

**On the Significance of the Copernican Revolution:
Transcendental Philosophy and the Object of Metaphysics**

*Sobre la importancia de la revolución copernicana:
Filosofía trascendental y el objeto de la metafísica*

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Abstract

This paper argues that the famous passage that compares Kant's efforts to reform metaphysics with his transcendental idealism to the earlier Copernican revolution in astronomy has a more systematic significance than many recognize. By examining the totality of Kant's references to Copernicus, one can see that Kant's analogy points to more than just a similar reversal of perspective. By situating Kant's comments about Copernicus in relation to his understanding of the logic implicit in the great revolutions in mathematics and natural science, this paper argues that Kant's appeal to the Copernican revolution in astronomy as a forebear to his own transcendental project indicates that his attempt to revolutionize metaphysics by setting it on the secure path of the sciences demands a shift in how we think of the proper object of metaphysics.

Keywords

Copernicus, Copernican revolution, metaphysics, transcendental idealism

Resumen

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Este artículo argumenta que el famoso pasaje que compara los esfuerzos de Kant para reformar la metafísica con su idealismo trascendental con la anterior revolución copernicana tiene un significado más sistemático de lo que muchos reconocen. Examinando la totalidad de las referencias de Kant a Copérnico, se puede ver que la analogía de Kant apunta a algo más que un simple cambio de perspectiva. Al situar los comentarios de Kant sobre Copérnico en relación con su comprensión de la lógica implícita en las grandes revoluciones en matemáticas y ciencias naturales, este artículo argumenta que la apelación de Kant a la revolución copernicana en astronomía como precursor de su propio proyecto trascendental indica que su intento de revolucionar la metafísica colocándola en el camino seguro de las ciencias exige un cambio en la forma en que pensamos en el objeto propio de la metafísica.

Palabras clave

Copérnico, revolución copernicana, metafísica, idealismo trascendental

Despite the fact that it is often taken as a kind of cipher for his transcendental idealism as a whole, Kant's so-called Copernican revolution is perhaps one of the most misleading images of the *Critique of Pure Reason*. Whether Kant's invocation of Copernicus in the B Preface bears any significance at all has, in fact, been an issue of some debate throughout the last century.¹ Even among those who hold that the references in the B Preface do indeed indicate a significant parallel between the Copernican revolution in astronomy and Kant's attempted transcendental turn in metaphysics, what exactly the content of this similarity is remains further disputed.² This disagreement is due at least in part, I imagine, to the paucity of explicit references to Copernicus in Kant's writings—I find only eight references to Copernicus in the *Akademieausgabe*—and the tendency to assume that the references in the *Critique* alone are sufficient to establish the full meaning of this suggestive analogy. Engagement with the totality of Kant's comments about the significance of Copernicus and attention to the specific context in which his use of the

¹ Negative responses are given by, for example, Cross (1937), Hanson (1959).

² The most common understanding of the significance of the Kant's Copernican revolution explains that both Copernicus and Kant abandon an intuitive perspective on a problem (the relation between our terrestrial position and celestial motions and the relation between objects and their true conceptual representation, respectively) in favor of a counter-intuitive but scientifically productive hypothesis (heliocentrism, transcendental idealism). This view is found, for example, in Paton (1937); Allison (2004, p. 36); and Guyer (1987, p. 1-2). Other commentators, including Smith (1913) and Schulting (2009), argue, however, that the analogy Kant saw between himself and Copernicus should not be indexed primarily to a hypothetical change in perspective (from geo- to heliocentrism, for example). Although I agree with Smith and Schulting on this point, my interpretation of the broader significance of Copernicus for transcendental idealism diverges considerably from theirs.

Copernican analogy is situated in the Preface to the second edition of the *Critique*, however, provide an understanding of the Copernican revolution effected by transcendental idealism that is at odds with the dominant reading of the analogy. In particular, this more thorough investigation of the figure of Copernicus in Kant's thought resists the now-popular reduction of the complex relation between epistemology and metaphysics in transcendental idealism to the suppression of the latter by the former.³

In this essay, then, I will analyze the significance of the figure of Copernicus for Kant's intended revolution in rather than abandonment of metaphysics. I have divided this analysis into two parts. In the first part I will review the passages in which Kant explicitly refers to Copernicus or Copernican astronomy in order to expand the discussion beyond the rather familiar confines of the B Preface. This section will show that the analogy Kant identifies between Copernicus's work and his own is either almost entirely insignificant or amounts to something more than just a similarly strategic reversal of perspective. In the second part I will argue for the latter of these two options. There I will show that the significance of Copernicus for Kant's transcendental revolution in metaphysics rests not only on a reversal of perspective, as is commonly acknowledged, but also on the importance of the proof of the epistemic legitimacy of Copernicus's heliocentric reversal of Ptolemaic geocentrism. I will develop this claim by emphasizing two passages: first, a marginal note Kant wrote in Baumgarten's *Metaphysica* that contrasts Copernicus with the Pythagorean philosopher Philolaus of Croton; and, second, Kant's discussion of the sequence of scientific revolutions in geometry and natural science that, he claims, foreshadows a similar revolution in metaphysics. The first passage indicates Kant's awareness of the necessity of epistemic validation for any initially speculative reversal of perspective. The second will allow me to argue that Kant attempts to secure the epistemic legitimacy necessary to make of metaphysics a true science by distilling and adopting the common structure of the geometrical and experimental scientific revolutions. In each case,

³ A recent example of this strand of interpretation is found in Kitcher (2011, p. 6): "The epistemological turn [of Kant's *Critique of Pure Reason*] is effected by revealing apparently metaphysical theses as disguised epistemological assumptions." She adds, "It [the *Critique*] carries out the epistemological turn in two ways. Negatively, it shows why metaphysical principles cannot be established by the methods used by Kant's predecessors. Positively, it reveals that principles that were mistakenly understood as metaphysical are *a priori* principles that are both necessary for cognition and that arise through actions of the mind" (p. 7). As I will argue in the second section of this essay, the metaphysical revolution Kant intended to inaugurate with his transcendental idealism can only be understood as the wholesale replacement of metaphysics by epistemology on the condition that one maintains the idea that the proper objects of metaphysics are things as they are in themselves and so ignores the shift in the object of metaphysics that transcendental idealism recommends.

I will show, Kant understands these scientific revolutions to depend on an alteration of what these disciplines took as the proper objects of their investigations. The conclusion of this analysis of the role Copernicus plays in the transcendental idealist reorganization of metaphysics will finally be that Kant attempts to repeat the Copernican revolution in astronomy, which is characterized as a speculative reversal of perspective that is validated by some species of proof, in metaphysics by conceiving of the object of metaphysics not as a necessary being but as the object of a specific type of synthetic *a priori* knowledge. By reframing metaphysics as an inquiry into those things that can be known by *a priori* conceptual means, Kant deploys both the typically recognized Copernican reversal of perspective—by arguing that objects must conform to conditions of intelligibility rather than the reverse—as well as the generally unrecognized but equally critical epistemic validation of this reversal. Since the ordinary means of experimental observation used in the validation of natural scientific claims are not available to metaphysics, a new method of epistemic legitimation is required in order to repeat this second element of Copernicus’s heliocentric revolution. Kant attempts to meet this requirement, I contend, by making the means for determining the epistemic legitimacy of one’s metaphysical claims an element of the object of metaphysics itself. Kantian metaphysics is not an investigation of objects that outstrip the limits of experience, then, but an investigation of *a priori* conceptual knowledge and its objects. This new object of what Kant takes to be a finally scientific metaphysics is neither wholly objective nor wholly subjective, but is both insofar as it objectively contains the principles of the subjective intelligibility of its objectivity. Once we have understood just what makes Kant’s Copernican revolution both Copernican and revolutionary, we will see that the critical stance of his transcendental idealism does not amount to an abandonment of metaphysics in favor of epistemology. Transcendental idealism remains committed to the importance and cognitive legitimacy of theoretical metaphysics, so long as this metaphysics is reorganized according to what Kant argues is its proper object.⁴

⁴ Thus Kant writes to Kästner in August of 1790:

the efforts I have heretofore made are in no way meant (as they may appear to be) to attack the Leibniz-Wolffian philosophy (for I find the latter neglected in recent times). My aim is rather to pursue the same track according to a rigorous procedure and, by means of it, to reach the same goal, but only via a detour that, it appears to me, those great men seem to have regarded as superfluous: the union of theoretical and practical philosophy. This

Part 1. Kant on Copernicus

Any analysis of the significance of Copernicus for transcendental idealism, and in Kant's own supposed Copernican revolution in particular, would do well to begin by laying out those texts in which Kant makes explicit reference to him. That is where this paper will begin. There are eight references to Copernicus in Kant's writings, and I will touch upon each of them here. First, I will consider the most prominent references from the Preface to the second edition of the *Critique of Pure Reason*, then mention another passage from the body of the first *Critique* before cutting a roughly chronological path through those passages found in Kant's unpublished reflections, the Jäsche *Logic*, and *The Conflict of the Faculties*.

1.1 The *Critique of Pure Reason*

The brief but suggestive discussion of Copernicus in the Preface to the second edition of the *Critique of Pure Reason* (1787) is certainly the most widely recognized of Kant's references to Copernicus. These passages also provide the basis for the typical interpretation of Kant's own Copernican revolution—a phrase that does not, it bears noting, appear in any of Kant's writings. On this interpretation, Copernicus's significance for the project of transcendental idealism lies in his resolution of a series of astronomical difficulties regarding the regularity of the planetary orbits through a heterodox reversal of perspective. Rather than presuming that the motions of the planets and heavens are due entirely to their orbits around a stationary earth, Copernicus suggested that Ptolemaic astronomy could be greatly simplified, and so rendered more intelligible, by asserting that the earth, like the other planets, in fact orbits the sun. Kant's interest in Copernicus, then, would be in harnessing his revolutionary change in scientific perspective for the purposes of either finally putting metaphysics on “the sure path of science.”⁵

The cornerstone of Kant's mature philosophical system is the claim that metaphysics could only ever be a system of synthetic *a priori* knowledge. Such a science must be synthetic, Kant claims, in order to connect a conceptual determination with the object that concept purports to represent. Metaphysics must be *a priori*, on the other hand, if its claims to universal necessity are to be legitimate. Insofar as knowledge depends upon

intention of mine will become clearer when, if I live long enough, I complete the reconstruction of metaphysics in a coherent system. (Kant, Br, AA 11:186).

