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# Immanuel Kant's reference to the 'Copernican Revolution'

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## Abstract

In 1543 Copernicus published his ground-breaking book entitled *De revolutionibus orbium coelestium* - On the Revolutions of the Heavenly Spheres. In it he formulated a model of the universe that provided a paradigm shift from the prevailing and taken-for-granted Ptolemaic system. According to Ptolemy the stationary earth held a privileged position at the centre of the solar system with all planets and the sun revolving around it – the geocentric system. In what can only be regarded as an astronomical revolution, the Copernican system positioned, not the earth but the sun at the centre of our planetary system. This explosive insight shattered the entrenched, coveted, and taken-for-granted earth-centred (geocentric) system and replaced it with one that is solar-centred (heliocentric). Unprecedented reverberations were felt in the fields of astronomy, religion, and commonsense, and was subsequently, and justifiably entitled *The Copernican Revolution*. In 1781 Immanuel Kant's *Critique of Pure Reason* was published and in it he made a number of references to the Copernican Revolution. Much of the secondary literature on the *Critique* suggests Kant referred to his revolutionary discovery regarding metaphysics, and particularly epistemology, as analogous to the Copernican Revolution of 1543. An alternate view suggests Kant's reference to Copernicus was not intended to indicate an analogy between the ground-breaking insights of Copernicus's heliocentric system and Kant's anthropocentric metaphysical system but to something rather different. While, generally speaking, there is little doubt that Kant's contribution to philosophy was revolutionary, his reference to Copernicus, and what he meant by it, has been a cause of debate and disagreement. This paper explores the conflicting views regarding Kant's reference to Copernicus with a view to uncovering if the reference is justified or not. However, the pathway navigated permits an exploration of some of the most important of Kant's philosophical contributions. Consequently, this paper addresses the main question posed regarding Kant's intentions with his reference to Copernicus, and in doing so provides an understanding of some important contributions from Kant's *Critique*.

Key words: Copernican revolution, empiricism, rationalism, transcendentalism, Newtonian, subjective turn, Copernicus's 'first thought'.

## 1 Introduction

In 1781 Immanuel Kant's *Critique of Pure Reason* was published and most serious philosophers agree, to a greater or lesser extent, that this work brought about a transformation in western philosophy the likes of which had not been seen since the ancient Greeks: '*and [Kant's] work did indeed change philosophy permanently*', Hatfield, (2004 p. ix); '*within a few years of the publication of his Critique of Pure Reason in 1781, Immanuel Kant was recognised...as one of the great philosophers of all time*', Guyer and Wood, (1998 p. vii); '*the Critique of Pure Reason is a philosophical classic that marks a turning-point in the history of philosophy*', Kemp Smith (1918 p. viii); '*the most important phenomenon which has appeared in philosophy for two thousand years... the principal works of Kant*', Schopenhauer (1969 translation). The philosophical transformation brought about by the *Critique* was largely centred on the question; what is the range of human understanding? Or, from a negative perspective, what are the limits of human understanding? In the *Critique* (I will use the term *Critique* to refer to the Critique of Pure Reason throughout, and all references are from Politis, V. Ed. (1993) based on Micklejohns' translation, unless otherwise stated) Kant turned his attention, not to the product of human understanding but, to the producer; the instrument by which human understanding is generated i.e. human rationality. At the outset Kant was satisfied that human understanding and knowledge were constituted by both sensed experiences and reason, and both had a range within which they operated effectively – outside this range claims regarding human understanding and knowledge were vulnerable to attack and could not be defended. However, while I will explore some of the important innovative insights provided in the *Critique* the leading string of this paper is provided by Kant's employment of the term 'Copernican Revolution'. When one understands the enormity of the revolution instigated by Copernicus with his transformation of our planetary system from the entrenched, coveted, and taken-for-granted earth-centred (geocentric) system to one that is solar-centred (heliocentric); an analogy with Kant's work may be regarded as an overstatement. Some commentators say that this was an un-important reference while others say Kant doesn't use un-important references. My contention, like others, is the relevance or irrelevance of the analogy is dependent on Kant's intention when he mentioned it. An exploration of Kant's intentions when he mentioned this reference may seem trivial, and indeed that may well be granted, however, what makes this exploration worthwhile is the veracity or otherwise of the analogy provides a story-spine that requires investigation of some of the most important aspects of the *Critique*. The secondary literature on the *Critique* (all references to the *Critique* henceforth will have a prefix 'B' to suggest the second edition in 1787) provides a variety of interpretations regarding Kant's intention when he refers the Copernican Revolution. Politis (1993, p. xlv) writes '*Kant sums up his distinctive idealism by the metaphor of mind imposing order on nature, a view he compares to Copernicus' revolution in astronomy*'. An alternate view suggests Kant's reference to Copernicus is, prima facia, conflicting in that Copernicus's astrology demotes humanity from the central, eminent position, while Kant's epistemology promotes humanity to a central and crucial position (Kemp Smith, 1918 p. 23). While, generally speaking, there is little doubt that Kant's contribution to philosophy was revolutionary, his reference to Copernicus, and what he meant by it, has been a cause of debate and disagreement, for examples see Ferrarin, (2015, pp. 265 - 272); Robinson (2012, pp. 32 – 34); Rastovic, (2011, pp. 19 – 26); Schulting, (2009, pp. 39 – 65); Ewing, (1938, pp. 16 - 17); Kemp Smith (1918, pp. 22 -25); Warner, (1914, pp. 410-429) (Warner conceded a change of mind regarding Kant's intention when referring to Copernicus in the Preface to the second edition of the *Critique* after reading Kemp Smith (1918)); and Creighton J.E., (1913, pp. 133 – 150). To address these conflicting views it is

important to sketch out the key areas where the analogy is justified or otherwise. Some of the questions in the literature include:

