ON KANT'S COPERNICAN REVOLUTION AND THE PRACTICAL TRANSFORMATION OF METAPHYSICS[1,2]

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It is an important concern for Kant to render the metaphysics to transition from the speculative to the practical domain. In the second edition preface of the Critique of Pure Reason, *Kant stated that we can securely guide the metaphysics along the path of a science through a revolution in philosophy, in which the revolution is generally called Copernican Revolution. Since Kant divided metaphysics into metaphysics of nature and of morals, the revolution for the path of a science should aim not merely at metaphysics of nature but also at metaphysics of morals. However, the critique of the traditional metaphysics of nature does not directly lead to the systematic construction of the metaphysics of morals. It contains a transition. Yet, we cannot reach this transition based on the classical understanding of the Copernican Revolution, which disregards the historical context in astronomy. To contextualize the revolution within Kant's philosophy, we will reveal the essence of the Kantian Copernican Revolution. It shows that the essence of the revolution should not be a reversal of cognition and objects but a transformation in the cognitive faculties itself. Through the new interpretation of the Copernican Revolution we can illustrate how did Kant achieved the transition. It presents as a progressively practical transformation process and ultimately provides the groundwork for constructing the metaphysics of morals.*

Keywords: *philosophy; metaphysics of morals; metaphysics of nature; Copernican Revolution; faculty of mind; Newtonian Mechanics*

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1 This work was supported by the China Scholarship Council, [2020] 71.

2 This work is translated by a Chinese text with some modifications. The original version is published on No. 5, Vol. 25 of Journal of Shandong University of Science and Technology (Social Sciences) in October 2023 with the title "Kant's Practical Transformation of Metaphysics: An Exploration Based on the Reinterpretation of the Philosophical 'Copernican Revolution'".

Una de las principales preocupaciones de Kant es posibilitar que la metafísica transite del ámbito especulativo al práctico. En el prefacio de la segunda edición de la Crítica de la razón *pura, Kant afirma que la metafísica puede orientarse de manera segura hacia el camino de la ciencia mediante una revolución en la filosofía, conocida comúnmente como la Revolución Copernicana. Dado que Kant divide la metafísica en metafísica de la naturaleza y metafísica de la moral, dicha revolución debe dirigirse no solo a la metafísica de la naturaleza, sino también a la de la moral. Sin embargo, la crítica a la metafísica tradicional de la naturaleza no conduce directamente a la construcción sistemática de la metafísica de la moral; entre ambas se encuentra una transición. Esta transición no puede comprenderse desde la interpretación clásica de la Revolución Copernicana, que pasa por alto el contexto histórico de la astronomía. Para contextualizar esta revolución en la filosofía kantiana, es necesario desvelar su esencia. Demostraremos que esta esencia no reside en una simple inversión entre cognición y objetos, sino en una transformación fundamental de las facultades cognitivas. A partir de esta nueva interpretación de la Revolución Copernicana, es posible esclarecer cómo Kant logra esta transición, presentada como un proceso progresivo de transformación práctica, que finalmente sienta las bases para la construcción de la metafísica de la moral.*

Palabras clave: *filosofía; metafísica de la moral; metafísica de la naturaleza; Revolución Copernicana; facultades cognitivas; mecánica newtoniana*

1.Introduction

In the second edition's preface of the *Critique of Pure Reason* (the first *Critique,* hereafter), Kant asserts that we can render metaphysics to become a science through a revolution in the field of philosophy, in which the revolution is commonly called Copernican Revolution. This task consists of two steps: the first step is to criticize the traditional dogmatic metaphysics; the second step is to construct a scientific system of metaphysics. The former serves as the method or the outline of science, which is the main content of Kant's first *Critique* (*KrV*, BXXII). But for the latter, since metaphysics in Kant's system is constituted by two parts, namely metaphysics of nature and metaphysics of morals, the task of constructing a scientific system of metaphysics can be divided into answering two questions: (i) How to render the metaphysics of nature to become a science through the Copernican Revolution? (ii) How to render the metaphysics of morals to become a science through the Copernican Revolution?

In regard of the first question, because traditional metaphysics contains merely the metaphysics of nature in the narrow sense, if Kant successfully criticized the traditional dogmatic metaphysics, the scientific system of metaphysics can reasonably be derived from the uncriticized part. In the first *Critique*, Kant distinguishes two constructions of metaphysics of nature based on different principles: In the "Transcendental Methodology", metaphysics of nature includes transcendental philosophy and the natural science of pure reason, the latter of which is divided into rational physics, rational psychology, rational cosmology and rational theology. In contrast, in the "Transcendental Dialectic" it is divided into rational psychology, rational cosmology, and rational theology, in which he demonstrated that the super-sensible knowledge in these three parts is merely transcendental illusion (*KrV*, A845-A847/B873-B875). Thus, the remaining uncriticized part is rational physics, which is precisely the content to be constructed in the *Metaphysical Foundations of Natural Science*. Therefore, the transition from negative critique to positive systematical construction does not raise the question of how to make the transition.[3]

However, it seems to be entirely a different issue in view of the second question. Since metaphysics of nature and metaphysics of morals belong to two completely heterogeneous fields: while the former concerns the issue of "is" in theoretical dimension, the latter concerns the issue of "ought" in practical dimension. Hence, even if we accept that Kant successfully criticized traditional metaphysics, it does not directly lead to the construction of a systematical metaphysics of morals, which is in opposite to the situation in metaphysics of nature. It involves a transition from metaphysics of nature to metaphysics of morals. The problem is: since Kant believes that the Copernican Revolution in philosophy can also make the metaphysics of morals become a science, this revolution must also afford to explain this "transition". But if the Copernican Revolution is in generally understood as the inversion

3 We will not talk about if Kant's viewpoint is right or not. A skeptical idea about it see, De Boer (2020, pp. 232-238).

from "cognition conforming to objects" to "objects conforming to cognition", the best result Kant can reach is the unknowability of the super-sensible objects in metaphysics of nature, without extending beyond speculative philosophy to moral philosophy. Therefore it leads to the following problem: how to achieve this "transition" through the Copernican Revolution, so as to make the metaphysics of morals become a science?

Due to the longstanding misinterpretation of the Copernican Revolution in philosophy as merely an inversion of the relationship between cognition and objects, the issue of the "transition" has remained unaddressed. In recent times, some scholars have pointed out that the Copernican Revolution pertains not only to Kant's theoretical philosophy but also to his moral philosophy. These researchers have contributed to a deeper understanding of the "revolution", yet they have not addressed the issue of the "transition" within the framework of metaphysics (Blumenberg, 1985, pp. 691-713; Brandt, 2007, pp.223-258; Schönecker, Schulting, and Strobach, 2011). A Chinese researcher Anqing Deng was the first to highlight this ignored issue and has conducted some highly insightful research (Deng, 2009; Deng, 2014, pp.81-100). Deng proposed two solutions to this question: Solution one posits that the essence of the Copernican Revolution is not an epistemological inversion of the relationship between cognition and objects but a shift in thinking attitudes, which should be understood as the shift from the old type of speculative metaphysics concerning knowledge to the metaphysics of morals concerned with action. Solution two suggests that this shift in thinking attitudes is a transformation from a natural attitude to a reflective philosophical attitude. The philosophical attitude, which directs at the cognitive faculties themselves, inherently contains the inversion of the relationship between cognition and objects. Thus, Kant can achieve the practical turn of metaphysics.

