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A Brief Analysis on the Scientific Basis of Broad-Spectrum Philosophy

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Abstract: In this study, we discuss the scientific background or scientific basis of Broad-spectrum Philosophy. In addition, we also introduce the Broad-spectrum Philosophy inheritance and development from these scientific backgrounds. Moreover, we shows the enlightenments that Broad-spectrum Philosophy have on the study of Philosophy. In our study results, we conclude that the abstract theory forms (including its abstract concepts, models and methods) of Broad-spectrum Philosophy have attracted much attention from the theoretical circles.

Keywords: Broad-spectrum philosophy, enlightenments, scientific basis

INTRODUCTION

Spectrum Philosophy is a new philosophy science brought up by Zhang Yuxiang, a professor and scholar of our country, in 1996. It takes Marxist Philosophy as the direction and Dialectical Structuralism as the building thought of theoretical systems, summarizes and refines the contents of numerous specific sciences closely related to philosophical theories, develops the useful and discards the useless among them and put forward a series of new concepts, principles and methods of both universality and specific mathematical forms. In this thesis, several aspects are listed, described and analyzed.

Paul (1973) discusses the recollections of marx and engels. Zhang (2009) analyze the structural mathematics and its applications in broad-spectrum analysis. Zhang (2004) make a introduction to broad-spectrum theory of existence. Zhang (1998) have a study on broad-spectrum philosophy. Xing (2000) study the solution of complex linear equations in the modal force analysis on main structure of speed machine tool. Chen (2001) have a research of the modeling and correcting fem with contact element for the combined surfaces of grinder bolts.

This study discuss the scientific background or scientific basis of Broad-spectrum Philosophy. In addition, we also introduce the Broad-spectrum Philosophy inheritance and development from these scientific backgrounds. Moreover, we shows the enlightenments that Broad-spectrum Philosophy have on the study of Philosophy. In our study results, we conclude that the abstract theory forms (including its abstract concepts, models and methods) of Broad-spectrum Philosophy have attracted much attention from the theoretical circles.

BROAD-SPECTRUM PHILOSOPHY AND MATHEMATICAL SCIENCE

Mathematics and Physics are the basis of all natural sciences as well as some social sciences (e.g., Mathematical Economics, Quantitative Sociology, Cliometrics, etc.). If it is recognized that all sciences shall follow a mathematical road (viewpoint of Marx), Mathematics, at least, will be the basis of all sciences.

Naturally, as a science pursuing the mathematicalization of philosophy, Broad-spectrum Philosophy can never be separated from seeking for theories and methods from mathematical sciences. Two aspects are introduced below.

Firstly, the mathematical basis of Broad-spectrum Philosophy is Structured Mathematics. Like all sciences, Mathematics always follows a way from particular to general (universality) and directing the particular with the general. One of the general and universal achievements is the Structured Mathematics, including Set Theory, Abstract Algebra, Graph Theory, Category Theory, etc.

Since Broad-spectrum aims to solve the contradiction between the universality and the accuracy of philosophical propositions, what it adopts is Structured Mathematics, which is of both universality and mathematical forms.

The core concept of Structured Mathematics is structure, which is defined as abstract relations and their combination and recombination. Abstract relations are the subset of Descartes direct product. This is already a much difficult concept and it is hard for people to imagine that social relations like conjugal

relation, friendship, relation between superior and subordinate, neighborship, etc., are the subset of direct product. Still it is much more difficult for people to imagine that the images of Monk Pig, Monkey King, a hanged ghost, etc., can be generated through the combination and recombination of the subset of direct product.