- Was Kant talking about his employment of the scientific method in the field of metaphysics, which had proved so fruitful in the fields of mathematics and physics, and particularly for Copernicus? - i.e. Kant's conviction that the scientific method can provide the basis for progress in metaphysics similar to that achieved by Copernicus in physics.
- Was Kant comparing his 'revolution' in metaphysics to that initiated in science by Copernicus?
- Was it about the position, or the perspective, taken by the observer and how this impacts on the way we understand?
- Is there something else that can be uncovered to justify Kant's reference to the Copernican revolution?

These questions will provide the basis for the exploration to follow. In the first instance I will have a brief look at that essence of the Copernican revolution. This is followed by an exploration of a number of key insights and interpretations from Kant's *Critique* including the prevailing philosophical approach to human understanding: rationalism and empiricism, and his innovative transcendental approach to philosophy. This is followed by Kant's analysis of the scientific method, including analytic and synthetic knowledge, which creates the basis for his *synthetic a priori* knowledge. This limited yet sufficient exploration of the *Critique* concludes with his foundational contributions to philosophy: humans create the world we experience. I then turn to the secondary literature to explore the conflicting views regarding the rationale for Kant's reference to Copernicus and this is succeeded by a discussion on the merits of each position. I will then take a stand regarding the most likely intention Kant had in mind when referring to Copernicus and in doing so I will propose that a misinterpretation by many, if it be so, may be more beneficial than injurious to his philosophical legacy. And so, this paper aims to establish if Kant's reference to Copernicus is significant however, the journey enables a tour of some of the most important of Kant's philosophical contributions. However, let us first be reminded of Copernicus's contribution, which opened a new perspective regarding the planetary system and provided a pivotal point in the history of science known as the Copernican Revolution.

## **2. The Copernican Revolution**

### **2.1 Pre-eminence of the world and humanity**

In 1543 Copernicus published his groundbreaking book entitled *De revolutionibus orbium coelestium* - On the Revolutions of the Heavenly Spheres. In it he formulated a model of the universe that provided a paradigm shift from the prevailing and taken-for-granted Ptolemaic system. According to Ptolemy the stationary earth held a privileged position at the centre of the solar system with all planets and the sun revolving around it – the geocentric system. By implication, from a theistic perspective, God's greatest creation, human beings, had the highest privilege by inhabiting the most important planet at the centre of the universe.

### **2.2 Copernicus's paradigm shift**

In what can only be regarded as an astrological revolution, the Copernican system placed the sun, not the earth, at the centre of our planetary system – the heliocentric system – which, not only relegated the earth and humanity from the position of eminence at the centre of the God-created universe, it also ushered in a revolutionary approach to understanding astronomy. This resulted in massive opposition among the scientific community, the Catholic Church, and

people of common sense, because the Copernican system challenged their cast-iron, dogmatic perspectives. Acceptance of insights associated with the Copernican revolution was a slow burner until later astronomers such as Kepler and Galileo convinced a reluctant public of the new science of the starry heavens above us.

### **2.3 Implications of the Copernican revolution**

Clearly, as indicated above, from a human perspective, there is a number of ‘disturbing’ implications from the Copernican revolution including:

- The relegation of the world to a peripheral position
- The pre-eminence of mankind is now questionable
- The casting of doubt on a religious ideology that provided a mode of living and a purpose for life
- A crucial, yet convincing, shift of perspective for astronomers with an entrenched view of the planetary system.

These implications undermined the anthropocentric position of mankind and all associated and dearly-held beliefs. So, how then could this revolution provide an analogy for a Kantian system that claimed pre-eminence for human intelligence, and endorsed the human mind as the creator of the world as we know it, and is essentially anthropocentric? In the following section I will explore some of the important aspects of Kant’s anthropocentric epistemology as the basis for an evaluation of divergent propositions regarding his intention when he referred to the Copernican revolution. We will firstly explore the prevailing philosophical context of the second half of the 18<sup>th</sup> century, which was dominated by conflicting rationalist and empiricist views regarding human understanding.