But Deng's first solution directly equates the essence of the Copernican Revolution with the aforementioned "transition", thereby negating the fundamental meaning of the "revolution" as an inversion of the relationship between cognition and objects. The second solution, which advances beyond solution one, is much more effective. But it regards the philosophical attitude as a correction of the natural attitude, so that it restricts itself in the transcendental faculties and can't enter the practical dimension. Moreover, all the above research neglects the historical contexts of astronomy and philosophy in which the Copernican Revolution occurred, and thus missed the opportunity to grasp the real essence of the Copernican Revolution. It turns out to be fail to achieve a real breakthrough on that "transition".

Inspired by Deng's thoughts, I will try to solve the "transition-problem" by reinterpreting the Copernican Revolution. Firstly, I will examine Kant's summarized essay about his critical philosophy, which is contributed to the prize essay contest announced by the Royal Academy of Science in Berlin and will demonstrate that the "transition-problem" is not only logically inherent in his system but also historically on his own concern. Then, by tracing the historical contexts of the history of astronomy and philosophy, I will clarify that

the astronomical Copernican Revolution is not equivalent to the Copernican hypothesis in Copernicus' time, but rather the entire process initiated by Copernicus and completed in Newton's theory of mechanics. By combining Kant's texts and drawing analogies to the astronomy, we can reveal the essence of the Copernican Revolution in Kant's text. It indicates that its essence lies in a transformation within the cognitive faculties themselves and further extends its implications to the practical realm. Finally, by employing the reinterpreted Copernican Revolution I will demonstrate how does Kant transition from the metaphysics of nature to the metaphysics of morals. It turns out to be that this transition unfolds as a step-by-step progress of transformation to the practical realm, thereby laying the groundwork for the systematic construction of the metaphysics of morals.

2. A Quasi-transition of metaphysics in the *Progress of Metaphysics*

In his published works Kant did not specifically address the issue of the "transition" within the systematic framework of metaphysics. The only related discussion appears in an essay Kant wrote for prize essay contest announced by the Royal Academy of Science in Berlin. The essay, which is edited and published afterwards by his students, was titled "What real Progress has Metaphysics made in Germany since the Time of Leibniz and Wolff?" (Hereafter *Progress of Metaphysics*). It contains the claims relevant to the issue of the "transition" and corroborates Kant's intention to address the issue of "transition" and makes partial progress.

From the title we find that the theme of the prize essay contest is closely related to Kant's statements on metaphysics in the prefaces of both editions of the first *Critique*. And the date of the Academy's prize essay contest (1788) is precisely after the publication of both editions of the first *Critique* (1781, 1787). This is not a coincidence. In fact, the competition was specifically aimed at Kant's first *Critique.* So, Kant's response could be seen as a further elaboration of the relevant points made in the prefaces of the first *Critique*. However, *Progress of Metaphysics* did not provide an answer to the issue of "transition". This may be partly because he had not yet written the *Metaphysics of Morals* when Kant completed the essay (1793). But the most important reason lies in the constraints of the theme. As a named essay, Kant needed to limit his discussion to the scope specified by the Academy. So, he should talk about his own advancements in comparison with those of the Leibniz-Wolff philosophy. This constraint prevented Kant from delving deeply into some issues. But we can still discern traces of the "transition" of metaphysics in his discussion.

The difference between Academy's requirements and Kant's own concerns lies in that the Academy restricts the theme within the Leibniz-Wolff philosophy, whereas Kant's revolutionary transition in metaphysics pertains to all metaphysical theories in history. It forces Kant to discuss the progress in metaphysics based on the Leibniz-Wolff philosophy. The metaphysics in it is defined as "the science progressing from sensory knowledge to super-sensory knowledge through reason" (AA 20:260). But Kant thinks that this defini-

tion limits metaphysics to the realm of theoretical philosophy, which excludes the practical doctrine of pure reason. Kant's dissatisfaction with this definition is more evident in his discussion about the real progress of metaphysics. He stated that:

> It must certainly be borne in mind from the outset, that throughout this whole treatise, in accordance with the problem posed by Academy, metaphysics is intended merely as a theoretical science, or, as it can also be called, a metaphysics of Nature; which means that its transition to the super-sensible must not be understood as a step into a quite different rational science, the morally-practical, which can be called meta-physic of morals. For this would be to stray into a wholly different field, even though the latter also has as its object something super-sensible, namely freedom, albeit not in respect of what it is by nature, but rather in virtue of what is grounds for practical principle, in regard to action and omission. (AA 20:293)

This statement indicates that the progress of metaphysics into practical domain would be missed under the constraint due to the Academy's requirement. To comply with the requirement, Kant refrained from discussing this theme in the essay. However, he simultaneously pointed out that the real progress also involves the transition from metaphysics of nature to metaphysics of morals. It can be anticipated that the solution of the "transition-problem" would have been one of Kant's tasks in examining the real progress of metaphysics if the theme was not restricted.

But even under the restriction, Kant did not merely repeat the content from the second edition preface of the first *Critique* when he clarified the progress of metaphysics. Instead, he provided a partial advancement beyond it. Specifically, Kant divided the progress of metaphysics into three stages. The first stage was termed as the theoretical-dogmatic stage, which corresponded to traditional ontology and the "Transcendental Analytic" in Kant's first *Critique*. In this part he discussed several main categories in comparison with the Leibniz-Wolff philosophy. The second stage was called the skeptical-suspension stage, which corresponded to the "Transcendental Dialectic", in which he mainly criticized some problems within his "Traditional Cosmology". The third stage was named the practical-dogmatic stage. In this stage he demonstrated how the three ideas of theoretical reason (soul, world and God) attained reality in the practical dimension. These three ideas are also the three postulates of pure practical reason in the *Critique of practical Reason*. However, Kant argued that since they originate from general but not pure practical reason in the practical dimension, they still belong to metaphysics of nature. The content of the first and second stages does not extend beyond the scope of the first *Critique*. The difference lies in the third stage. After criticized the unknowability of super-sensible objects in traditional metaphysics, the first *Critique* further points out that these rational ideas have otherwise a regulative use. Although these regulative ideas still hold value, they do not possess objective reality.

But in this prize essay Kant posited that the three rational ideas could regain their reality and not just as regulative use in the practical realm according to the third stage. Although due to the constraints of the Academy's task, the progress in metaphysics Kant made does not yet extend to the domain of the "transition", it constitutes a preparatory stage and suggests the possibility of achieving this "transition".

