science, rationality or spirituality. Thus, *The Third* relies on an accurate appraisal of the connection between The First and The Second.

Peirce asserted that where self-knowledge and distinctiveness are concerned even scholars who are expert in the study of neurobiology and cognitive psychology meet with serious difficulty where everything must seem paradoxical.<sup>28</sup> The problem results because even those who are well-informed associate the self with being distinct from the second and the first. Self-knowledge is inhibited when the self is conceived of as an atomistic, autonomous, individual isolated from constructive interaction with The Second and The First. The problem has to do with the difference between continuity and isolation which Peirce tried to resolve with his theory of *synechism*. Peirce described continuity as the possibility for discrete units to display enormous complexity (discrete units can experience intentionality and feelings plus, more complex discrete units can experience knowing, and thought). However,

<sup>26</sup> James W. (1956 [1897]). *The Will to Believe, Human Immortality*. Vol. 1–2. Mineola, New York: Dover Publishing Company. P. 150–151.

<sup>27</sup> Ibid. P. 483–604.

<sup>28</sup> Peirce C. S. (1958). *The Collected Papers of Charles Sanders Peirce*. London: Oxford University Press. P. 224–225.

Peirce's synechism theory adds that experience, intentionality, information, feelings, sensations, thoughts and consciousness are not merely discrete unrelated final ends that suddenly appear as an epiphenomena or emergent feature in particular entities but, exist as potential in the originating source, and as potential features that continued to evolve.

For Peirce information is a type of language encoded into the fabric of existence and decoded by human consciousness.<sup>29</sup> Information (which Semioticians believe to be a fundamental feature of existence) generates interconnectedness by its predisposition to link biological elements into a complex unity. The information encoded into each individual human organism acts as a blueprint that urges acts intended to fulfill the intention of the individual's natural biological value preference. In other words, complementarity, for Peirce, provides a means for filling the Kantian gap between the primordial life generating force (the First) and mind (the interpretant or the Third). The gap is filled by the information that the life generating force encoded into the fabric of existence (the Second). Self-knowledge, in this sense, is constructed from an accurate appraisal of the interaction between the knower (that is fundamental feature of biological make-up of organic organisms) and the information encoded into the other mineral, chemical and biological aspects of existence.

One must remember that for Peirce thought (language) is also a sign that provides insight into the nature of The First. Peirce clearly believed that the normal mind's tendency to insist on conceiving of itself in terms of atomistic individuality heightens the sense of distinction between the self and existence. However, a semiotic perspective on existence leads to the realization that the life generating force — that is fundamental to nature's biological composition — shapes complexity into what we understand to be the self (an interpretation of the connection one has with existence that is mediated by mind, conceptualizations and culture). The original biological forces (the roots of Pragmatism leaves some openness for how life's underlying creative forces are defined) that generated complex biological organisms contained the possibility of mind/*logos* (which became a discrete factor of existence). Flourishing, in terms that humans appreciate most, demands aligning individual value preferences with nature's basic biological principles (or with nature's basic biological intentions).

Pragmatists avoided the realism-antirealism schism over how the experience of phenomena relates to the true nature of Being (realism versus transcendental idealism) by placing the emphasis on the human value preference to interact with phenomena in a way that is in line with the things most valued in the human experience. John Dewey attempted to re-unite the fragmented individual — that had been pulled apart under the influence of *philosophical idealism* — by establishing a complementary connection between the self and the ultimate ground of being. By doing this Dewey reduces the ontological gap between nature, humanity, and human culture. Dewey agreed that self-knowledge includes an awareness of the essential interconnectedness between the human biological nature and the life-generating force(s) that ordained the biological principles of existence.