## ***3 Kant’s ground-breaking approach***

### **3.1 Empiricism and Rationalism**

The metaphysical transformation brought about by Kant centred on a number of questions including what is the range of human understanding? Or, from a negative perspective, what are the limits of human understanding? At the outset Kant was satisfied that human knowledge is constituted by sensed experiences *and* reason. Both had a range within which they operated effectively, however, outside this range human understanding and knowledge could not be defended and was therefore unsound. The philosophical ground in which Kant was rooted provided two competing doctrines – empiricism (representing human sensed experiences) and rationalism (representing human reason). The empiricists, or sceptics, held the view that the world, as we humans know it, is an actual image of an objective out-there-now-real (Lonergan 1958) world; we know an objective world that humans engage with and know, not immediately but mediately, through our five senses i.e. seeing, hearing tasting, touching, and smelling. However, because human knowledge is dependent on experiences mediated through human sense organs, individual interpretation varies and therefore provides unsound grounds for knowledge that can extend to generalisations or universality. While inconclusive and contingent the empiricists were satisfied that this was the limit of human knowledge. The empiricists, chief among whom was David Hume, did, according to Kant, make much sense, however, Kant believed that a series of impressions derived from sensed experiences could never come to the level of generalisable and universal understanding and knowledge. Kant contended that without something that forms, unifies, synthesises, makes sense of the impressions, there was no possibility of knowledge. The empiricists were adamant that these forming and synthesising capacities are not given in experiences and anything not so derived should be committed to the flames (Hume 1772).

Rationalists provided the opposition, and chiefs among the rationalists were Descartes and Leibnitz. Like the empiricists, they too questioned the validity of human sensed experience in providing objective knowledge of the world and so dismissed this doctrine out of hand. The rationalists relied on the capacity of human intelligence alone to provide knowledge. Rationalists:

*'...held that it is possible to determine from pure a priori principles [human rationality] the ultimate nature of God, of the soul, and of the material universe' (Kemp Smith, 1912, p. 13).*

Descartes and Leibnitz contended that human rationality, unfettered by subjective sensed experience, determines objective reality. Kant was satisfied that there was some validity in this view as human rationality plays a fundamental role in forming and synthesising human understanding. He argued the empiricists had stopped short while the rationalists had gone too far. So, from Kant's perspective there was much validity in each view however he was not focused on developing an accommodation of these conflicting approaches, even though one could argue that his conclusions did just that. The key question for Kant in the *Critique* - are the categories of understanding available prior to experience? - required an approach other than empiricism or rationalism because *'it is impossible to argue the objective validity of the categories (B122), by using either empirical (Locke), nor rational ways (Descartes, Leibniz) (Katrechko 2016, p.106).* Kant created his innovative *transcendental approach* to validate the use of *a priori* categories in experience.

### **3.2 A transcendental approach**

Empiricism and rationalism were not going to provide the rigorous conclusions required by Kant to establish an answer to the question: is *synthetic a priori* knowledge possible? He created a *transcendental argument* to develop transcendental knowledge: knowledge of the necessary conditions without which human knowledge is impossible.

*A new philosophical strategy which was called by Kant "altered (transcendental) method of our way of thinking" (BXVIII – XIX; see also: BXII, BXIV) is supposed by it, according to this strategy "if we ask about the possibility of cognition, we proceed not from an object, but from conditions that turn it into the object of cognition" (Gideon, 1903). Accordingly, Kant calls the Critique a "Treatise on the method, (rather than system of metaphysics)" (BXXII), where transcendental arguments act as its essential basis (Katrechko, 2016, p. 100).*

The transcendental method focused on the conditions that make human experiences and knowledge possible. In fact, he conflates metaphysics and epistemology: *'metaphysics is the science of the first principles of human cognition (B871).* Katrechko (2016) points out that transcendental philosophy is an approach that is occupied not so much with the objects of cognition but with the manner by which objects are cognised:

*'thereby making a transcendental shift in the study of objects given in experience (empirical perspective) to the transcendental conditions of their possibility (transcendental perspective)' (p. 100).*

So, the *Critique* is an exploration, not of sensed, experienced, and known objects but, the conditions of the possibility of objects, i.e. the necessary intellectual conditions that transform experiences into cognised objects: culminating in Kant's time, space, and the categories of the understanding (B33 – B169). Transcendental argumentation, not unlike presenting beyond-reasonable-doubt evidence in a court case, is the method employed by Kant to make a

convincing argument that these capacities necessarily exist and they are accessible and available prior to experience of the world. The conclusion of the argument is that human experience and knowledge is possible only if we have access to *synthetic a priori* knowledge. This move by Kant redirects philosophy, from the ancient preoccupation with ontology: ‘*what there is in reality*’ (Robinson 2012, p. 6), to the modern age - the Enlightenment – which focuses on the process of understanding ‘how do we know’ and the *a priori* character of the process. Through this method Kant comes to the view of the rationalists that knowledge was provided through the human cognitive capacities, and significantly, without divine contributions – Descartes believed that God provides insights when humans made a genuine effort (Magee, 1987 p. 91). However, without reference to the experienced, *phenomenal* world, rationalists operated in an immaterial world; a groundless, world of speculation, opinion, belief, superstition, and faith – Kant’s *noumenal* world. The differentiating of the phenomenal and the noumenal was Kant’s greatest contribution to philosophy according to Schopenhauer (1969, pp. 417-418). Transcendentalism supported the rationalist perspective regarding our capacity to create knowledge of the world as we know it and this knowing process that creates such knowledge is available *a priori*. Transcendentalism equally accepts the empiricists’ view that the context and source of knowledge is the world of experiences – the phenomenal world. His ‘altered method’ provides a synthesis of the limiting aspects of both perspectives by accepting that human knowledge is constituted within the context of the experienced world *a posteriori*, and these sensations are necessarily categorised and synthesised by an *a priori* intellectual capacity.

