

Question of Knowledge: On a Humean Analysis of Space and Time

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Abstract: This paper aims to demonstrate the characteristics and direction of knowledge that David Hume legitimizes from his spatial and chronological standpoint by discussing how Hume projects a topology of reality. It is from the notion that one's surroundings affect very well the generation of ideas that Hume's view of space and time becomes significant. Hence, this discussion attempts to present a more coherent and specific organization of Humean empiricism by relating it to how he characterizes physical reality.

Keywords: Causality, Indivisibility, Space and Time

“The infinite divisibility of space implies that of time, as is evident from the nature of motion. If the latter, therefore, be impossible, the former must be equally so.”

Introduction

Hume refrained from giving his definite account of reality, although some may take his skepticism as a plausible linkage to building some kind of a metaphysical realism.¹ On the one hand, regardless of whether Hume is arguing merely from an epistemological standpoint or is creating a construct of reality, what consequently becomes significant, is the question of what features belong to the sort of knowledge that would prevail in such perspective. In line with the latter, one must be mindful of the fact that Hume allotted half of the first chapter of *Treatise of Human Nature* for the discussion on space and time. This account will then situate the scope of reality entitled to human knowledge. Knowledge, to be understood more clearly in this context, necessarily has to lean onto a particular framework for it to be conceptualized. This can be evident from the varying and contrasting theories that have been attributed to knowledge throughout history. Most likely unaware of this

fact, Ancient Epistemology and Physics spearheaded by Aristotle passively transformed into the Cartesian mechanics² to the absolutist Newtonian and relational Leibnizian views of reality.³ What consequently became of the tune embraced by thinkers from the middle of the 18th century development of Scottish Enlightenment was skepticism which primarily attended to the rejection of Cartesian metaphysics. In 1739, the release of *Treatise of Human Nature* purported a ‘new version’ of skepticism which as described by Klemme in his text, ‘marked the turning point in the history of modern epistemology’.⁴ Klemme identifies two significant reactions to this revolutionary model of reality given by Hume. One of which who is Immanuel Kant in his *Critique of Pure Reason* (1781), indirectly argued against Hume's account of space and time by his theory of the pure forms of intuition. Inarguably, it is Kant who supplemented the seeming open-endedness of Hume's theoretical philosophy. One of the most famous collaboration that can be

attributed to both would be Kant's remark in the Preface of the Prolegomena to any Future Metaphysics saying that Hume awakened him from his 'dogmatic slumber'. This awakening apparently regarded Hume's philosophy to be excessively skeptic that in the history of philosophy, it needed Kant to provide for its shortcomings.

This paper will furthermore give focus to the theoretical development of Hume's philosophy by justifying its place in the contemporary times, specifically as a contribution to the field of Quantum Mechanics through elucidating space and time as the substratum on which the theoretical application of Hume's epistemological theories lies.⁵

Causal Relation

The so-called Humean Revolution⁶ traces its roots from Locke's empiricism that ultimately rejects the possibility of innate knowledge as it has been argued by Descartes. Hume also followed Locke's theory with regards to the origin of ideas however by distinguishing 'impression as lively perceptions and idea that should stand for all our perceptions' in which according to him was, on the contrary, conceptually 'perverted by Mr. Locke'.⁷ Nonetheless, it can be pinpointed from these concepts, including the impossibility of innate ideas that knowledge is only formed through experience or factual discovery. Immediately, the field of experimentation for Hume becomes situated to a particular sphere: experience. Still constant with empiricism, Hume further denies that same intelligibility contested by Berkeley. This is most apparent in his renowned argument against the intelligibility of causation which argues that although it is established that knowledge only begins and can be created from experience, it does not give any insight into causal laws and to its operations. The basis of 'factual reasoning'⁸ or matters of fact, additionally devises a new

