Peirce's Theory of Interpretation

Cheongho Lee

I. Introduction

Charles Peirce attempted to elaborate his philosophy of nature by denying the Cartesian distinction between mind and body and also by contesting Kant's critique of metaphysics. Peirce represents metaphysical notions as "hypotheses."[1] For Peirce, the propositions hold true as hypotheses, or, interpretations based on our understanding of the world. Naturally, we need philosophy of nature in order to perform inquiries of the world, and also to construct an adequate theory of interpretation.[2] Robert Neville sees that Peirce suggested a complex and interesting philosophy of nature, drawing our attention to the work of "mind," especially its appropriation of signs.[3] Mind manifests nature by using signs in every form of inquiry, and indeed, such interpretive activity is already present in *all* experience for Peirce. Peirce's semiotic theory of interpretation, however, does not exclude any influence of matter regarding experience. It is true that in Peircean scheme, matter is "effete mind" (CP[4] 6.25). But matter as effete mind is one of Peirce's hypotheses of his version of "objective idealism," which intends to deny the materialistic doctrine that inevitably separates the laws of mind and of body by making the former subordinate to the latter (CP 6.24). The old laws of mind and body are brought together

---

[1] Robert C. Neville, *Recovery of the Measure* (Albany: State University of New York Press, 2013), 3.
[2] Neville, *Recovery of Measure*, 4.
[3] Neville, *Recovery of Measure*, 14.
[4] CP refers to six volumes of the *Collected Papers of Charles Sanders Peirce* (Cambridge, Massachusetts: Harvard University Press, 1931-35) edited by Charles Hartshorne and Paul Weiss and the seventh and eighth volumes of the *Collected Papers* (Cambridge, Massachusetts: Harvard University Press, 1958) edited by Arthur W. Burks. The numbers indicate the appropriate volume and paragraph number of the *Collected Papers*. This system will be followed in the following pages.

under the influence of the "law of habit," which posits "the elementary phenomena of mind" that "fall into three categories" (CP 6.18).

The main objective of this paper is to investigate Peirce's semiotic theory of interpretation with regard to his theory of determination, as crossing over a "Whiteheadian bridge," following Carl Hausman's well-known account of Peirce's theory of interpretation. The theory of determination bears upon "aesthetics" in the primary sense of the term. That is, as the theory of feeling and the power of feeling to determine not only meaning, but process itself, both natural and semiotic, in their ineliminable overlap, the theory of interpretation is a kind of "aesthetic inquiry."

II. Interpretation as Communicative Process

Peirce's theory of interpretation is inevitably derivative from his theory of determination, which, simply put, comes down to the process by which the object determines signs and signs determine interpretants (CP 4.531). In terms of determination process, Peirce fleshes out his theory of interpretation from the three categories that perpetually turn up in Peirce's intellectual career. The three kinds of determination processes are, as Peirce names, icon, index, and symbol, each of which has a complex relation to Firstness, Secondness, and Thirdness. It is true that the three moments of semiosis are positioned at the center of Peirce's theory of interpretation.

It should be mentioned, before delving more into the theory, that, at the outset, interpretation is a *process* of interpretations of interpretations. The process of interpretation makes communication among persons continuous, and thus possible.[5] The continuity of process

---

[5] Peirce's synechism, his doctrine of continuity, describes the continuity of such processes. See CP 4.107~149.

itself follows the determination of "temporality" that has a structure of beginning to ending. For Peirce, the stream of consciousness is conditioned by temporal process where the temporally precedent determines the temporally descendant. In the relational flow of experience, the present *mediates* the past and the future.

In this sense, the triadic structure of Peirce's semiotics involves the relations much richer than the dyadic structure could do. As Gérard Deledalle rightly acknowledges, Saussurean semiotics is based on the dyadic division of the signifier and the signified, both of which are considered to be in a relation of *equal* exchange.[6] The equality between the sign vehicle and its content presupposes "a perfect correspondence between communicative intentionality on the one hand, and interpretation on the other."[7] This Saussurean semiotics, that Deledalle calls "code semiotics," is so limited that it lacks "adequate instruments" for describing the "semantic wealth of signs," which the two poles of *langue* and *parole* cannot contain.[8] The dyadic Saussurean semiotics thus neglects the extensiveness of the world of signs that overflows the two rigid poles, and fails to delineate realms of meaningful interpretation.