*‘But, though all our knowledge begins with experience, it by no means follows that all arises out of experience’ (Critique, B 1).*

The transcendental method had uncovered the vulnerabilities and strengths of both empiricism and rationalism; and in doing so established the necessary conditions without which human understanding is impossible.

### **3.3 The scientific method in mathematics and physics**

In the Preface to the second edition of the *Critique* Kant credits the Greeks with putting mathematics on the sure course of science by incorporating empirical constructions of geometrical figures with the intellectual concept of those figures. This new scientific method required both intellectual concepts and empirical constructions to make progress in mathematics. In the context of physics, Kant credits Bacon with the provision of a fresh impetus for the physical sciences to move in this new direction. However, it was Galileo, and others of his time, developed a similar approach for science. This approach was similar to that for mathematics in that both empirical observations as well as intellectual concepts collaborated - the natural world provided the context for the testing and measuring of preconceived laws. Ultimately both mathematics and physics employed empirical experimentation to clarify and verify intellectual hypotheses developed by human reason. The mathematicians and the physicists had learned:

*‘...that [reason] must not be content to follow, as it were, the leading strings of nature, but must proceed in advance with principles of judgment according to unvarying laws, and compel nature to reply to its questions. For accidental observations, made according to no preconceived plan, cannot be united under a necessary law (B xi – B xii).*

Required, according to this scientific view, is a set of rational principals or unvarying laws discovered by the physicists prior to, and sometimes during, the experimental phase, and then tested in the real world so that the physical world provides answers, verifications, etc., to the questions of the inquirer. There is a continuous interplay between the sequence of observations and refinement of the developing universal law.

### 3.4 A 'scientific' method for metaphysics

Affording metaphysics the sound footing of science, i.e. the development of universal, necessary, and verifiable laws, was one of the key objectives of Kant's *Critique*. Kant pointed out that metaphysical explorations employ nothing like the scientific method and, as a result, over the previous centuries no progress has been made. Like the scientists, metaphysicians cannot derive lawfulness through '*...accidental observation, made according to no preconceived plan*' (B xi). Kant was satisfied that metaphysics can be retrieved from the '*groping about*' (B vi) of metaphysicians by placing it on the sure path of science ('*groping*' is mentioned three times in the Preface). He was convinced that metaphysics required a rigorous method analogous to the scientific method - Kant's transcendental method (see 3.2 above) - to provide an approach for the development of universal, necessary, and verifiable laws of metaphysics. In this way metaphysics can be elevated to the level of a science and make similar progress. Kant was fully committed to the effectiveness of the scientific method in the production of sound and rigorous scientific knowledge, and he was particularly convinced regarding the products of Newtonian science. However, questions remained about the basic assumptions and principles regarding the establishment of sound scientific knowledge, in particular Hume's scepticism regarding the taken-for-granted principal of causality, or cause-and-effect.

*By means of [causality] alone we attain any assurance concerning objects which are removed from our ... memory and senses. The only utility of all sciences, is to teach us, how to control and regulate events by their causes. Our thoughts and enquiries, are therefore, every moment employed about this relation* (Hume 1772, p. 145).

Hume suggests that some philosophers insinuate the actions of a mysterious... *universal Creator, who discovers [causality] to the mind, and renders it present to us* (ibid, p. 142). However, employing mysterious powers to fill an intellectual gap is not as unusual as we might think. A level of mystery is required to make sense of some of our most coveted scientific discoveries. For example, Newton developed the laws of gravity and yet the essence of gravity remained a mystery to him, and many of his contemporaries, and retains its mysterious character to this day. The scientific, mechanical, method was in fact the 'best theory' that necessarily incorporated a mysterious element – gravity - for the scientific project to make progress (see Chomsky, 2000. pp. 106-113). However, there is no mystery for Hume who emphasises the empirical conclusion that 'causality' is not accessible through the senses and is therefore groundless. His scepticism has undermined the intellectually-necessary connection - i.e. causality - that enables human understanding and in turn scientific discoveries. He points out that the necessary connection between events:

*...arises from a number of similar instances, which occur, of the constant conjunctions of these events... that after a repetition on similar instances, the mind is carried by habit, upon the appearance of one event, to expect its usual attendant, and to believe that it will exist* (ibid, pp. 144 -145).

Hume's mind habits, resulting from empirical repetitions (seems a lot like causality) had shattered a major pillar of the scientific method. Kant needed to address this destructive scepticism if the scientific method, and ultimately human understanding were to have a sound foundation. After critiquing rationalism and empiricism (discussed in section 3.1 above) he carried out an exploration of analytic and synthetic knowledge and their relationship with *a priori* and *a posteriori* knowledge.