Dewey explained that humans have an inherent biological value predisposition to experience

complementarity. Dewey's version of Pragmatism reflected a perspective on complementarity that he described as a human value preference that favors relating to things in nature in ways that shape environmental interactions into outcomes that are beneficial for individuals and cultures. In other words the value preference for complementarity can be defined as a natural function of nature's intentionality to prompt a human preference for more

<sup>29</sup> Peirce C. S. (1958). The Collected Papers of Charles Sanders Peirce. P. 19–20.

beneficial interactions. “For the individual there is a value in survival and reproduction, and for a culture there is a value in continuity. But natural function takes place only within a set of prior assignments of value (including purposes, teleology, and other functions).”<sup>30</sup>

For Dewey epistemology is an inquiry into the means of gaining reliable knowledge of how to eliminate the dualistic nature-human gap which will in turn generate knowledge of how to experience more beneficial interactions. Reliable knowledge — insight into the connection between humanity’s inherent values, the teleological significance of intentionality, and humanity’s social psychological preference — is indeed a conceptualized understanding of how to align human action with the neural value preference. Knowledge provides understanding of how diversity can be shaped into cooperative unity.

Humanity’s fundamental cognitive experience began with learned responses to environmental stimulus. These cognitive abilities have been a special capacity that have played an important role in formulating our response to the challenge of unpredictable encounters, formulating an understanding of what it means to be human (as we understand ourselves at this stage of human development) and, the understanding of how patterns of learned behavior shape culture. This ability, if not a special gift of nature, certainly was developed to help humans have a better experience with nature as well as with each other. Humanity has learned that culture, as an extended network of complex cooperative structures, supports thriving in spite of the challenges that humanity is confronted with. However Pragmatists would add that survival is enhanced by enlarging the scope of beneficial and cooperative interactions.

Thus, the Holistic perspective stressed by Pragmatists based on a triadic and semiotic view of existence stresses a complementarity perspective on nature-human interactions (that the inherent drive for growth and increased complexity — imprinted into organic organisms by nature’s underlying biological principles — is achieved best when individuals have a complementary interaction with the environment). The experience of life as we appreciate it most results from attunement with one’s inherent neural value preference which means an attunement with the fundamental biological principles of existence. One way to appreciate what this entails is to survey a few representative types of organism-environment couplings, starting with single-cell organisms and moving up by degrees to more complex animals. “In every case we can observe the same adaptive process of interactive coordination between a specific organism and recurring characteristics of its environment.”<sup>31</sup>

Pragmatists argue that humanity has been predisposed with a neurological (cognitive) inclination that prompts shaping interactions into complex units of structured cooperation (this is true for the individual as it is for the culture). Contemporary science affirms that we witness intentionality as a part of the interaction dynamics of organic organisms — at the smallest cell level and at the more complex scale of social interactions and social structures. Reliable knowledge — insight into the connection between nature’s life-generating forces, intentionality (the teleological intention of the life-generating force), and the humanity’s social psychological preference — is indeed a means of eliminating the gap by increasing the understanding of essential interconnectedness. The appreciation of the link between life’s biological principles and mind plays an important role in formulating the social psychological understanding of personal well-being and social flourishing.

<sup>30</sup> Searle J. (1995). *The Construction of Social Reality*. New York: The Free Press. P. 6 & 15.

<sup>31</sup> Johnson M. & Rohrer T. (2007). *We are Live Creatures: Embodiment, American Pragmatism, and the Cognitive Organism // Body, Language and Mind*. Vol. 1 / eds. T. Ziemke, J. Zlatev & R. Frank. New York: Mouton de Gruyter Publishers. P. 24.

Dewey was critical of modern philosophy's attempt to shape reality on the basis of reason while at the same time divorcing reason from reality.<sup>32</sup> In accordance with the triadic, semiotic, interactionist view of ontology Dewey stressed that humanity's biological nature is an unique composition of the biological dimension of nature thus, reflects the biological composition of nature. Dewey recognized that because humans, like all animals, adapt to the environment in ways that effect the environment; "any disequilibrium of an organism in its environment, encompasses both organism and environment."<sup>33</sup> In that respect one reflects the other (self-knowledge is partially based on understanding human nature or the way in which triadic interaction mirrors the ontological nature of existence).