Now, the question is how Peirce's triadic semiotics fully appreciates the temporal determination in the communicative process of interpretation. As I insist, the possibility of communication should be approached from the standpoint of the theory of determination. At a glance, the process of determination seems to be directional; in Peirce's terms, an object determines its sign and a sign determines its interpretant. This succession leads to an *ad infinitum* process of sign-determination where signs as earlier interpretants infinitely determine

---

[6] Gérard Deledalle, *Charles S. Peirce, 1839-1914: An Intellectual Biography* (Amsterdam and Philadelphia: John Benjamins Publishing Company, 1990), xii.
[7] Deledalle, *Peirce,* xii.
[8] Deledalle, *Peirce,* xii.

interpretants that are further signs. Therefore, interpretation is defined as the chain of "mutual determination," which I shall explain below in more depth.

The directional mutuality in the communicative process should be based on *mediated* determinations before all else. Any cognition in thinking process is mediated and thus the way of inquiry could be continuous. Even in his early years, Peirce was setting himself against Cartesian presumption that blocks inquiries in real communicative process. While Descartes accepts "intuition" and "introspection" as two justifiable sources of evidence, Peirce denies that intuition and introspection provide *philosophically* important evidence. This position is revealed in "Questions Concerning Certain Faculties Claimed for Man" (1868), where Peirce clearly mentions his conviction that intuition and introspection fail to be *fully determined* by previous cognition.[9] Peirce's formal definition of an intuition is a premise in an argument which is not the conclusion of some earlier argument, in Peirce's own words, "a cognition [...] determined directly by the transcendental object" (CP 5.213). In the same essay, introspection is defined as "a direct perception of the internal world" which is not derived from external observation (CP 5.244). Judging from Peirce's theory of determination, therefore, introspection violates the direction from the external to the internal, which is "objectification," whereas intuition violates that from the internal world to the external world, which I call "subjectification" elsewhere.[10]

The real process of interpretation is a complex process of inter-determination that the determination of meaning depends on transferring of meaning vehicles, or, symbols as Peirce calls. As symbols, as the unit of communicative interpretation, are projected toward the

[9] According to Peirce, the cognition of mind is a process that continuously divines the nature as any change comes to pass. (CP 5.263)

[10] Cheongho Lee, "Peirce on Person: Peirce's Theory of Determination and the Existence of Personality," *Appraisal* 11-1 (2016): 28.

interpreter, the effect that intended symbols yield is much broader than actuality even in the least complex level. Proceedings of symbols should deal with the full purview of the real, which includes *more than* the universe of actuality.

Interpretation thus involves the problem of "intention" and "repetition."[11] More specifically, a give-and-take action of signs is a mere repetition of sign-sharing that is indifferent from determinate process. Interpretation means being adequately or meaningfully determined by an object, that is, by signs through and through. In interpretation where the object determines the sign and the sign determines the mediate interpretant, the determinative process that makes a person an interpreter is not simply done by accepting the sign suggested by the speaker. For instance, if someone says "there is a glass of wine," the speaker invites the interpreter to be similarly determined by the signs the speaker suggested. Signs given by the speaker act as a new object to the interpreter and the speaker *intends* for the interpreter to be determined by the signs which are actually *different* from those by which the speaker was determined. Communicative process thus means that, instead of just being determined as an interpretant by an object, the interpreter is determined by a "communicative effort." Leading to the *same* communicative result, or sharing same level of complexity, therefore, is not possible in the domain of symbolic references only through delivering signs. Communication necessarily involves intentive effort, by which the interpreter is determined to attain the same level of complexity.

---

[11] The problem of repetition and intention is related to the difference between extensional and intensional logic. Unlike extensional logic, like the case of repetition, where meaning is subordinate to reference, intensive logic concerns about how meaning is preserved, or how meaning is possible. For the possibility of meaning, exclusive and individuated reference is not necessary, since meaning is in essence ambiguous. But there should be the principle that brings meaning in the flow of ambiguous process of experience and this can be investigated from the perspective of intensive logic, by which we could investigate intentive communicative process.

III. Peircean Categories and Interpretation

Now, the question is how the interpreter determines, or is determined by, the communicative effort. Processes of interpretation as communication succeed once one attain meaningful experience. Again, Symbols as Thirdness dominate the exchange of sign-objects between the speaker and the interpreter. The Thirdness of a glass of wine is an object to the interpreter, which is interpretable, intelligible, and thus makes sense to the interpreter. But in order for the interpreter to see what comes next, the interpreter has to have some resistance from the given sign. The sign, then, at one and the same time, provides the resistance in the form of question such as "Is it really wine?", whether it is conscious or not. That resistance is the Secondness of the object. The Firstness of the object includes in it the *intelligibility* as an object and the *potentiality* of resistance in the form of such questions.