### 3.5 Analytic and synthetic knowledge

Since the time of Aristotle human knowledge was categorised as being either analytic or synthetic. Analytic knowledge is derived from statements where the concept in the predicate



contains the concept of the subject, for instance 'all cats are animals'. If one knows what constitutes the concept of an animal, it is clearly and distinctly true that the concept of a cat is among that category. In Kantian terms analytic knowledge is known prior to experiences of the world, does not require exploration in the world, and is therefore *a priori*. Knowing the meaning of what words represent acknowledges the verification of analytic truths, and, according to Kant, is significant of nothing important.

Synthetic knowledge, on the other hand, is put together after experiencing the world. Statements such as 'most bachelors live alone' requires empirical investigation before the truth or otherwise of the statement is established. Establishing the truth of such hypotheses by explorations in the world of experience, i.e. empiricism, provided the bedrock for the scientific method. Synthetic knowledge – the putting together of experiences – is also known as *a posteriori* knowledge.

### 3.6 Synthetic a priori knowledge

Kant's challenge was to show how a dogmatic understanding, going back to Aristotle, that knowledge is constitutive of either analytic *a priori* - which requires no empirical experiences in the world - or synthetic *a posteriori* - which permits only human experiences as the source of knowledge - cannot account for the manner in which humans know the world. Knowledge, according to Kant requires another constituent in the form of *synthetic a priori* knowledge. *Synthetic a priori* knowledge is the uniquely human capacity to unify, to form, and to understand the perceptions provided through human sensations. Essentially Kant is postulating that humans do not experience an objective world; *synthetic a priori* knowledge provides the **uniquely human capacity** along with our *a posteriori* **uniquely human sensations** to create a **uniquely human world** – a world that we humans create. Clearly, from the standpoint of empiricism or rationalism, this third way was not only transformational; it was fundamentally revolutionary.

Kant's analysis of the scientific method had led him to conclude that the fundamental challenge was to establish the possibility of *synthetic a priori* knowledge i.e. that the human intellect naturally and necessarily creates ideas, preconceptions, of how the world is in terms of concepts and laws before the evidence for these creations is sought by empirical investigation in the real world (see quote (B xi – B xii) in section 4.3 above). His *Critique of Pure Reason* is a statement of intent: he will critically analyse the human intellect in its purest form, unrestricted, undistracted, uncontaminated; i.e. released from the impositions of sensed experiences, and derive conclusions regarding its pure capacities and its pure limitations. Pure Reason, according to Kant, provides *synthetic a priori* knowledge in the form of anticipations, speculations, questions, and categorisations that humans necessarily employ to create the world we experience.

### 3.7 A uniquely human world

Kant derived, through his transcendental method, an accommodation of important elements of empiricism and rationalism. He concluded that all human knowledge is constituted by the dual human capacity for experiencing and cognising:

*Without the sensible faculty no object would be given to us, and without the understanding no objects would be thought. Thoughts without content are empty, intuitions without concepts are blind (B 75).*

And so, the world as known to humans has two contributory elements: it requires sensed experiences along with the mobilisation of human rational capacities that enable the forming and synthesising of these experiences. Evidently, for Kant, humans don't know an objective

out-there-now-real world – the world as we humans know it is derived from human senses and human intellectual capacities that actively perceive and form a uniquely human world – a world as only we humans know it. The *Critique* provides a convincing argument for the existence of *synthetic a priori* knowledge, and in so doing clarifies the capacity and the limits of human understanding. The reality of *synthetic a priori* knowledge enables humankind to bring a human experience and world into existence and sets the limits regarding the range in which this creative process is effective and verifiable i.e. the phenomenal world. Humankind can now look inward and trust its rationality when it comes to understanding the world as we humans know it. The world had become subjectively and autonomously human – humans are no longer passive consumers of an objective world, we are the active creators of our own world.

From a metaphysical and epistemological perspective human intellect had moved from a passive, observer role, to an active, agentic, and pivotal position in the creation of our human world. Human rationality has taken the exalted position as creator of the world as we know it, summed up in what is often referred to as Kant's motto for the Enlightenment: *Sapere Aude* - dare to think, or dare to create (Kant 1784). Kant had created a revolutionary interpretation of how humans understand - we have cut the strings and escaped the puppeteer. This was a revolution, from a metaphysical perspective, which undoubtedly merits comparison to the Copernican revolution. Kant's uncovering of human subjective, autonomous, creativity has created a clearing for individuals to choose to be free, decisive, and responsible for their own actions. Many would argue that Kant's revolution provided the fountainhead for subsequent, unanticipated offshoots including existentialism, anarchism, atheism, post-structuralism, to mention a few. And now we need to explore if Kant was, justifiably to many, comparing his developments in metaphysics with that of Copernicus's astronomical revolution, or if his intention was other than that.