3. A reinterpretation of the Copernican Revolution based on the historical context

To solve the issue of "transition", we should reveal the real essence of Kant's Copernican Revolution. It is widely accepted that Kant has made a Copernican Revolution in the field of philosophy. This revolution is generally defined by Kant's following classic statement:

> Up to now it has been assumed that all our cognition must conform to the objects; but all attempts to find out something about them a priori through concepts that would extend our cognition have, on this presupposition, come to nothing. Hence let us once try whether we do not get father with the problems of metaphysics by assuming that the objects must conform to our cognition, which would agree better with the requested possibility of an a priori cognition of them, which is to establish something about objects before they are given to us. (*KrV,* BXVI)

According to this statement, the core meaning of the philosophical Copernican Revolution lies in the inversion of the relationship between cognition and objects, namely from the original "cognition conforms to objects" to the "objects conform to cognition". This inversion is further illustrated by analogy with the astronomical Copernican Revolution, where the heliocentric model replaced the geocentric model, as a reversal of the relationship between the cognitive subject and its objects.

However, this classic understanding has caused two main correlated problems: Firstly, it is generally believed that Copernicus transitioned from the geocentric model to the heliocentric model, while Kant, conversely, transitioned from "cognition conforms to objects" to "objects conform to cognition". Therefore, Kant's transition should not be seen as a kind of Copernican Revolution, but rather as an **"**Ptolemaic Counter-Revolution**"**. This criticism, first raised by S. Alexander and has persisted as a challenging critique to Kant (Smith, 1918, pp.22-23; Russell, 1948, p.9; Meillassoux, 2008, p.118). Secondly, this revolution, if we follow the classic understanding, can only be applied within Kant's theoretical philosophy and does not pertain to his practical philosophy. Consequently, it fails to explain how the revolution enables metaphysics to transition to the moral domain.

These problems indicate that the classic understanding of the Kantian Copernican Revolution is not plausible. In fact, it contains two unexamined presuppositions: first, that Copernicus indeed initiated a revolution in the history of astronomy; second, that Kant ini-

tiated a corresponding revolution in the field of philosophy, too. Both presuppositions arise from neglecting the historical-genetic context. By clarifying the superimposed errors due to the ignorance of the historical contexts in philosophy and astronomy, and by situating the doctrine of Copernicus within a broader scientific historical context, we will elucidate the real meaning of the astronomical Copernican Revolution. By this clarification we can reveal the essence of Kant's philosophical Copernican Revolution by means of placing it into Kant's textual context. It shows that its essence does not lie in the inversion of the relationship between cognition and objects but in the transformation of our own mental faculties. With the help of this work, we will then demonstrate the specific manifestations of the revolution in both theoretical and practical dimensions.

3.1 The astronomical Copernican Revolution under the historical Context

Although the Copernican Revolution is widely recognized, research by notable historians of science such as T. S. Kuhn and I. B. Cohen indicate that, according to the *On the Revolutions of the Heavenly Spheres (De Revolutionibus orbium coelestium)*, Copernicus did not subjectively intend to initiate a revolution in the history of astronomy. On the contrary, his primary goal was to improve the classical Ptolemaic system of astronomy. Thus, in terms of the viewpoints and the astronomical terminology in his theory, Copernicus should be considered as a successor to traditional astronomy. Regarding the hypothesis commonly seen as the essence of the Copernican Revolution (the heliocentric model replacing the geocentric model), Copernicus proposed this hypothesis because it could better explain various astronomical phenomena, rather than create a new system of astronomy. Moreover, Copernicus was not the originator of the hypothesis of the earth's motion and heliocentrism; similar views had been proposed by ancient astronomers before him (Kuhn, 1957, p.144). Copernicus's main contribution was regarded as introducing more precise mathematical demonstrations for this hypothesis. Furthermore, after the publication of his *On the Revolutions of the Heavenly Spheres*, Copernicus's ideas were not widely accepted as revolutionary for more than half a century. Due to the extensive mathematical knowledge and technical work, his thought primarily attracted attention only from the professional astronomers, who were interested in it not for the heliocentric hypothesis itself but for the useful mathematical tools it provided (Kuhn, 1957, pp.185-228). Therefore, it seems overstated to consider the Copernican hypothesis as a revolution in astronomy from the historical standpoint.

With the development of astronomy and natural sciences over several centuries, by the time Kant was writing his *Critique of Pure Reason*, the view that Copernicus's work had sparked an astronomical revolution was widely accepted. Kant was undoubtedly familiar with this saying. But it does not mean that he proposed a corresponding philosophical Copernican Revolution by analogy with astronomical revolution. In fact, Kant did not label his metaphysical transition as the name of "Copernican Revolution" (Hanson, 1959,

pp.274–281). Kant did aim to the revolution in metaphysics by emulating the revolution of mathematics and natural science and did associate it with Copernicus's hypothesis, but he carefully used the term "the first thoughts of Copernicus" („die erste Gedanken des Kopernikus") rather than "Copernican Revolution". According to Cohen's textual research, early interpreters of Kant's philosophy like Reinhold did not summarize Kant's theory as a Copernican Revolution in philosophy. This kind of interpretation was first introduced by some French scholars after a time (Cohen, 1985, pp.237-254).

Kant's reviews of the revolution in natural sciences strongly suggest that he did not view Copernicus' hypothesis as a revolution in astronomy. So, we can drive from it that the revolution in metaphysics did not come from the analogy with "the first thoughts of Copernicus". According to the preface of the second edition of the *Critique of Pure Reason*, the revolution in the way of thinking within natural science was influenced by Francis Bacon (1561-1626). Although the exact initiator of this revolution cannot be pinpointed, Kant believed that natural scientists with a clear sense of this revolution included Galilei (1564-1642), Torricelli (1608-1647), and Stahl (1659- 1734). Therefore, the revolution in natural sciences occurred sometime between Bacon and Galileo according to this time-order. Given that Copernicus' *On the Revolutions* was published in 1543, which is well before Bacon's mature ideas, and considering that astronomy is a branch of natural sciences, it is unlikely that Kant viewed Copernicus' work as a revolution in astronomy. Thus, it is untenable to say that Kant has achieved a philosophical Copernican Revolution by analogy with Copernicus' astronomy.

Let us turn back to the discussion of the Copernican Revolution in astronomy. Although Copernicus' own theory cannot be seen as revolutionary, if we stretch the development line of history, its value and impact unfolded over time and eventually leaded to a revolution in the history of astronomy. As T. Kuhn noted: "the significance of the *De Revolutionibus* lies, then, less in what it says itself than in what it caused others to say. The book gave rise to a revolution that it had scarcely enunciated. It is a revolution-making rather than a revolutionary text." (Kuhn,1957, p.135) According to Kuhn, when viewed within a broader historical context, Copernicus' theory has gradually showed its value and influence by the development of other astronomers such as Brahe, Kepler, Galileo. And at the end in Newtonian physics as its mature form, it created a new cosmology fundamentally different from the Aristotelian-Ptolemaic worldview. Thus, the book *On the Revolutions* carried content that transcended the text itself, and its meaning generated continually over time. Its impact enlarged from the astronomy to various natural sciences and eventually society. From this perspective, a Copernican Revolution indeed occurred in the history of astronomy.

