Matter & Space, Plato & Aristotle:

The Receptacle of Plato's *Timaeus* as Aristotelian Prime Matter

by

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Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners. I understand that my thesis may be made electronically available to the public.

Abstract

In the *Timaeus*, Plato presents his natural philosophy of the origins of the cosmos, space, and the four elements. In the 'Receptacle passage' of *Timaeus* 47e-53c, the eponymous speaker Timaeus affirms that the three underlying components of the cosmos are intelligible Platonic Being, sensible Becoming, and the Receptacle and that the Receptacle is space. In *Timaeus* 53c-57d, he proceeds to present a geometric construction of the four elements of air, fire, water, and earth from two basic triangles into four corresponding regular Platonic solids that constitute a corpuscle of each element. Based upon these passages, Aristotle interprets the *Timaeus* as presenting Plato's theory of matter, where Platonic matter is space itself and matter is composed of geometric planes.

In this thesis, I explore the function and role of the Receptacle and its relationship with the geometric construction of the four elements. I argue that the *Timaeus* presents an account of Platonic compounds (or elemental bodies), which are constituted by the Receptacle (as an underlying Platonic matter or substratum), Platonic Becoming, and images of the intelligible Platonic Being. I show that Aristotle's characterization is true, Platonic matter is space, which is the Receptacle. My major finding is that the Platonic account of elemental bodies prefigures Aristotelian hylomorphism. The Receptacle is an Aristotelian prime matter and the images of Platonic Being are Aristotelian forms. However, since Plato and Aristotle have starkly diverging metaphysical accounts of change and Becoming, Platonic Becoming lacks a clear counterpart in Aristotelian natural philosophy.

Keywords: Plato, Aristotle, Receptacle, matter, space, substance, hylomorphism, prime matter, metaphysics, elements, geometry, triangle, Timaeus

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Dedication

Foremost, I dedicate this thesis to my parents. I am forever indebted to my mother and father for all the love, care, support, and guidance, as well as the countless books and rather expensive violin lessons, throughout the years that has cultivated my love of learning. Second, I dedicate this thesis to my maternal grandmother, who helped to feed and raise me, as well as teaching me how to read and write Chinese characters. Her love and dedication to me (and also to her many other grandchildren) has helped bring me to where I am today. Last, I want to thank the Demiurge, the heavenly father and maker of our supremely good and beautiful cosmos. I understand that this work of cosmological craftmanship took approximately thirteen billion years to settle in place to how it is now, while my pithy account took only one earthly summer.

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Quote

"In our case, we are about to make speeches about the universe – whether it has an origin or even if it does not – and so if we're not to go completely astray, we have no choice but to call upon the gods and goddesses, and pray that they above all will approve of all we have to say, and that in consequence we will, too. Let this, then, be our appeal to the gods; to ourselves we must appeal to make sure that you learn as easily as possible, and that I instruct you in the subject matter before us in the way that best conveys my intent." (Plato, *Timaeus* 27c-27d, translation by Zeyl).

Introduction – The Master Plato & The Pupil Aristotle

Plato, son of Ariston and Perictione, was born in Athens in 429 BC and lived his entire life in his home *polis* till his death in 348 BC.[1] During his lifetime, Plato became the student of Socrates and devoted his life to the fundamental questions of the nature of reality, knowledge, justice, truth, and beauty. He explored these diverse topics within his illustrious and foundational dialogues and by founding (and teaching at) a centre of learning, "the Academy, arguably the first university"[2] which attracted students from all across the Hellenic world. One of Plato's greatest students was Aristotle of Stagira. Born in 384 BC in the northern Greek town of Stagira, Aristotle moved to Athens at age seventeen to study at Plato's Academy and studied for sixteen years until the death of Plato in 348 BC. Following the passing of his venerable master, Aristotle continued to study and investigate the nature and principles of the world and later secured employment in the court of King Philip of Macedon as a private tutor to the young prince Alexander in 343 BC. After several years in northern Greece, Aristotle moved back to Athens in 335 BC and founded a rival school to the Academy, the Lyceum, where he taught and developed his own systematic worldview and approach to investigating the world.[3] In contrast to Plato's output, Aristotle's corpus can be characterized as more systematic, due to the sheer size of his surviving works, and simultaneously frustrating and terse to read, because parts of his extant works are likely compiled drafts or his own lecture notes, never intended to be published for a lay audience.[4]

Although Plato is most commonly noted and remembered for his magnum opus, the *Republic*, a work which explores the nature of justice and the constitution of the human soul, developed via

[1] Plato. 2004. *The Republic.* Translated by C.D.C Reeve. Indianapolis / Cambridge: Hackett Publishing Company, Inc. See the introduction of his translation by Reeve (ix-x).
[2] Ibid. x.
[3] Shields, Christopher. 2023. "Aristotle." Vers. Winter 2023. The Stanford Encyclopedia of Philosophy. Edited by Edward N. Zalta & Uri Nodelman. https://plato.stanford.edu/entries/aristotle/. Section 1. Aristotle's Life.
[4] Shields 2023, Section 2. The Aristotelian Corpus: Character and Primary Divisions.

an extended political analysis of the just city, the focus of my thesis is Plato's briefer work of natural philosophy, the grand cosmogony and theogony, the *Timaeus*.[5] I study its account of the nature of the world, space, the four elements, and the reception of these concepts by Aristotle. It is best to begin any account of a thing at its natural beginning. Thus, I present a brief summary of the *Timaeus* to help situate the reader.[6]

Plato's Cosmogony: A Brief Summary of the *Timaeus*

In Plato's text *Timaeus*, the eponymous speaker presents a grand cosmogony,[7] a "likely account"[8] of the origin, design, and construction of the perceptible, ordered cosmos. The account begins with its initial reasoned design and construction by a divine craftsman, the origins of the four classical elements and common worldly materials,[9] and the nature of sense perception and the physiology of the human body,[10] and it ends with the creation of mankind and the myriad of lifeforms on Earth.[11] In the beginning, the divine craftsman, or Demiurge,[12] encountered chaotic elemental stuff and sought to improve it. So it reasoned and designed our universe to be a living organism with an intellect, soul, and body. The world-soul is composed of numerical proportions of metaphysical entities of the Same, the Different, and Being, while the spherical body is composed of the four elements of fire, earth, water, and air.[13] The Demiurge proceeds to set the