question: *But if we still carry on our stifling humour, and ask, What is the foundation of all conclusions from experience?* (E 4.14). Upon our encounter with a particular experience, we are confined into thinking that such necessarily followed from another, at the same time that from such thinking, something will also be following one's experience. According to Hume, such belief is created by our notion of causality. Therefore, it follows that our principle of causality binds us into making an extrapolation⁹ that the *future will resemble the past experience* (E 4.19, 4.21). The challenge for Hume is to identify the foundation of the successive and uniform construct attributed to experience. He then concludes that *it is not reasoning which engages us to suppose the past resembling the future, and to expect similar effects from causes, which are to appear similar* (E 4.23), but the *principle of CUSTOM or HABIT that for wherever the repetition of any particular act or operation produces a propensity to renew the same act or operation, without being impelled by any reasoning or process of the understanding* (E 5.5). He further explains, *that the necessary connexion, which we feel in the mind, this customary transition of the imagination from one object to its usual attendant, is the sentiment or impression, from which we form the idea of power or necessary connexion* (E. 7.28). Causal relation, commonly classified as a source of credible knowledge, is then relegated to be no more than a probability.¹⁰ This stems from the fact that connection between events cannot be literally established¹¹. On the 7th chapter of the Enquiry, Hume finally gave a definition of how cause is perversely taken:

- 1) *An object followed by another, and where all the objects, similar to the first, are followed by objects similar to the second.*
- 2) *Where, if the first object had not been, the second never had existed.*
- 3) *An object followed by another, and whose appearance always conveys the thought to the other.*¹²

Millican considers this response from Hume ‘as probably the most famous argument in English language philosophy’.¹³ But to pinpoint the significance of his causal theories, it must be contributive to review the aims of the Enquiry. Hume did intend to present a ‘mental geography’ that would situate knowledge to a particular realm. Such objective is then responsible for the delineation of some faculties of the mind.¹⁴ This argument precisely casts doubt to sciences, primarily to those who uphold absolute certainty. On the same chapter, Hume maintains that ‘sciences will remain uncertain and chimerical’ in their own notions ‘unless skepticism is applied to it’ (E 1.14).

Significance of Skepticism with Space and Time

Even at its elementary, the manner of Hume’s classification of ideas and how they are associated, projects a molding of how far knowledge can be dealt with by the mind. This is apparent in his argumentations for instance, when he mentions that necessary connection is created from the habitual relation of repetitive experiences or a customary transition is imagined by the mind whenever it conceptualizes its experiences. Chronology, in this sense can be implied to be confined within a spatial framework. His skepticism towards ‘mental geography’ and its tendency towards the extrapolation of knowledge insinuates the significance of space and time which according to him, is the manner and order in which objects appear (or exist)¹⁵, more importantly in characterizing the structure of Hume’s theoretical philosophy. On the hand, Baxter claims that in order to reveal the success of Hume’s account on space and time, it must be understood as a consequence of this Pyrrhonian Empiricism.¹⁶

Space

There have been widespread criticisms ascribed to Hume’s account of space and time. These negative evaluations however are expected to retract especially when its coherence with the skeptical approach of Hume is identified.¹⁷ As mentioned, the second of the first book of the Treatise was dedicated for the discussion of space and time. It is not much given emphasis on the Enquiry although a further refinement about the ideas of extension can found in (E 12.15) and time (E 12.20).

The neglect of this chapter can be warranted by its incongruity with Geometry and Classic physics.¹⁸ Contrary to the Geometrical principle of infinite divisibility, Hume argues that *space and time cannot be divided infinitely for it is composed of finite number of parts which then are “simple and indivisible”*.¹⁹ This theory marks first on Hume’s system of space and time. As a conclusion of the first part, his second argument claims *that these indivisible parts are inconceivable unless occupied by something real and existent, and so space and time must each simply be the manner or order in which objects exist*.²⁰

Space 1.1 – Space cannot be infinitely divisible

Hume begins his theory of space by starting from his notion of ideas which can be best alluded to pixelated electronic photographs.²¹ A file at its maximum can be viewed wholly as a picture, but with the zoom in and zoom out feature of an application, a photo can be magnified to the minutest pixel. In reality, the aggregation of these pixels unifies the photo. Hence, any photo necessarily has to be composed by these elements. According to Hume, *ideas which we form of any finite quality is not infinitely divisible*. This is because, for Hume, *the capacity of the mind is limited, and it can never fully attain a full and adequate conception of infinity*. Just as