But how did the meaning of the Copernican hypothesis (heliocentrism replacing geocentrism) change during this process? Copernicus initially proposed his hypothesis within the Ptolemaic tradition and his theory retained many remnants of Ptolemaic system. Then Kepler

radicalized the Copernican hypothesis, developed it fully according to heliocentric principles and discovered the laws of planetary motion, which confirmed the reliability of the Copernican hypothesis. However, once this seemingly counter-intuitive hypothesis was confirmed, it raised a series of new scientific problems. While traditional cosmology had its own explanations based on geocentrism, once the geocentrism be negated, traditional cosmology can not then solve these scientific problems. It promotes scientists to develop new theories. Newtonian mechanics emerged in this context. It has not only solved these problems but also formed a new cosmology that replaced the old one. So, the heliocentric hypothesis led to the discovery of the Newtonian theory of attraction and ultimately completed the astronomical revolution. Concurrently, Newton's cosmology, within a new worldview, endowed the Copernican hypothesis with new meaning. Therefore, it was not the heliocentric hypothesis itself that represented the astronomical revolution, but rather that the Copernican hypothesis induced and triggered the revolution and subsequently gained new meaning under the new cosmology.

We can now understand why it has been persistently claimed that Kant has initiated a philosophical Copernican Revolution, even though he never explicitly stated it. Because it is due to a historical-genetic misunderstanding. Although Copernicus did not himself initiate an astronomical revolution, his theory triggered one that eventually shaped a new cosmology. When we reviewed the theory of Copernicus through this new cosmology, it is natural to attribute the entire thinking structure of this cosmology to Copernicus and leads to the belief that the astronomical revolution has been done by him. Similarly, when Kant's discussion of Copernicus' hypothesis is placed within this context, the Copernican Revolution is attributed directly to Kant by way of neglecting the historical-genetic context. But after clarifying the reasons of this misunderstanding, we can connect the astronomical revolution that initiated by Copernicus and completed by Newton to Kant's revolution in philosophy, so that to endow it with the name of a philosophical Copernican Revolution.

3.2 The essence of the philosophical Copernican Revolution

Based on the historical-genetic context, we have revealed the real meaning of the astronomical Copernican Revolution. Following this, we will show that Kant's system also encompasses a philosophical Copernican Revolution. By replying on Kant's statements about the astronomical Copernican Revolution and comparing them with the content of his critical philosophy, we aim to uncover the essence of the philosophical Copernican Revolution. Then we will explain its implications and manifestations in Kant's theoretical philosophy.

Just as the astronomical Copernican Revolution was not achieved by Copernicus himself but by subsequent astronomers, when Kant introduced the "first thoughts of Copernicus" in the preface of the first *Critique*, his purpose was merely to prepare for entering a doctrine. This introductory statement itself did not yet signify a revolution in philosophy. The philosophical Copernican Revolution can only be fully understood based on Kant's critical system per se. Kant was clearly aware of this. In a footnote of the preface, he has stated that:

> In this preface I propose the transformation in our way of thinking presented in criticism merely as a hypothesis, analogous to that other hypothesis, only in order to draw our notice to the first attempts at such a transformation, which are always hypothetical, even though in the treatise itself it will be proved not hypothetically but rather apodictically from the constitution of our representations of space and time and from the elementary concepts of the understanding. (*KrV*, BXXII)

This statement shows that the transformation of revolution in Kant's philosophy, which is progressed from an attempt or hypothesis in the preface to the apodictically proof in his *Critiques*, is just like the astronomical revolution, which is progressed from Copernicus' hypothesis to the apodictically proof in Newton's system. Thus, by drawing a parallel between the astronomy and philosophy, we can ascribe the term "Copernican Revolution" to Kant by an analogy with the astronomical Copernican Revolution.

The next task is to reveal the essence of the philosophical Copernican Revolution. Since the preface of the *Critique of Pure Reason* does not clarify the revolution's essence and the main part of the *Critique* only elaborates on the revolution, where can we find a summary of the essence of it? Fortunately, in the same footnote as the previous quote, Kant's explanation of the astronomical Copernican Revolution indirectly suggests this essence. Kant claimed that:

> the central laws of the motion of the heavenly bodies established with certainly what Copernicus assumed at the beginning only as a hypothesis, and at the same time they proved the invisible force (of Newtonian attraction) that binds the universe, which would have remained forever undiscovered if Copernicus had not ventured, in a manner contradictory to the senses yet true, to seek for the observed movements not in the objects of the heavens but in their observer. (*KrV*, BXXII)

Unlike the preface, which serves as an introduction to the main part of the *Critique of Pure Reason*, this footnote is not merely a supplement to the body content of the preface. In the preface, Kant only presented "the first thoughts of Copernicus" as a hypothesis, but here he asserted that the hypothesis had achieved indubitable proof. And he has also mentioned Newton's theory of attraction. Since Newton's system provided definitive proof and explanation for Copernicus' hypothesis and Kant juxtaposed the situations in philosophy and astronomy in this footnote, and consider that, the main part of the first *Critique* is also apodictically the proof to the hypothesis of the body content of its preface, by comparing this quote with the main part the first *Critique* and the body content of its preface, we can reveal the essence of the philosophical Copernican Revolution.

Let's analyse two important details in the above quote. First, the term "the motion of heavenly bodies" in the quote translated from "Die Bewegung der Himmelsköper", whereas

when Kant in the preface discussed about "the first thoughts of Copernicus", he used the term "Himmelsbewegung", which should be translated as "heavenly motion" rather than "celestial motion" (*KrV*, BXVI)[4]. This difference seems not so important at the first glance, but they belong to two different types of cosmology. In Copernicus' era, astronomers believed that the heavens consisted of a large heavenly spheres with stars embedded in them. Copernicus endorsed this view, hence his book was named *On the Revolutions of the Heavenly Spheres* rather than *On the Revolutions of Celestial Spheres*.[5] Under the Cosmology in Copernicus' era, the motion of heavenly spheres is not the motion of stars in the sky as we understand it today, but the motion of the heavens themselves as spheres. In contrast, modern astronomy eliminated the hypothesis of the motion of celestial spheres and instead care about the motion of heavenly bodies. When Kant uses "heavenly motion" in the body part of the preface, he means the motion of heavenly spheres. This shows that he treats the "first thoughts of Copernicus" in the preface in accordance with Copernicus' original idea. But when he uses "the motion of heavenly bodies" in the footnote, he had shifted from the cosmology from Copernicus' viewpoint to the modern one. Additionally, the "central laws" of the motion mentioned in the footnote were not proposed by Copernicus, as the laws of celestial motion were established by Kepler and further developed by Newton. Therefore, these central laws referred to in the footnote originated from Kepler or Newton, not from Copernicus.