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[5] Zeyl, Donald, and Barbara Sattler. 2022. "Plato's *Timaeus*". Stanford Encyclopedia of Philosophy. May 13. Accessed March 28, 2023. https://plato.stanford.edu/entries/plato-timaeus/ . Section 7 – Teleology.
[6] Quotations and paraphrases of *Timaeus* are from Zeyl, Donald J, trans. 2000. *Timaeus*. Indianapolis and Cambridge: Hackett Publishing Company, Inc. Any modifications by me are noted in the footnote citations with square brackets.
[7] A theogony is an account of the origins of a god or divinity. When Timaeus concludes his speech, he refers to our universe as a "visible living thing containing visible ones, a perceptible god" (*Timaeus* 92c).
[8] The cosmology is characterized as a likely account by Timaeus in the metaphysical prologue of *Timaeus* 28c-29d. Explicit self-descriptions of the text as "likely account" are stated at multiple points: (*Timaeus* 30c, 48d-48e, 53d, 55d, 56a-56b, 56d, 57d, 59c, 72d, 90e). One variation on the phrase 'likely' is "likely story" at *Timaeus* 68d.
[9] Plato, *Timaeus* 47e-61d.
[10] Ibid. 61e-90d.
[11] The creation of air-borne, land-walking, and aquatic-dwelling creatures is described in Plato, *Timaeus* 90e-92c. Note that a brief mention of animal-life is given earlier at *Timaeus* 42c and later plant-life at Plato, *Timaeus* 77-77b.
[12] "So, whenever the craftsman [δημιουργός] looks at what is always unchanging" (Plato, *Timaeus* 28a, translation modified from Zeyl).
[13] Plato, *Timaeus* 29d-37a.

seven classical planets (the Sun, Moon, Mercury, Venus, Mars, Jupiter, and Saturn) and the stars of the firmament into motion around the stationary Earth, which stands still at the centre of the spherical universe. As the final act of this great work, the creator made the traditional Greek gods, the Homeric and Hesiodic gods up from the generations of Gaia and Ouranos down to Zeus and Hera and the Olympian couple's progeny. The craftsman orders these younger gods to finish the construction of the universe by making mortal lifeforms to inhabit the cosmos as the final adornments of creation.[14]

However, following this dazzling account of creation, Timaeus suddenly interrupts and states that most of what he has previously presented is only "what has been crafted by Intellect (nous). But I [Timaeus] need to match this account by providing a comparable one concerning the things that have come about by Necessity (anankē)."[15] He explains that "this ordered world is of mixed birth: [such that] it is the offspring of a union of Necessity and Intellect",[16] such that the account of the cosmos must be modified to account for the role and influence of Necessity. Thus, he introduces a 'third kind', a third metaphysical category or entity, which is distinct from intelligible unchanging Being and sensible ever-changing Becoming.[17] He states that the third kind "is a receptacle of all becoming – its wetnurse, as it were."[18] What follows is a terse discussion of the nature and role of the Receptacle[19] via various analogies with qualities of gold, perfume, and soft impressionable materials.[20] He invites the reader to question and refine the use of language in

[14] Plato, *Timaeus* 37d-47d.
[15] Ibid. 47e, translation modified from Zeyl.
[16] Ibid. 48a, translation modified from Zeyl.
[17] In *Timaeus* 27c-29d, Timaeus distinguishes between two metaphysical categories: Being and Becoming. Being is what is eternal, never changes, and is. Becoming is what comes to be, passes away, and never really is. It is only in the later section of *Timaeus* 51c-51e that he explicitly refers to eternal Being as the Platonic 'Forms'.
[18] Plato, *Timaeus* 49a.
[19] Henceforth, I use the term 'Receptacle' as the name of Plato's third kind.
[20] Plato, *Timaeus* 50a-50e.

how one names and identifies the 'this-ness' and 'what is such-ness'[21] of the commonly perceived sensible elements of water, earth, air, and fire.[22] It is within this section that the fundamental nature of the four elements is intimately tied to (and framed with) the metaphysical nature and function of the Receptible along with Being and Becoming.

Following the extended metaphysical account of the Receptacle and its connection to the other two metaphysical kinds, Timaeus presents an explicit geometric construction of the four elements of fire, earth, water, and air. The elements are cast into the form of four of the five Platonic solids[23]: fire to the tetrahedron, earth to the cube, water to the icosahedron, and air to the octahedron. Yet, these solids are themselves composed of even smaller pieces. Individual solids of the elements of fire, water, and air have equilateral triangles as their faces. Furthermore, each of these faces are themselves composed of six right-angled scalene triangles. Meanwhile, each face of a cubic solid of earth element is itself made from four right-angled isosceles triangles.[24] Thus, the four elements are rooted in the geometry of the two basic triangles of the right-angled scalene and right-angled isosceles triangle.

Yet, this second beginning with its curt metaphysical-epistemological discussion and the seemingly sudden turn to geometry has generated countless interpretive questions and puzzles. These questions have ranged from the role of this section with respect to the earlier parts of the *Timaeus* crafted by Intellect[25], and deeper questions about the text's relationship to the wider Platonic corpus and Plato's philosophical system.[26] Questions about the geometry section have

[21] Ibid. 49b-50a.
[22] Ibid. 49b-53b.
[23] The fifth Platonic solid is the dodecahedron, which has twelve pentagon faces.
[24] Plato, *Timaeus* 54a-55c.
[25] The earlier section, *Timaeus* 29e-47e, is described as the account crafted by Intellect at *Timaeus* 47e-48a.
[26] Cherniss, Harold. 1957. *The Relation of the Timaeus to Plato's Later Dialogues*. American Journal of Philology 78 (3): 225-266. Cherniss analyses how the *Timaeus* relates to Plato's other major texts like the *Republic*, *Parmenides*, *Theaetetus*, and *Laws*.

ranged greatly from the grounds for this geometric construction of elements, how the incredible diversity of qualities and materials of the universe are generated from the two basic triangles[27], whether the geometric formulation of elements is a type of atomic theory,[28] the appropriateness of applying the term atomism to Plato's account in the *Timaeus*,[29] whether there are an infinite number of basic triangles,[30] and why the fifth Platonic solid of the dodecahedron is not used as an element's solid and used to delineate or 'embroider' the universe.[31]

The questions about the nature and role of the Receptacle are no less puzzling and greatly vary too. They span from Matthew Gorey's[32] proposal that the initial pre-cosmic state of the Receptacle is Plato's "tendentious caricature of a materialist cosmos"[33], Federico Petrucci's[34] analysis of the relationship of the pre-cosmic Receptacle to intelligible Being and how the Receptacle might participate in itself intelligible Platonic Being, Gregory Vlastos'[35] investigation into whether the disorderly motion in the pre-cosmic Receptacle is intended to be a literal description of the early state of the universe, the potential role of the disorderly motion in (and of)

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[27] Brisson, Luc, and Salomon Ofman. 2020. "The Two-Triangle Universe of Plato's Timaeus and the In(de)finite Diversity of the Universe." Apeiron 54 (4): 500-516. They propose a new method of constructing all grades of the two basic triangles which constitute the four elements.

[28] Lloyd, D. Robert. 2007. "The Chemistry of Platonic Triangles: Problems in the Interpretation of the *Timaeus*." *HYLE – International Journal for Philosophy of Chemistry* 13 (2): 102-106. Lloyd argues that there are a finite number of basic triangles that compose the four elements. Also see: Vlastos, Gregory. 1981. "Plato's Supposed Theory of Irregular Atomic Figures - Chapter 15." in *Platonic Studies*. Princeton: Princeton University Press: 366-373. Vlastos criticizes Cornford's proposal that the description of smell in the later sections of the Timaeus entails irregular solids.