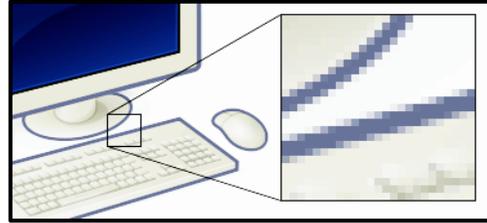
the quality of a photo is determined by its number of pixels (picture elements). The more number of pixels, the higher the resolution of the photo becomes. Nonetheless, having a specific number of pixels, a photo only assigned a limited magnification level and that going beyond that set limit would be impossible.

Progressively, the second premise of Hume argues that *whatever is capable of being divided in infinitum, must consist an infinite of number of parts and that 'tis impossible to set any bounds to the number of parts, without setting bounds at the same time to the division.*²² However, by establishing that the mind is only finite, it consequently applies that there are no ideas which can be divided infinitely. Therefore, space can only be divided into a limited number of parts. The parts which then assemble space are those that remain indivisible. *'Tis therefore certain, that the imagination reaches a minimum, and may raise up to itself an idea, of which cannot conceive any sub-division, and which cannot be diminis'd without a total annihilation.*²³

Space 1.2 – Adequacy

It then becomes a confusion to argue for space through ideas. Nevertheless, if one reviews the first argument presented in the Treatise, it will be clearer to know that Hume, in arguing for space and time, is only being consistent with what he discussed about impressions. According to him, *the perceptions of the mind are composed of impressions and ideas, whereas impressions are the most vivid perceptions presented to our senses, and it always follow that ideas have less vivacity than that of the latter.*²⁴ Coherently continuing about his theory on space from this first principle, Hume then argues that these minimum ideas correspond to the more vivid perceptions of the minutest impressions from perception.

*pixel illustration²⁵



As a further analysis of the pixel analogy, an illustration of is provided above to be zoomed in to a particular corner of the photo, exhibiting the pixelation of its parts. The magnified image can be seen to have been divided into cubes. Such counts as a pixel or a picture element. Each cube corresponds to the hue as it is visible when the photo is at its original size or when it is not magnified. Analogously, the original size of the picture parallels with a *complex idea*²⁶ the way it is known to the senses. On the one hand, the division of ideas resembles with the process of magnification to the most minimal ideas. The order in which Hume argues about ideas through space and time apparently appears only to be a substantiation of its existence. This seeming demand for affirmation is even more manifested when he claimed that *minimal ideas are the adequate representations of the most minute parts of extension.*²⁷ A plausible comparison that can be related to this principle of adequacy, is the concept of apprehension from the Mimamsa school of Philosophy in India. According to Mimamsa, knowledge is intrinsically valid or Svatahprāmayāna. They give emphasis on the immediacy and directness of knowledge or *anubhūti* in the process of cognizing a valid form of knowledge. For them, memory cannot be treated as a valid form of knowledge because it only rose from the impression (direct apprehension) of a prior cognition. Significantly, the validity of knowledge or apprehension are classified to be free from contradiction of any **subsequent knowledge**, as a consequence, it must truly represent the object it is cognizing.²⁸

The proof of extension is justified by the correspondence of the impression with the object in reality just as Hume ascertains extension as an adequate representation of minimal ideas.

Therefore, turning back to Hume, it only implies that by the sole acquisition of any idea, it necessarily follows that there is space. Although consistency is much demonstrated, from the notion that the finitude of the mind is engendered from a limited source of knowledge, which is experience or the immediacy and credibility such kind of cognition, it cannot be avoided to see that Hume is becoming dogmatic in the correspondence he established.

The argument regarding ideas as being not infinitely divisible accords with the principle of adequacy in a way that it insinuates the notion that if one extrapolates on what has been directly apprehended, then one is swerving from reality/truth or validity.