Dewey argued that nature's biological principles have encoded organisms with life-enhancing urges, impulses and tendencies. These biological intentions are manifest as an impulse (that urges types of cooperative interaction that evolved into complex organisms and shaped human interactions into cooperative units we call cultures). The life principle has imbued organic elements with a natural urge that motivates a preference for beneficial interchange. This interchange is the only means for nourishment and growth.<sup>34</sup> An extended range of cooperative interchange is necessary because (life actually demands a continuous interchange between life elements).

Dewey proposed that cultures are ethically obliged to align their mega organic structure with humanity's natural biological predisposition. Dewey believed that a cultural worldview represents an accumulation of knowledge of how to manage interactions in ways that promote the flourishing of the culture. Human culture was spurred on by the realization that cooperative interaction is not only basic to maintaining individual integrity it is essential for the integrity of all structured units. This means that for a culture to flourish its worldview must be based on an understanding of how to expand its scope of internal and external cooperative interactions. In other words to promote a thriving culture neural value preferences must be shaped into the worldview of the culture (the culture's foundational normative principles and its most cherished values).

### **Pragmatism and Complementarity: their Contribution to Science and Philosophy**

If one traces the notion of semiosis back to its roots in the philosophy of Peirce it is described in a way that gives a clearer picture of how The First, The Second and The Third are in complementary relation thus, contributes to a more viable approach to epistemological inquiry and ontological investigations. Peirce would say that self-knowledge is indeed formulated by means of appraising the relationship between the life principle (Universals) and the self (particulars). I argue that Peirce is describing something similar to the principle of complementarity (also in a similar way that James explained the concept).<sup>35</sup> Peirce understood that the primordial life generating force that shaped the biological nature of existence (that he called the origin of things) evolved into humanity's biological nature. The elements of nature do not exist in isolation from each other but as an organic whole

<sup>32</sup> Dewey J. (1920). *Reconstruction in Philosophy*. New York: Henry Holt and Company. P. 50–51.

<sup>33</sup> Dewey J. (1929). *Experience and Nature*. London: George Allen & Unwin, Ltd. P. 253.

<sup>34</sup> *Ibid.* P. 277–278.

<sup>35</sup> James W. (1890/1998). *Principles of Psychology*. Vol. 1. P. 479.

(each part is ecologically connected with every other part). Even what appears to be not self becomes the basis of how the self is composed and realized (the self exists as a continuity of biological elements, forces, and principles).

Research in complementarity (conducted by physicists, biologists, psychologists and sociologists) reveals that the concept offers an explanation for the link between how humans self-organize, the structuring of culture, and humanity's relationship to the environment.<sup>36</sup> Neuroscientist Gerald Edelman suggests that the principle of complementarity explains that interactions occurring between individuals, within cultures, between cultures, and interactions between nature and humanity are manifestations of a neural value predisposition that was ordained by nature's biological forces. Edelman implies that complementarity explains the connection between nature's creative forces, nature's biological principles, humanity's biological nature, and value preferences triggered as human cognitive skills evolved.

What is true for self-formation is true for knowledge formation placing Pragmatism within a Constructivist framework of knowledge formation. "Knowledge is not *something separate and self-sufficing, but is involved in the process by which life is sustained and evolved.*"<sup>37</sup> Pragmatist philosophy reflects a notion similar to complementarity in its explanation of the connection between nature's fundamental biological life-enhancing principles — that are encoded onto the ontological make-up of nature's biological elements — and humanity's biological nature (natural human tendencies). "The world is subject-matter for knowledge because mind has developed in that world; a body-mind, whose structures have developed according to the structures of the world in which it exist, will naturally find some of its structures to be concordant and congenial with nature, and some phases of nature with itself."<sup>38</sup> Pragmatists conceive of the gap between fact and value being mediated by continuity (complementary interaction) between biological principles as they are manifest in various forms (a type of empirically based idealism/Universalism).