[29] Brisson, Luc, and Salomon Ofman. 2020. "The mathematical anti-atomism of Plato's *Timaeus*." *Ancient Philosophy* 42 (1): 1-28. Brisson and Ofman (2020, 19-24) argues that characterizing Plato as an atomist is frequently an anachronism and that scholars ought be careful in how they define atoms before judging Plato's account of the elements.

[30] Visintainer, John R. 1998. "A Potential Infinity of Triangle Types - On the Chemistry of Plato's Timaeus." *Hyle - International Journal for Philosophy of Chemistry* 4 (2): 117-128. Visintainer (1998, 199-127) argues, contra (Lloyd 2007, 102), that there is potentially an infinite number of basic triangles, but in actuality there is some smallest triangle, which makes Plato a kind of atomist.

[31] Kotrč, Ronald F. 1981. "The Dodecahedron in Plato's "*Timaeus*"." *Rheinisches Museum für Philologie* 124 (3/4): 212-222. Kotrč analyzes the specific verbal construction of the embroidering of the cosmos in the dodecahedron in light of the wider geometric nature of the elements.

[32] Gorey, Matthew M. 2018. "Atomism and the Receptacle in Plato's *Timaeus*." *Phoenix* 72 (1/2): 105-118.

[33] Gorey2018, 105-106.

[34] Petrucci, Federico M. 2023. "On Plato's Precosmos (*Ti.* 52d2-53c3)." Elenchos 44 (1): 45-51.

[35] Vlastos, Gregory. 1939. "The Disorderly Motion in the *Timaios*." *The Classical Quarterly* 33 (2): 73-77.

the Receptacle in the providential construction of the universe,[36] the mystery of why the Receptacle is no longer referenced after the geometric section,[37] if the geometric section is intended to be a wholly new theory or even a radical revision of the Receptacle,[38] how the phenomena of the four elements are supposed to exist in the Receptacle in light of the controversial passage of *Timaeus* 49a-50a,[39] how to properly translate particular lines within the controversial passage concerning the proper way to discuss the phenomena of elements in the Receptacle,[40] how the elemental bodies are related to both the Receptacle and their geometric solids,[41] and whether the Receptacle is Plato's basis for his account of sensible phenomena and change in the universe.[42] As this short list show, even this small section of Plato's treatise on natural philosophy can generate an unlimited number of interpretative puzzles and wonder.

Thesis Overview

I present a non-Aristotelian study of the *Timaeus* and I argue that the *Timaeus* presents an account of Platonic compounds (or elemental bodies). Platonic compounds are constituted by three parts: the Receptacle (as an underlying matter or substratum), Platonic Becoming, and images of intelligible Platonic Being. Furthermore, I argue that the Receptacle is space itself and that Platonic

[36] Maso, Stefano. 2018. "Providential Disorder in Plato's *Timaeus*?" *Peitho / Examina Antiqua* 9 (1): 37-52. Maso proposes that the disorderly pre-cosmic state of the Receptacle is part of a wider demonstration of the role of teleological providence in creating our cosmos. A similar argument is given by Jelinek, Elizabeth. 2011. "Pre-Cosmic Necessity in Plato's Timaeus." *Apeiron* 44 (3): 287-291.
[37] Gregory, Andrew. 2003. "Aristotle and Some of His Commentators On The "*Timaeus*" Receptacle ." *Bulletin of the Institute of Classical Studies - Supplement* 78: 33-34.
[38] Gregory 2003, 35.
[39] Buckels, Christopher. 2016. "Making Room for Particulars: Plato's Receptacle as Space, Not Substratum." *Apeiron* 49 (3): 305-306. Also see Zeyl, Donald J, trans. 2000. *Timaeus*. Indianapolis and Cambridge: Hackett Publishing Company Inc, lvi-lix.
[40] Lee, Edward N. 1967. "On Plato's *Timaeus*, 49D4-E7." *The American Journal of Philology* 88 (1): 2-12. Lee gives a line-by-line and word-by-word analysis of the Greek text and argues that Plato clearly conveys his intent of how to strictly and careful analyse the ontological status of referents in common language as a precursor to defining the Receptacle and its relationship to the four elements.
[41] Krása, Ondřej. 2021. "Bodies and Space in the *Timaeus*" in *Plato's Timaeus - Proceedings of the Tenth Symposium Platonicum Pragense*, edited by Chad Jorgenso, Filip Karfík and Štěpán Špinka, 131–148. Brill. Krása (2021, 133-140) argues that the geometric construction of elements is itself a type of modification of space, which Krása identifies as the Receptacle.
[42] Gregory 2003, 37.

space is the Platonic matter of Platonic compounds. Based on my account of Platonic compounds and Platonic 'matter-space', I argue that the Platonic account of the elemental bodies prefigures Aristotelian hylomorphism. The Receptacle is an Aristotelian prime matter and the images of Platonic Being are Aristotelian forms. However, since Plato and Aristotle have starkly diverging metaphysical accounts of change and Becoming, Platonic Becoming lacks a clear counterpart in Aristotelian natural philosophy.

In this thesis, I analyse Plato's natural philosophy: the nature of the Receptacle, the nature of space, and the four elements of Greek antiquity (fire, air, water, and earth), on Plato's own terms as expressed within *Timaeus*. Furthermore, I compare Plato's account with Aristotle's natural philosophy of the nature of space, the four elements, and the Aristotelian conception of matter. I bring together and compare Plato and Aristotle's perspectives for four reasons. One, the nature of the Receptacle and its relation to Plato's account of both the four elements and space is controversial, as seen in the brief overview of interpretive questions given above.[43] Two, as Andrew Gregory notes, "Aristotle and some of his commentators have some interesting and significant things to say about the receptacle"[44] which may clarify the nature and function of the Receptacle in Plato's wider natural philosophy. Third, since it "is unclear whether the receptacle is supposed to be matter, or whether it is supposed to be space, or whether it is in some way both matter and space",[45] determining the nature and function of the Receptacle and subsequent 'geometric construction' passage would clarify a major early account of matter and/or space. In turn, clarifying Plato's account of matter and/or space may clarify his metaphysical distinction between the Platonic Forms and the sensible world. Four, since Aristotle was Plato's student,

[43] Ibid. 29.
[44] Ibid.
[45] Ibid.

Aristotle and his own comments on Plato's natural philosophy are situated in the same historical and cultural context. This historical and cultural position allows Aristotle to provide historically and culturally informed insights into Plato's thoughts and can potentially elucidate the accounts and subtler details of the Receptacle in the *Timaeus*.