English translations of Kant are drawn from the volumes listed in the bibliography below.

⁵ Kant, KrV, Bix.

experience, it remains irreducibly contingent and local, and so cannot be legitimately considered universally valid. Insofar as metaphysical knowledge is synthetic and *a priori*, then, it both makes objective claims, that is, claims about the nature of something real, and does so in a way that bears no necessary connection to the experiences of any particular individual and so is valid for all individuals. The question of the possibility of this kind of synthetic *a priori* knowledge is, Kant consistently reminds us, the driving force behind his critical thought.⁶

The deep-seeded conception of truth as adequation according to which truth is characteristic of those ideas or thoughts that conform to their objects, and the empiricist extension of this idea into a commitment to the passive determination of ideas by the objects of experience appear to render any hope of *a priori* knowledge impossible, and so if metaphysics is to be possible as an objective science, something of a change in perspective on the nature of truth must first be accomplished. Kant writes:

Hitherto it has been assumed that all our knowledge must conform to objects. But all attempts to extend our knowledge by establishing something in regard to them *a priori*, by means of concepts, have, on this assumption, ended in failure. We must therefore make trial whether we may not have more success in the tasks of metaphysics, if we suppose that objects must conform to our knowledge. This would agree better with what is desired, namely, that it should be possible to have knowledge of objects *a priori*, determining something in regard to them prior to their being given.⁷

Such a bold and counter-intuitive reversal of a long-established philosophical presumption is not recklessly experimental or speculative, Kant suggests.

The change in perspective that lies at the heart of transcendental idealism has a strong scientific precedent and should for that reason not be rejected because of its opposition to common sense. If we accept the suggestion that the possibility and limits of synthetic *a priori* knowledge might become more comprehensible on the assumption that objects must conform to the form of knowledge, Kant writes:

We should then be proceeding precisely along the lines of Copernicus' first thought. Failing of satisfactory progress in explaining the movements of the

⁶ See, for example, Kant, KrV, A6-10/B10-14, B14-24 and Prol., AA 4:265-280.

⁷ Kant, KrV, Bxvi.

heavenly bodies on the supposition that they all revolved round the spectator, he tried whether he might not have better success if he made the spectator to revolve and the stars to remain at rest.⁸

This passage provides the core of what we typically take Kant's Copernican revolution to be. Transcendental idealism, insofar as it displaces the active or determining role of the object onto subjective forms of knowledge, "proceed[s] precisely along the lines" of the Copernican reversal of the stability and orbital motion of the sun and the earth. Kant marshals this analogy, then, to claim some of the undeniable scientific productivity of the Copernican hypothesis for his own hypothetical reversal of the epistemological priority of the object over the subject. The analogy Kant draws here is quite shallow, however, and unravels when it is taken to consist in anything more detailed than a formal reversal of perspective that resolves questions intractable from the previous perspective.

If one attempts to give some determinate content to the formal similarity of Copernicus's and Kant's changes in perspectives, the analogy is consumed by a rather striking irony. Under greater scrutiny, Kant's Copernican revolution appears considerably more Ptolemaic than Copernican.⁹ If Copernicus's great contribution lies in his heliocentric reorganization of Ptolemaic astronomy, the broader consequences of his hypothesis urge a reconsideration of the priority given to the human, terrestrial perspective and its supposed centrality in the universe as a whole. Kant's proposed revolution in metaphysics, on the other hand, argues for the irreducibility of the active contribution of the thinking subject to cognition, and so argues in favor of just that centrality of the human perspective that Copernican astronomy rejects. If we consider the content of the perspectives involved in these two reversals, that is, Kant's analogy surely fails under the weight of the opposition of the perspectives finally endorsed by Copernicus and Kant. If limited to this formal reversal of perspective, however, the significance of Copernicus for Kant's attempted reorganization of metaphysics is quite modest and this famous passage ought to be recognized as a clever rhetorical device that ultimately reveals little about Kant's thinking or the project of transcendental philosophy more generally.¹⁰ As I will show, Kant's

⁸ Kant, KrV, Bxvi-xvii (translation modified).

⁹ That Kant's Copernican revolution ought better be referred to as a Ptolemaic counter-revolution has been observed many times in the literature: first in Smith (1913), but perhaps most prominently in Russell (2009).

¹⁰ This is certainly the position taken very forcefully by a certain S. Alexander, who writes:

It is very ironical that Kant himself signalized the revolution which he believed himself to be effecting as a Copernican revolution. But there is nothing Copernican in it except that he

engagement with Copernicus and the latter's significance for a transcendental resuscitation of metaphysics is not limited in this way, not even within the B Preface.

In a footnote that comes at the end of a long paragraph on the relevance of his own reversal of perspective for the central question of the B Preface—that of the possibility of a scientifically rigorous metaphysics—Kant again affirms the parallel between transcendental idealism and Copernican heliocentrism, though this parallel differs from that identified a few pages earlier in the text. Here we read that Kant's reversal of epistemological perspective, like its Copernican analogue, is validated by its productive engagement with other areas of study. Since, on the hypothesis presented in the Preface, subjective forms of experience condition all knowledge, no theoretical knowledge of the unconditioned is possible. It is precisely this extension of knowledge beyond the conditions of experience and into the unconditioned that metaphysics and reason “by necessity and by right”¹¹ demand, however, and so transcendental idealism is squarely at odds with any theoretical knowledge of the absolute.¹² This inaccessibility of the absolute from within the theoretical domain restricted by the transcendental idealist thesis, Kant explains, surprisingly allows for a successful determination of the absolute through the practical use of reason.¹³ The satisfaction of reason's demand for the unconditioned through its practical employment, the possibility of which is recognized according to Kant

believed it to be a revolution. If every change is Copernican which reverses the order to the terms with which it deals, which declares A to depend on B when B had before been declared to depend on A, then Kant—who believed he had reversed the order to dependence of mind and things—was right in saying that he effected a Copernican revolution. But he was not right in any other sense. (quoted in Smith [1913, p. 549])

¹¹ Kant, KrV, Bxx.

¹² This does not, I claim, amount to asserting that any theoretical metaphysics is impossible by the lights of transcendental idealism. In this passage from the B Preface and in similar passages from the Transcendental Dialectic (see, for example, KrV, A307-309/B364-366 and A321-332/B377-389), Kant aligns metaphysics with reason, and so with knowledge of the unconditioned. It is clear from the Principles of the Pure Understanding, however, that there are, in Kant's estimation, a series of objectively valid synthetic *a priori* judgments unrelated to reason's thirst for the unconditioned. These objective and universally necessary claims (for example, “All alterations take place in conformity with the law of the connection of cause and effect” [KrV, B232]) clearly satisfy the requirement outlined above for metaphysical knowledge, namely, that it exhibit a synthetic *a priori* character. That is, transcendental idealism does not require a wholesale rejection of metaphysics in favor of the sole epistemic legitimacy of natural scientific methods of empirical investigation. I will return to this issue in section 2.2 below.

¹³ I am concerned in this paper only with metaphysics that issues from a theoretical use of reason—what Kant calls the metaphysics of nature—and so will leave the issue of reason's grasp of the absolute in practical philosophy entirely to the side. On the relation between theoretical and practical metaphysics in transcendental idealism, see Zöller (2014). On the relevance of the Copernican analogy to these two dimensions of Kant's metaphysics, see Schönecker, Schulting, and Strobach (2011).

only through his limitation of theoretical reason to the realm of possible experience, further validates transcendental idealism's change in epistemological perspective. Kant's position shares this structure of mutual validation of results from distinct areas of investigation with Copernican astronomy, he claims. Kant writes:

Similarly, the fundamental laws of the motions of the heavenly bodies gave established certainty to what Copernicus had at first assumed only as an hypothesis, and at the same time yielded proof of the invisible force (the Newtonian attraction) which holds the universe together. The latter would have remained forever undiscovered if Copernicus had not dared, in a manner contradictory to the senses, but yet true, to see the observed movements, not in the heavenly bodies, but in the spectator.¹⁴

The Copernican hypothesis is granted a high degree of certainty through its harmony with the laws of Newtonian mechanics while at the same time rendering the central claim of those mechanics more intelligible.¹⁵ Kant's related distinction between things in themselves and appearances similarly allows for the possibility of synthetic *a priori* knowledge of appearances while simultaneously rendering the unconditioned intelligible in practical terms. Not only, then, does Kant identify the formal similarity of the changes in perspective advocated by Copernicus's heliocentrism and his own transcendental idealism, but it also fleshes the analogy out by arguing that each of these changes in perspective—astronomical on the one hand, epistemological on the other—is supported by and productive for other areas of research—that of physics or Newtonian mechanics for Copernicus, and of a metaphysical determination of the absolute for Kant. After expanding on the content of the significance of Copernicus for his own project in this passage, Kant acknowledges a limitation of the Copernican analogy: whereas the truth of Copernican heliocentrism is demonstrated hypothetically, Kant's transcendental idealism, he claims, claims to be demonstrated apodeictically.

Knowledge established through hypotheses can only be as strong as the evidence that supports those hypotheses, and so can never be genuinely certain, necessary, and universal. Unlike hypothetical reasoning, however, Kant's defense of the necessity and

¹⁴ Kant, KrV, Bxxiiin.