Pragmatism bridges the gap and at the same time explains the connection between experience and the unfathomable (Peirce explains this connection in terms of *Il Lume Naturale* — an affinity between mind and nature).<sup>39</sup> In several of his writings Peirce analyzes the metaphysical issue of how something ethereal (mind) clearly interacts with and affects what is tangible thus, shedding more light on that aspect of existence that heretofore was considered indiscernible. He does this by pointing out that there is a complementary connection between the self (humanity's biological nature and the human neural structure) and the phenomenal world. In other words for Peirce there is a confluence of "what is out there" (a signal encoded by biological principles) and the human cognitive capacity (something "in here" that is shaped by biological principles with the ability to decode that information).

Dewey believed that if thought occurs on the basis of a discrete, autonomous, individuation then science cannot claim that it is possible for the subject and object of experience to stand in epistemic relations to each other or, as put by James, given the problem

<sup>36</sup> *Berntson G. & Cacioppo J.* (2008). *A Contemporary Perspective on Multilevel Analyses and Social Neuroscience // Interdisciplinary Research: Case Studies from Health and Social Science* / eds. F. Kessel, P. Rosenfield & N. Anderson. Oxford: Oxford University Press. P. 36–37.

<sup>37</sup> *Dewey J.* (1920). *Reconstruction in Philosophy*. New York: Henry Holt and Company. P. 87.

<sup>38</sup> *Dewey J.* (1998). *The Essential Dewey: Pragmatism, Education, Democracy*. Vol. 1. / eds. L. Hickman, T. Alexander. Bloomington, Indian: University of Indiana Press. P. 145.

<sup>39</sup> *Peirce C. S.* (1960). *Collected Papers of Charles Sanders Peirce*. Vol. 1–4. Cambridge: Harvard University Press. P. 127–128.



of separation between concepts and *things within themselves* science will continue to have an epistemological problem for knower is one concept and known is another both separated by a chasm.<sup>40</sup> Dewey defined the fact of the interpenetration of various natural elements as the basis for the co-construction of things of nature. He also thought of the co-mingling of natural elements as resulting in the co-construction of the sense of self and of human culture. Self-realization and reliable knowledge are based on the understanding that the co-mingling and co-construction that shapes reality means that the private self is merged with the wider reality and in this respect self-knowledge immensely transcends the immediate self to realize being in its widest sense.<sup>41</sup>

William James states that consciousness has a propensity to shape phenomena into some type of meaning that provides a sense of unified continuity (the human capacity for interpretation gives rise to the interpretant or, what becomes conceived of as the self). In this sense James influenced science to consider that what we take to be reality is a conceptual construction of interaction-between the manifestations of the life principle, how that is experienced as particular phenomenon, and the interpretant. Thus, James' depiction of the principle of complementarity influenced the epistemology and ontology of science plus the philosophy of science by introducing a complementary way of looking at the connection between objects and our representations of them.

Gradually the principle of complementarity was recognized by the sciences and the philosophy of science for providing logico-mathematical grounds for a complementary description of what heretofore had been exclusive descriptions (although by means of a para-consistent logic).<sup>42</sup> Pragmatism began to be recognized for contributing to mediating the relationship between science and the philosophy of science. It does this with both an empirical and logical manner of making our ideas clear that emphasizes that what we conceive of as real (or what we conceive of as knowledge) is the conceptualization of experience. "Logic may give us the science of the *intelligi*, the philosophy of nature of the *percipi*, but only psychology can give us the systematic connected account of the *experiri*, which is also in its wholeness just the *experior* — self-consciousness itself."<sup>43</sup>

### **Pragmatism contributes to the notion of philosophy as scientific discourse with its assertion**

that if the science of the self (or mind) is the study of how biological elements can evolve into self-awareness, what else can philosophy be in its fullness but a type of knowledge formation. In this respect Pragmatism explains that the study of self (in terms of interrelatedness between the information in nature (manifested as information encoded into nature's

<sup>40</sup> Gale R. (2002). The Metaphysics of John Dewey / transactions of the Charles S. Peirce Society. Vol. 38, № 4. P. 500.