Second, the expression "first man" from the "if Copernicus ("the first man") had not ventured, in a manner contradictory to the senses ..." is often assumed to refer to Copernicus, so that the English and Chinese translations replace it directly with "Copernicus". But this replacement is questionable. When Kant described the revolution in mathematics, he used a similar expression. Considering the statement "the first person (man) who demonstrated the isosceles triangle" (*CpR*, BXI), "the first man" in it represent the person who led to a revolution in the way of thinking in mathematics. According to this analogy, the "first man" in astronomy should correspondingly refer to the person who led to a revolution in the way of thinking in astronomy. According to Kant, as previously mentioned, this man would not be Copernicus. Moreover, Copernicus' theory continued the traditional Ptolemaic system, which followed mathematical astronomy rather than modern physical astronomy. Copernicus' proposition of the heliocentric hypothesis was just used for mathematical calculations. It is not his primary concern to talk about contradictions with our senses. For astronomers of his time, making assumptions contrary to the senses was not unreasonable.

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4 The Cambridge version translation is "celestial motion", which is an error.

5 This difference has in the later time always been ignored by researchers. So the early version of English translation of the book's title was *On the Revolutions of Celestial Spheres*(by Charles Glenn Wallis in 1939), which was later corrected as *On the Revolutions of Heavenly Spheres*. The same error appears also in the German version which was first translated as *Kreisbewegungen der Weltkörper* (by Carl Ludolf Menzzer im 1879) but then corrected as *Vom Umschwung der himmlischen der Kugelschalen.*

Hence, When the first man did his research in the manner of contradictory to senses, he transferred or was transferring from the classic view of cosmology to the modern view of cosmology. So, regarding the "first man" as Copernicus is inappropriate, much less to mention that the heliocentric hypothesis was not Copernicus' original idea.

These points indicate that Kant was aware of the historical distance between Copernicus' theory and the subsequent astronomical theories. When he was discussing the topic of the astronomical Copernican Revolution in the previous footnote, he had already transitioned from the historical context of Copernicus' era to the modern astronomical perspective and treated Copernicus' original hypothesis from the background of modern astronomy. Because the distance between the attempt in analogy with Copernicus in the second preface and the actual revolution within his critical philosophy is just like the distance between Copernicus and Post-Copernicus Astronomy, we can transpose his view on the astronomical Copernican Revolution in this footnote to his critical system itself and reveal the essence of the philosophical Copernican Revolution by an analogy with the astronomy.

As we know from the above quote, that Copernicus' hypothesis was validated through the laws of motion of heavenly bodies, which were further proven and explained by Newtonian mechanics. Therefore, Kant also considered Newton's system as the mature form of the astronomical Copernican Revolution, just like we have earlier overviewed. According to Newton's Mathematical *Principles of Natural Philosophy*, the foundation of the Newtonian physics is his theory of mechanics and in the cosmology is his theory of attraction. And Newton used the theory of attraction to explain the structure of the cosmos and the laws of the motion of heavenly bodies. Hence, based on Kant's viewpoint of astronomy, Newton's theory of attraction can be seen as the essence of the astronomical Copernican Revolution. Let us make an analogy of this relation with Kant's philosophy. We need to find the "invisible force" (unsichtbare Kraft) equivalent to Newton's attraction, which similarly serves as the foundation of Kant's critical System. This "force" should be our cognitive faculties, since the concepts of "force" (Kraft) and "faculty" (Vermögen) are closely related and often interchangeable in Kant's philosophy (*Kant-Lexikon*, 2015, pp.2481-2483). And the cognitive faculties indeed form the foundation of Kant's critical philosophy, as they are the structural basis of the three *Critiques*. And just as Newton's theory of attraction provided definitive proof and explanation for Copernicus' hypothesis, Kant's critical system based on cognitive faculties provided definitive proof and explanation for the "first thoughts of Copernicus", too. Moreover, this analogy is consistent with Kant's analogy of the "first thoughts of Copernicus". In the latter Kant compared the reversal of the relationship between cognition and objects to Copernicus' hypothesis, in which the "cognition" referred to our cognitive faculties. Hence when Kant elaborates on the attempt, he indeed explains how the relationship between cognition and objects is inverted through the three cognitive faculties, namely

sensibility, understanding and reason (*KrV*, B XVII-XVIII).[6] Here the cognitive faculties are further regarded as the essence of this revolution.

Furthermore, since the "invisible force" in natural science constructs the laws of nature, correspondingly, cognitive faculties in philosophy should construct the laws of nature as the sum total of all empirical objects**.** Kant's discussion of the role of the faculty of understanding can precisely confirm this point. Just as Newtonian mechanics demonstrated the general laws of nature and the laws of celestial motion, Kant believed that our faculty of understanding provides a priori laws for the sum total of empirical objects, as all phenomena are a priori contained within these faculties and become possible only through this faculty. Therefore, the phenomena in the empirical world must conform to the a priori form of understanding. This is generally called "the understanding legislates for the nature". Thus, for Kant, the "invisible force" that binds the universe in philosophy is our faculty of understanding. This is in accordance with the function of Newtonian attraction as an "invisible force", which also binds the universe. The difference lies in the fact that Kant examines the formal unity of nature under metaphysics, while Newton investigates the empirical laws of nature within the realm of physics.

Therefore, the essence of the philosophical Copernican Revolution lies in the transformation within our faculties of mind. According to the critical philosophy, this transformation can be outlined as the shift of the cognitive faculties from the merely passive capacities engaged in judgment and reasoning to the "force" that possess spontaneity and legislative functions. Specifically, in theoretical philosophy, since cognitive faculties are the capacities for judgment and reasoning that are applied in general logic, and the spontaneous and legislative functions the force that is applied in transcendental logic, this transformation in cognitive faculties can be particularly outlined as a shift from their applications in the general logic to their transcendental applications.

Admittedly, the above analogy may seem inappropriate in the super-sensible realm, because Newton's attraction is a mechanical force in nature, which is applicable only to the sensible realm, whereas Kant's faculties of understanding and reason are spontaneous capacities that pertain to the super-sensible realm and relate to the laws of freedom. But the key point of this analogy lies in the discovery process of the two "forces" and their roles in binding the universe, rather than in the coherence of their intrinsic nature. Just as the Copernican hypothesis in astronomy and its corresponding analogy in philosophy are not entirely synonymous, Kant did not avoid comparing the laws of freedom with Newton's theory of gravitational attraction. In the *Opus Postumum* Kant asserted that: "Newton's

6 It is evident that the word "cognition" cannot be understood as concrete knowledge which contains cognitive content expressed in the form of judgments, as this would inevitably lead to a circular, because it will use the "cognition" as a result of the revolution as an element within the revolution's process. Since cognition always involves both cognitive faculties and objects, it should represent the cognitive faculties.

attraction through empty space and human freedom are analogous concepts..."(AA 21: 35). Notably, R. Brandt has conducted a detailed analysis based on this analogy, exploring the relationship between Newton's laws of gravitational attraction and Kant's laws of freedom(Brandt, 2007, pp.232-239).

Up to now, we have revealed the essence of the philosophical Copernican Revolution. And we then explained its implications and manifestations in Kant's theoretical philosophy. Reviewing on the first problem posed at the beginning, it is now evident that it's not plausible to say that Kant's philosophical revolution must be an "Ptolemaic Counter-Revolution". On the contrary, we should rather call it a post-Copernican "Copernican-Newtonian Revolution" (Schönecher, Schulting, Strocach, 2011, p.498; p.514.).