It should be noted that this Secondness itself is a sign that has icon, index, and symbol. Iconicity in this sense is the Firstness of Secondness. The Secondness of Secondness is indexicality, which is the power to pick something out in the Thirdness of this Secondness, which is its symbol. Again, symbolic power is communication that invades the meaning which consists of temporal process. In other words, temporal unit is the necessary condition of meaning; to mean something, the communicative effort must be performed in a temporal continuum from a past to a future. Thus, the past result of the process is expected to be extended in the future, which is the Thirdness, while the current result is Secondness of the sign. By being Firstness as an interpretant, determinability as an interpretant functions in the same way that there must be something receptive that could be determined by physical object. This is a certain brute existence that is open to feeling the world.

The Secondness of the interpreter is thus one's intelligent manipulation of the sign

world in order to get at the object world. In other words, I should have the power of language or at least a power to move signs around to be determined by communicative effort. It should be noted that the intelligent manipulation is not language yet. Language is one example of how we manipulate signs. The interpreter has that power of signs, not just the Thirdness of signs, that have to do with the moments in which signs become *thought*, the minimal unit of meaningful experience. In this way, following the whole temporal process of manipulation, the interpreter can successfully think. The preceding provides an example of a successful semiosis.

IV. The Structure of Reflective Thinking

The manipulation of signs underlies Peirce's concern regarding how the reflective thinking is possible. From this line of interest, Peirce focused on the investigation of operating principles of hypothetical thinking. The operation of hypothesis, or abduction as he names it, is based on the structure of reflective thinking. Peirce acknowledges that active thinking which precedes reflection becomes reflective following the structure that presides in nature. The formalization of reflective thought, therefore, sheds light on the process by which our cognition that have happened already becomes reflective in a determinate way.

The order of reflective thought has some applicability to active thinking; we can actually think following the order of reflective thought, even if there is more to thinking than reflection can capture or govern. Constructively rearranging a thought that we already succeeded in thinking actively provides us with a structural relationship in reflection. The order of reflective thought has the organicity as we shall see below. The structure of reflective thought is applied to all areas of knowledge, which is not reducible to any physical treatment of knowledge. Discovering out the existing overlap of the order of reflective thought and the order of active

thinking is a crucial point to which Peirce paid tremendous attention, even though the overlap is never fully grasped by any finite effort.

Thinking includes all that falls within the realm of attention at the moment. In our actual semiotic process, attention functions as a razor that cuts out not only all of the unnecessary sensory manifold, but also all of the other present thinking until it gets down to one thing, the most attention-worthy point in the present event. What is important here is that reflection is limited to things that attention was paid to. Attention is thus an act that opens a gateway to the content of future reflection. In other words, only those images that have been attended to *can* be ordered in reflection. This limitation holds even in the case of negation. Our experience of negation is limited to the abstract *generation* of concepts, wherever we do not possess previous experience. In thinking negatively, we reflectively respond by generating concepts in an attempt to find related concepts. In this sense, our reflection in the form of negation, or the act of negation itself, is *not* what is negated. It is a process of generating an image of things based on our previous experience. In the case of negation, attention is a condition *for* reflection.

The structure of reflective thinking should be intensively relational and ordinal. It does not matter whether reflective thinking regards intensive or extensive magnitudes, because "first", "second", "third" applies to both. Even if their definitions are not clear, even if they are not measurable, and even if there is just no noticeable difference, still, there are always three moves, and those three moves are ordinally enacted. Intensive relations are clearly ordinal. Intensive magnitudes are experienced in one moment, whether the adjacent moments are extensively individuated or not. The important point is that all meaningful significations happen in the

continuum of ordinals.[12]

Successful semiosis can be carried out entirely in the realm of meaning.[13] Semiosis is ordinal in character that cannot have an exclusive extensive correlate. The ordinal relations are not discrete gradations, all of which are present in every aspect of the movement. For Peirce, "Firstness", "Secondness", and "Thirdness" are thus present in any event of semiosis, that is, at every stage and in every part of the whole of semiosis. Therefore, the theory of semiosis is not merely restricted to a theory of reference. It is not about how you pick out things in the world, but about how things in the world *mean* anything according to the structure of reflective thought.