¹⁵ I will return to Kant's high esteem for the Copernican heliocentric hypothesis in section 1.3 when I address two passages that explicitly identify Copernicus with the exemplary use of hypotheses in the natural sciences.

productivity of transcendental idealism rests not on empirically collected evidence but on the necessity of conceptual analysis alone. Kant writes:

The change in point of view, analogous to [Copernicus's] hypothesis, which is expounded in the *Critique*, I put forward in this preface as an hypothesis only, in order to draw attention to the character of these first attempts at such a change, which are always hypothetical. But in the *Critique* itself it will be proved, apodeictically not hypothetically, from the nature of our representations of space and time and from the elementary concepts of the understanding.¹⁶

It would be a mistake, then, to extend the analogy Kant establishes between his own position and Copernicus's heliocentrism to the point where we might expect to prove or disprove the doctrine of transcendental idealism through empirical evidence. Despite drawing a rhetorical connection between his own philosophical project and a giant of modern science, Kant is careful to mark the difference between his transcendental analysis and the methods of the natural sciences. If the stated goal of the B Preface is to inquire into the possibility of a finally scientific metaphysics, this scientificity does not consist in a methodological similarity between transcendental philosophy and the natural sciences.¹⁷

These passages from the Preface note two points of similarity as well as a divergence between the Copernican revolution in astronomy and Kant's proposed revolution in metaphysics. These two positions are both characterized, as the typical understanding of Kant's Copernican revolution rightly notes, by a counter-intuitive change in perspective. This change in perspective is accompanied by a reciprocally productive interaction between two otherwise distinct fields of knowledge, epistemology and practical metaphysics. These parallels do not rest, however, on a methodological similarity, since the apodeictic results of his transcendental analysis differ in kind from the inductive results of natural scientific investigation. These passages constitute less than half of Kant's remarks about Copernicus, and so we would do well to consider the whole of those references

¹⁶ Kant, KrV, Bxxiiin.

¹⁷ For perhaps the fullest account of what Kant means by science (*Wissenschaft*), see the Preface to the *Metaphysical Foundations*, AA 4:467-470. Pure natural science, considered as a science (*Wissenschaft*) rather than mere empirical knowledge (*Wissen*), Kant explains there, is a system that rests on *a priori* principles as opposed to empirical observation. Such a system of principles itself presupposes a metaphysics, which has both a transcendental or general and a special element. Far from adopting the empirical methods of the natural sciences (which Kant associates with science improperly so-called), the natural sciences, insofar as they are properly scientific, Kant argues, depend on the *a priori* principles identified by Kant's transcendental analysis.

before concluding that the typical reading of Kant's Copernican revolution is generally correct even though it does not always recognize the considerably limited relevance of this analogy for the project of the *Critique* as a whole.

The only other reference Kant makes to Copernicus in the first *Critique*, indeed the only reference in the whole of the first edition (1781), contributes relatively little to a reading of the significance of Copernicus in Kant's work. The rather minimal relevance of this passage will be matched, then, by the brevity of my remarks about it. Toward the end of the third chapter of the *Analytic of Principles*, *The Ground of the Distinction of All Objects in General into Phenomena and Noumena*, Kant criticizes a use of the terms *mundus sensibilis* and *mundus intelligibilis* that he has identified "in the writings of modern philosophers."¹⁸ One must resist the temptation, Kant warns, incorrectly to map the concepts of phenomena and noumena onto the distinction between the *mundus sensibilis* and *intelligibilis* insofar as one means these latter terms to identify two distinct sets of objects, one of which is known through the senses and the other through the intellect alone. "According to this usage," Kant explains,

some have thought good to entitle the sum of appearances, in so far as they are intuited, the world of the senses, and in so far as their connection is thought in conformity with laws of understanding, the world of understanding. Observational astronomy, which teaches merely the observation of the starry heavens, would give an account of the former; theoretical astronomy, on the other hand, as thought according to the Copernican system, or according to Newton's laws of gravitation, would give an account of the second, namely, of an intelligible world.¹⁹

This construal of the distinction between phenomena and noumena, which is "a merely sophistical subterfuge,"²⁰ obscures Kant's critical conclusion that the concepts of the understanding can only be legitimately applied to objects of possible experience by asserting the existence of a purely intellectual knowledge. Copernican astronomy and Newtonian mechanics are not instances of the pure intellection of a *mundus intelligibilis*, but of the empirical, which is to say sensible, employment of the understanding. Kant's

¹⁸ Kant, KrV, A256/B312. Kant's own use of the term *mundus intelligibilis* changes considerably from the Inaugural Dissertation to the first *Critique*, and so we might read this comment to be self-critical as well. For an account of the shift in Kant's use of this term and its relation to his Leibnizian and Wolffian heritage, see McQuillan (2011).

¹⁹ Kant, KrV, A257/B312-313.

²⁰ Kant, KrV, A257/B313.

rather indifferent reference to both Copernicus and Newton here says little about his specific and considerable interest in either of these scientists. Indeed, this passage, which is intended to fend off improper interpretations of the phenomena-noumena distinction, says more about the distance Kant would like to place between the first *Critique* and his Leibnizian heritage than it does about the relevance of the figure of Copernicus for his new transcendental idealism.

1.2 Marginal Notes in Baumgarten's *Metaphysica*

There are only two pre-critical references to Copernicus in Kant's writing, both of which date from the silent decade between his articulation of the central problem of transcendental idealism in the famous letter to Herz in February of 1772 and the eventual publication of the *Critique of Pure Reason* in 1781. These references are found in the marginal notes of Kant's copy of the fourth edition of Alexander Baumgarten's *Metaphysica* (1757), which Kant consistently used as the textbook for his courses on metaphysics. I will briefly describe the content of these references now, and will return to the second reference at greater length in section 2.1.

The first reference draws an interesting connection between Scholastic debates about the nature of substance and modern astronomical research. Next to a passage from the Preface to the second edition of the work (1742) about the difference between Aristotle's, Aepinus's, and Baumgarten's own conceptions of the independence of substance,²¹ Kant writes, "Difference between Copernicus and Tycho."²² Aristotle defined substance, Baumgarten explains, as that of which all things are predicated, but which is not itself predicated of anything else. Eighteenth century theologian and philosopher Franz Albert Aepinus argues, Baumgarten reports, that the independence of substance does not preclude a given substance from being a determination of a second substance as long as the first could be separated from the second. When we recall the Tychonic model of astronomy, the connection Kant makes here quickly becomes clear. In an attempt to avoid "both the mathematical absurdity of Ptolemy and the physical absurdity of Copernicus,"²³ Tycho combined the geocentrism of the former with the heliocentrism of the latter. The resulting model places the earth in a stationary position at the center of the solar system.

²¹ See page XVII of the *Metaphysica*, reproduced in Kant, AA 17:8.

²² Kant, Refl 4918, AA 18:28.

²³ Tycho Brahe, quoted in Thoren (1990, p. 239).

The sun is said to orbit the earth with the five remaining known planets orbiting the sun.²⁴ Kant draws our attention to the different accounts given of the sun in the Copernican and Tychonic models. Tycho has the sun orbit, and so depend on, the earth even while it is itself orbited by the other planets, which are in turn dependent upon it. Copernicus, however, maintains that the sun is orbited by all the planets and itself orbits nothing. This difference, Kant notes, can be rather cleanly mapped onto the difference in Aepinus's and Aristotle's definitions of substance, the former allowing a substance to both have determinations and be the determination of another substance whereas the latter holds substance to be that which has determinations but is itself not a determination of another substance. This suggestive comment might well shed light on the connection between Kant's interests in natural science, and astronomy in particular, and metaphysics,²⁵ but for the purposes of the present study, the second reference to Copernicus in these marginal notes is considerably more relevant.

A few pages later, now in a note next to a passage from the Preface to the third edition of Baumgarten's text (1749), Kant distinguishes Copernicus from another, considerably more obscure astronomer who opposed geocentric astronomy, Philolaus of Croton. At this point in the Preface Baumgarten is offering an analysis of the relation between error, justificatory grounds, and what he calls private sufficient reason (*privativa ratio sufficiens*).²⁶ In the margin of this page Kant makes the familiar critical claim that knowledge cannot be reduced to conceptual analysis, and so must exhibit a fundamentally synthetic character. "The analysis of concepts that we already have does not much suffice to a knowledge of things *in concreto*," he writes, "we must, through a synthesis in which we observe the concept in many instances *in concreto*, collect many things which essentially belong to the concept but are not contained within it."²⁷ A mere analysis of concepts in the absence of concrete empirical manifestations, Kant continues, can only ever be empty. Such speculation is not necessarily incorrect just because it is empty; it does not, however, rise to the dignity of knowledge justified by conceptually synthesized empirical content. Speculation unsupported by empirical evidence should not be rejected as false, then, but treated with guarded suspicion. To illustrate the point, Kant concludes the

²⁴ For a more complete account of the Tychonic model, see Thoren (1990, chapter 8).

²⁵ For an interesting analysis of the Copernican revolution that does just this, see Pierre Kerzberg (1989).

²⁶ See page XL of the *Metaphysica*, reproduced in Kant, AA 17:17.

²⁷ Kant, Refl 5064, AA 17:77. Cf. Kant, KrV, A258-259/B314-315.

note with a comment that is particularly relevant here: “Just as when Philolaus said that the earth moves, and Copernicus proved it.”²⁸

Philolaus was perhaps the first to assert that the earth does not occupy a central position in the universe,²⁹ and indeed Copernicus identifies Philolaus as a precursor to the heliocentric position elaborated in *De Revolutionibus* (1543).³⁰ According to Kant, though, Philolaus did not know that the earth moved; Philolaus’ claim was not based on proof, but on speculation. Copernicus, on the contrary, genuinely knew the truth of heliocentrism because his claim was accompanied by some unspecified manner of synthetic proof.³¹ What this marginal note indicates is that the importance of Copernicus cannot be reduced to a sigil in Kant’s work for revolutionary changes in perspective.³² The distinction Kant draws here between Copernicus and Philolaus, which leads to his famous valorization of the former, rests not on their astronomical models, which are similar enough, but on the epistemic justification offered in support of these models. I will return to this generally overlooked note in part two of the paper in an attempt to construct an account of the significance of Copernicus for Kant’s own intended transformation of metaphysics in the light of both the entirety of his remarks about the famous astronomer and of Kant’s engagement with the history of scientific revolutions.³³

1.3 On the Proper Use of Hypotheses

We find two more references to Copernicus in the context of Kant’s rather late reflections on the logical structure and limits of hypotheses. These are found in the Jäsche *Logic* (published in 1800) and in a comment added in the 1790s to an unpublished reflection

²⁸ Kant, Refl 5064, AA 17:77.

