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*Peirce's Reception in Japan*

In Japan, the number of investigations of Charles Sanders Peirce's philosophy has recently increased. In this article, we can focus only on a few instances of the research movement in Japan that has put Peirce's ideas at its center. However, even such a limited survey shows that Peirce's work has affected various Japanese academic areas. In this paper we talk about three types of Japanese studies of Peirce's pragmatism:

1. discussions of Peirce's theory of abduction,
2. examinations of Peirce's theory of signs,
3. cosmological considerations of Peirce's pragmatism.

*1. Discussions of Abduction*

Peirce regards not only induction but also abduction as a synthetic inference to draw a conclusion concerning a fact not involved in the premises. Basically, researchers use the following formula for abduction:

The surprising fact, C, is observed; But if A were true, C would be a matter of course.  
Hence, there is reason to suspect that A is true (EP2: 231).

This style of inference is the fallacy of affirming the consequent. On the other hand, Peirce asserts a perceptual judgment is an abductive one. Then, a perceptual judgment is an antecedent of some implication and followed by a surprising fact, which is its consequent. But we cannot specify what kind of fact it is from the form of the fallacy of affirming the consequent. Are we able to comprehend the nature of an abductive inference only by means of the fallacy of affirming the consequent? Japanese researchers, with this fundamental problem of abduction in mind, are elucidating the logical structure of abduction by throwing light on the conditions that enable abduction to fulfill its role in inquiry. Some researchers lay more stress on the abductive function of adopting hypotheses to explain why observed facts occurred. Others focus on a different formula for abduction:

M is, for instance, P<sup>I</sup>, P<sup>II</sup>, P<sup>III</sup>, and P<sup>IV</sup>;  
S is P<sup>I</sup>, P<sup>II</sup>, P<sup>III</sup>, and P<sup>IV</sup>;  
∴ S is M. (CP1: 559)

According to this, we discover strong similarities between two objects and grasp one with the concept applied to the other in abduction. This indicates the way in which we form a perceptual judgment through an abductive process. (Atarashi 2011; Ito 1985; Murakami 2012; Yonemori 2007; Akagawa 2011; Muranaka 2006; Muranaka 2010; Muranaka 2012).

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There are also studies that focus on how the notions of abduction can be applied in particular fields. One of these aims to introduce abductive inquiries into learning activities at elementary or middle schools (Sugita – Kuwabara 2013; Yunoki 2007). In accordance with the above formula of abduction, first of all, children have to be aware of surprising facts. The kind of facts that is surprising depends on the child's interest. The gaps between the child's knowledge and the facts observed by the child make them surprising. But in the Japanese system of education, teachers must conduct classes with textbooks specified by their schools in fixed classrooms (in Japan, children study in one classroom and do not move to other classrooms, except for special subjects, for instance, music and physical education). It is necessary for the teacher to direct children's attentions toward particular facts that are worth examining in terms of their curriculum. Because of this, the teacher, for example, occasionally takes the children out of their classroom and stimulates them so that they can concentrate on the facts being studied. By asking the children why a fact occurred, the teacher encourages them to think about hypotheses to explain it, i.e., the antecedents of certain implications that would be followed by the fact as their consequent. It is important to recognize that there are several possible antecedents. In their classroom, children are divided in small groups, present their own opinions in the groups, and take ideas that seem to be plausible from them. The teacher advises that they should trace the processes of deriving the fact in question from their chosen ideas step by step. Then, in front of the whole class, the children give presentations about them to other members and discuss various possibilities with each other from wider viewpoints, so they may arrive at a hypothesis with which all of them finally agree. Here, it is crucial that they have the perspective of fallibilism. They examine more closely the connection between a hypothesis and a fact and search for the other consequences from the hypothesis to confirm its validity. If they do not successfully accomplish this investigation, then they will find themselves in a situation where they need to think of a new hypothesis for the fact. Such an abductive inquiry is very difficult for children and takes a lot of time. But learning activities based on abduction are meaningful especially in Japanese schools because the ways of teaching adopted in most Japanese schools is basically indoctrination, which tends to suppress children's imaginative ideas. From an educational point of view, therefore, abduction is the foundation of children's heuristic learning activities, and children can cultivate their abilities to create new ideas on the basis of acquired knowledge by studying the structure of abductive inferences and using them practically.