V. Hausman's Reading of Peirce: Brokenness of Symbol

In order to get a sound sense about how the success of semiotic activity could be explained in Peirce's theory of interpretation, it is beneficial to inspect Hausman's notion that "a sign is an instance of a semiotic process,"[14] which epitomizes the generation of the sign and its interpretation. Once again, the whole process of semiosis has to do with the sign's becoming an object, which then becomes a sign again. The sign is a point of entry into the semiotic process. What starts as an object becomes a sign that points to another object. On both sides of the sign we find either an object or an interpretant and, thus, there is no absolute distinction to be made

---

[12] People can have different ideas about what would be a minimal collection of ordinal relations necessary to explain how reflective thought applies to active thinking, and active thinking to action which Peirce saw three.

[13] It seems obvious that some would have a hard time in understanding Peirce's idea here, because they think the realm of meaning is limited to intelligibility of mind. But the realm of intelligibility is not necessarily limited to what is intelligible to the mind, specifically the human mind, because a sign interpretation is possible even in a situation where the mind is momentarily dormant.

[14] Carl R. Hausman, *Charles S. Peirce's Evolutionary Philosophy* (Cambridge and New York: Cambridge University Press, 1993), 72.

among sign, object, and interpretant. But since the semiotic activity is a process, which temporally flows, tracing any sign backward is possible and it is the "history" of semioses which are held in the interpretant and brought forward to the interpretant. Thus far we follow Hausman. But here must add that the future semioses which are held in the object must be transformed into a broken relation *to* the interpretant as the object, through its operating as a sign; it thus becomes a *part* of the interpretant.

A broken symbol, however, allows for historical continuity, which is easily understood within Peirce's theory. Through the semiotic processes, the Interpretant becomes a repository for all of the semiotic activity. But there are limits; the interpretant is finite since ensuing interpretants are contained and the initial interpretant has to undergo a "transformation" to contain them. Thus the past is altered by the present to some extent.[15] The interpretant is both transformed *and* constant through the process of semiosis and eventually the interpretant is what grows. The sign is something that points to the future and to its own growth in terms of meaning and also intelligibility, or knowability. The interpretant accumulates through the semiotic processes as "Mind."

Another important point in Hausman's reading of Peirce's semiosis is its elaboration on "the infinitesimal and determination."[16] For Hausman, the increments of semiosis are infinitesimal. In growth, there is no least unit that is discrete. Infinitesimals are conditions for determination.[17] This seems relevant to me in terms of actuality. The actual process of semiosis is possible without recourse to any "quantifiable" unit. As a matter of analysis, however, the

---

[15] I think Peirce's view of "presentism" seems to have been corrected after 1902. After that time, for Peirce, semiotics is not a philosophy any more, mainly due to being affected by Royce's *World and the Individual*. See Hausman, 162.

[16] Hausman, *Peirce's Evolutionary Philosophy*, 188-89.

[17] Hausman, *Peirce's Evolutionary Philosophy*, 188.

phenomena must be observable. In order for us to watch the growth, we have to analyze the continuity itself, which consists of infinitesimal increments. Hence the following discussion will assume, contrary to fact, the observability of all growth; but I recognize that only the effects of growth are thus observable. In other words, what can be observed is the result of the growth rather than the infinitesimal increments.

Now, it seems clear that the infinitesimal increments consist of the continuum of possibilities, which cannot be unambiguously quantified, but are observable in the growth of the continuum itself. At this point, an infinitesimal is defined as a possibility that is not exhausted in the analysis of any given individuals. Infinitesimals range across individuals throughout a series of continua. A continuum thus exists for possibility. It is true that no finite analyses can demonstrate infinitesimal discontinuity; yet, individuals are real and this implies discontinuity at some level. Discrete individuals that are synthesized into one do not bring an absolute continuum into existence. A continuum would require more than that. The continuum must have "parts" in order to be created at all.[18] But the continuum is not merely collections of possibilities; it is rather an event, the *concrescence* of possibilities and actualities. The reality of event implies that there is only infinitesimal difference between the collections of possibilities of ingression and the constellation of possibilities as continuum in the structure of the possible.[19] It is manifest that the infinitesimal difference can make a real difference in the real world. Intelligibility thus depends on continuity. In other words, the intelligibility of continuous collections of possibility is the

---

[18] Hausman, *Peirce's Evolutionary Philosophy*, 59.

[19] Randall E. Auxier and Gary L. Herstein demonstrate three modes of ingression, that is, subjective mode, objective mode, and conceptual evaluation of ingression, in relation to the determinate order based on their reading of Whitehead's *Process and Reality*. For more detailed information, see Randall E. Auxier and Gary L. Hernstein, *Quantum of Explanation: Whitehead's Radical Empiricism* (New York: Routledge, 2017), 188-191.

proof of the continuity, which is irreducibly intelligible to us.