The core idea of Structured Mathematics is its independence of "number". It is known to all that Mathematics is a science that studies the quantitative relations. However, it is unknown to many people that Mathematics has given birth to another direction in its process of transformation from particular to general, namely, Structured Mathematics, a Mathematics independent of "number". For a simple example, how to make a mathematical description of the sentence "Confucius is both an educationalist and a social activist"? Obviously, this sentence has no quantitative features and can be only considered from the point of structure. Firstly, "educationalist" is a set and so is "social activist"; secondly, "both…and…" indicates a relation of intersection. Therefore, if the set of educationalist is assumed as A and the set of "social activist" is assumed as B, then the proposition Confucius (assumed as K) is "both an educationalist and a social activist" is an element in $A \cap B$, namely $K \in A \cap B$. Note that, no quantitative relation is involved here at all. Moreover, this simple expression also contains new information that's not featured in the description of natural language (namely, "Confucius is both an educationalist and a social activist"). Firstly, it provides two sets (the set of educationalist A and the set of social activist B). Secondly, it provides the intersect operation of two sets. Thirdly, it reveals that the nature of an object (here, it means "What does Confucius do") is the general nature of certain set (actually, an equivalent class). This concept also brings about a series of more in-dept discussions.

Secondly, the vitality of Broad-spectrum Philosophy comes from the development of the useful and the discarding of the useless in specific sciences. The developments of modern sciences feature both continuous differentiation & specialization and interpenetration and in the development process of modern sciences, new concepts and new methods of cross-disciplinary and cross-cutting feature are extracted one after another. For example, Klein (1872), a German mathematician related the concept of transformation group (a kind of algebraic structure formed by elements of "transformation") to the classification of Geometry and he believed that if all kinds of transformation groups in the space are taken into account, the research into all invariant natures and invariables under transformation forms will form a kind of Geometry. Therefore, Geometry, transformation groups and invariability are connected together. When it came to the middle of the 20th century, the relations among transformation groups, invariability and objectivity were exposed day after day. Newtonian mechanics was revealed as a science studying the invariability under Galilean transformation groups and Theory of Relativity was revealed as a science studying the invariability under Lorentz transformation groups and such and such. This provided the most direct mathematical basis for Broad-spectrum Philosophy to promote the "material" concept in Philosophy and to redefine the concept of "objectivity" (hence to define "objective reality").

For another example, the birth of Noneuclidean Geometry (e.g., Riemannian Geometry, Lobachevsky Geometry, etc.) broke the situation of Euclidean Geometry "dominance"; the appearance of Theory of Relativity broke the situation of Newtonian Mechanics "domination"; and it was just under these scientific backgrounds that Broad-spectrum brought up the principle of multi-leaf objectivity, which is a basic principle of significant importance to Ontology, Epistemology, View of Truth and innovative thinking.

Broad-spectrum philosophy and system sciences: "System Science Rush" was given birth in our country in about later 1980s。 Branches of System Sciences including System Theory, Cybernetics, Information Theory, Synergetics, Dissipative Structure Theory, etc., were popularized all around the county. And in the field of Philosophy and Social Sciences, they also brought about hot and long-lasting discussions. The value of System Science for Philosophy lies in that it provides a set of concepts and methods of quite high universality, for example, concepts like system, structure, information, feedback, control, synergy, order, disorder, evolution, etc. and methods like Black-box Approach, Grey-box Approach, Feedback Control Method, System Analysis and Optimization Method, etc. The building idea of Dialectical Structuralism brought up by Broad-spectrum Philosophy takes just in the thought of relation between systems and environments from Systems Sciences, while the Broad-spectrum Theory of Class Change takes in the concept of "Evolution" from System Sciences and Broad-spectrum Theory of Mapping takes in the thought of "Black-box Approach", etc.

Seen from the viewpoint of Broad-spectrum Philosophy, System Sciences also has its own limitations. Firstly, some of its concepts and methods feature overt or covert scientific backgrounds. For instance, Self-organization Theory has backgrounds of Thermodynamics and Statistical Physics. Secondly, its

mathematical models are of quantitative relation type, for example algebraic equations, differential equations, etc. For those systems of no obvious quantitative relations, e.g., the conceptual system in Philosophy, some principles in view of the world and view of value, models of quantitative relation type are obviously inapplicable. Considering this, Broad-spectrum Philosophy doesn't copy the concepts and methods of System Sciences, instead, it only absorbs its reasonable ideas; and it adopts structured Mathematics instead of quantitative Mathematics.