## 2. Examinations of Peirce's Theory of Signs

Other researchers are more interested in Peirce's theory of signs (Arima 2014; Yonemori 1981). Some of them compare Peirce's conceptions of signs with Saussure's and reveal the features peculiar to Peirce's theory of signs. Peirce's classification of signs is more exhaustive and comprehensive. According to one researcher, Peirce did not introduce the distinction between *langue* and *parole* into his theory of signs

(Maeda 2006). But this researcher regards *Legisign* as *langue* because a *Legisign* is a sign that possesses a potentiality as a law. This researcher incorporates *parole* into Peirce's classification of signs by identifying *Dicisigns* that are propositions describing facts as a realization of *Legisigns* through *Symbols* and *Rhemes* that represent certain kinds of possible objects. He suggests that Peirce's theory of signs provides us with an important perspective on the treatment of difficulties which Saussure confronted concerning the notion of *langue*.

Another researcher points out that one of the differences between Peirce's theory of signs and Saussure's is as follows: Peirce's conceptions of signs can be applied not only to human activities but also to semiotic processes of other creatures and physical phenomena, whereas Saussure's semiotics focuses on the developments of human languages and human cultures (Egawa 2011). Since Peirce terms his own position as an *evolutionary cosmology*, Peirce's theory of signs is a cosmological interpretation of semiotic events occurring in the universe. This researcher concludes that Peirce tried to characterize objects represented by signs as evolutionary realities by grasping the dynamic aspects of the interrelations of signs, objects, and the interpretants that combine them.

Other researchers scrutinize the effect of Peirce's theory of signs on the theory of the photograph. According to Peirce, a photograph is an index, and it is a sign that represents its object by virtue of being connected with it as a matter of fact. In other words, a photograph represents its object on the basis of the fact that it is the effect of light reflecting from the object. But some photographs convey no information on their objects and do not play the role as index any longer. Is Peirce's understanding of the photograph wrong? One researcher replies "no" and gives the definition of a photograph as follows: a photograph is an image which retains the indexical function (Ogura 2013). From this standpoint, we may say that digital technology deprives photographs of indexicality. For instance, computer-generated images can be produced without physical causal connections with the objects they represent irrespective of whether such objects actually exist. Thanks to digital technology, we are able to create computer-generated images as if they were photographs. In the digital age, some photographs maintain no indexicality but work as icons: in fact, Peirce characterizes an icon as a sign which denotes its object by virtue of its own characteristics independent of the reality of the object. Since Peirce insists that an index involves a sort of icon, an iconic computer-generated image is to be regarded as a degenerated form of photograph. Thus, Peirce's theory of signs still presents an effective perspective on photographs and their surroundings in the digital age.

### 3. *Cosmological Considerations of Peirce's Pragmatism.*

Peirce's theory of the universe is interpreted as an evolutionary cosmology. Researchers argue that Peirce's view is characterized by 1) the plastic notion of the universe as the product of growth, 2) *tychism*, which means that the growing universe involves the action of absolute chance and is freed from complete regularity, 3) *objective idealism*, which equates matter with effete mind and identifies rigidly

fixed habits as physical laws, 4) *synechism*, which asserts that the evolution of the universe is the process of the growth of a continuum where a new continuum comes to being through a discontinuity that occurs in the existing continuum by chance, and 5) *agapism*, which emphasizes the circular movement of creative love in evolution where organisms live in harmony with other organisms by sacrificing their own perfection to the perfectionment of other organisms (Atarashi 2011; Ito 2006). Hence, Peirce's evolutionary cosmology is the theory of the evolutionary growth of the universe from its birth on the basis of the logic of the operation of absolute chance and habits formation. As Peirce's theory of categories is grounded in his logic of relatives, Peirce stresses the logical structures of all events in the evolutionary universe. We may call Peirce's evolutionary cosmology the metaphysics of the logic of evolution. Accordingly, in the light of Peircean cosmology, we may state that logic is not only the process of reasoning but also the fundamental mode of being and the logic of modality lies at the root of the evolutionary universe.

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