Thesis Roadmap

In the first chapter, I review relevant sections of Aristotle's natural philosophy and his sparse comments on his master's work of natural philosophy, the *Timaeus*. Also, I delve into the wider scholarship about the Receptacle and the interpretative questions of how Aristotle characterizes and critiques Plato's Receptacle and how Plato describes various entities which Aristotle calls matter and substance. The first chapter provides the background knowledge of Aristotle (and context for) my later arguments and comparisons between Plato and Aristotle. In the second chapter, I argue for my interpretation of the origin, function, and character of the Receptacle, the Receptacle's relationship to the four elements, the identification of the Receptacle as space, and my characterization of 'Platonic compounds'. In the last and third chapter, having established both Plato and Aristotle's conceptions of space, matter, and the four elements, I compare and contrast their systems in light of my analysis of the *Timaeus* and I show the how the account of Platonic compounds prefigures Aristotelian hylomorphism and the fundamental differences between Plato and Aristotle's natural philosophies of Becoming and change.

Chapter 1 – Aristotle – The Reception of the Receptacle

In this chapter, I begin by presenting Aristotle's comments and reception of Plato's Receptacle and his brief remarks on the nature of space and matter in *Timaeus*. Next, I situate Aristotle's critiques by giving a brief overview of his natural philosophy: his conception of substance, matter, space, and how he understands the relationship between matter and space. Last, I present an analysis of Aristotle's critique of Plato's *Timaeus* and several major interpretative questions and views about the Receptacle, how it connects with the geometric construction of the four elements,[46] and whether Plato has an account of matter. As this overview of the views of Aristotle and later scholars will show, Plato presents an account of the nature of the four elements, however Plato's underlying ontology of the 'substance' or 'matter' for the four elements is disputed.[47]

Section 1.1 – Aristotle's Commentary on Plato's *Timaeus*

In his major works on natural philosophy,[48] Aristotle often prefaces his account of the natural world by surveying, commenting on, and briefly arguing against the views of his predecessors. Plato's natural philosophy, as expressed in the *Timaeus*, is referenced multiple times in Aristotle's major works: *Physics*, *On the Heavens*, and *On Generation & Corruption*.[49] Aristotle reports and disagrees with what he considers to be Plato's account of matter and space in the

[46] I refer to the 'geometric construction' of the four elements given at *Timaeus* 53c-54d.
[47] Riel, Gerd Van. 2021. "Matter Doesn't Matter: On the Status of Bodies in the *Timaeus* (30a–32b and 53c–61c)" In *Plato's Timaeus*, edited by Chad Jorgenson, Filip Karfík and Štěpán Špinka, 169–186. Brill. Riel proposes that Plato does not give an account of matter in the *Timaeus* and that Plato did not consider there to be any need to give an account of matter.
[48] Quotations and paraphrases of Aristotle's philosophy are from: Aristotle. 1984. *The Complete Works of Aristotle - The Revised Oxford Translation*. Edited by Jonathan Barnes. 2 vols. Princeton, New Jersey: Princeton University Press. I cite Aristotle's works as: *Text* book.chapter, line.
[49] The *Timaeus* is referenced twice in quick succession in *Physics*, six times in *On the Heavens*, and four times in *On Generation & Corruption.* The specific aspect of the *Timaeus* being reviewed and critiqued varies in each instance. The two references in *Physics* are at *Physics* 4.2, 209b11-209b16 and *Physics* 4.2, 209b32-210a1. The six references *in On the Heavens* are *On the Heavens* 1.10, 280a24-280a33; 2.13, 293b17-293b31; 3.1, 299b24-300a19; 3.2, 300b9-300b31; 3.8, 306b3-306b29, and *On the Heavens* 4.2, 308a34-308b28. The four references in *On Generation & Corruption* are *On Generation & Corruption* 1.2, 315b25-315b30; 1.8, 325b12-325b33; 2.1, 329a5-329a24l 2.5, 332a27-332b4.

Timaeus. In Book IV of *Physics*, he discusses the nature of space and place and he claims that "Plato in the Timaeus says that matter and space are the same; for the 'participant' and space are identical."[50] Aristotle explains that he reports Plato's view, because Plato was distinct from the other philosophers whom Aristotle knew, in that Plato presented an account of space in the *Timaeus*. In Book 8 of *On the Heavens*, he argues for why the substratum of matter must be formless and unshapen and notes that "or thus the 'all-receptive', as we read in the Timaeus, will be best for modelling the underlying nature of matter".[51] This claim of a substratum of matter is paralleled in the opening of Book 2 of *On Generation & Corruption*. Here Aristotle claims Plato presented a vague conception of the substratum of the four elements and that Plato "has not stated clearly whether his 'Omnirecipient' exists in separation from the elements; nor does he make any use of it. He says, indeed, that it is a substratum prior to the so-called elements—underlying them, as gold underlies the things that are fashioned of gold.".[52] Thus far, Aristotle has claimed that Plato presents some account of the substratum of matter related to a thing called the 'all-receptive' or the 'omnirecipient'. Based on Aristotle's descriptions and the choice of name in the original Greek, the two terms of 'all-receptive' and 'omnirecipient' refer to the Receptacle.[53] Taking together his testimony in *Physics*, *On the Heavens,* and *On Generation & Corruption*, Aristotle identifies Plato's Receptacle as both space and matter! Aristotle testifies to another property of the Receptacle in Book 1 of *On Generation & Corruption.* He claims that Plato is an atomist like Leucippus. Leucippus proposes that the four elements are composed of an unlimited number of three-dimensional solids as the atomic pieces of the elements. But Plato's basic indivisible atoms

[50] Aristotle, *Physics* 4.2, 209b11-209b16.
[51] Aristotle, *On the Heavens* 3.8, 306b3-306b29.
[52] Aristotle, *On Generation & Corruption* 2.1, 329a5-329a24.
[53] Keyt, David. 1961. "Aristotle on Plato's Receptacle." *The American Journal of Philology*, 82 (3): 290-300. Keyt (1961, 291-296) makes this connection based on the Greek text.

of the four elements are two-dimensional figures, planes, of some limited number.[54] In summary, Aristotle ascribes to his old master Plato the following view: matter is space while simultaneously matter (the underlying part of the four elements of fire, air, water, and earth) is fundamentally composed of atomic two-dimensional geometric figures. Yet still, Plato purportedly thinks that the substratum of matter (which simply is space) is the all-receptive Receptacle. Overall, I think that Aristotle ascribe a highly bizarre and chimeric view of space and matter to his teacher which warrants strong skepticism and doubt. I call this view 'bizarre and chimeric' for two reasons. First, it is very unclear what it would mean for the underlying parts of the four elements to be made of two-dimensional figures, while simultaneously accepting that matter is space. My initial naïve view is that matter and space are different things. I think of matter as something that resides inside (and is separate from) space. Second, I think it conceptually incoherent to suggest that space is composed of two-dimensional geometric figures because the world appears to have three-dimensional objects.