The continuum, for whatever else it may be, is a communication of the intelligibility of the process of becoming as semiosis. Ordinary processes of communication can be illustrated with 3D printers, for example, that can function below the level of physiological continuity. By "below," I mean that the information and meaning carried in the ones and zeroes is simpler than physiological wholes even if perhaps comparable to bits of genetic code. The way that 3D printers produce physical artifacts from discrete parts (ones and zeroes) is literally the imitation of reality that is *approximately* recreated in binary information. In other words, computers, based on discrete mathematics, can reduce physical and even physiological information to parts which relate massive collections of ones and zeroes at overlapping levels of generality. The original whole (itself parts of reality) has been analyzed into binary by a radical reduction to units capable of computational analysis, which is the only thing that the machines can do.[20] In a sense, the genetic codes work in the full physiological complex in the sense that the two genetic units, ones and zeroes, are analogous to any two fundamental forces of nature; one is the organized, and the other is the not usefully organized. Peirce's metaphysics, that is considered counter to thermodynamics, does not neglect this feature of the universe. The movement of energy goes through time as creating time, as being organizing and organized process, *ahead of* space. What Peirce calls Agape is actually the temporal energy that creates the crystalized Mind and individual finite minds at the same time, which follows the two forces of nature. These are symbolized in the ones and zeroes which depict a semiotic process.

VI. A Whiteheadian Bridge over Peirce's Theory of Interpretation

---

[20] Auxier and Hernstein, *Quantum of Explanation*, 78.

The way that machines interpret reality positively considers the possibility of communication between and among computers and human beings. Whitehead's epistemology can be helpful regarding this issue. His concept of "flat loci" (bi-metric non-local relations) is used in this analysis. A flat locus is essentially a spatial region that represents the finite arrangement of ones and zeroes. A computer turns what it "sees" (the visual information to which it is exposed) into ones and zeroes according to mereo-topological schemata that follow Whitehead's axioms in Part IV of *Process and Reality*.[21] The analysis of the physics of seeing and perceiving in Whitehead therefore does work in the real world. How to teach a machine to see an image in three dimensions is based on the bi-metrical reduction of the real thing into mereo-topological regions reducible to ones and zeroes, by way of which something in the real world can be bi-metrically replicated.

The *living space* of human beings, however, is the Euclidian geometrical world, which is fully functional for human beings.[22] This is the world humans *feel* in the sense of *aesthesis*. The continuity of this felt world with the semiotic process is crucial for any theory of interpretation. Indeed, we might even identify the semiotic process with interpretation. For that reason, we have to find a way to present the world to the computers in such a way that it is recognizable as *our* world, where symbols function at all levels of experience, i.e. feeling, *aesthesis*. In order to teach computers to "cognize" things, we thus have to teach them another geometry, which involves all

---

[21] There were some minor problems with Whitehead's axioms that were resolved in a pair of article by Bowman Clarke, between 1981 and 1983. The results of Clarke's reformulation of the axioms provide a useful starting point for theoretical computer scientists in subsequent decades. Auxier and Hernstein, *Quantum of Explanation*, 89-90.

[22] Different sorts of biological beings may function in living spaces that are other than Euclidian. For example, according to Barbara Shipman, there is evidence that honey bees function in at least six dimensions. (available at http://discovermagazine.com/1997/nov/quantumhoneybees1263)

of the reductions of three dimensions to two.

The bi-metrical units of the real thing are accumulated until they attain a meaningful effect in mereo-topological regions. When meaningful effects cross the threshold that renders them intelligible to a semiotic perceiver, this is truly a mutual communicative process that involves reductions of semiotic processes into discrete parts, which is susceptible to being transferred into the units of ones and zeroes. These units are transmitted into the physical, electrical level of ones and zeroes by aid of the mediatory level which consists of many steps. We even have to let computers process the reduction of four dimensions, which includes time, to ones and zeroes. Their ability of sequencing time in a linear way involves recursive processes that move so fast, that the way we feel the movement of discrete parts is continuous, leading us to the interpret of the movement as continuous "sentence."[23]