Broad-spectrum philosophy and pansystems methodology: Pansystems Methodology is a new methodology established by Professor Wu Xuemou, a Chinese Scholar. Just as its name suggests, "Pansystems" is a wide system, in another words, it is a methodology fit for wide systems. For Broad-spectrum Philosophy, Pansystems Methodology has three most distinct features. The first feature is the universality of concepts. The objects studied by Pansystems Methodology are generalized systems, generalized relations, generalized transformations, generalized symmetry and generalized optimization. One of its major differences from System Sciences is its development and discarding of the backgrounds of specific sciences, which is consistent with the fact that philological concepts have the maximal universality (broad-spectrum). The second feature is the proceduralizaiton of methods. As we know, philosophical methods have no procedures (just as signified in "The view of world is exactly methodology") and the methods of specific sciences are too special and specific and only applicable in dealing with some particular objects. While Pansystems Methodology procedualizes the methods to make them applicable for "Pansystems", which gives important enlightenments on solving the procesuralization of philosophical methods. The third feature is the pansystems feature of mathematical models. The mathematical models of specific sciences are generally quantitative relation models and just as mentioned above, even the mathematical models of System Sciences are quantitative relation models. One important task of Pansystems Methodology is to make Discrete Mathematics (Set Theory, Modern Algebra, Graph Theory, etc.) into pansystems and make them suitable for description of pansystems problems like generalized systems, generalized relations, generalized transformations, generalized symmetry, etc., which is of vital meaning to the mathematization of philosophical problems (philosophical problems generally involve no quantitative relations). The mathematical models of Broad-spectrum Philosophy belong to mathematical models of pansystems type, i.e., the structured (instead of quantitative) mathematical models stated above. Broad-spectrum Philosophy not only absorbs the useful elements of mathematical models of Pansystems Methodology, but also develops the useful elements related to Discrete Mathematics and traditional Mathematics (e.g., Calculus), discards the useless elements and reforms them based on the requirements of philosophical problems. For example, Broad-spectrum Philosophy relates the invariance under transformation groups with that under observocontrol mode (observocontrol mode is the specification of praxis concept) and further with the judgment of objectivity (objective reality).

For another example, Broad-spectrum Philosophy develops the concept of Partial Derivative into the generalized partial derivative of generalized systems, thus building models for the management method of "Some things can be done and some not" and such and such, which are all achievements by inheriting and developing Pansystems Methodology Zhang (1998).

ENLIGHTENMENTS

Seen from the basic problems (i.e., objects of study) it aims to solve, Broad-spectrum Philosophy's absorption and development of the above basic sciences and cross sciences has significant importance.

Firstly, corresponding and suitable methods are needed to solve new subjects. The core problem Broad-spectrum Philosophy aims to solve is the contradiction between the universality and the accuracy of philosophical propositions, which means, Broad-spectrum Philosophy shall take into account the universality of philosophical propositions and realize the accuracy of them at the same time. Obviously, Applied Mathematics is a necessity in order to realize the accuracy in mathematical sense. However, the reason why philosophical propositions are of universality lies just in that they discards the specific features of specific objects, including quantitative features. For instance, the "material" concepts in Philosophy discard all specific features of all specific substances, including softness, hardness, color, weight, size, etc., and retain their most general features, namely, "being independent of and being able to be reflected by human consciousness". In this case, traditional Mathematics, which takes quantitative relations as the objects of study, loses its value of application. Broad-spectrum Philosophy's adoption of Structured Mathematics and its adoption and development of useful elements in the Pansystems Methodology and discarding of the useless happens to provide a solution for this problem, for they don't need

numbers and need only mathematical structures that develop and discard quantitative relations. For example, one of the features of “material” concept stated above, namely, “being able to be reflected by human consciousness” can be described with mapping (development and discarding of functional relations) concepts and the other, “being independent of human consciousness" can be described with concepts of equivalent class, etc.