This argumentation from Hume primarily rejects the indivisibility principle of Geometry. In this discipline, unrestricted proportioning of space is performed through mathematical equations.²⁹ The proportionality of a geometrical plane to an idea of a real plane permits Geometry to approximate measures for precision. Hume however objects to this by arguing that *they are not properly demonstrations, being built on ideas, which are not exact, and maxims which are not precisely true* (T 1.2.4.14). Given the copy principle, it has been established that ideas are less lively than impressions (which are immediate perceptions), hence the standards for measure or proportions are actually altered versions of ideas from impressions. Hume questions the legitimacy of the 'rule of standard' wherein all geometrical propositions and axioms are derived. Notably, most schools of rationalism are founded on such a system.³⁰

Therefore, it follows that the relation of geometrical maxims in order to come up with propositions, becomes vulnerable to error as it goes away from the adequacy of impressions. If a philosophical system is based on this kind of knowledge, then, as Hume mentions, *their first principles, tho' certain and infallible, are too coarse to afford any such subtle inferences as they commonly draw from them.*³¹

Space 1.3 – Space as an Idea

This idea of Hume belongs to the school of Relational view on space and time. Pooley defines Relationalists as those who maintain that space-time does not have the basic, non-derivative or sourced existence. According to them, claims about space-time are ultimately *to be understood as claims about material entities and the possible patterns of spatiotemporal relations that they can instantiate.*³² It therefore is a plausible consideration to brand Hume as becoming dogmatic with his correspondence theory (of impressions and ideas to objects) as he admits that *space or extension is merely an idea, an abstract idea merely on the disposition of points, or manner of appearance, in which they agree* (T 1.2.3.5). This conclusion maintains the sense of particularity or the significance of experience in representing such idea from reality. Hume therefore is not becoming dogmatic, in his characterization of how human nature views reality. Rather, his skepticism still accounts for his conclusion. According to Hume, abstract or general ideas are nothing but particular ideas. Contrary to the common Aristotelean notion of abstraction, Hume emphasized that they truly are distinct ideas but their generality is only created from representation.³³ Baxter has given an elucidation of this by saying that the skeptic treatment of Hume to his idea of space is that from neither agreeing or disagreeing to the notion of space being absolute, while acquiescing on the idea of space as being relative to the manner in which

how it appears to a person.³⁴ Therefore, Hume is not presenting any specifications of space nor of its quality neither its tangibility. His skeptic approach warrants the idea of space the way common people would take seeing as believing. Having this idea of space in mind prevents us from maintaining a specific ground or manner wherein knowledge is situated but only permits us to infer that we may be able to trace its patterns through experience.

Time

Hume's account on duration can be evident in his skeptical conclusions. Such that *we cannot be certain that the past will resemble the future*, which also can be seen from the comparison to Mimamsa school of Indian Philosophy which claims that the *validity of knowledge is measured if it is not affected by any contradiction of a subsequent knowledge*. The significance of impressions is acknowledged as those that bear the most force or vivacity whenever presented to the mind. In the development of ideas, duration becomes an important concept in validating whether the transformation of impression to idea is adequate. Nonetheless, Hume argues that time or duration is as well an abstract idea. If space is to the manner of appearance, the concept time, on the one hand, is created from the order or succession in which objects appear.

The idea of time, being deriv'd from the succession of our perceptions of every kind, ideas as well as impression, and impressions of reflection as well as of sensation will afford us an instance of an abstract idea, which comprehends a still greater variety than that of space, and yet is represented in the fancy by some particular individual idea of a determinate quantity and quality.
(T 1.2.3.6)

Knowledge 1.1 – Relation to Space and Time

These two concepts became fundamental to Hume's theory of custom and habit. As a conclusion, Hume argues that it becomes impossible to conceive space without objects that would give impression to us. There can be found no correspondence of the idea of a vacuum to extension.³⁵ The same conclusion is applied to the concept of time as it cannot be conceived without change.³⁶ It only follows that our knowledge from experience or from relations of ideas are framed by the manner or succession in which objects appear. Therefore, the rigid construal that reality is arranged in a particular manner insinuates that custom has successfully penetrated to the knowledge of other possibilities. Hence, the empirical foundation of knowledge is advocated by Hume in order to keep the sense of particularity in interpreting the different objects or instances in the distinct manner or order they appear.