Interpretation truly presupposes a continuity that consists of infinite infinitesimals as consistently mentioned above. An infinitesimal is "located" under the surface of discrete individuals so to speak. But all infinitesimals that belong to a continuum have *inner* connections. In order to be interpreted, the inner connections need to be disclosed. Following Whitehead, a reality has to be *actual* in order to exercise determination over our power of determination. The movement from the world of images that are presentationally immediate to a world we can communicate is possible because the world is open to discreteness; what is merely divisible becomes an actual division. As in the example of a 3D printer above, ones and zeroes could be treated as the least of entities. They are neutral with regard to what is being turned into discrete

---

[23] For example, a pianist plays the piano according to a perceptual timeframe. Computers can play Mozart, but this is a mere transferring of bi-metrically interpreted musical notes. Playing the piano has to be deployed in real time, which is not just a modal repetition. It involves "interpretation of sonic possibility" as we can witness in the case of improvised ad-hoc playing.

quanta. The ones and zeroes do not have favorites; they will treat everything as potentially ones and zeroes.

VII. Conclusion

Thus, concealed possibilities can be actualized when the continuum is broken, genuinely divided. In explaining the process that leads to perceptual judgment, Hausman's infinitesimal possibilities are brought into an initial moment of experience and they are determined as they become a potentiality of actualization.[24] The determination is then the outcome of spontaneous possibilities that are not distinguished from each other at the initial moment of experience. As the process of actualization, or the process of determination, proceeds, a continuum of infinitesimal possibilities starts to be broken and the continuity of the continuum enters into a mode that is ready to be *interpreted*. The change of mode includes inferential differentiation that moves from a First to a Second and into a mediated Third. In this sense, the mediation of a Third itself is interpretation, which includes abductive inference.

As Hausman suggests, "incommensurable numbers suppose an infinitieth place of decimals. … Thus, continuity supposes infinitesimal quantities."[25] Peirce once maintained that "[i]n adding and multiplying them [infinitesimal quantities] the continuity must not be broken up" (CP 6.125). But in an unbroken continuum there are no points that are marked (hence no genuine division), and that it is broken when marked by points (CP 1.168). Peirce truly acknowledges that possibility can be actualized when it is broken into parts.[26] For Peirce, if we see an enduring

---

[24] Hausman, *Peirce's Evolutionary Philosophy*, 189.
[25] Hausman, *Peirce's Evolutionary Philosophy*, 184.
[26] In a sense, Peirce may not understand possibility rightly, because he did not clearly mention whether possibility is created. In comparison, Whitehead treats possibility as uncreated.

datum as a continuum, it should be first broken in order to be interpreted, which is manifest in instances of Secondness.

According to Neville, in Peirce's pragmatic semiotics, signs possess the power to grow and generalize by extending themselves to increase the field of their mediation.[27] I emphasize here that the aesthetic dimension is brought to a fundamental level in the determination of "enjoyment." In the field of signs, the subjective enjoyment of interpreter can function as a main communicative factor in every step of experience.[28] Whether we are responding, acting, and truth-telling, all of our experience are aesthetic interpretation at bottom. More fundamentally, by providing relevant elaboration of the continuity of the felt world with the semiotic process, Peirce's theory of interpretation would remedy the modern mistake that separates thinking from other processes of nature, a mistake which is still incurably pervasive.

BIBLIOGRAPHY

Auxier, Randall E. and Hernstein, Gary L. *Quantum of Explanation: Whitehead's Radical Empiricism*. New York: Routledge, 2017.

Hausman, Carl R. *Charles S. Peirce's Evolutionary Philosophy.* Cambridge and New York: Cambridge University Press, 1993.

Lee, Cheongho, "Peirce on Person: Peirce's Theory of Determination and the Existence of Personality," *Appraisal* 11-1 (2016): 26-32.

Neville, Robert C. *Recovery of the Measure: Interpretation and Nature.* Albany: State University of New York Press, 1989.

Peirce, Charles S. *Collected Papers of Charles Sanders Peirce,* Vols. I-VI. Edited by Hartshorne, Charles and Weiss. Paul. Cambridge: Harvard University Press, 1931-35.

---

[27] Neville, *Recovery of Measure*, 48.
[28] This is the subjective universality in Kantian sense.

———. *Collected Papers of Charles Sanders Peirce,* Vols. VII-VIII. Edited by Burks, Arthur. Cambridge: Harvard University Press, 1958.

Pluhar, Werner S. trans., Kant, Immanuel. *Critique of Judgment*. Indianapolis: Hackett Publishing Company), 1987.

Whitehead, Alfred N., *Process and Reality.* New York: The Free Press, 1978.

Discover. "Quantum Honeybees." http://discovermagazine.com/1997/nov/quantumhoneybees1263.