Aristotle's judgements warrant strong skepticism for two related reasons. First, Aristotle is reporting and commenting on Plato's natural philosophy in the context of explaining his own natural philosophy of space and matter. Second, the Aristotle's testimony paints his teacher as proposing a highly unusual union of matter, space, and atomism. Overall, I think that by reviewing Aristotle's comments with his own principles in mind, it is possible to judge the veracity and fairness of Aristotle's comments on Plato. Furthermore, Aristotle's characterization provide specific points for careful analysis of what Plato means. These points raise the question of how often one should rely on a later commentary of a philosophical work and demonstrate the need to tackle philosophers on their own terms, when possible, in order to clearly and fairly judge them.

[54] Aristotle, *On Generation & Corruption* 1.8, 315b25-315b30.

In the context of my thesis, I will present my understanding of the Timaeus on Plato's own terms and later incorporate Aristotle's comments. Thus, in preparation for my final analysis, in the next section, I briefly review the major parts of Aristotle's natural philosophy of substance, matter, and space. This will clarify my own stance on Plato's natural philosophy and my own judgement of how Aristotle characterizes Plato's natural philosophy.

Section 1.2 – Aristotle's Metaphysics

Aristotle's conception of matter and the four elements grows out of his wider metaphysics. First, I explain his theory of the four causes, where two of his causes, the material and formal cause, are the primary causes of particular things and objects in the world. Second, I review his definition of matter and substance to give the deeper context for what he thinks matter is. Third, I review his account of the four elements of fire, air, water, and earth. Aristotle's account of the four elements and how they change relies on his account of material and formal causes, as well as his definition of matter and substance. After this exposition of Aristotle's conception of matter and the four elements, I review his concept of space, which is tied to his conception of the bodies of the four elements.

Aristotle's Four Causes

In Book 1 of *Metaphysics*, Aristotle outlines his philosophical inquiries and he frames the investigation of the world in terms of the 'why' of particulars and universals.[55] He categorizes all causes in one of four causes: the formal cause, material cause, the efficient cause, and the teleological cause.[56] [57]The formal cause is the form or pattern of a thing and parts of a formula. The material cause is the immanent material of something like bronze or silver. The efficient cause

[55] Aristotle, *Metaphysics* 1.1-1.2.
[56] Falcon, Andrea. 2023. "Aristotle on Causality". Stanford Encyclopedia of Philosophy. March 7. Accessed July 21, 2024. https://plato.stanford.edu/entries/aristotle-causality/, Section 2. The Four Causes.
[57] Aristotle, *Metaphysics*. 1.3, 983a24-983b1.

is the origin of a change of property or the prevention of a change in property.[58] The teleological cause is "that for the sake of which a thing is".[59] The formal cause is conceptually noteworthy because as a pattern, it is "the formula of the essence and the classes which include this… and the parts of the formula"[60]. Aristotle gives the example of how the ratio of 2:1 is the formal cause of the musical octave. Based on this, I take formula and form to mean the arrangement and component parts of a thing. A formal cause specifies the particular parts and their necessary relationship, ordering, or arrangement, such that a formal cause is a formula. In the case of musical intervals, the formal cause of an octave interval is that one tone's pitch is double the pitch of the other tone.[61] The efficient cause, or moving cause, is the source of a qualitive change, like change in composition or arrangement of matter, or quantitative change, such as a child throwing a peddle and setting it into motion. The teleological cause (in more intelligible English) has two kinds. One is the teleological cause as the goal or intent of a deliberative agent who reasons towards some final state of affairs. Two, the teleological cause as the final state of affairs which different processes and components come together and necessarily produce as some final end. The final state is the actual function or state of affairs that are the final result of the processes. An example of the teleological cause in nature is the arrangement and shape of teeth in animals being fitting to the function of biting and chewing food.[62] In other words, the teeth are for the sake of biting and chewing food.

[58] Ibid. 5.2, 1013a24-1013b3.
[59] Ibid.
[60] Ibid. 5.2, 1013a25.
[61] Ainsworth, Thomas. 2020. "Form vs. Matter." The Stanford Encyclopedia of Philosophy. Edited by Edward N. Zalta. https://plato.stanford.edu/entries/form-matter/, Section 1. Matter and form introduced.
[62] Aristotle, *Physics* 2.8, 198b17-198b33.

Aristotle's Conception of Substance & Matter

In Book 1 of *Categories*, Aristotle explains his theory of particular objects and the nature of qualities. He defines a substance as that which "most strictly, primarily, and most of all—is that which is neither said of a subject nor in a subject".[63] A substance is a specific and particular entity or thing, such as an individual man or an individual horse, which might be stated as having some quality, property, or attribute.[64,65] Aristotle distinguishes between accidental and substantial changes. An accidental change is a change in a non-essential property or trait of a particular object. An accidental change does not fundamentally change what a thing is. For example, a man is either musical and able to play the flute or he is not. In either case, an unmusical man gaining the ability to play the flute does not change his substance of being a man.[66] A substantial change is a change where the specific substance or thing comes into being or passes away. One example of a substantial change is when a person dies and rots away. The substance of a human being was there and, after death and rotting, is gone. Aristotle defines a substratum as "that [upon] which other things are predicated, while it is itself not predicated of anything else".[67] A substratum is independent of predicates, the statements and claims of some quality or attribute of some particular thing, and a substratum enables other things to be predicated. In Book 1 of *Physics*, Aristotle defines matter as "the primary substratum of each thing, from which it comes to be, and which persists in the result, not accidentally".[68] Aristotelian matter is the constant underlying aspect of a thing which endures through various forms of accidental, i.e. non-substantial changes of some substance. Note that for Aristotle there are degrees of the matter of a substance, such that one may

[63] Aristotle, *Categories* 1.5, 2a13-2a18.
[64] Gill, Mary Louise. 1989. *Aristotle on Substance - The Paradox of Unity.* Princeton, New Jersey: Princeton University Press, 31-32.
[65] Ainsworth 2020, Section 1. Matter and form introduced
[66] Aristotle, *Physics* 1.7, 189b34-190a4.
[67] Aristotle, *Metaphysics* 7.3, 1028b35.
[68] Aristotle, *Physics* 1.9, 192a25-192a34.

speak of the matter of some specific constituent matter.[69] For example, the matter of a house is bricks, planks of wood, and plaster and its form is the specific arrangement of the materials such that the house actually stands. An accidental change for a house is to be painted blue, red, green or any other colour. The house undergoes a substantial change and is destroyed if one disassembles and separates these three constituent parts into three homogenous piles. Next, one may further analyse the matter (or underlying substratum) of each of the materials of bricks, wood, and plaster into their component Aristotelian elements of earth, water, fire, and air.