<sup>41</sup> Dewey J. (1967). Early Works of John Dewey. Vol. 2, 1882-1898 // Psychology. 1887. Vol. 1. Carbondale: Southern Illinois University Press. P. 245.

<sup>42</sup> Da Costa, Newton. & Krause, D'ecio. (2009) Complementarity and Paraconsistency. *Logic, Epistemology, and the Unity of Science*. Volume I. (Rahman, Shahid. Symons, John. Gabbay, Dov. & van Bendegem, Jean Paul. Edits). Dordrecht, Netherlands, Springer Publishing, 558.

<sup>43</sup> Dewey J. (1886). Psychology as Philosophic Method // Mind. Vol. 11, № 42. P. 160.

elements), mind, and the evolution of this interaction into self-knowledge is not merely the highest of the sciences but is Science.<sup>44</sup>

With such approaches to ontology and epistemology what had seemed incongruous can be explained in a way that offers more pragmatic meaning to peoples' lives. This resolution is justified because, as Karl Popper points out, "It can easily be shown that if one were to accept contradictions then one would have to give up any kind of scientific activity: it would mean a complete breakdown of science."<sup>45</sup> In this sense linguistics for Pragmatist are defined as the means by which philosophers perform rational (logical) communicative interaction (inquiry). Pragmatism reduces "The tension between the particularism of world disclosure and the universalism of fact-stating. Language is no longer seen as a means of representing objects or facts, but as the medium of expressing a people's spirit."<sup>46</sup> This opens the way to get at the very premises of science and the philosophy of mind (that an individual can be aware of self and at the time realize the underlying principles, the Universals, or laws of nature that shaped it.<sup>47</sup>

## References

- Abhedananda S.* (1905 [2005]). *Vedanta Philosophy: Self Knowledge (Atma-Jnana)*. Whitefish, MT: Kessinger Publishing.
- Apel Karl-Otto* (1998). *From a Transcendental Semiotic Point of View* / ed. M. Papastephanou. Manchester, UK: Manchester University Press.
- Apel Karl-Otto* (1994). *Karl-Otto Apel: Selected Essays. Vol. 1: Towards Transcendental Semiotics* / ed. E. Mendieta. Atlantic Highlands, New Jersey: Humanities Press.
- Berntson G. & Cacioppo J.* (2008). *A Contemporary Perspective on Multilevel Analyses and Social Neuroscience // Interdisciplinary Research: Case Studies from Health and Social Science* / eds. F. Kessel, P. Rosenfield & N. Anderson). Oxford: Oxford University Press.
- Da Costa N. & Krause D'ecio* (2009). *Complementarity and Paraconsistency. Logic, Epistemology, and the Unity of Science. Vol. 1 / eds. S. Rahman, J. Symons, D. Gabbay & J. P. van Bendegem*. Dordrecht, Netherlands: Springer Publishing.
- Dewey J.* (1967). *Early Works of John Dewey. Vol. 2, 1882-1898 // Psychology. 1887. Vol. 1*. Carbondale: Southern Illinois University Press.
- Dewey J.* (1998). *The Essential Dewey: Pragmatism, Education, Democracy. Vol. 1 / eds. L. Hickman, T. Alexander*. Bloomington, Indian: University of Indiana Press.
- Dewey J.* (1929). *Experience and Nature*. London: George Allen & Unwin, Ltd.
- John Symons (Editor) Visit Amazon's John Symons Page* *Dewey J.* (1886). *Psychology as Philosophic Method // Mind. Vol. 11, № 42*.
- Dewey J.* (1920). *Reconstruction in Philosophy*. New York: Henry Holt and Company.
- Diamantopoulos C.* (2007). *Thoughts on Logical Positivism, Simon's Decision Theory and the Aristotelian Teleology*. Athen, Greece: Published by the Institute of European Integration and Policy.
- Feyerabend P.* *Realism, Rationalism and Scientific Method: Philosophical Papers. Vol. 1*. London: Cambridge University Press.
- Folse H.* (1994). *Bohr's Framework of Complementarity and the Realism Debate // Neils Bohr and Contemporary Philosophy / eds. J. Faye, H. Folse*. The Netherlands, Kluwer Academic Publishers.