We can now turn to address the second problem posed at the Introduction of this text. By "translating" the astronomical revolution that revealed the laws of the starry heavens *above us* into practical philosophy, we will thereby clarify the real meaning of the revolution, which will let the moral law *within us* be discovered.

3.3 The Revolution in Moral Philosophy

Let us turn to the Copernican Revolution in Kant's practical philosophy. Reviewing the preface of the second edition of the *Critique of Pure Reason*, Kant's discussion is primarily confined to the realm of speculative philosophy. But after discussing the role of the attempt or experiment analogous to the Copernican hypothesis in speculative philosophy, he briefly touches upon its relationship with practical philosophy. This is the only place in the preface where this issue is directly addressed, which will be particularly important for expanding the extension of the revolution to the practical realm. Kant says that:

> Now, after speculative reason has been denied all advance in this field of the super-sensible, what still remains for us is to try whether there are not data in reason's practical data for determining that transcendent rational concept of the unconditioned, in such a way as to reach beyond the boundaries of all possible experience, in accordance with the wishes of metaphysics, cognitions a priori that are possible, but only from a practical standpoint. (*KrV,* BXXI)

When we compare this quotation with the classic statement which was regarded as the definition Copernican Revolution by Kant, we will find the parallel relation between them. Here Kant mentions that after the first *attempt or try* (Versuche) conducted in theoretical philosophy (see. B xvi), another *attempt* (to try/ zu versuchen) can be conducted in the practical realm. Since the purpose of Kant's attempt is to lead to the genuine revolution, this indicates that Kant's plan for the revolution of metaphysics is not limited to the theoretical dimension but also involves the construction of metaphysics of morals. Therefore, the

extension of the revolution to the practical realm is not merely our subjective analogy but is inherently included in Kant's thought.[7]

Regarding the extension of the revolution, although Kant does not explicitly point it out, we can derive it from the meaning of it in his theoretical philosophy. Since it begins with an "attempt", just as in the theoretical dimension the attempt to reverse the relationship between cognition and objects leads to a revolution, we can also start from examining the relationship between cognition and objects in the practical dimension. The key to understand the reveal of cognition and objects in practical philosophy lies in the meaning of the "practical knowledge" (praktische Erkenntnis) mentioned in the quotation. Contrary to our general ideas, besides the narrow sense of theoretical knowledge, Kant also endows "knowledge" a broad meaning. Broadly defined, knowledge includes both theoretical and practical knowledge. While theoretical knowledge concerns "what something is", practical knowledge concerns "what ought to be", i.e. the possibilities of action for the acting subject, which is expressed as imperatives. Since imperatives can be either categorical or hypothetical, practical knowledge includes both categorical and hypothetical imperatives. The former are a priori synthetic judgments in practical philosophy (AA 04: 414). Thus, just as the "cognition" (which leads to knowledge) in the reversal of the relationship between cognition and objects in theoretical philosophy refers to theoretical cognitive faculties, in practical philosophy, it should refer to practical cognitive faculties related to desire, with the corresponding "objects" being the objects of desire.

Certainly, the reversal of the relationship between cognition and objects as an attempt only provides the premise for exploring the essence of the revolution. It is not the essence of the revolution per se. As previously mentioned, the real essence of the revolution lies in the transformation of cognitive faculties analogous to Newtonian attraction. We can limit this general explanation to the practical dimension. By this analogy, the "invisible force" in practical philosophy should be the practical cognitive faculties. Therefore, the essence of the Copernican Revolution in the practical dimension lies in the transformation of the practical cognitive faculties themselves. This transformation involves the cognitive faculties shifting from its merely general practical application to another pure practical application besides it. Similar to theoretical philosophy, we can verify this analogy through Kant's discussion of the pure practical application of faculties of reason. Kant believes that pure practical reason can by itself serve as the determining ground for the will, thereby becoming originally legislative. The laws it establishes are the laws of pure practical reason or moral laws. This function of practical reason is usually called as "reason legislating for itself". Moral laws also indicate an intelligible world and actively determine this world. This intelligible world has previously only a negative meaning in theoretical philosophy. Hence, the reason in its

7 It is necessary to highlight that, without the concerning about the historical context and the differentiate between Copernican hypothesis and its real Revolution, the connection of it with practical dimension can not be found.

pure practical use is thus the "invisible force", which binds the super-sensible world, just like Newtonian attraction as the "invisible force" that binds the sensible world.

4. The practical transformation of metaphysics through the Copernican Revolution

We have demonstrated that the essence of the Copernican Revolution lies in the transformation within the faculties of mind, and we have extended this transformation from the speculative dimension to the practical dimension. Now we can return to the problem posed at the beginning: how can Kant through the Copernican Revolution make the transition of metaphysics from the speculative to the practical dimension, so as to make the metaphysics of morals become a science? We will solve this problem by answering three questions: (1) Is metaphysics in general sense possible? (2) How does one transition from metaphysics of nature to metaphysics of morals? (3) How can metaphysics of morals be grounded to become a science? We will show that the answer to each of these questions relies on the Copernican Revolution, in which the faculties of mind manifest successively as the transcendental and practical uses of understanding and reason. Based on their different manifestations the "transition" will be presented as a progressive transformation to the practical dimension.

4.1 The transcendental use of the understanding and the possibility of metaphysics

Given that Kant considers all historical attempts to make metaphysics to be a science to have failed, so the foremost question we should answer is: if the metaphysics can in a sense still be possible? Since "metaphysics only deals with synthetic a priori propositions" (AA 04: 274), the question can be changed into: if the a priori synthetic judgments are possible? If they are possible, then the metaphysical knowledge as a specific category thereof is also possible. Kant addresses this question through the Copernican Revolution, but the way this revolution is presented is much more complex than commonly understood. Specifically, since judgment is a function of the understanding, this revolution naturally first occurs within the faculty of understanding. Kant provides a detailed analysis of it in the B-Deduction of the first *Critique*. According to Henrich, the proof structure of this Deduction consists of two steps that marked by §20 and §21, which together form the basis for demonstrating the possibility of metaphysics (Henrich,1969; see also Allison,2004, pp.159-201). We can now link the two steps with the Copernican Revolution.

In the first step, Kant reveals the essence of the Copernican Revolution within the faculty of understanding through the Deduction: all the manifold of intuition necessarily is subject to the categories of the understanding. The Ground for the "one" („Eine") manifold in intuition is not found within the intuition itself, but in the transcendental unity of apperception of the understanding. In other words, the essence of the revolution is the shift of the faculty of understanding from merely representing the relations between concepts in judgments to unifying the manifold in intuition into the objective unity of apperception, i.e. from the application in the general logic to the application in the transcendental

logic, in which Kant has abstracted from the way in which the manifold for an empirical intuition is given. In the second step, the revolution makes a priori synthetic judgments possible: By incorporating the way in which the manifold for the intuition is given, Kant indicated that the unity imposed on the manifold for the intuition is precisely the unity to be found in our empirical intuition. The result is that empirical objects conform to our faculty of understanding rather than the understanding conforms to empirical objects. This is a deepened version from the classical standpoint of the Copernican Revolution. Yet it is the manifestation of the revolution but not its essence. Consequently, the question of how a priori synthetic judgments (as they pertain to empirical objects) are possible is answered through these two steps of the Deduction. However, since the spontaneity of the understanding in this place is not pure, the categories can only be applied to empirical objects. Given that Kant demonstrates in the transcendental deduction of the categories that their super-sensible use is invalid, and since the fundamental characteristic of metaphysical knowledge is precisely concerned with the super-sensible object, although Kant's revolution has proved the possibility of a priori synthetic judgments, it has simultaneously proved that all metaphysics of nature in a positive sense are impossible due to the limitations of the use of the understanding.