Aristotle's Conception of The Four Elements & 'Prime Matter'

In Book 1 of *Physics*, Aristotle says that there is an underlying matter, or substratum, for all perceptible bodies, which in turn are always bound up with the two contrarieties.[70] In Book 2 of *On Generation & Corruption*, he explains the nature of perceptible bodies, the four elements of fire, air, water, and earth, by bringing together his conception of the contrarieties with this underlying elemental matter. He says that "there is a matter of the perceptible bodies (a matter out of which the so-called elements come-to-be), it has no separate existence, but is always bound up with a contrariety"[71] He defines perceptible bodies as objects which are grasped by the sense of touch and tangible qualities.[72] The four primary contrarieties are hot, cold, wet, and dry, which form two opposing pairs and these four qualities have an underlying prime matter.[73] Aristotle explains that the first pair of qualities (hot-cold) is the power to divide and disassociate (hotness) and to coalesce and unite things (coldness). The second pair of qualities (wet-dry) are the susceptibilities of being moulded and adapted to some shape (wetness) and of being determinable in some limit or shape (dryness). The qualities of the hardness and softness of materials derives

[69] Gill 1989, 120-126.
[70] Aristotle, *Physics* 1.9, 325a25-329b2.
[71] Aristotle, *On Generation & Corruption* 2.1, 329a25-329b2.
[72] Ibid. 2.2, 329b6-330a29.
[73] Gill 1989, 44-45.

directly from the qualities of wetness, as moist things lack definite shapes, and from the dryness, since dry things are solid and do not yield under external force.[74] From these primary contrarieties are the four Aristotelian sublunar elements of fire, air, water, and earth.[75] Each of the four elements consists of two qualities: one quality from hot-cold and another quality from wet-dry. Air has hot and wet, fire has hot and dry, water has cold and wet, and earth has cold and dry.[76] A corollary of this system is that an element cannot have opposite contrarieties at the same time. Such a hypothetical element is both conceptually incoherent and physically impossible.[77] From this system of binary contraries, Aristotle argues that there must be only four elements and not an infinite number.[78] He defends this claim by pointing out that, if there were infinite elements, that entails an infinite number of contrasting contrarieties to distinguish every single elements. This would suggest every element is defined by an infinite number of contrarieties, such that the change of one element to another would require an infinite number of changes in their contrarieties to come into being. Aristotle also points out that the four elements are observed to cyclically transform into each other, such as air compressing into clouds of rain, earthen wood combusting into fire, and so forth.[79] Thus, he concludes that there are only the four elements as defined from

[74] Ibid. 329b6-330a29. Aristotle's account bears an uncanny resemblance to the Yin-Yang metaphysics initially conceived by the tenth century Chinese philosopher Zhou Dun Yi (周敦頤) and later developed by the Neo-Confucian philosopher Zhu Xi (朱熹) in the eleventh century. In this Chinese system, all sensible binary phenomenological properties are changes and variations between the fundamental metaphysical essences of Yin and Yang, such that the five Chinese elements (fire, metal, wood, water, and earth) undergo constant inter-transformations into each other as they take on different degrees of Yin-Yang properties. The susceptibility of qualitative change (passivity and rest) and the power of qualitative change (activity and motion) are Yin and Yang, respectively. Gallinaro, Ludovica. 2017. "Neo-Confucianism and Zhou Dunyi's Philosophy." *Philosophy Compass* 12 (1): 1-11.

[75] Aristotle divides the cosmos into a sublunary and superlunar realm, where everything under the orbit of the Moon is made of the four elements, while the outer reaches of the universe are composed a quintessence, aether. See Aristotle *On the Heavens* 1.3, 270b1-270b25.

[76] Aristotle, *On Generation & Corruption* 2.3, 330a30-331a6.

[77] Gill 1989, 68-70.

[78] Wedin, Michael. 2013. "Aristotle on the Impossibility of Anaximander's apeiron: On Generation and Corruption, 332a20-25*." *Phronesis* 58: 17-31. Wedin gives an explicit reconstruction of Aristotle's argument against an infinity of elements and contrarieties, as well as why Anaximander's 'unbounded' is a conceptual and logical impossibility.

[79] Aristotle, *On Generation & Corruption* 2.5, 332b5-333a16.

the sensible and distinguishable qualities of the two contrarieties. In the traditional view of Aristotle,[80] following his definition of matter, the four elements are interpreted to have a "purely indeterminate substratum underlying all material composition and providing the ultimate potentiality for all material existence" [81] called prime matter. Prime matter is the ultimate substratum for all change of the two contrarieties and the very bottom of Aristotle's hierarchy of matter.[82] This prime matter exists eternally since if "it were capable of being created or destroyed, there would have to be some even lower matter to underlie those changes"[83]. Thus, the most basic parts of sensible elemental bodies, which materially constitute all sensible objects, in the Aristotelian system is prime matter and varying combinations of the contrarieties of hot-dry and wet-dry.

Aristotle's Hylomorphic Theory of Matter & Form

In Book 7 of *Metaphysics*, Aristotle explains how anything, which is produced by both human art or nature itself, is the result of the union of matter and form. Matter is some mixture of the four elements, having some finite volume, and is arranged in a particular form (structure or formula) to make something what it is. He gives the example of the bronze sphere, which is the union of the underlying bronze matter and the form of a geometric sphere.[84] Explicitly, he says that for any object, it "will always have to be divisible, and one part must be this and another that, I mean the one must be matter and the other form."[85]. In this bronze sphere example, the very idea of a bronze sphere requires the underlying matter of bronze plus its particular arrangement of its

[80] Graham explains why Aristotle's natural philosophy requires a prime matter, but ultimately produces a paradox within his system of change and matter. Graham, Daniel W. 1987. "The Paradox of Prime Matter." *Journal of the History of Philosophy* 25 (4): 475–90.
[81] Graham 1987, 475.
[82] Ainsworth 2020, Section 2. Prime matter.
[83] Ibid.
[84] See Gill 1989, 141-144, and Aristotle, *Metaphysics* 7.8.
[85] Aristotle, *Metaphysics* 7.8, 1033b20-1034a8.

bronze matter into a ball. Furthermore, as with my example of the deconstructed house, the metal of bronze can itself be decomposed into its more fundamental matter, namely some mixture of the four elements, though likely primarily earth given the hardness of metals. Aristotle also defines matter to be composed of bodies, divisible magnitudes with extension in all three dimensions of length, width, and depth.[86,87]. Thus, for Aristotle, all sensible things and objects in the world must be a combination of matter arranged in some form.[88]

Aristotle's Conception of Space

In Book 4 of *Physics,* Aristotle begins his inquiry into the nature of 'place'(τόπος) or 'space' (χώρα)[89] and his critique of void (κενόν). In his discussion concerning the nature of space, Aristotle initially uses the three terms ('place', 'space', and 'void') as synonyms for space and location, but he does clarify and give precise senses when he specifically mentions Plato's Receptacle and when he argues against the concept of void.[90] Aristotle introduces his conception of space or place by noting how everyone has the common-sense belief that anything that exists must be somewhere.[91] Space has three dimensions of length, breadth, and depth and also space is not a body.[92] As noted in the previous section, body refers to collections of elemental matter.[93] Aristotle states on the connection between space and matter that "everything that comes to be comes to be in something, and that in which the generation takes places must either be incorporeal or possess body"[94] The ever-changing four elements, and so their compounds like bronze, clouds, or humans, must be located in some place and that place is either incorporeal or possesses body. However, Aristotle