It's not hard to be known that the questions to be solved by Broad-spectrum Philosophy (namely, the contradiction between the universality and accuracy of philosophical propositions) are quite difficult and the traditional Mathematics which takes the quantitative relations as the objects of study is powerless. If it is not for the birth of Structured Mathematics, especially the birth of Pansystems Methodology, the problems of Broad-spectrum Philosophy (namely, the contradiction between the universality and accuracy of philosophical propositions) couldn’t have been solved. Therefore, a corresponding and suitable methodology is a must in solving a major subject.

Secondly, we shall do well in develop the useful elements of modern sciences and technology. Apart from the Philosophy of Marxism, the theoretical sources of Broad-spectrum Philosophy also include the enlightenments of various modern sciences and technology and many concepts and methods of Broad-spectrum Philosophy have overt or covert scientific backgrounds. Apart from the relations that the concept of “objectivity” (the equivalence under certain obervocontrol mode) originates from transformation groups and sciences including Newtonian mechanics, Theory of Relativity, etc., it also summarizes and promotes the useful elements of numerous sciences. For instance, the large system generalized partial derivative method mentioned above is the promotion of the partial derivative forming method in Calculus. Another example is that the generalized extremum analysis established on partial order relation is the promotion in general object system of extremum forming methods in traditional analytic geometry and calculus.

In philosophy, development and discarding is both “promotion” and “abandonment”, which means “abandoning” some specific scientific backgrounds to make them more universal and carrying forward the reasonable elements to make them into concepts, models and methods suitable for a wider range. As stated above, for the achievements of System Sciences, Broad-spectrum Philosophy, on one hand, discards the overt or covert backgrounds of specific sciences (Thermodynamics, Statistical Physics, etc.) in the System Sciences and abandons the mathematical methods (quantitative mathematical methods) adopted by System Sciences and one the other hand, absorbs the basic concepts and basic methods of universality in System Sciences.

Thirdly, we shall be good at finding out the combining point of modern sciences and technology and philosophical problems. Which scientific problems and technological problems are meaningful in Philosophy or can be developed and reformed into philosophical problems and are of critical importance for Philosophy to successfully take in scientific and technological nutrition. We can consider that one of the secrets for the success of Broad-spectrum Philosophy is the capturing of the combining point of modern sciences and technology and philosophical problems. For instance, at first thought, the objectivity of objects doesn’t have any relations with transformation groups, however, if the elements in transformation groups (i.e., transformation) are considered as the obersocontrol modes of human, transformation group, equivalent class and invariance will be intrinsically related with objectivity of objects, thus the objectivity of objects can be precisely described with these mathematical models. Another example goes like this: it seems that virtual technology (e.g., playing games on computer, driving in virtual environment, experimenting under virtual environment, etc.) has nothing to do with philosophical problems, however, when deep-seated problems of virtual technology are quested, philosophical problems will be related: for example, when the relation between the virtual world and the real world is asked, or when it is asked whether the virtual world is a “third world” apart from real world and spiritual world, or whether virtual experiment is a mode of practice, philosophical problems that must be answered will rise. It is just in the process of answering these kinds of questions that Broad-spectrum Philosophy promotes the research of its own.

CONCLUSION

This study discuss the scientific background or scientific basis of Broad-spectrum Philosophy. In addition, we also introduce the Broad-spectrum Philosophy inheritance and development from these scientific backgrounds. Moreover, we shows the enlightenments that Broad-spectrum Philosophy have on the study of Philosophy. In our study results, we conclude that the abstract theory forms (including its abstract concepts, models and methods) of Broad-spectrum Philosophy have attracted much attention from the theoretical circles.

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