Knowledge 1.2 – Hume, Immanuel Kant and Quantum Mechanics

The Humean Revolution led to the rejection of causality. It however constituted the source of knowledge to a relegated form of experience by avoiding any form of extrapolation. Together with the establishment of his notion of space and time and this mode of skepticism, Hume then situated knowledge in the finiteness of the human mind in which would later be referred to by Immanuel Kant as the Phenomenal world in which according to him are *appearances, to the extent that as objects they are thought in accordance with the unity of the categories*.³⁷ However, as Hume may appear to be remarkably lacking to Kant, he went beyond the confines of the human mind by arguing that:

For if the senses merely represent something to us as it appears, then this something must also be in itself a thing, and an object of a non-sensible intuition, i.e., of

*the understanding, i.e., a cognition must be possible in which no sensibility is encountered, and which alone has absolutely objective reality, through which, namely, objects are represented to us as they are, in contrast to the empirical use of our understanding, in which things are only cognized as they appear.*³⁸

Kant's account of Space and Time will then be fundamental in proving that there may be knowledge of apart from what we cognize in experience or synthetic a priori judgments.

For Kant, Space and Time are not empirical concepts abstracted from experience in the way Hume argues about it. Furthermore, space is presupposed in referring sensations to something external and that external experience can only be possible through the presentation of space. He concludes that space is different (independent) from the concept it instances. Therefore, it is not a concept but a *form of intuition*.³⁹ On the one hand, Kant argues for Time as also necessarily to be presupposed in order to represent the appearance and changes among objects. Time is therefore given *a priori* as the grounds for intuition.⁴⁰

By asserting the empirical reality of space and time⁴¹, Heisenberg, one of the key pioneers of Quantum Mechanics, argues that it would have been logically consistent if Kant followed Berkeley and Hume in rejecting notion of substance. According to him, Kant still observed reality from the assumption that there is a foregoing event and considers it as the basis of all scientific work. This however is not anymore true of Atomic Physics. Heisenberg further mentions that the theory of relativity has given a significant change on how modern physicists think. As an example, Heisenberg considered radium atom. The time of emission of a particular particle cannot be predicted or be found determinately. In such experiments there is always a room left for uncertainty, which

according to the book is brought by the interaction between the nucleus and the rest of the world. Nonetheless, the way Kant thinks did not make any contribution to it, as contrary to what he declared that his discovery will be the "basis of any future metaphysics that can be called science". The assumption of a pure intuition of space and time also denotes the assertion of a causal chain to serve as a glue to the unity of space and time. But for the biologist Lorentz, these a priori concepts as forms of behavior are inherited and innate schemes in animals and it may belong to man⁴², but not to a world independent of them.⁴³ Causality in quantum mechanics, is then determined by Schrödinger's time-equations with temporal succession having no necessary connection or even probably that a specific state will be followed by another.⁴⁴

Moreover, the infamous double-slit experiment of Quantum physicists proposes that the most minute parts of reality cannot be observed to have determinate moving patterns. When atomic particles are shot through two slits, it loses an interference with other particles. From an observer's standpoint, specially when matter is at its most solid phase, a formation of a single and aligned band is detected. Solid matter fits through the slits and shoots itself to where the slits are directly faced. Nonetheless, particles create very random and unpredictable trajectories.⁴⁵

Conclusion

Despite the long gap that incurred between them, the rectification of Hume's causal and spatio-temporal theories became significant in the application of modern physics, specifically in the state-function as it determines the state of any physical system at any specific time. However, it is still of a dismay that modern physics could have been more advanced from the time that it had lost from the digression

from David Hume. Nonetheless, in thinking of such possibility, it should be of contentment for the sciences to have even reached such development. After all, what Hume is merely implying from the manner or succession of objects of life as it appears to us and its meaninglessness is our wholeheartedness to accept whatever may come to us.