[86] Ibid. 3.5, 204b5-204b21.
[87] Aristotle, On the Heavens, 1.1, 268a1-268b10.
[88] Ainsworth 2020, Section 4. Matter-involving forms.
[89] χώρα is the precise Greek word used by Plato for the Receptacle.
[90] Keyt 1961, 291-293.
[91] Aristotle, *Physics* 4.1, 208a26-208a32.
[92] Ibid. 4.1, 209a5-209a7.
[93] Aristotle *On Generation & Corruption* 2.1, 329a25-329b2.
[94] Aristotle, *On the Heavens* 3.6, 305a15-20.

rejects the idea of place being a body as this would entail two bodies in the same place. He notes that if every place must have a place, then there is an infinite regress of a place for every place. [95] He rejects the infinite regress of unending places (in the case of place being a body) by distinguishing the vessel of a thing and the thing itself, since a "vessel is no part of what is in it".[96] Place is the vessel or container of each object and is coincident with the delineation and boundaries of particular objects.[97] Aristotle also explicitly rejects identifying matter nor form with space (or place), noting that as far as space is "separable from the thing, it is not the form; and in so far as it contains it, it is different from the matter".[98] Overall, Aristotle's conception of space (or place) can be summarized as the volumetric size, i.e. the magnitude, and the location of specific objects, or bodies, within the universe. In the final analysis, Aristotle posits the entire universe, 'the-all', as the ultimate vessel for everything that is and comes to be. He reiterates the idea that for something to exist, that thing must be located in some place, saying "what is somewhere is itself something, and there must be alongside it some other thing wherein it is and which contains it."[99] The final container is the entire universe itself and there are no things outside of the universe because that would be another way of saying that a thing or object does not exist. Space is co-extended with the universe.

A related concept that Aristotle tackles is the concept of void. In his preliminary analysis of void, he notes that a common view is that void is the same as place and a vessel for bodies.[100] Void is "thought to be place with nothing in it."[101] The common view is that void is the literal

[95] Ibid 4.1, 209a5-209a7.
[96] Aristotle, *Physics* 4.3, 210b23-210b30.
[97] Ibid. 4.4, 212a30-212a31.
[98] Ibid. 4.2, 209b30-209b31.
[99] Ibid. 4.5, 212b12-212b22.
[100] Ibid. 4.6, 213a11-213a19.
[101] Ibid. 4.7, 213b32-213b34.

emptiness and room that allows any motion of bodies and the elements to occur.[102] However, Aristotle notes, this common view of void is inconsistent because void is conceived of in relation to tangible objects and their weight.[103] He asks people who conceive of the void: "what would they say of an interval that has colour or sound—is it void or not?"[104] The concept of a void derived from tangibility of bodies and objects fails to account for light and sound being observed in ostensively prototypical causes of a void. Aristotle's point is that I might imagine a 'void' between my house and a nearby hill. However, would I be able to see the hill through the void? If I answered yes, then I have accepted that whatever causes vision travels though, and thereby occupies void. If I answer no, then I cannot explain how I can see through the void. Aristotle concludes that "it is plain that on this showing void does not exist, either unseparated or separated; for the void is meant to be, not body but rather an interval in body".[105] Void is not body, rather it is the interval or the specific space within demarcated particular bodies. With this general overview of Aristotle's natural philosophy concerning substance, matter, the four elements, and space, I turn to modern views of how Aristotle tackles Plato's views of matter and space.

Section 1.3 – Modern Interpretations – Claghorn's Analysis: Aristotle's Criticism of Plato's *'Timaeus'*

In his book *Aristotle's Criticism of Plato's 'Timaeus'*[106], George Claghorn presents a thematic and systematic analysis of (and comparison between) Aristotle's natural philosophy and the Plato's natural philosophy as presented within the *Timaeus*. He argues that by carefully studying how Aristotle comments and critiques Plato that "Aristotle largely agreed with Plato,

[102] Ibid. 4.6, 213a11-213a19.
[103] Ibid. 214a7-214a11.
[104] Aristotle, *Physics* 4.7, 214a7-214a11.
[105] Ibid. 214a17-214a26.
[106] Claghorn, George S. 1954. *Aristotle's Criticism of Plato's 'Timaeus'*. The Hague: Springer Dordrecht.

both in the principles and presuppositions of his natural science.".[107] In this section, I review two pertinent chapters of Claghorn's analysis for two reasons. First, it provides specific avenues of questions for understanding Plato's natural philosophy on his own terms, while acknowledging when and how Aristotle's views might shed some light on Plato's thought. Second, the points made by Claghorn are meant to further illustrate the rich interpretative landscape around Plato's Receptacle and his account of the four elements. In my own interpretation, I will draw on the observations and claims given by Claghorn. One claim of particular interest is his claim that Plato and Aristotle's views on space and 'matter' are in strong concordance. However, following this section on Claghorn, I provide the views of other scholars via Andrew Gregory who surveys Aristotle and commentators on Aristotle to gauge the general reception of Plato's *Timaeus*.

In his second chapter titled "Aristotle's Criticisms of the Receptacle",[108] he argues that Plato's Receptacle is Aristotelian prime matter. Claghorn notes four points of similarity between the two entities. First, the Receptacle and prime matter are types of non-beings. In Aristotle's philosophy, there is a difference between matter and privation. The generation and corruption of qualities may be described as coming out of that which has no being, such that Aristotelian matter is a non-being with respect to specific qualities. Meanwhile privation is the total lack of any qualities and the potential to receive or change qualities. Claghorn notes how both Aristotelian matter and Plato's Receptacle are instances of 'non-being' due to their status as the host of qualities that come to be and constantly pass away. In particular, the Receptacle is explicitly singled out as not being any sort of Platonic Form or Being.[109] Second, the Receptacle and prime matter are unintelligible, being difficult or impossible to grasp intellectually.[110] Third, both the Receptacle

[107] Claghorn 1954, 1-2.
[108] Ibid.5-19.
[109] Ibid. 9-10.
[110] Ibid. 10.

and prime matter "are filled with potencies".[111] The Receptacle has the ability to receive and express all sensible qualities, analogous to how Aristotle's prime matter has the power to be the underlying stuff for all coming-to-be and passing-away.[112] Last, "both were thought of as extended".[113] In the *Timaeus*, the Receptacle is identified as space and that everything which exists must be in space. Claghorn notes how the Receptacle, as space, accords with Aristotle's general conception of space and place, where place is "the position or location of the volume of a body"[114] of some body of the four elements within space. The deeper connection between the Receptacle and prime matter comes from how "each thing is made in matter in the sense that matter is a necessary constituent of surrounding bodies, which made place possible"[115]. Matter is a piece delineated in contrast to its surrounding neighbouring bodies. Meanwhile for the Receptacle, particular instances of the four elements are geometric demarcations within or precise limits of the Receptacle itself. In other words, the prime matter is like the Receptacle in how it "both expresses space and place and which makes their existence possible" as no object or thing in the universe can be said to exist without prime matter (the Receptacle).[116] Based on these four major points of agreement, Claghorn concludes that Aristotle properly and fairly understood his teacher's Receptacle and that Aristotelian prime matter is a modification and development of Plato's Receptacle.[117] I find Claghorn's conclusion to be incredible because he proposes that, despite the centuries of rivalry between Aristotelianism and Platonism, Aristotle is actually in deep agreement with Plato on two major aspect of natural metaphysics, the nature of matter and space. I reserve further analysis and comment until after reviewing Claghorn's third chapter.