#### **4 The extent of Kant's comparison to Copernicus**

##### **4.1 No comparison or limited comparison was intended**

The aptness of the comparison by Kant of the Copernican astronomical revolution ('revolution' or 'revolutionary', are mentioned five times in the Preface to the *Critique*) to his metaphysical revolution seems obvious at first appearance – both created a revolutionary paradigm shift in their respective fields of astronomy and metaphysics. Whether one agreed or disagreed, the discoveries of both Copernicus and Kant provided the reference point for subsequent astronomers and philosophers. However, some commentators are convinced that Kant intended no comparison when he referred to Copernicus. Hanson, referred to in Schulting (2009 p. 42), suggests that the revolution mentioned by Kant had nothing to do with Copernicus and was referring only to the success of the scientific method. He suggests:

*'The name 'Copernicus' is brought in here only to illustrate the propriety of making trial of an untested hypothesis, particularly when extant theories seem fruitless'.*

In this view the comparison with Copernicus is related to the use of the scientific method and mention of Copernicus was in relation only to the success he had with this method. Integral to this method is the employment of new ideas when current ideas are not getting anywhere and that's about it, as far as Hanson is concerned. Many believe otherwise including Schulting (2009) who suggests something deeper is going on and there is an implicit connection made to Copernicus's revolution in science and Kant's metaphysical revolution.

*The communis opinio among Kant interpreters now is that, in the passage at B xvi, (a) Kant de facto makes an analogy with Copernicus, which (b) by implication refers, in some way, to the Copernican revolution, and that (c) consequently it is justified to speak of Kant's own Copernican revolution (in some sense) (p. 41).*

Furthermore, according to Schulting, the connection between the reference to Copernicus and Kant's proposed epistemological developments has not been fully explained.

#### **4.2 Kant reference was anti-Copernican**

As was mentioned above, some of the secondary literature likened Kant's transformational shift, which placed human creative, intellectual capacities in a central and pre-eminent position regarding how we know the world, to Copernicus's revolution, which shifted the sun from its peripheral, moving, and trivial, role to that of the anchor and reference point of our planetary system. However, a closer examination of this comparison reveals an obvious contradiction. The Copernican revolution consigned the world, and humans living on it, to a relegated position in the solar system, while for Kant, the human position was promoted to the most important position when it comes to the way the world is for us. Many commentators implicitly acknowledged this difficulty but were prepared to employ a healthy portion of poetic licence in the telling of a good story. However, some commentators were explicit in pointing to the obvious contradiction. As Alexander (1910), quoted in Kemp Smith (1918 p. 23) suggested '... [Kant's] revolution, so far as it was one, was accurately anti-Copernican'. Kemp Smith (1910) is satisfied that Kant didn't mean to link his transformational epistemology with Copernicus's famous revolution. Kemp Smith suggests that the *Critique* is nothing less than the development of a '*Ptolemaic, anthropocentric metaphysics*' (p. 23) ...more like a hostile counter-revolution rather than one analogous to the Copernican revolution.

It is fair to say that many readers of Kant's *Critique* take account of this obvious contradiction and yet agree, while one revolution downgrades and the other revolution elevates the importance of the human perspective, in their respective fields Copernicus and Kant had developed insights that would forever change our understanding of the physical world and metaphysics – both were equally revolutionary. And so, is that the extent of the comparison? Apart for the obvious revolutionary nature of both Kant's and Copernicus's discoveries, what is Copernican about Kant's metaphysics? More significant of the comparison, according to some commentators, is the view that the position of the observer is key to the development of knowledge.

#### **5.3 The scientific method**

Kant leads up to his reference to Copernicus in the Preface by discussing the development of the scientific method and the sure path that this provided for developments in the sciences and mathematics. There is the view that Kant's Copernican reference is related to the revolutionary developments made by Copernicus by exploiting the scientific method. Kant was convinced of the benefits of a scientific approach in the fields of mathematics and physics and, on this basis, the legitimacy to claims of knowledge, and the necessity of *synthetic a priori* knowledge to the development of knowledge, could only be achieved with a philosophical approach akin to the scientific method. For Kant, the sure path of science provided the reference and orientation in his search for increased rigour and coherence regarding intractable, yet fundamental, obstacles to the development of metaphysics. However, the scientific method could not be used without alternation because of the change of context – the sciences deal with empirical data while philosophy deals with universal and necessary laws '*... but it is this that reason seeks for and requires*' (B xii).

Schulting (2009) argues that the analogy points to Kant's intended use of the essence of this method, but with some adjustments because of the change of context from empirical science to metaphysics.

*'...[C]learly the systematicity that Kant has in mind for metaphysics is of a different kind than that which science aims for; the method of philosophy can therefore not be the same*

*method that science employs in regard to its object, which for philosophy is not empirical and a posteriori but formal and a priori' (pp. 39 – 40).*

In this view Kant's reference to Copernicus is the use of the scientific method, adapted to the needs of philosophy, to produce reason-seeking universal and necessary laws.

*Kant's Copernicanism resides precisely in there being a philosophical analogue of this rational-experimental procedure that is characteristic of the sciences (ibid. p. 59).*

And so when Kant mentions Copernicus he is referring to the employment of a metaphysical method, inspired by the scientific method, as the director of his inquiry.