²⁹ For what is perhaps the most colorful scholarly history of Philolaus, see Barnes (1982, pp. 297-311).

³⁰ See Copernicus (2002, pp. 4, 13).

³¹ Friedman explains that the truth of heliocentrism was only truly provided when Newton devised an argument based on calculations concerning the universe’s center of mass. For more, see Friedman (1998, p. 170). Blumenberg also marks this fact and so adduces that “Copernicus’ prefiguration of the transcendental turning consists precisely in the fact that he had to present a hypothesis without being able to undertake to prove it” (1987, p. 600). Although Blumenberg is no doubt a better historian of science than Kant, the note I am now discussing clearly indicates that Kant—rightly or wrongly—considered Copernicus to have proven his hypothesis. For an alternative account of the structure of the proof deployed by Copernicus (and Kant as well, he argues), see Schulting (2009, pp. 62-64).

³² Although this note predates the publication of the first *Critique* by some years, the content of the note clearly indicates that it belongs to Kant’s critical thought and not his pre-critical, which was not nearly so dismissive of analytic knowledge claims.

³³ Schulting acknowledges this passage in a footnote addressing Aristarchus as a forerunner of Copernican heliocentrism, but does not offer any commentary on its significance (2009, p. 55 n). To the best of my knowledge, no other commentator mentions this passage.

written in the 1770s. In each case Copernicus's heliocentric hypothesis is mentioned as exemplary of the legitimate and productive use of hypotheses in the natural sciences.

After a brief discussion of the virtues and limits of a skeptical attitude toward the role of certainty in philosophical reasoning in the Jäsche *Logic*, Kant explains that a hypothesis can never produce genuine certainty, but can, when well constructed, become an inductive “analogue of certainty.”³⁴ An hypothesis is, according to Kant, “a holding-to-be-true [*Fürwahrhalten*] of the judgment of the truth of a ground for the sake of its sufficiency for given consequences”.³⁵ This kind of inductive reasoning posits a sufficient ground or cause on the basis of a series of already given phenomena, now understood as effects of the posited cause. Since it is impossible exhaustively to catalog and verify all the possible effects of posited ground, the truth of an hypothesis can never be known with true certainty. The strength of an hypothesis and what separates it from mere speculation is its ability to explain as many of the relevant phenomena as possible without entailing any false or non-existent consequences. In addition to its ability to explain existing phenomena, an hypothesis must meet three additional criteria: the hypothesis itself must be empirically possible; the effects the hypothesis is intended to ground must properly follow (by the lights of current natural science, presumably) from the hypothesis; and the hypothesis cannot itself require further hypothetical support. On this final point Kant explains, “If, in the case of a hypothesis, we have to have several others to help, then it thereby loses very much of its probability.”³⁶ This is the criterion, he adds, that distinguishes Copernicus from Tycho. As we have already seen, Brahe's geo-heliocentrism attempts to mediate between Ptolemaic and Copernican astronomy, and constructs a whole series of presuppositions or subsidiary hypotheses in order to do so. “The Copernican system, on the other hand,” Kant writes, “is an hypothesis from which everything can be explained that ought to be explained therefrom, *so far as it has yet occurred to us*.”³⁷

The exemplarity of the Copernican hypothesis is expanded in a roughly contemporary unpublished reflection. After listing the central features and limits of hypothetical reasoning that I have just glossed, Kant again presents Copernican

³⁴ Kant, *Log*, AA 9:85.

³⁵ Kant, *Log*, AA 9:84.

³⁶ Kant, *Log*, AA 9:85.

³⁷ Kant, *Log*, AA 9:86 (emphasis original).

heliocentrism as a paradigmatic case. Before the text breaks off Kant notes that the heliocentric hypothesis meets the necessary criteria:

E.G. The Copernican system. 1. That the earth moves is possible. 2. That the stars appear to move from east to west is certain. 3. That this [effect] can follow from such [an hypothesis] [text breaks off].³⁸

Kant clearly views Copernican astronomy as something more than a choice example of the importance of the willingness to adopt a new perspective when traditional standpoints fail to provide sufficient explanatory power. What Kant highlights in these discussions of the role of hypotheses in the natural sciences is the importance of the epistemic legitimacy of Copernicus's hypothesis. This specific concern for the justification of Copernicus's position, which distinguishes it from both Tyconic and Philolaic astronomy, indicates that Kant's understanding of Copernicus is not at all limited to the motif of a reversal of perspective, and so our conception of the Copernican revolution Kant intended to inaugurate in metaphysics should not be so limited.

1.4 *The Conflict of the Faculties*

The eighth and final reference to Copernicus comes in the second essay of *The Conflict of the Faculties*, "An Old Question Raised Again: Is the Human Race Constantly Progressing?" This essay, written in 1793 and published in 1798, again explicitly connects Copernicus with a change of perspective. Unlike the standard reading of the Copernican revolution as outlined in the first *Critique*, however, the change in perspective discussed here is not that from transcendental realism to transcendental idealism, but from the immediacy of perception to the rational mediation of experience. Kant's repetition of the idea that the Copernican innovation is linked to a change in perspective serves a purpose entirely distinct from a discussion of the relation between Copernicus and transcendental idealism in general, and so should not be taken to reinforce the perspectivist understanding of Kant's Copernican revolution.

After reviewing a series of available positions on the question of humanity's moral progress, Kant argues that, because human freedom is not bound by the mechanical laws of natural phenomena, no genuine knowledge of the future development human morality is possible through experience alone. Before turning to an analysis of historical signs as the

³⁸ Kant, Refl 2680, AA 16:468.

key to such foreknowledge, Kant pauses to suggest that perhaps a different way of approaching perceptual data might lead to a more productive response to his question. He writes:

If the course of human affairs seems so senseless to us, perhaps it lies in a poor choice of position [*Standpunkt*] from which we regard it. Viewed from the earth, the planets sometimes move backwards, sometimes forward, and sometimes not at all. But if the standpoint selected is the sun, an act which only reason can perform, according to the Copernican hypothesis, they move constantly in their regular course.³⁹

The Copernican hypothesis Kant refers to here is beyond a doubt a change in astronomical perspective that renders otherwise disorderly experiences systematically intelligible. Viewed from the perspective of the immediacy of sensible perception, which indicates that the planets revolve irregularly around the earth, astronomical data resist systematic explanation and lead otherwise intelligent people to “entangle themselves to the point of absurdity in Tychonic cycles and epicycles.”⁴⁰ When the immediacy of our own perceptual position is re-situated within the rational framework of Copernican heliocentrism, however, the irregularity of the apparent motions of the planets from the perspective of the earth are explained by the regularity of their and the earth’s motions around the sun.

The emphasis on perspective in this passage might lead us to consider it as support for the claim that the real significance of Copernicus for Kant’s transcendental idealism is the analogy between the former’s heliocentric reversal and the latter’s epistemological change in perspective. What we should notice here, however, and what counsels against such an understanding of the relation between this passage and the references to Copernicus in the B Preface, is the considerable difference between the change of perspective associated with Copernicus in *The Conflict of the Faculties* and that typically indexed to Kant’s Copernican revolution. The change in perspective mentioned in the B Preface is, as we have seen, from the assumption that “intuition must conform to the constitution of [...] objects” to the assumption that “the object (as an object of the senses) must conform to the constitution of our faculty of intuition.”⁴¹ The change in perspective Kant discusses as analogous to the Copernican hypothesis in *The Conflict of the Faculties*,

³⁹ Kant, SF, AA 7:83.

⁴⁰ Kant, SF, AA7:83.

⁴¹ Kant, KrV, Bxvii.

however, has nothing to do with the transcendental idealist thesis of the necessary conformity of objects with the forms of intuition or cognition. Despite the repetition of the motif of a revolutionary change in perspective modeled after Copernican astronomy in these passages, the changes in perspective are not the same. Rather than reinforcing the standard reading of the Copernican revolution, then, this passage affirms my earlier claim that the identification of Kant's Copernican revolution with a perspicuous change in perspective is to evacuate it of any real content. In the following section I will draw the passages discussed here, which comprise the entirety of Kant's references to Copernicus, together with a consideration of the conceptual context that leads into the famous Copernican analogy in the B Preface. When seen in this light, I will argue, the significance of Copernicus for Kant's own proposed revolution in metaphysics becomes considerably clearer.

Part 2. The Importance of Proof and the New Object of Metaphysics

What the exegesis of part one of this paper illustrates is that Kant's engagement with Copernicus, though not extensive, is too complex to allow a reduction of the meaning of Kant's so-called Copernican revolution to a reversal of perspective with regard to the determining priority of the object and subject of knowledge that mirrors Copernicus' heliocentric reversal of the geocentric perspective of Ptolemaic astronomy. Kant's comments about the difference between Copernicus and Philolaus indicate this clearly enough. If all Copernicus provided Kant was a rhetorical device to explain the change in perspective entailed in transcendental idealism, then we might just as accurately, though with considerably less rhetorical force, talk about Kant's Philolaic revolution. Kant, however, distinguishes what he sees as the merely speculative astronomy of Philolaus from Copernicus's epistemically justified heliocentric hypothesis.