Despite that Kant has negated the possibility of metaphysics of nature through the Copernican Revolution, it also leaves room for the possibility of metaphysics in some other form. Let's revisit the first step of the B-Deduction mentioned above. In the first step, the way in which the manifold for the empirical intuition is given is abstracted away. Yet the understanding must still relate to objects even though the way of given is abstracted away, because thinking is merely the act of linking given intuition to an object. The difference is that in this concern the object is not empirical but transcendental (*KrV*, A247/B304).[8] Therefore, based on the use of the understanding, we can distinguish two types of objects, namely empirical and transcendental objects. The transcendental object "cannot contain any determinate intuition at all, and therefore concerns nothing but that unity which must be encountered in a manifold of cognition insofar as it stands in relation to an object" (*KrV*, A109). Since the categories of the understanding can only determine empirical objects but not transcendental ones, the transcendental object remains as an indeterminate thought. It can be understood negatively as the object that not of sensory intuition, which is called negative noumenon, in contrast to a positive noumenon. Here the revolution once again inverts the relationship between knowledge and objects: it shifts from the understanding conforming to general objects to transcendental object conforming to the understanding. Since a transcendental object is merely the unity encountered in the manifold of intuition

8 The term "transcendental object" is ambiguous, in the B edition of the first *Critique*, it is replaced by terms such as negative noumenon, but for our purpose, it suffices to understand that it arises from the transcendental use of the understanding and is used by Kant equivalently with intelligible object or negative noumenon.

according to the categories of the understanding, this "conforming" does not imply that the object is determined by the cognitive faculties but that its existence is posited by them.

Since there are indeterminate and indeterminable objects, then the a priori knowledge that related to these objects will be possible, as long as these indeterminate objects can be determined elsewhere. And as super-sensible objects, they align with the requirement of metaphysics to be based on cognitive faculties without recourse to any experience. Therefore, metaphysics is possible in some other form. Considering that the world formed by the intelligible object is the intelligible world, and that the intelligible or transcendental object is the object that we "have no concept of it except merely that of the object of a sensible intuition in general, which is therefore the same for all appearances" (*KrV*, A253), there are no multiple types of intellectual object. And the term "world" merely refers to the totality of objects. Thus, the relationship between transcendental or intelligible object and the intelligible world is not one part to a whole but is identical with each other. So, like the intelligible object, the intelligible world is indeterminate but thinkable. And based on the same reason, metaphysics is possible in some other form within the realm of the intelligible world.

4.2 The practical use of the understanding, the transcendental use of reason, and the transition to metaphysics of morals

Given that metaphysics is possible, and as we have demonstrated that it cannot be metaphysics of nature, according to Kant's division of the system of metaphysics, it can only be metaphysics of morals. Therefore, there is a transition from metaphysics of nature to metaphysics of morals. The problem is: how can Kant realize this transition? We will show that the Copernican Revolution is also the key to answer this question. To this end, we need foremost to assume that metaphysics of morals is possible, so that the moral laws can directly determine the will. And this assumption will be substantiated in the next subsection.

Now considering the equivalence between transcendental object and the intelligible world, there are two equivalent ways to prove the transition: (i) To prove that the pure practical reason can determine the transcendental object that remain undetermined and indeterminable within theoretical philosophy. (ii) To prove that the undetermined and merely thinkable intelligible world in theoretical philosophy can be determined in the practical realm, thus filling the realm left indeterminate in theoretical philosophy with the intelligible world of practical philosophy. The first proof is a challenge for us because the practical use of reason is about the determination of the will and therefore does not directly relate to any specific objects. In the second proof, the intelligible world is nothing more than the pure intelligible form of the unity of apperception. Thus, when the possibility of metaphysics of morals is presupposed, this intelligible world will be determined in the practical realm, because the moral law "points to a pure world of the understanding and indeed, even determines it and let us cognize something of it" (AA 05: 43). Therefore, the above question can be adopted as the following form: why can the moral law determine the

intelligible world? This is equivalent to: Why do the categories of the understanding have a super-sensible use in the practical realm? This is because the understanding not only has a relation with objects in theoretical knowledge but also relates to the faculty of desire in the practical knowledge. Since the faculty of desire is the will, the pure understanding here is identical the pure will (AA 05: 55). It means that all categories of the understanding are included in the pure will and so they will also have their practical use.

But it leads to the problem that the categories of understanding in the practical philosophy have to be used to the super-sensible realm. This problem can also be solved through the Copernican Revolution. As mentioned in the previous section, the B-Deduction has two steps: the first step suspends the way in which the manifold for the intuition is given, and the second step adds it again to the manifold for the intuition. We can now feel the importance of it. In the first step, since the origin of the categories is independent of all sensory conditions, it means that the categories must not necessarily be limited to sensory objects. Unlike the second step of the B-Deduction, as long as they are not limited to phenomena in their theoretical use, they can also be applied to the intelligible object or intelligible world. Thus, the transcendental unity of the categories produced by the Copernican Revolution can be utilized in the practical realm, whereas in theoretical philosophy the super-sensible use of the categories can only lead to illusion (AA 05: 55-56). Consequently, (ii) has been proven. So, the transition to metaphysics of morals is possible through the Copernican Revolution. Moreover, the revolution inverts the relationship between knowledge and objects once again: through the revolution the intelligible object (intelligible world) conforms to cognition (pure practical reason), whereas before the revolution the empirically conditioned reason autocratically determines the will and it causes the cognition (general practical reason) to conform to the objects (material objects). This inversion progresses beyond the inversion in the previous section, as the merely posited transcendental object now becomes determined by our cognitive faculty.