#### **4.4 Trust in the Newtonian worldview**

According to Copernicus, a number of spectators viewing a similar phenomenon from a similar position would necessarily provide a universal and generalisable reality. He based this conclusion on the fact that astronomy has developed as a science and couldn't do so without universal agreement regarding important observations. So, while the spectator's understanding is subjectively created, an agreed understanding emerges when numerous observers experience similar phenomena.

Kant, like Copernicus, believed this to be true. Universality, derived from subjective experiences, is borne out by the facts and lawfulness of physics, in particular Newtonian physics, as well as mathematics. Human cognition is capable of deriving lawfulness from the random dynamics of the real world. So, how then do we do this if our sources are, according to the Empiricists, empirical only? Kant is going to propose that the means by which we impose lawfulness on reality is derived from non-empirical factors i.e. given intellectual capacities, prior to experience, that work in conjunction with human experiences. These intellectual capacities are integral to human rationality prior to experiences. Without these intellectual augmentations of human sensations, it would not be possible to make any scientific progress – sensations alone could never provide Newton's Law of Gravity. On this basis Kant's Copernicanism is related to both his and Copernicus's Newtonian world view.

#### **4.5 The subjective turn**

Central to Copernicus's revolution is a shift in perspective of the observer. Copernicus believed that observing planetary movements from a stationary sun provided not only a different model but also one less complicated than that observed from a stationary earth. Among Copernicus's conclusions was the perspective of the observer is crucial. Kemp Smith (1910) is clear that Kant's reference is related to Copernicus's hypothesis that our model of the planetary system is dependent on where it is viewed from; ultimately a ... '*subjective explanation of apparently objective motions*' (ibid, p 25). This is clearly the case from the *Critique*:

*'So the central laws of the movements of the heavenly bodies established the truth of that which Copernicus, at first, assumed only in hypothesis, and, at the same time, brought to light the invisible force (Newtonian attraction) which holds the universe together. The latter would have remained forever undiscovered, if Copernicus had not ventured on the experiment - contrary to the senses, but still just – of looking for the observed movements not in the heavenly bodies, but in the spectator' (Footnote B xix).*

This subjective turn in metaphysics – the view from the spectator's perspective - strictly speaking, according to Schulting (2009), had begun with Descartes, not Kant, who introduced the original subjective viewpoint in philosophy, first published in his *Discours de la méthode* in 1637. Taken at face value, the subjective turn in philosophy took place some 150 years prior to Kant's *Critique*. That said it would be unfair not to credit Kant with taking subjective and autonomous human intellect to its high point. Schulting (ibid.) believes that Kant's reference to Copernicus in this regard is more symbolic than substantive.

#### 4.6 Copernicus's first thought – the hypotheses, thoughts, and reflections of the observer

Robinson (2012) is somewhat less tolerant of the comparison regarding Kant and Copernicus's revolution:

*'Commentators often refer to Kant's aims and achievements as his so-called Copernican Revolution.... Copernicus is not even mentioned in the first edition of the work and then only briefly in the Preface to the second edition. In the latter he refers not to a 'revolution' inaugurated by Copernicus but to Copernicus's 'first thought': den ersten Gedanken des Kopernicus' (p. 32).*

Copernicus's first thought, according to Robinson, came about as the result of a request from the then Pope to develop a more precise calendar because the date for the important Catholic feast of Easter had sometimes varied by a magnitude of weeks. This variation resulted from a lack of coherence in the existing mathematical models of astronomy and Copernicus at first admitted that there was no agreed solution to this problem. The prevailing system had been augmented, altered, amended to the extent that there were numerous Ptolemaic systems operating to accommodate all the irregularities and apparent contradictions. Copernicus's dissatisfaction with the incoherence of the Ptolemaic system(s) provided the motivation to expose the fallacy and discover a lawful, comprehensive system to accommodate all known planetary dynamics. *'Harmony, coherence and naturalness were clearly central to the Copernican revolution'* (Schulting, 2009, p. 57).

Copernicus hypothesised that a solution to this problem may reveal itself if the perspective of the observer is changed. He imagined an observer situated, not on a stationary earth, but on a stationary sun. And so Copernicus engaged in a thought experiment, which produced a revolutionary paradigm shift that displaced the conventional geocentric system and provided for the emergence of the radical heliocentric system.

While Robinson acknowledges that reality complies to the perspective of the observer he believes that the substance of the comparison is that the observer is not a passive recipient of those empirical observations – s/he brings hypotheses, thoughts, and reflections to the observation, and is therefore an active creator of what is understood. Robinson (2012) points out that Copernicus understood that human knowledge is dependent on:

*'...the modes of receptivity by which events in the external world become translated into experience...the observer arrives on the scene with an assortment of suppositions, orientations, and expectations (ibid, p. 33).'*

In summary Copernicus concluded that reality complies to the combination of sensed experiences with the positional, psychological, philosophical, etc., disposition of the observer.