¹ Baxter, Donald L. M., *Hume's Difficulty* (New York: Routledge, 2008), 6-7.

² Millican, P., In his Introduction to *An Enquiry Concerning Human Understanding* (New York: Oxford University Press Inc., New York, 2008), XIV.

³ Philosophies directed to by Hume and Kant although both differ from the stances regarding it. [See Allison, Henry E. *Custom and Reason in Hume: A Kantian Reading of the First Book of the Treatise* (New York: Oxford University Press Inc., New York, 2008), 54].

⁴ Klemme, Heiner F. "Scepticism and common sense." In *The Cambridge Companion to The Scottish Enlightenment* (United Kingdom: Cambridge University Press, 2003), 117-118

⁵ This reading has been influenced by Peter Millican as an objection to Kant's Synthetic A Priori knowledge [See Millican, Peter. 3.2 *Responses to Hume's Famous Argument*. Oxford Unit: Faculty of Philosophy. April 10, 2010. <https://podcasts.ox.ac.uk/32-responses-humes-famous-argument> (accessed September 20, 2015)].

⁶ Millican, P. *Op. Cit.*, XXIX

⁷ Footnote for T 1.1.1.1

⁸ As it is first presented in the Treatise

⁹ Oxford Dictionary of English (ODE) defines *extrapolation* (verb) as: extend the application of (a method or conclusion) to an unknown situation by assuming that existing trends will continue or similar methods will be applicable [See also Millican P. *Op. Cit.*, XXXVIII].

¹⁰ Distinction with Locke

¹¹ With necessity

¹² E 7.29

¹³ Millican, *Op. Cit.*, XXXVIII

¹⁴ E 1.13 Such as the credibility of associating ideas

¹⁵ T 1.2.4.2

¹⁶ Analysis of a different kind of skeptic stance by Hume. [Baxter, Donald L. M. "Hume's Theory of Space and Time in Its Skeptical Context." In *The Cambridge Companion to Hume*, by David Norton and Jacqueline Taylor (New York: Cambridge University Press, 2009), 146.]

¹⁷ *Ibid.*, 105

¹⁸ *Ibid.*

¹⁹ T 1.2.1.2

²⁰ Find Treatise

²¹ Hume's thought experiment with regards to this claim is depicted through a grain of sand and with the vivacity of the representation of it. This representation model is at a great degree parallel to picture elements (pixels). [See T 1.2.1.3]

²² T 1.2.1.3

²³ T 1.2.1.4

²⁴ This is famously known as the copy principle. [See T 1.1.1.1 to the establishment of this principle at T 1.1.1.8].

²⁵ Talk, ed g2s • "Pixel-example.png." *Wikimedia Commons*. May 27, 2006.

<https://commons.wikimedia.org/wiki/File%3APixel-example.png> (accessed December 9, 2015).

²⁶ Complex ideas are contrary to simple perceptions or impressions never are exact copies of simple ideas. [See T. 1.1.1.4]

²⁷ T 1.2.2.1

²⁸ Sharma, Chandradhar, *Indian Philosophy: A Critical Survey* (U.S.A: Barnes & Nobles, Inc., 1962), 201

²⁹ See for example T 1.2.2.2

³⁰ "To them it will doubtless seem strange that I should undertake to treat men's vices and absurdities in the *geometric style*, and that I should wish to demonstrate by certain reasoning thing, which are contrary to reason, and which they proclaim to be empty, absurd, and horrible." [See Spinoza, Baruch, *The Ethics* (New Jersey: Princeton University Press), 135

³¹ From inaccurate standards created from mere appearances [See T 1.2.4.31]

³² Pooley, Oliver. "Substantialist and Relationalist Approaches to Spacetime." In *The Oxford Handbook of Philosophy of Physics* (New York: Oxford University Press, 2013) p. 1 of 48

