The Interaction and Convergence of the Philosophy and Science of Information

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1. The Informational Turn of Contemporary Science and Philosophy

As the science and philosophy of information develop, the specific character of information becomes more and more clear. From the point of view of science, information as well as matter and energy are now regarded as the three essential elements constituting the world, bringing about a fundamental transformation of our worldview and way of thinking.

Generally speaking, the Philosophy of Being, as well as the theory of the compartmentalization of the extant domain is the major paradigm of philosophy and makes up the core of philosophical metatheory. Following tradition, we can reasonably summarize "the existential = the material + the mental" as in the traditional Western ontological paradigm, except for few doctrines out of the ordinary.

Based on the latest progress in the science of information, the contemporary philosophy of information compartmentalizes the existential domain again. It puts forwards a new ontological paradigm: "the existential = the material + the informational". In the light of it, information is constituted by two domains: the objective informational and the subjective informational (mental). Compared with the traditional ontological paradigm, this new one not only reveals a whole fresh existential domain - the objective informational world - but also stipu1ates the essence of mind as a form of an advanced state of informational activity .[1]

The Western philosophical world has proposed various kinds of philosophical turns. However the result of those alleged turns did not transform the highest level of the philosophical paradigm as they were not fundamental ones. Comparatively speaking, because it achieves the transformation in the highest level of philosophical paradigm, the Philosophy of Information brings about a fundamental turn in philosophy for the first time.[2]

2. The Intrinsically Convergent Unified Relationship of Science and Philosophy

In the most general sense, we can view philosophy as a human activity of seeking universal reason, while scientific observation and experiment have the character of concrete sensory data. On the basis of this, people have been used to recognize philosophy and science as separate disciplines. In fact, reasoning and operating with sensory data must not be separated completely at all levels of human cognitive activities. Human beings inevitably evaluate all kinds of sensory data in their rational constructions. It is this that constitutes the difference between human consciousness and the animal mind, as well as the ultimate ground of Philosophy and Science being intrinsically a unity.

Humans do not cognize the objective world directly. There are multiple kinds of complex intermediate relationships of between people and their cognitive objects. In my research on the contemporary philosophy of information, I have proposed a doctrine regarding the complex emergent occurrence of cognition, which explains aspects of five such intermediates: the objective field of information, its subjective physical structure, its subjective cognitive structure, its subjective instruments of materialization, and its subjective generative historical dimension. Since intermediate states with those five aspects exist between perception and cognition, the phenomena that scientists see directly are not the "objective facts" themselves of observation and experiment, but rather macroscopical signs that are designated as information, the "objective facts" remaining after passage through intermediate measuring instruments. Valid scientific judgments are accordingly possible only by explaining those signs. And the corresponding explanations depend not only on the analysis of the instruments and equipment of observation employed by those scientists, but also the scientific theoretical paradigms they use in recognizing structure. So there is no scientific fact that could be decided only by so-called concrete evidence; science, rather, is the product of the combination of concrete evidence and general reasoning. If defined in this way, philosophy is no longer something transcendental, irrelevant to and outside of science. It is actually the content covered in science which contains as an organic part, inevitably, the central role of mental activity.

2.1 General Rationality and Logic

A key concept in my theory is that of general rationality. I consider this an ontological feature of a scientific doctrine that measures how 'rational' it is, that is how far developed from the automatic, purely reactive forms of animal cognition. A higher rationality is one which reflects the best - therefore MOST ETHICAL - capacities of human beings to interact with themselves and the world. The term general rationality in Chinese accordingly corresponds to what is called informal logic in Western philosophy. 'Informal' means that it is not based on simple linguistic reasoning using systems of axioms, but is rather like abductive logic as proposed by Magnani or the dynamic Logic in Reality of Brenner that refers to real processes.

From this perspective, general rationality describes the evolution of informational processes in both the disciplines of science but also in cognition and philosophy as the behavioral 'activity' of human beings of which there are clearly higher and lower levels. There are only differences in the degree of general rationality involved in the various scientific disciplines, rather than the presence or absence of that rationality. From this, we can establish a relative boundary between philosophy and science from an onto-epistemological standpoint. The degree of generality (the extent of application)

defines the inner differences of levels of generality of reasoning and consequently a hierarchy in philosophy and science themselves.

In fact, there exists a kind of dual-sense relationship between the levels of general rationality: in one respect, lower general rationality is the foundation on which higher general rationality is established on; in the other respect, lower general rationality is the presentation of higher general rationality in a concrete domain. The double sided characters of the definition of the lower and higher general rationalities will inevitably induce the interactions between different levels of rationality to define and converge. In this process, the higher general rationality will illuminate universally, restrict and control holographically the lower general rationality, while the lower general rationality not only embodies certain normative principles belonging to the higher general rationality at its own level but also provides certain valid basic support for higher general rationality due to its own plentiful contents and materials of activities. Those interactions between levels of general rationalities will necessarily result in the holographic unified relationship of inner convergence that ground and embody mutually, as well as reflect, constrain, control and define reciprocally different of levels of general rationality.

A true philosophy of science, which should be founded by science, cannot be separated from and override science. Rather, the foundational role of science determines its effects on philosophy from the bottom up. The dependence of philosophical development on scientific development indicates that science is the strongest and most basic driving force for the transformation of philosophy.