The difference between Philolaus and Copernicus hinges, in Kant's eyes, on the role of proof. By isolating what separates these two figures in Kant's mind we can identify a crucial element of Kant's understanding of the significance of Copernicus, and so will have a much clearer picture of his own Copernican revolution in metaphysics. Kant writes, we recall, "Philolaus said that the earth moves, and Copernicus proved it."⁴² What interests Kant in Copernicus, as I have already indicated, is not simply his reversal of perspective,

⁴² Kant, Refl 5064, AA 17:77.

but the epistemic justification that accompanies and legitimates this reversal. What exactly Copernicus's epistemic justification consists in and how Philolaus failed to accomplish something similar will be key to understanding what elements of Copernican thought Kant intends to repeat in his own. In the note about Philolaus Kant avers that the difference between Philolaic speculation and Copernican science is related to the necessity of subsuming a series of empirical instances under a concept in order to give that concept real epistemic weight. Now, there are certainly many elements of Philolaus's thought that do not seem to possess this kind of robust empirical support. Within existing testimonials concerning Philolaus's position we find, for example, the claims that the moon is populated by people approximately fifteen times stronger than terrestrial humans, and that these moon people have no need to defecate.⁴³ He also asserts that the center of the universe is occupied by a great fire encased by a glass sphere rather than the sun.⁴⁴ It is certain that Philolaus had not collected the series of empirical instances necessary for knowledge *in concreto* of the physiology of any lunar peoples or of the composition a great fire anchoring the cosmos. There was surely some empirical experience, however, that led Philolaus to postulate the movement of the earth, so we cannot without testing credibility suggest that his astronomy was a product of unadulterated conceptual analysis executed in isolation from experiential epistemic motivation. Thus, the presence of empirical instances that motivate conceptual thinking cannot in itself be sufficient to account for the kind of proof that separates science from mere speculation. Although Kant does not provide the necessary tools for identifying what distinguishes Copernican legitimacy from Philolaic folly in this note, he does in another context we have already discussed.

As we saw in the analysis of Kant's understanding of the proper use of hypotheses, the natural sciences can benefit considerably from the approximation of certainty through the use of well-constructed assumptions. Good hypotheses serve as analogues of certainty, he argues, insofar as they can ground or explain all of the phenomena to which they relate without either positing unobserved or false phenomena or themselves requiring further hypothetical support. As we have seen, Kant repeatedly identifies Copernican

⁴³ See Barnes (1982, p. 301).

⁴⁴ It is this last claim that evidently disqualifies, at least in Sir Thomas Heath's eyes, Philolaus from claiming the title of "the Ancient Copernicus." See Heath (2004). That Philolaus was not a heliocentrist (since he held that the sun orbited the great fire) makes little difference for my larger argument. The importance of the Copernican revolution for Kant lies in his postulation of the movement of the earth less than the stability of the sun.

heliocentrism as the paragon of hypothetical certainty, and what allows for the success of Copernicus's hypothesis, Kant remarks in the first *Critique*, is the prevailing context of Newtonian mechanics and questions concerning the nature of gravitational force. To say nothing of the falsity of Philolaus's other astronomical propositions, his assertion of the earth's movement certainly lacks the natural scientific context that would provide a reciprocally supporting context that Kant deems necessary in order to validate its claim to truth. Although there was certainly some collection of phenomena that led Philolaus to posit the rotation of the earth around the great fire, those phenomena were incapable of lending the necessary epistemic support to what is, in Kant's eyes, a poorly constructed but true hypothesis.

What distinguishes Copernicus from Philolaus, then, is the quality of their hypothetical reasoning. We have already seen, though, that Kant denies that transcendental idealism is only hypothetically true. The position laid out in the first *Critique* differs from its Copernican analogue, Kant explains, inasmuch as it enjoys apodeictic and not merely hypothetical certainty. Any account of synthetic *a priori* truths cannot, of course, rely on empirical support without abandoning the very apriority it attempts to secure.⁴⁵ Kant's own Copernican revolution in metaphysics cannot, then, adopt Copernicus's exemplary hypothetical reasoning in order to provide epistemic support for its proposed reversal of epistemological perspective. Copernicus indicates, for Kant, the necessity of providing proof for any speculative hypothesis, but does not himself provide a method for accomplishing that proof in the realm of metaphysics. By returning to the pages of the B Preface that immediately precede Kant's remarks about Copernicus, however, we will see that Kant's strategy for establishing epistemic legitimacy in metaphysics and overcoming the irresolvable conflicts of the history of philosophy is closely related to the developments of early modern natural science.

2.1 Kant's History of Intellectual Revolutions

Kant begins the B Preface with a discussion of the possibility of imparting the rigor of the sciences to the battlefield of metaphysics. If metaphysics cannot be rendered scientific, it ought to be abandoned; and if it is to become scientific, it must find its paradigm in the

⁴⁵ In addition to the footnote from the B Preface already discussed, Kant also notes the impossibility of using hypotheses in metaphysics at the end of his analysis of hypotheses in the section of the Jäsche *Logic* discussed above. See Kant, Log, AA 9:86. See also Lemanski (2012).

intellectual revolutions by which the two undisputed sciences, mathematics and physics, themselves became scientific. In each of these cases, Kant argues, the mere groping characteristic of prescientific exploration gave way to a systematically organized and universally valid science through a revolution in its way of thinking. By isolating what Kant takes the revolutions in ancient mathematics and modern physics have in common, I will argue that the epistemic justification that he seeks to establish in metaphysics requires the identification of a new object of metaphysical inquiry. On Kant's account, both geometry and experimental science accomplished systematic epistemic justification through a shift in their object of investigation, and this structure must be repeated in metaphysics if the Copernican revolution is to be realized. The new object of metaphysics, like those of the mathematical and physical sciences, will allow for the possibility of providing a kind of critical proof rather than mere dogmatic assertion in matters that outstrip the possibility of empirical verification.

Mathematics became a science, Kant explains, when, thanks to the “happy thought of a single man,”⁴⁶ mathematicians ceased taking as their object either the empirical figures of geometric diagrams or the conceptual definitions of geometrical objects. Abstraction from a series of empirical diagrams cannot provide the characteristic universality of mathematical results, and formal analysis alone cannot secure their exemplary veracity. The revolutionary moment in mathematics, according to Kant, comes when Thales “[brought] out what was necessarily implied in the concepts that he himself had formed *a priori*, and had put into the figure in the construction by which he presented it to himself.”⁴⁷ Mathematics properly understood became a true science, that is, when it took as the object of its investigations neither empirical figures nor conceptual definitions, but constructions. Mathematics neither generalizes from particular figures nor unpacks conventional definitions; it analyzes the synthetic content of spatio-temporal constructions. Such constructions account for the universality of mathematics through their necessary rules and its veracity through the production of a sensible figure.

The limitations of Kant's account of mathematics should not bother us for now. What is important for my purposes is not whether Kant is correct, either about the proper object of mathematics or the historical development of the field, but how he introduces his own proposed metaphysical revolution—his Copernican revolution—as a repetition of the

⁴⁶ Kant, KrV, Bxi.

⁴⁷ Kant, KrV, Bxii.

structure of earlier scientific revolutions. The result of the shift of mathematical objects away from figures or concepts toward constructions is that the mathematician can thereby avoid “ascrib[ing] to the figure anything save what necessarily follows from what he has himself set into it in accordance with his concept.”⁴⁸ The meaning of this important and contentious phrase—“what he has himself set into it in accordance with his concept”—will come into greater relief after reviewing Kant’s analysis of the experimental revolution in modern physics.

The revolution of empirical science indexed to Bacon’s methodological intervention follows, centuries later, roughly the same pattern, according to Kant, as the Greek mathematical revolution. Physics elevated itself above the disorganized groping of mere curiosity, Kant explains, when it took the experimental manipulation of natural phenomena, rather than nature as it is commonly available to observation, as its object of study. The central development of physics, like that of mathematics, is essentially tied to the recognition of a new object and the new methods that object demands. Kant appeals to three scientists, each of whom produced results by observing nature in decidedly unnatural circumstances:

Galileo caused balls, the weights of which he had himself previously determined, to roll down an inclined plane; [...] Torricelli made the air carry a weight which he had calculated beforehand to be equal to that of a definite volume of water; [...] Stahl changed metals into oxides, and oxides back into metal, by withdrawing something and then restoring it.⁴⁹

What is important in each of these cases, Kant says, is the resolutely artificial object of investigation. Galileo, Torricelli, and Stahl each produce a very specific experimental situation, which indicates “they learned that reason has insight only into that which it produces after its own plan.”⁵⁰ Had Galileo not carefully produced balls of different masses, he would not have discovered the universality of gravitational force.

⁴⁸ Kant, KrV, Bxii.

⁴⁹ Kant, KrV, Bxii-xiii.

⁵⁰ Kant, KrV, Bxiii. Whether this is how these scientists thought of their own research is ultimately of little concern. As Hanson rightly suggests, “Kant may be telling us something about these great scientists which even they did not know” (1959, p. 279).

The physicist cannot identify the laws of nature, whose universal necessity make her enquiry a science, if she does not begin by placing demands upon the phenomena she intends to describe. “Reason,” Kant writes,

holding in one hand its principles, according to which alone concordant appearances can be admitted as laws, and in the other hand the experiment which it has devised in conformity with these principles, must approach nature in order to be taught by it. It must not, however, do so in the character of a pupil who listens to everything that the teacher chooses to say, but of an appointed judge who compels the witnesses to answer questions which he himself has formulated.⁵¹

To investigate systematically the laws of nature, physics requires at least two things: the principles or hypotheses supplied by the physicist herself and an experimental apparatus that forces nature to respond to these principles. It is only by abandoning ‘nature’ as an object of study and turning its attention to the systematic experimental constraint of nature that physics articulates laws of nature. As Kant understands it, physics, like mathematics, can only produce unified, general results if it first produces its own object. Mathematics, whether it knows this or not, produced for this purpose the concept of a construction, and physics produced the concept of an experimental system.