In addition to proving the possibility of this transition, we must also demonstrate its necessity. Since the faculty of reason can operate separately without relating to empirical objects and it is present as the faculty that always seeks the unconditioned from the conditioned. It will constitute the driving power of the transition: Firstly, for the speculative reason, when it seeks the unconditioned for the sensibly conditioned, it prevents metaphysics from descending into skepticism, although it leads to a series of transcendental illusions. Because the reason, despite its failures, never abandons the quest for some certain form of metaphysics, it even urges us to use the practical reason to fulfill the vacancy remained in theoretical philosophy (*KrV,* BXXII). More importantly, the unity of practical reason requires rational beings to seeks absolute unconditional laws for its actions. Although the practical reason also cannot reach the unconditioned, its infinite ascending does not lead to illusion but continually motivates us to act according to pure practical knowledge under the guidance of how things ought to happen (AA 04: 463). Furthermore, the primary of prac-

tical reason allows it to proceed where theoretical reason halts. Thus, the faculty of reason ensures the necessity of the transition. Thus, the discovery of this capacity of reason also stems from the Copernican Revolution, which is similar to that of the understanding. As we know, the general or logical use of reason is the indirectly inferential ability. But the reason in its real use shows that it "contains the origin of certain concepts and principles , which it derives neither from senses nor from the understanding" (*KrV*, A299/B355). It presents the transcendental use of reason instead of its general use that characterized by the capability to generate concepts or principles on its own. Similar to the faculty of understanding, reason transfers from its general use that passively receives concepts and relies on them for the inferences to its transcendental use that generates its own concepts and their objects. This is the Copernican Revolution within the faculty of reason.

4.3 The practical use of reason and the groundwork of metaphysics of morals

Now we turn to the last question: how can metaphysics of morals be grounded so as to become a science? We can divide this question into two questions: first, how can metaphysics of morals be possible? Second, how can metaphysics of morals become actual? We will demonstrate that both questions can be answered through the extended version of the Copernican Revolution in moral philosophy. It should be noted in advance that when we talk about the "groundwork of metaphysics of morals", we often refer to Kant's book by the same name. But because in this groundwork the *Critique of Practical Reason* can more prominently show the role of the Copernican Revolution, we will focus on the second *Critique*.

Just like to prove the possibility of metaphysics of nature is equivalent to prove the possibility of the knowledge of the pure theoretical reason, to prove the possibility of metaphysics of morals is the same as to prove the possibility of the knowledge of pure practical reason. It involves two steps: first, to provide the ground for the existence of the moral law; second, to provide the ground why the moral law can directly determinate the Will. In the first step, since freedom is the *radio essendi* of the moral law (AA 05: 4), so the question is: how can freedom be possible? In the first part of this section, by use of the revolution within the cognitive faculties we have distinguished the world into the sensible world and intelligible world. And it is the intelligible world that preserves the possibility of the idea of freedom, so freedom can be possible through the Copernican Revolution. In the second step, Kant argues that by "adding a positive determination to a causality thought only negatively, the possibility of which was incomprehensible to speculative reason, which was nevertheless forced to assume it" (AA 05: 48), the objective reality of the moral law can be demonstrated. In this quote, "the speculative reason had to assume" is called transcendental freedom, and the "positive determination" is no other than the self-legislation of the Will. Since the possibility of freedom has been demonstrated, the question can be raised in the following form: how can the self-legislation or autonomy of the Will be possible? Kant's

answer to this question is quite brief and dogmatic. He considers it is a fact of reason that does not require any external conditions to prove it. Although we cannot further ask for the ground of it, its reality is indisputable and thus its possibility is evident. It reveals the a priori legislation of practical reason, which illustrates the "revolution" within practical reason. Reason in the practical realm transitions from the faculty that is merely passively deriving the determining ground of the Will from empirical material to the faculty that is able to determine the Will on its own. Or simply speaking, it transitions from a general practical use to a pure practical use. Moreover, because the pure practical use of reason is based on the possibility of freedom, which is preserved by the "revolution" in the theoretical dimension, the "revolution" within practical reason is also based on the "revolution" within theoretical philosophy. Therefore, the Copernican Revolution makes the moral law and its objective reality possible, thereby making metaphysics of morals possible.

Let's turn to the question of the actuality of the metaphysics of morals. Unlike theoretical knowledge, in which objects are directly given in sensory intuition, pure practical knowledge requires making this object actual without the help of any experience. It becomes actual by determining the will through the law and prompting the subject to take actions that actualize the object. But what is the ground for pure practical knowledge to make objects actual? Kant believes that this ground must also come from our faculty of reason. In its pure practical use, reason not only has a priori legislative capacity but also imposes coercion on us to act according to its legislation, which makes the moral law be a categorical imperative. Kant argues that the coercion of the law is undeniable, because by examining the lawfulness of one's actions we can find that "whatever inclination may say to the contrary, their reason, incorruptible and self-constrained, always holds the maxim of the will in an action up to the pure will" (AA 05: 32). Thus, through its original legislation the pure practical reason demands us to act according the law: What I will, I command. Nevertheless, Kant has only described this phenomenon and did not provide a detailed explanation of why reason has coercive force and of how his coercion operates through our cognitive faculties. A more thorough explanation of them can be found in Fichte's theory of science. Until now, just as the laws of heavenly motion confirm the "invisible force" that binds the structure of the world, the moral laws confirm the "invisible force" within reason that dictates how the world ought to exist. So the basis for how things ought to happen is not found in the objects of the world but within the cognitive faculties of subject. This force within reason causes the fourth inversion of the relationship between knowledge and objects: from the heteronomy in previous theories of morals, in which the Will (as cognitive faculty) was determined by empirical objects, to the autonomy in Kant's moral philosophy, in which the morals laws directly determine the Will (as the legislative capacity of reason) and produce actual objects through this determination in action. Through this new inversion, metaphysics of morals achieves its actuality.

5.Conclusion

By a reinterpretation of the Copernican Revolution we have clarified the practical transformation of metaphysics with a step-by-step progress. We can hold that the "transition-problem" of the metaphysics has been solved. Besides it we can then draw some conclusions on our topic:

Firstly, as referred in the introduction, the central issue addressed in this paper was initially proposed by Anqing Deng. Regarding Deng's fundamental view on this issue, our research defends his insight that Kantian ethics can be integrated with metaphysics, so to render ethics to be the first philosophy. His two solutions include two different aspects: the first regards the revolution itself as the transformation from metaphysics of nature to metaphysics of morals, while the second is deemed to be the revolution to achieve a metaphysical transformation, which can be characterized as a conversion process (although he does not exactly present this idea). Our research attempts to deepen the second one, namely, to present the "transition" of metaphysics as a progressive process of practical transformation.

Secondly, considering the development of Kant's own thoughts, the construction of metaphysics of morals was a central target throughout his philosophical career. From his promise to Herder in the 1760s about a book named *Metaphysics of Morals* to the accomplishment of that book in the 1790s, it spanned about 30 years long. Kant's critical works during this period can be seen as the by-products of this target. Therefore, we should stand at a systematic perspective to understand Kant's main works. It means that we should holistically examine the interrelations between the various branches of Kant's works, rather than fragmentarily involve in a certain part like epistemology, ethics or philosophy of science, and so on. This is the core concern of our research.

Lastly, regarding the topic of metaphysics itself, contemporary metaphysics has suffered under severe criticism and rejection. It is mainly due to the development of the modern natural sciences. Natural sciences reveal natural laws through empirical method, which stands in contrast to the super-sensible nature of metaphysics. However, Kant emulated the methods of natural sciences to reveal that metaphysics can be a science in its practical dimension, thereby promoting the practical transformation of metaphysics. This provides us with a different perspective for rethinking the contemporary fate of metaphysics, whose value warrants further research.

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