The rationality of science is much more universal and can surpass the limits of those narrow disciplines from which it was originally generated and evolve into a higher general rationality. This hierarchical transition is a process of self-sublimation of general rationality, the review and reproduction of the nature of general rationality. That self-sublimation of regeneration, review and reproduction permits the examination of previous higher general rationality in the transiting process of the lower general rationality to the higher level. The higher general rationality defines, amends and processes those original lower general rationalities (delete: by examination). In other words, the higher general rationality imposes its methodological effects on lower general rationalities while generalizing, summarizing and defineing the rational elements of those lower general rationalities as well. It is a kind of philosophical critique which is implemented in this process.

Whether a more concrete general rationality could enter the level of a more universal higher general rationality is decided by two aspects: one is whether those general rationalities have more universal character by themselves or not; the other is whether philosophy critiques those original lower general rationalities according to their own levels.

Indeed, philosophy must enrich and develop itself through science; however, that doesn't mean that philosophy is just a vassal of science. Philosophy has the critical role, at its own level in the development of the chains of human knowledge about the limits of science and philosophy. It is thus inevitable to consider aspects of the transformations enacted on philosophy by science and critiques made on science by philosophy.

We have observed that several new research approaches have been opened up in the studies of information problems: the computational, the information-ethical, the communication-informational, the information-cognitional, the semiotic-informational, the information-phenomenological, and so on. However, because these approaches employ theories dependent on a certain given concrete philosophy or science, they are constrained by the narrow and limiting character of the original theories and disciplines consciously or unconsciously, and these theories cannot reveal the true unique and

revolutionary significance of information problems. An information theory founded on those theories can not be described as a higher science of information, not to mention as having the character of a general philosophy of information or a unified science of information.

Judging from this, the transformation of philosophy by science is not achieved automatically by using scientific success by itself as a criterion, but depends corresponding critical works that science acts on philosophy. That is a double sided interactive process to which both science and philosophy have to contribute. The transition from lower general rationality to higher one, and the critiques that philosophy makes of science have the following dual effects: on the one hand, outer information is criticized by philosophy; on the other hand, because that kind of critique changes the original construction of philosophy in itself, the philosophy is criticized recursively as well. If it is a comprehensive and complete change of construction, if that critique in itself is made of the most basic concepts and principles, or the highest paradigm of philosophy, a fundamental transformation has been made. The establishment of the contemporary philosophy of information reveals the significance for the development of philosophy itself through this kind of dual critique.

The general character of information transcends the basic beliefs and theoretical structures of traditional philosophy. The philosophy of information that truly shows the general character of information establishes the critiques that philosophy makes of science as well as the critiques that philosophy makes of itself.

3. Toward a Unified Science of Information

As a result of the role of information I established in the fundamental existential domain, the philosophy of information now provides a kind of dual-existential and dual-evolutionary theory of matter and information, which shows that information is a general phenomenon existing throughout the cosmos. Therefore, all research on matter and information should take this dual dimensionality into account. Because of the absence of the informational dimension in traditional philosophical and scientific research, it is now necessary to transform the research methods of traditional philosophy and science completely to bring them into line with the new scientific paradigm that is provided by the developing science and philosophy of information. By means of that transformation, all scientific and philosophical domains are facing an integrative developing trend I have named the "Informational Scientification of Science"[3]. The emergence of this completely new and developing trend in philosophy and science, in my view, calls for the further establishment of a general unified science of information which includes all the domains of traditional philosophy, science and technology. It is transdisciplinary in the sense of Hofkirchner, Nicolescu, Brenner and others.

The tentative idea of establishing a unified science of information was initiated by a group of European scholars in the 1990s. Since then, from different levels and viewpoints of disciplines, many scientists and philosophers from all over the world have made numerous, fruitful work in that direction including A. D. Ursul and Konstantin Kolin from Russia: Pedro Marijuan, Wolfgang Hofkirchner, Luciano Floridi, Sören Brier, Rafael Capurro and Joseph Brenner from Europe: Yi Xin Zhong. Ming Li, Changlin Liu, Litian Shen, Xianhan Luo, Dongsheng Miao, Kang Ouyang, Xueshan Yan and myself from China; and, John Collier and Albert Borgmann from other countries. The independence and universality of the informational world revealed by these related researches is a precondition for

the establishment and development of a new modem paradigm of science and philosophy, a new world view as well as a unified science of information.

4. Structure of the Proposed Unified Science of Information

Based on my research in this area, I have divided the unified science of information into six major levels: philosophy of information, general theory of information and informatics of which several sub-levels and categories or branches exist and engineering/technological informatics.

As a result of its continuity across all levels of human knowledge from philosophy to science to engineering and communications technology, a unified science of information would be a disciplinary system that can be described in Chinese by the metaphor of 'standing upright between heaven and earth'. This metaphor captures the role of information in providing a link between phenomena at the lowest physical level and the highest human cognitive level. [4]

Because this unified science of information is 'upright between heaven and earth' and includes all levels of human knowledge, different scholars and disciplines could construct their concrete disciplines accordingly, including theories and viewpoints from their levels and points of view which today are separated. The result is that the trend toward so many diverse individual disciplines, schools and ideas of informational science is still increasing.

The development of a science of information will bring about a whole new integration of human science and philosophy as they converge with one another. In that process of integration, the philosophical sense of the science of information and the scientific character of the philosophy of information would be present in their entirety. From this standpoint, the philosophy of information could be viewed as apart of a general science of information, and the science of information could achieve its real foundational unity in the general provisions of philosophy. In other words, the unified science of information is the scientific basis of the general philosophy of information, and the philosophy of information is the general theoretical precondition of the unified science of information that is actually to be unified. In my opinion, the establishment of a unified science of information and the mature development of a philosophy of information should be the same process of mutual convergence, the two sides of the whole new integral developing pattern about contemporary human knowledge.

References and Notes

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