Taken together, the reorientation and accompanying remarkable productivity of mathematics and physics offer a model for the restoration of the dignity of Kant’s real interest, the now long deposed queen of the sciences. “The examples of mathematics and natural science, which by a single and sudden revolution have become what they now are, seem to me,” Kant writes,

sufficiently remarkable to suggest our considering what may have been the essential features in the changed point of view by which they have so greatly benefited. Their success should incline us, at least by way of experiment, to imitate their procedure, so far as the analogy which, as species of rational knowledge, they bear to metaphysics may permit.⁵²

To follow in the footsteps of these revolutions, I argue, Kant reorganized metaphysical research according to the proper object of that science, an object that had previously been misidentified. What Kant identifies as the proper object of metaphysics is not being qua

⁵¹ Kant, KrV, Bxiii.

⁵² Kant, KrV, Bxv-xvi.

being, the principles or causes of things, or the highest being, as Aristotle would have it. Nor is it beings as they are rather than only as they appear, as Kant himself maintained in the Inaugural Dissertation. The conceptual creation that will deliver metaphysics from its “groping among mere concepts,”⁵³ the new object of a transformed metaphysics capable, not only of speculation, but of demonstration and epistemic validation is, I will show, that which can be known by synthetic *a priori* means.

2.2 The Object of Critical Metaphysics

To claim that the object of metaphysics is the object of synthetic *a priori* knowledge no doubt introduces a complicated relationship between metaphysics and epistemology, and Kant’s emphasis on the priority of an investigation of the source and limits of knowledge has led many interpreters to claim that transcendental idealism supplants the caprices of metaphysical speculation with the sobriety of epistemological humility. Taking a cue from Kant’s remark that even “the despisers of metaphysics, who wanted thereby to give themselves the appearance of having clearer heads, also have their own metaphysics,”⁵⁴ I am suspicious of any attempt to sanitize Kant’s texts themselves of metaphysical commitments, implicit and explicit. In order to clarify the role of metaphysics in his critical project, I will now briefly sketch Kant’s conception of the relationship between metaphysics and transcendental philosophy, which is “occupied not so much with objects as with the mode of our knowledge of objects in so far as this mode of knowledge is possible *a priori*.”⁵⁵ Not only will this show that transcendental idealism does not entail the substitution of epistemology for metaphysics, it will also elucidate how Kant understands the object of a metaphysics finally rendered scientific by his proposed repetition of the Copernican revolution. Kant’s critical metaphysics is not exclusively concerned with subjectively necessary forms of intuition and thought, I will show, but also with the necessary and universal objective knowledge these subjective conditions authorize.

The central question of transcendental idealism is of course that of the conditions of the possibility of synthetic *a priori* judgments. Kant’s interest in this peculiar form of knowledge is motivated by his understanding of metaphysics as a necessary and universal, hence *a priori*, science coupled with his rejection of the analyticity of knowledge central to

⁵³ Kant, KrV, Bxv.

⁵⁴ Kant, V-Met/Mron, AA 29:765.

⁵⁵ Kant, KrV, A11-12/B25.

Leibnizian philosophy. These two characteristics place metaphysics in a precarious position; it is not clear that synthetic *a priori* judgments are possible at all. Kant writes:

Metaphysics, even if we look upon it as having hitherto failed in all its endeavours, is yet, owing to the nature of human reason, a quite indispensable science, and *ought to contain a priori synthetic knowledge*. For its business is not merely to analyse concepts which we make for ourselves *a priori* of things, and thereby to clarify them analytically, but to extend our *a priori* knowledge. And for this purpose we must employ principles which add to the given concept something that was not contained in it, and through *a priori* synthetic judgments venture out so far that experience is quite unable to follow us, as, for instance, in the proposition, that the world must have a first beginning, and such like. Thus metaphysics consists, at least *in intention*, entirely of *a priori* synthetic propositions.⁵⁶

Whether they are ultimately legitimate or not, metaphysical claims in general must be synthetic insofar as they assert that a concept possesses a characteristic not analytically contained in that concept and must be *a priori* insofar as they do not depend on experience for their validation. It is the task of transcendental philosophy to determine the conditions of the possibility of such synthetic *a priori* judgments and, by extension, to determine the legitimacy of metaphysical claims. The assertion that metaphysics requires us “through *a priori* synthetic judgments to venture out so far that experience is quite unable to follow us,” which is not itself entailed by the definition of metaphysics as the domain of synthetic *a priori* judgments, and the reference to a central question in rational cosmology imply that Kant is here identifying metaphysics with the ideas of reason analyzed in the Transcendental Dialectic.

Reason’s unwavering demand for totality and the transcendental ideas this demand produces provide the most obvious material for the metaphysical extension of knowledge beyond the contingent limits of experience through synthetic *a priori* judgments. Transcendental ideas, or concepts of reason, like that of the beginning of the world, combine empirically conditioned concepts with their absolute, unconditioned ground. Explaining the structure of transcendental ideas in general, Kant writes:

The transcendental concept of reason is, therefore, none other than the concept of the *totality* of the *conditions* for any given conditioned. Now since it is the

⁵⁶ Kant, KrV, B18.

unconditioned alone which makes possible the totality of conditions, and conversely, the totality of conditions is always itself unconditioned, a pure concept of reason can in general be explained by the concept of the unconditioned, conceived as containing the ground of the synthesis of the conditioned.⁵⁷

Transcendental ideas satisfy the conditions that metaphysical claims be both synthetic and *a priori*, and so serve as the paradigm of metaphysical inquiry. Ideas are synthetic insofar as they combine a given object or objects of experience with their unconditioned, absolute ground. Insofar as this ground is unconditioned, it is not subject to the spatio-temporal conditions of intuition, and so the synthesis of the given object of experience and its absolute ground cannot depend on experience. Ideas of reason provide ample opportunity for the metaphysician to “venture out so far that experience is quite unable to follow”⁵⁸ her since “they are transcendent and overstep the limits of all experience; no object adequate to the transcendental idea can ever be found within experience.”⁵⁹ The logical structure of judgments dictates, according to Kant, that there are precisely three ideas of reason,⁶⁰ and so Kant remarks that “Metaphysics has as the proper object of its enquiries three ideas only: *God, freedom, and immortality.*”⁶¹ It would seem, then, that the critical fate of metaphysics hinges upon the success of reason’s attempt to extend knowledge beyond experience in the comprehension of these ideas.

Of course Kant concludes that transcendental ideas, necessary though they may be, cannot legitimately extend knowledge beyond the limits of experience. The Transcendental Deduction argues that the objective validity of knowledge claims is conditioned by the givenness of an intuitive manifold. The critical conclusion of the Deduction is accordingly that “*there can be no a priori knowledge, except of objects of possible experience.*”⁶² Since ideas of reason transcend any possible sensible manifestation, any metaphysical judgment concerning God, the world as a whole, or the nature of the soul fails to meet a central condition of the objective legitimacy of any judgment whatsoever, and so contributes nothing to our body of knowledge. It is this conclusion that, very early on, earned the

⁵⁷ Kant, KrV, A322/B379.

⁵⁸ Kant, KrV, B18.

⁵⁹ Kant, KrV, A327/B384.

⁶⁰ See Kant, KrV, A323/B379, A33/B390-A338/B396.

⁶¹ Kant, KrV, B395n.

⁶² Kant, KrV, B166.

author of the *Critique* the moniker “the all destroying *Kant*.”⁶³ The critical results of the Dialectic indeed require the sharp limitation of metaphysical speculation on the basis of an epistemological analysis of the conditions of the objective employment of the categories in the Analytic. If Kant consistently maintained his claim that metaphysics has only three objects, then I would agree with Mendelssohn and those who find in transcendental idealism the replacement of metaphysics with epistemology. But this is not the end of the story of Kant’s remarks about metaphysics.

The transcendent concepts of reason are not the only *a priori* concepts Kant identifies, and so the project of articulating a properly critical metaphysics is not dashed by the negative results of the Dialectic. Leaving aside the *a priori* concepts of reason altogether, Kant explains, “Now, an *a priori* concept, that is, a concept which is not empirical, either already includes in itself a pure intuition (and if so, it can be constructed), or it includes nothing but the synthesis of possible intuitions which are not given *a priori*.”⁶⁴ In addition to transcendental ideas, which illegitimately synthesize concepts beyond any possible intuition, there are, then, two other possible domains of synthetic *a priori* knowledge, each of which must be considered before declaring Kant an anti-metaphysician: first, there are *a priori* concepts that, when synthesizing pure intuitions, produce mathematical knowledge; second, there are *a priori* concepts that provide the necessary rules for the synthesis of merely possible empirical intuitions and that form the basis of transcendental philosophy.

Although mathematics shares with metaphysics the characteristic of being a synthetic *a priori* body of knowledge, Kant urges that the tasks of philosophy and mathematics be rigorously distinguished.⁶⁵ Metaphysics, as we have already seen, is, if it is possible at all, synthetic *a priori* knowledge through concepts. Mathematics, by contrast, is knowledge achieved by the construction of concepts. “To *construct* a concept,” Kant explains, “means to exhibit *a priori* the intuition which corresponds to the concept. For the

⁶³ Mendelssohn (1972- , 3.2, p. 3) (emphasis original).

⁶⁴ Kant, KrV, A719/B747.

⁶⁵ In the final pages of the *Critique* Kant links the historical failure of philosophy properly to identify its object domain and the rising contempt for the discipline of philosophy “first among outsiders, and finally even among [philosophers] themselves” (KrV, A844/B872). The key discoveries of the *Critique* that allow Kant to identify the true object of metaphysics are, he says, first, the importance of the distinction between *a priori* and *a posteriori* knowledge and, second, the differentiation of philosophy and mathematics as *a priori* sciences. See KrV, A842/B870-A844/B872.

construction of a concept we therefore need a *non-empirical* intuition.”⁶⁶ The pure concepts of mathematics synthesize material provided by pure intuitions of space, and so do not depend on perception for their content. Since mathematical knowledge achieves *a priori* objective validity by synthesizing pure rather than empirical intuitions, Kant distinguishes mathematics from the conceptual nature of metaphysics by remarking that “everything is grounded in intuitions [in mathematics],” whereas “In metaphysics we use pure reason, without grounding ourselves in intuitions.”⁶⁷ The intuitive construction of *a priori* concepts in mathematics indeed produces synthetic *a priori* knowledge, but of a generally intuitive rather than conceptual nature. Though a source of synthetic *a priori* knowledge, mathematics is not metaphysics.