<sup>44</sup> *Dewey J.* (1886). *Psychology as Philosophic Method*. P. 166.

<sup>45</sup> *Popper K.* (1940). *What is Dialectic? // Mind, New Series. Vol. 49, № 196*. P. 408.

<sup>46</sup> *Habermas J.* (1999). *Hermeneutic and Analytic Philosophy: Two Complementary Versions of the Linguistic Turn*. Royal Institute of Philosophy Supplement. Vol. 44. P. 53–54.

<sup>47</sup> *Ibid.* P. 64.

- Friedman M.* (2000). *A Parting of the Ways*. Carnap, Cassirer, and Heidegger. Peru, Illinois: Open Court Publishing Company.
- Gale R.* (2002). *The Metaphysics of John Dewey* / transactions of the Charles S. Peirce Society. Vol. 38, № 4.
- Gardner S.* (2007). Philosophical aestheticism. *The Oxford Handbook of Continental Philosophy* / eds. B. Leiter and M. Rosen. (75–121). Oxford: Oxford University Press.
- Habermas J.* (1999). *Hermeneutic and Analytic Philosophy: Two Complementary Versions of the Linguistic Turn*. *Royal Institute of Philosophy Supplement*. Vol. 44.
- Heidegger D.* (2010). *Heidegger's Technologies: Post phenomenological Perspective*. New York: Fordham University Press.
- James W.* (1912). *Essays in Radical Empiricism*. New York: Longman Green and Company.
- James W.* (1984). *Essential Writings*. Albany, New York: Published by State University of New York Press.
- James W.* (1890/1998). *Principles of Psychology*. Vol. 1. London: McMillan and Company.
- James W.* (1956 [1897]). *The Will to Believe, Human Immortality*. Vol. 1–2. Mineola, New York: Dover Publishing Company.
- Johnson M., Rohrer T.* (2007). *We are Live Creatures: Embodiment, American Pragmatism, and the Cognitive Organism // Body, Language and Mind*. Vol. 1 / eds. T. Ziemke, J. Zlatev & R. Frank. New York: Mouton de Gruyter Publishers.
- Kant I.* (1987). *Critique of Judgment* / transl. by W. Pluhar. Indianapolis: Hackett Publishing Company.
- Kant I.* (translated copy 1996). *Critique of Pure Reason* / transl. by W. Pluhar. Indianapolis, Indiana: Hackett Publishing Company Inc.
- Peirce C. S.* (1960). *Collected Papers of Charles Sanders Peirce*. Vol. 1–4. Cambridge: Harvard University Press.
- Peirce C. S.* (1958). *The Collected Papers of Charles Sanders Peirce*. London: Oxford University Press.
- Plato* (1952). *Plato's Phaedrus* / translator R. Hackforth. Cambridge, U.K.: University of Cambridge Press.
- Popper K.* (1940). *What is Dialectic?* // *Mind*, New Series. Vol. 49, № 196.
- Rorty R.* (2000). *Philosophy and Social Hope*. London: Penguin Books.
- Rorty R.* (1987). *Platonists, Positivists, and Pragmatists // After Philosophy: End or Transformation?* / eds. K. Baynes, J. Bohman, & T. McCarthy. Cambridge, MA: Massachusetts Institute of Technology.
- Russell B.* (2005). *The Value of Philosophy*. *Philosophy: Basic Readings*. 2<sup>nd</sup> ed. / ed. N. Warburton. Abingdon, Oxon: Published by Routledge.
- Saunders S.* (2005). *Complementarity and Scientific Rationality*. *Foundations of Physics*. Vol. 35, Issue 3.
- Searle J.* (1995). *The Construction of Social Reality*. New York: The Free Press.
- Searle J.* (1992). *The Rediscovery of the Mind*. Massachusetts: MIT Press.