And so, following in the footsteps of Copernicus's primary hypothesis or first thought, the possibility of *synthetic a priori* knowledge, the central question of the *Critique*, was revealed to Kant in this crucial, and necessarily long, quote:

*'Let us then make the experiment whether we may be more successful in metaphysics, if we assume that the objects must conform to our knowledge.... We here propose to do just what COPERNICUS did in attempting to explain the celestial movements. When he found that he could make no further progress by assuming that all the heavenly bodies revolved round the spectator, he reversed the process and tried the experiment of assuming the spectator revolved, while the stars remained at rest. We may take the same experiment with regard to the intuition of objects. If the intuition must conform to the nature of the objects I do not see how we can know anything about the nature a priori. If, on the other*

*hand, the object (qua subject of the senses) conforms to the nature of the faculty of the of intuition, I can then easily conceive the possibility of such an a priori knowledge' (B xv - xvi).*

So, is the answer already provided by Hanson (quoted in Schulting, 2009, p. 42) that Copernicus's first thought provided the spark for Kant to employ an '*untested hypothesis, particularly when extant theories proved fruitless*'? There is no doubt that this is what Kant did but he didn't need to refer to Copernicus in this regard. Part of the answer is comprised in the shift in perspective that helped Copernicus develop a more rational and orderly planetary system. Kant certainly exploited this approach to support his hypothesis that human knowledge was founded on the conformity of objects to the intellectual processes of the human mind – human intelligence created the objective world not, as was dogmatically accepted, that the objective world resulted from incremental accretions of human understanding. Again, a shift in perspective was not the sum of what Kant got from Copernicus. Copernicus laid the groundwork for Kant's conviction that *synthetic a priori* knowledge is not only possible but is also necessary. And so in mentioning Copernicus's first thought Kant has a precedent of sorts for his subjective turn, and he was now satisfied that the '*assortment of suppositions, orientations, and expectations*' (Robinson, 2012) constitute the *synthetic a priori* knowledge for his transcendental epistemology. And so, founded on an unshakable Newtonian conviction of the lawfulness of the universe, Kant hypothesised that a lawful model of human understanding exists and is necessarily composed of *synthetic a priori* knowledge and human experiences to constitute the natural world, as we humans know it.

## **5. Conclusion**

As a result of the preceding discussion it is reasonable to conclude that the Copernican reference can be justified on a number of levels:

1. Kant believed that his insights were as revolutionary in philosophy as Copernicus's were in astrology
2. The shift in perspective of the observer provided a dynamic for new ways of thinking
3. In a similar vein, some might say Kant was anti-Copernican by placing the human perspective in the pre-eminent position in the creation of knowledge
4. Kant developed a method akin to the secure course of science that had proved so successful in Copernican astrology
5. Kant was a convinced Newtonian, the worldview that provided such reassurance for Copernicus
6. Copernicus's emphasis on the position of the observer supported Kant's subjective and autonomous turn in metaphysics
7. By employing Copernicus's first thought Kant derived the required assurance that *synthetic a priori* knowledge is available and necessary in our understanding of the world.

Both Kemp Smith and Robinson agree that Kant did not suggest an analogy between the Copernican revolution and his own transformational metaphysics. They are clear that Kant was referring to Copernicus's 'first thought' and this refers to the importance of the shifting perspective of the spectator and how that position determines the reality of nature. While, for Copernicus, the objective of his first thought was to provide an elegant, law-governed planetary system, for Kant, the objective, derived from Copernicus's first thought, was to establish that the creation of such elegance and laws was sourced in a uniquely human experience. Kant now believed that a shift in perspective, akin to that of Copernicus's first thought, would provide for a mind-and-sensation-dependent reality i.e. looking for the reality of nature, not in an

objectively sensed world, but, in the sensing and thinking spectator. This, according to Robinson, is the key to Kant's reference to Copernicus.

*'The Kantian observer is not a passive recording instrument of the empiricists but one who brings to reality... an assortment of cognitive-perceptual powers that will establish the very possibility of sensibility, knowledge and understanding' (Robinson 2012, p. 34).*

Kant, like Copernicus, had established that the nature of our world is compliant with the position we assume: the intellectual creator of an objective reality sourced in our experiences of the world. Both Kant and Copernicus were completely aligned with the anthropocentric reality of nature. While Robinson's interpretation may be a more precise than that of commentators who posited an analogy between the astronomical revolution of Copernicus and the metaphysical revolution of Kant, I am satisfied that, while it is important to clarify Kant's intention when he referred to Copernicus, there is little damage derived from this misinterpretation. There is little doubt that Kant was influenced by the prevailing context which bristled with the power of the scientific method, the Newtonian worldview, and the subjective turn in philosophy. Notwithstanding the strength of the argument that Kant's intention, when referring to Copernicus, was to his primary hypothesis or his first thought, it is fair to say that both Copernicus and Kant caused a seismic shift in their individual fields of enquiry. However, the discoveries of Copernicus were accommodated within a relatively short period of time, while for Kant, his discoveries are still causing waves, some unintended in areas such as increased subjectivity and autonomy in fields such as phenomenology, existentialism, anarchism, atheism, and postmodernism. I believe that comparing, or even referring to Kant's transformational philosophy as 'Kant's Copernican revolution' is helpful in emphasising the explosive impact, similar to that of Copernicus, of Kant's new approach to philosophy.

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