The final possibility for the metaphysical extension of knowledge lays with those *a priori* concepts that “[include] nothing but the synthesis of possible intuitions which are not given *a priori*.”⁶⁸ These *a priori* concepts, which have their origins in the understanding, differ from concepts of reason insofar as they have some possible intuitive content, and they differ from mathematical concepts insofar as that intuitive content is empirical rather than pure. As I have already noted, *a priori* concepts can only have objective validity on the condition that they synthesize an intuitive manifold, and since the manifold is in this case empirical, these *a priori* concepts cannot produce *a priori* knowledge of actual objects. Because of the empirical nature of perception, conceptual knowledge of real objects can only be, according to Kant, *a posteriori*. This does not, however, disqualify *a priori* concepts of the understanding from forming the basis of synthetic *a priori* knowledge. When *a priori* concepts are placed in relation to any possible sensible manifold rather than to any actual, given sensible manifold, the conditions of

⁶⁶ Kant, KrV, A713/B741.

⁶⁷ Kant, V-Met/Mron, AA 29:780-781. One might object that passages from Kant’s metaphysics lectures have little bearing on the considered position of the *Critique*. Indeed what we know of Kant’s lectures is an artifact of student notes and is further complicated by the fact that Kant used Baumgarten’s *Metaphysica* as the basis for his courses in metaphysics, which might well give his lectures a more dogmatic tone than we find in the *Critique*. We cannot reject the relevance of the lecture notes wholesale, however, and a careful inspection of the Mrongovius lecture notes, which have been dated to the winter semester of 1782/1783, reveals them to be quite admissible in the current context. Although the text does occasionally refer to Kant in the third person, the language of the Introduction quite closely parallels that of the Doctrine of Method, which indicates both that Mr. Mrongovius was a diligent transcriptionist and that Kant was lecturing on material intimately related to the position articulated in the *Critique*. For more on these lecture notes, see Karl Ameriks and Steve Naragon, “Translators’ Introduction” in Kant (1997, pp. xxxiv-xxxvi); and Zelazny and Stark (1987).

⁶⁸ Kant, KrV, A719/B747.

objective validity established in the Deduction are met while maintaining the *a priori* nature of the resulting cognition. This form of cognition does not furnish *a priori* knowledge of objects, whether natural or supernatural, to be sure. Instead it finds our knowledge of the necessary features of any object of experience, which is to say it forms the basis of our knowledge of the most general features of objects in general. Thus, Kant concludes, “The only concept which represents *a priori* this empirical content of appearances is the concept of a *thing* in general, and the *a priori* synthetic knowledge of this thing in general can give us nothing more than the rule of the synthesis of that which perception may give us *a posteriori*.”⁶⁹

The *a priori* concept of a thing in general extends knowledge beyond the contingent determinations of empirical experience by articulating the necessary and universal characteristics of any possible object of experience. The extension of the concept of a thing is determined by the subjectively necessary structures of the *a priori* forms of intuition and categorical articulation of the synthetic unity of apperception analyzed in the Transcendental Deduction. The subjective necessity of the form of the concept of a thing in general might indeed lead us to conclude that Kant has replaced a metaphysical analysis of the *a priori* truths of the world with an epistemological analysis of the necessary structures of cognition, which in turn declares any metaphysical analysis to be illegitimately dogmatic. Indeed Kant occasionally says as much himself: “It [transcendental philosophy] occupies itself with the sources, the extent, and the boundaries of pure reason, without busying itself with objects. For that reason it is wrong to call it ontology.”⁷⁰ Or more famously, “the proud name of ontology [...] must give way to the more modest title of a transcendental analytic.”⁷¹ The knowledge furnished by the *a priori* concept of a thing is not knowledge of an object at all, Kant remarks, but knowledge of “the rule of the synthesis of that which perception may give us *a posteriori*.” Transcendental analysis leads to synthetic *a priori* knowledge, then, but this knowledge has only the necessary rules of cognitive synthesis as its object. The object of transcendental philosophy’s synthetic *a priori* knowledge is the conditions of knowledge itself rather than any real object or objects. Before concluding that Kant’s transcendental turn only renders metaphysics

⁶⁹ Kant, KrV, A720/B748.

⁷⁰ Kant, V-Met/Mron, AA 29:756.

⁷¹ Kant, KrV, A247/B304.

scientific by eliminating it entirely, however, we need to consider a distinction drawn implicitly in the *Critique* itself and explicitly in his 1782/1783 metaphysics lecture course.

In the Introduction to this lecture course Kant distinguishes between pure metaphysics (*metaphysica pura*) and applied metaphysics (*metaphysica applicata*). Pure metaphysics has as its domain the question of the possibility of *a priori* knowledge in general, and so “could be called transcendental philosophy, or critique of pure reason.”⁷² Applied metaphysics develops out of pure metaphysics and treats, as one might suspect, the objective knowledge authorized by the analysis of the conditions of the possibility of *a priori* knowledge produced by pure metaphysics. Despite the critical priority of pure metaphysics, the term ‘metaphysics’ really refers to the fields of applied metaphysics. Kant writes:

Applied metaphysics [*metaphysica applicata*], which contains the *a priori* cognition of objects, constitutes a system of pure reason, and that system of pure cognition of reason, is called metaphysics in the strict sense. Transcendental philosophy is the propaedeutic of metaphysics proper. Reason determines nothing here, but speaks always of its own faculty, and in metaphysics proper it makes use of this faculty, and metaphysics is always taken in this sense.⁷³

Transcendental idealism replaces metaphysics, taken in the pure sense, with epistemology and, so, abandons the project, articulated in the B Preface, of rendering metaphysics finally scientific by declaring it impossible. In light of Kant’s suggestion in this passage, however, that metaphysics in the strict sense is *applied* metaphysics, we should examine the objects of applied metaphysics and the possibility of their scientific cognition. This examination will show that Kant does not eliminate all branches of applied metaphysics as necessarily illusory, and so that there is a special domain of applied metaphysics—metaphysics in the strict sense—that is, according to Kant, neither merely epistemological nor incapable of producing systematic, *a priori* knowledge.

The taxonomy of applied metaphysics presented in the lecture course parallels the architectonic of metaphysics offered in the *Critique*. Applied metaphysics is divided, Kant explains in the lectures, into five fields: rational or general physics (*physica generalis* or *physica rationalis*), rational psychology (*psychologia rationalis*), rational cosmology

⁷² Kant, V-Met/Mron, AA 29:750.

⁷³ Kant, V-Met/Mron, AA 29:752.

(*cosmologia rationalis*), natural theology (*theologia naturalis*) and rational theology (*theologia rationalis*).⁷⁴ In the *Critique*, Kant writes, “The whole system of metaphysics [...] consists of four main parts: (1) ontology; (2) rational physiology; (3) rational cosmology; (4) rational theology.”⁷⁵ Three differences in these taxonomies need to be explained before importing the distinction between pure and applied metaphysics from the lectures into the exposition of the *Critique*. First, whereas Kant included both natural and rational theology in the system of metaphysics in the lectures, he only includes rational theology in the *Critique*. This discrepancy is due to a slightly different use of the term rational psychology in the two texts, and it is clear that in the *Critique* Kant considers natural theology to be a species of rational psychology.⁷⁶ This difference does not amount to a significant change in Kant’s understanding of the proper objects of applied metaphysics. Second, rational physiology is the general term for the study of the rational principles organizing given objects. Objects can be given either to inner or outer sense, so that rational physiology is composed of rational psychology and rational physics. According to both the *Critique* and the 1782/1783 lecture course, metaphysics consists of rational physics, rational psychology, rational cosmology, and rational theology. The third and final discrepancy between these two lists I will comment on before moving on to consider the implications of this division for the determination of the proper object of Kant’s critical transformation of metaphysics is the presence of ontology in the division offered in the *Critique*.

Kant’s use of the term ontology suffers from a certain ambiguity in the *Critique*. As we have already seen, he advocates for the replacement of ontology considered as the study of the most general characteristics of things as they are in themselves with the critical examination of the conditions of the possibility of the objective employment of *a priori* concepts. Nonetheless, ontology is listed as the first division of metaphysics in the Architectonic of Pure Reason. The meaning of ontology in the latter sense differs, however, from the meaning of ontology in the former sense. In the Architectonic Kant in fact identifies transcendental philosophy with ontology. Transcendental philosophy, he

⁷⁴ For Kant’s explanation of this division, see V-Met/Mron, AA 29:754-757. Although Kant sometimes distinguishes rational and general physics, he uses the terms interchangeably in the lectures. His preference for the term rational physics in the *Critique* is rhetorical, he explains, insofar as it prevents the confusion of metaphysics and mathematics, the latter of which is commonly referred to as general physics. See Kant, KrV, A848/B876 n.

⁷⁵ Kant, KrV, A846/B874.

⁷⁶ See Kant, KrV, A631/B659-A632/B660 and V-Met/Mron, AA 29:754-755.

writes, “treats only of the understanding and of reason, in a system of concepts and principles which relate to objects in general but take no account of objects that *may be given (Ontologia)*.”⁷⁷ What Kant here calls *Ontologia* is the same science that he calls pure metaphysics in the lecture course. Both of these sciences have as their object the rational conditions and limits of cognition, and so do not consider the effects of relating or applying these rational processes to real objects. In this way ontology, like pure metaphysics, is propaedeutic to the *a priori* cognition of the objects of rational physics, psychology, cosmology, and theology. Although not explicitly present in the *Critique*, then, the distinction introduced in the metaphysics lectures between pure and applied metaphysics is already at work. Ontology, or transcendental philosophy, is the pure analysis of the sources, limits, and extent of *a priori* cognition and rational physiology, psychology, cosmology, and theology are the special sciences that stem from the application of the results of the propaedeutic investigations of pure metaphysics.