³³ See T 1.1.7.8 to 10

³⁴ Baxter, Donald L. M. *Hume's Theory of Space and Time in Its Skeptical Context*, 128

³⁵ See T 1.2.5.1,22 – 24 for further discussion

³⁶ T 1.2.5.28

³⁷ Critique of Pure Reason A 249

³⁸ Critique of Pure Reason A 250

³⁹ Critique of Pure Reason B 38, A 24

⁴⁰ Critique of Pure Reason A 31

⁴¹ Through the mentioned conditions [See Critique of Pure Reason B44 A 28, A 36]

⁴² As Kant also asserts the idealistic, yet transcendent existence of space and time

⁴³ Heisenberg, Werner. *Physics and Philosophy: The Revolution in Modern Science*. Edited by F.S.C. Northop (New York: Harper Torchbooks, 1958), 87-91

⁴⁴ Northop, *Ibid.*, 13

⁴⁵ Milican, Peter. *3.2 Responses to Hume's Famous Argument*. Oxford Unit: Faculty of Philosophy. April 10, 2010. <https://podcasts.ox.ac.uk/32-responses-humes-famous-argument> (accessed June 3, 2016).

Bibliography

Primary Source

Hume, David. *A Treatise of Human Nature*. Edited by Ernest C. Mossner. United Kingdom: Penguin Classics, 1985.

Hume, David. *An Enquiry Concerning Human Understanding*. Edited by Peter Millican. New York: Oxford University Press Inc., New York, 2008.

Secondary Source

A. Books

Allison, Henry E. *Custom and Reason in Hume: A Kantian Reading of the First Book of the Treatise*. New York: Oxford University Press Inc., New York, 2008.

Heisenberg, Werner. *Physics and Philosophy: The Revolution in Modern Science*. Edited by F.S.C. Northop. New York: Harper Torchbooks, 1958.

Sharma, Chandradhar. *Indian Philosophy: A Critical Survey*. U.S.A: Barnes & Nobles, Inc., 1962.

Baxter, Donald L. M. *Hume's Difficulty*. New York: Routledge, 2008.

B. Book Section

Klemme, Heiner F. "Scepticism and common sense." In *The Cambridge Companion to The Scottish Enlightenment*, by Alexander Broadie, 117-135. United Kingdom: Cambridge University Press, 2003.

Baxter, Donald L. M. "Hume's Theory of Space and Time in Its Skeptical Context." In *The Cambridge Companion to Hume*, by David Norton and Jacqueline Taylor, 105-146. New York: Cambridge University Press, 2009.

Pooley, Oliver. "Substantialist and Relationalist Approaches to Spacetime." In *The Oxford Handbook of Philosophy of Physics*, by Robert Batterman, 378-425. New York: Oxford University Press, 2013.

C. Online Resources

Millican, Peter. *3.2 Responses to Hume's Famous Argument*. Oxford Unit: Faculty of Philosophy. April 10, 2010. <https://podcasts.ox.ac.uk/32-responses-humes-famous-argument> (accessed September 20, 2015).

Millican, Peter. *3a. Hume's Theory of General (or Abstract) Ideas*. Oxford Unit: Faculty of Philosophy. August 12, 2012. <https://podcasts.ox.ac.uk/3a-humes-theory-general-or-abstract-ideas> (accessed October 10, 2015).

talk, ed g2s • "Pixel-example.png." *Wikimedia Commons*. May 27, 2006. <https://commons.wikimedia.org/wiki/File%3APixel-example.png> (accessed December 9, 2015).

Other References

A. Books

Kant, Immanuel. *Critique of Pure Reason*. Edited by Paul and Wood, Allan Guyer. USA: Cambridge University Press, 1998.

Kant, Immanuel. *Prolegomena to Any Future Metaphysics*. Translated by Gary Hatfield. New York: Cambridge University Press, 2004.

Spinoza, Baruch. "The Ethics." In *A Spinoza Reader: The Ethics and Other Works*, by Baruch Spinoza, edited by Edwin Curley, translated by Edwin Curley. New Jersey: Princeton University Press, 1994.