The results of Kant’s pure metaphysics, which require, first and foremost, that *a priori* concepts be applied only to object of possible experience, undermines many of the claims of the special fields of applied metaphysics. Any field dedicated to the study of objects that transcend the limits of sensible experience cannot possibly contain any determinate knowledge of their objects. As Kant argues in the Paralogisms, the rational psychologist’s investigation of the nature of the soul on the basis of the necessity of the “I think” alone can only ever lead to the dogmatic assertion of conceptual knowledge where no such knowledge is possible. The inquiries of the rational cosmologist into the origins of the world and of the rational theologian into conceptual proofs of the existence of god are similarly recognized, in the Antinomies and the Ideal of Pure Reason respectively, to be in principle incapable of producing any genuine knowledge. Rather than grounding the use of *a priori* concepts in applied metaphysics, the subjective orientation of transcendental philosophy reveals the illegitimacy any knowledge claim based on the application of *a priori* concepts to the objects of rational psychology, cosmology, or theology. Transcendental philosophy does, then, replace much of metaphysics with an epistemological analysis of the sources and limits of knowledge. There is, however, a fourth branch of applied metaphysics not criticized in the Transcendental Dialectic, rational physics.

⁷⁷ Kant, KrV, A846/B874.

Rational physiology studies the rational principles of spatio-temporal objects. Although it shares a concern with the natural world with the empirical sciences, rational physics analyzes what can be known of spatio-temporal objects *a priori*, and so must be distinguished from physics as a science built of empirical observation.⁷⁸ Unlike the transcendent use of concepts in the other branches of applied metaphysics, Kant explains, rational physics “views nature as the sum of all objects of the senses, and therefore just as it is given us, but solely in accordance with *a priori* conditions, under which alone it can ever be given us.”⁷⁹ Whereas the other branches of applied metaphysics attempt to extend our knowledge to the unconditioned ground of conditioned objects of experience, rational physics treats natural objects only insofar as they can be given in experience. Kant lays out the system of *a priori* knowledge of natural objects so considered in the *Analytic of Principles*. So, in the *Axioms of Intuition* and the *Anticipations of Perception* he argues that natural objects are mathematically intelligible, in the *Analogies of Experience* that substance is permanent, that all alterations occur according to causal laws, and that all coexistent substances are reciprocally determining, and in the *Postulates of Empirical Thought* that modal predicates do not enlarge the concepts to which they are attached. Beyond the *Critique*, Kant further develops a metaphysical account of the rational principles of matter as the movable in space.⁸⁰

Although Kant does much to limit the metaphysical employment of *a priori* concepts, he does not eliminate metaphysics as a genuine science altogether. There are two branches of metaphysics capable of producing genuine knowledge, ontology and rational physics. Ontology or pure metaphysics, which Kant understands as the transcendental analysis of the sources, limits and scope of *a priori* knowledge, and rational physics each possess a domain of synthetic *a priori* cognitions organized under the rational system of the categories of pure reason. Far from abandoning the goal of articulating a finally scientific metaphysics under the sobering force of the epistemic limitations of human

⁷⁸ On the distinction between the empirical study of universal laws of nature and Kant’s *a priori* analysis of the rational principles of natural objects, see Watkins (2007).

⁷⁹ Kant, KrV, A846/B874.

⁸⁰ The degree to which the *Metaphysical Foundations* necessitates the admission of empirical concepts, like that of matter and movement, into the supposedly pure analyses of transcendental philosophy and the consequences of this admission for the priority of pure to applied metaphysics is beyond the scope of this paper. What is important for my purposes here is to call attention to the two-fold structure of the object of critical metaphysics, and to link Kant’s adoption of this new object of metaphysics to his understanding of the both the importance of the Copernican revolution in astronomy and the relation between the success of previous scientific revolutions and their identification of a new object of investigation. For an analysis of the rational physics of the *Critique* and the *Metaphysical Foundations*, see Westphal (1995).

cognition, Kant's transcendental idealism argues in favor of the legitimacy of a very specific understanding of metaphysics.

Although Kant divides metaphysics into the apparently separate branches of ontology or transcendental philosophy and rational physics (leaving the other branches, incapable of producing true *a priori* knowledge, to the side), these pure and applied species of metaphysics are in practice inseparable. One cannot endeavor to determine the true content of rational physics in isolation from the transcendental analysis of the conditions of the possibility of the application of *a priori* concepts. To attempt an analysis of the objects of *a priori* cognition without first considering the conditions of the employment of the categories, which Kant notes was the fatal flaw of the Wolffian project, dooms one to dogmatic speculation.⁸¹ Pure metaphysics, Kant says, is the necessary propaedeutic to applied metaphysics. What is less intuitive, however, is that pure metaphysics itself already implies applied metaphysics. The analysis of the conditions of the objective employment of *a priori* categories cannot be entirely separated from the application of these concepts to objects of possible experience because, Kant explains:

Transcendental philosophy has the peculiarity that besides the rule (or rather the universal condition of rules), which is given in the pure concept of understanding, it can also specify *a priori* the instance to which the rule is to be applied. [...] Otherwise the concepts would be void of all content, and therefore mere logical forms, not pure concepts of the understanding.⁸²

Pure metaphysics already contains the rudiments of applied metaphysics, that is, and so the epistemological analyses of transcendental philosophy already imply the metaphysical results of rational physics. Kant reiterates the point that the study of the conditions of synthetic *a priori* knowledge is internally connected to the study of the objects of such knowledge in a 1783 letter to Christian Garve. He explains there that “this faculty [of *a priori* judging reason] is the object of a formal and necessary, yes, and extremely broad, science [...] deducing out of its own nature all the objects within its scope.”⁸³ Kant's distinction between pure and applied metaphysics is misleading, then, and the correct identification of the proper object of metaphysics depends on recognizing the

⁸¹ See Kant, V-Met/Mron, AA 29:764; 126.

⁸² Kant, KrV, A135/B174-A136/B175. For more on the distinction between the pure concepts and logical forms, see KrV, A52/B76-A57/B82, A76-77/B102.

⁸³ Kant, Br, AA 10:340.

interdependence of transcendental philosophy and the applied metaphysics of rational physics.

Just as Kant's critical metaphysics itself is composed of two interdependent parts, the proper object of that metaphysics must possess a two-fold structure. The object of Kant's critical metaphysics is, as I have said, the object of conceptually driven synthetic *a priori* knowledge. The priority of transcendental philosophy over the application of the pure principles over objects is maintained in this claim about the object of metaphysics. Because this object is defined by the means by which it is known rather than by a property of the object itself, any study of this object must begin with an analysis of the conditions of *a priori* knowledge in general. The object of metaphysics is not for this reason identical with an analysis of the epistemological sources and limits of synthetic *a priori* cognition, however. As we have just seen, Kant argues that a complete analysis of the conditions of the possibility of *a priori* cognitions includes an articulation of the objects of such cognitions. The object of Kant's critical metaphysics is neither wholly objective, as in a dogmatic metaphysics that claims to know things in themselves (whether through the rationalist medium of pure intellection or the empiricist medium of sensation), nor wholly subjective, as in an epistemological analysis of the subjectively necessary structures of thought.⁸⁴ Rather, the subjective analysis of the conditions for the objective validity for synthetic *a priori* judgments gives rise to the study of the objects that satisfy those conditions. Pure metaphysics and applied metaphysics, which we have already seen can only be artificially or provisionally separated, each study the same object, the object of conceptual synthetic *a priori* knowledge.

3. Conclusion

I have shown that a thorough engagement with Kant's remarks about the distinguishing characteristics of Copernican astronomy provide a considerably richer understanding of the importance of Kant's own Copernican revolution in metaphysics than is possible on the basis of an interpretation of the B Preface alone. More specifically, it is clear that Kant thinks of Copernicus's heliocentric reversal as a significant model for his own thought not only because of the formal similarity of their counterintuitive reversals of perspective, but because of the proof Copernicus is able to provide in support of his hypothesis. Since the empirical means of epistemic legitimation available to Copernicus are incapable of

⁸⁴ On this point, see also Gibson (2011).

grounding Kant's transcendental idealist transformation of metaphysics, a new strategy for justifying the universal claims of metaphysics must be devised if the latter is to be rendered scientific. Kant identifies the key to this new strategy for grounding metaphysics in the common structure of the scientific revolutions in ancient geometry and modern experimental science. In each case, Kant claims, these disciplines grounded the universality of their claims by identifying a new object of investigation. Far from replacing metaphysics with epistemology, then, Kant attempts to resuscitate metaphysics and place it on the sure path of a science by identifying it as the study of objects of a certain kind of synthetic *a priori* knowledge.

When properly understood, then, metaphysics is that science whose conditions of epistemic legitimacy are a proper part of its object. Thus, following Kant's analyses of the scientific revolutions in mathematics and natural science, we should see this as the real content of Kant's Copernican revolution. What distinguishes Copernicus from Philolaus is real epistemic legitimation. What makes such legitimation possible is, according to Kant's history of scientific revolutions, the identification of an object of study that immanently contains the means for determining the veracity of our accounts of it. It is not incorrect to claim, then, that Kant's Copernican revolution consists in a theoretically advantageous reversal of perspective. The identification of the objects of synthetic *a priori* knowledge as the proper object of metaphysical research requires just that reversal of perspective that Kant identifies as analogous to Copernican astronomy in the B Preface. As I have shown, however, Kant's engagement with Copernicus is too rich to be reduced to this rather meager similarity. If we focus instead on the importance Kant attaches to epistemic support that distinguishes Copernicus from Philolaus and Kant's attempt to devise a means of producing this kind of proof for metaphysical claims, the larger context of the B Preface indicates that Kant's Copernican revolution is rooted in the identification of a new object of metaphysics. This new object provides both the commonly identified reversal of perspective and the less commonly identified but equally important epistemic support that Kant identifies with his Copernican precedent.

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