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[111] Ibid. 11.
[112] Ibid. 11-12.
[113] Ibid. 13.
[114] Ibid. 14.
[115] Ibid. 17.
[116] Ibid. 19.
[117] Ibid.

In Claghorn's third chapter titled "Aristotle's Criticisms of the Simple Bodies"[118], he discusses how Aristotle critiques Plato's account of the simple bodies, the four elements of fire, air, water, and earth. He argues that in the geometric construction of the four elemental solids[119] the basic triangles are purely "objects of a rational and mathematical determination".[120] He notes that one formulation of Aristotle's conception of form and matter[121] is "that which contains or limits is form, and that which is limited is matter".[122] Since Plato constructs the four elements out of geometric and mathematical determination and Aristotle views all sensible things as the union of matter and form, where matter is limited and contained by form, then the two philosophers agree about the determinative and spatially limiting conception of the bodies of the four elements.[123] However, this similarity in describing the bodies of the four elements does not mean the two philosophers share the exact same view of the underlying substratum of the elements. Claghorn points out the starkest difference between their views is that for Plato, the sensible qualities of the elements derive from their underlying geometric properties, while Aristotle classifies the four elements via their perceptible (tactile) properties of hot-cold and dry-wet.[124] Aristotle's fundamental disagreement with the geometric construction is that for him, mathematics is an abstract science which begins with and "is based on the existence of bodies; bodies are not based on it.".[125] In the Aristotelian system, mathematical and geometric entities and formulations are only abstracts from particulars in the sensible observable world, not the reverse case of the sensible

[118] Ibid. 20-38.
[119] The geometric construction of the four elements is at: Plato, *Timaeus* 53c-56e.
[120] Claghorn 1954, 25.
[121] Here Claghorn cites Aristotle, *On the Heavens*, 293b13-293b16. He cites the English translation by J. L. Stocks which is the same translation of the works of Aristotle which I am using: Aristotle. 1984. *The Complete Works of Aristotle - The Revised Oxford Translation.* Edited by Jonathan Barnes.
[122] Claghorn 1954, 26.
[123] Ibid.
[124] Ibid. 31.
[125] Ibid.

world being built up from mathematics and geometry. Plato inverts the ontological priority of mathematics and the study of the sensible elemental bodies.

Aristotle's second disagreement with Plato is the fact that the element of earth is excluded from the inter-elemental cycle of transformation due to the earth element's unique geometric composition from a basic triangle that is different from the basic triangle which composes fire, air, and water.[126,127] Claghorn suggests that despite the fact that Plato's earth element does not inter-transform with fire, air, and water, the fundamental system of the elements is still unified in the same way as Aristotle's four elements inter-transform via changes in one or both of the contrarieties (hot-cold and dry-wet) in how within both systems "change can only be understood in terms of rational elements common to all"[128]. This rational element is the conceptually distinguished and underlying component of the two systems, whether it is Aristotle's prime matter or geometric delineations of the solids as the elements in the Receptacle.

A third issue Claghorn reports by Aristotle is that Plato's account of elemental stuff does not provide a detailed account of how compounds of materials are built up from the four elements. In my reading of *Timaeus* 59b-60e, Plato does report the dominant elemental composition of materials like gold, olive oil, wine, bones, hair, clay, and salt. But he fails to state what combinations or even arrangements of the four elements would produce such items.[129] Overall, Claghorn proposes that Aristotle fundamentally gives constructive criticism of Plato's system as both systems of elements agree that mathematical construction is not a kind of material construction, the sensible four elements are not themselves the basic parts of things, and that particular entities or objects have ontological meaning only if the object is delineated from its

[126] Ibid. 34-35.
[127] See the two types of triangles used for earth versus fire, air, and water at: Plato, *Timaeus* 54c-54d.
[128] Claghorn 1954, 35.
[129] Plato, *Timaeus* 59b-60e.

surrounds in some manner.[130] Claghorn ends this chapter of his analysis by claiming that "Aristotle is fully aware of the meaning of Plato's Receptacle, and is restating this in his own doctrine"[131] as supported by the common features outlined above. For just "as Plato found it necessary to attack the Physicists, Aristotle now seeks to put to rout the Pythagoreans",[132] in their excessive mathematical approach to Platonic elements whereby they conflate mathematics and material stuff. Here, by the term 'Physicists' Claghorn refers to the pre-Socratic Milesian philosophers of Thales, Anaximenes, Empedocles, Leucippus, and Democritus, who proposed various first principles for reality.[133] At end of his third chapter, Claghorn suggests that Aristotle "at the same time, was consciously defending the doctrine he had received from Plato".[134] Based on Claghorn's entire exposition and analysis, I take a stronger version of his case to be that Aristotle consciously defended his teacher's doctrines and attempted to refine, clarify, and improve them as much as possible. Thus, all the similarities and identities which Claghorn found are correct. But this does not identify Plato's natural philosophy with Aristotle's natural philosophy.

Despite the very straightforward and noteworthy textual evidence presented by Claghorn, I do not fully agree with his conclusion about the strong agreement between Aristotle and Plato. My primary issue is that Claghorn's comparative work does not delve into the metaphysical chasm between Plato and Aristotle: Plato's theory of the intelligible eternal Forms. Claghorn does discuss the Ideas in a later chapter on the nature of time[135] and occasionally discuss the Platonic Forms throughout his analysis, but otherwise he does not reckon with how the metaphysics of Plato and Aristotle are incompatible. The Platonic Forms in the *Timaeus* are eternal and cannot be in the

[130] Claghorn 1954, 38.
[131] Ibid. 37.
[132] Ibid. 38.
[133] Ibid. 122.
[134] Ibid. 38.
[135] Ibid. 84-97.

universe.[136] But for Aristotle, his 'forms' or formal causes are always coeval with his matter in the universe.[137] Due to this difference in basic metaphysics, I do not think Claghorn has given a solid case for the identification of the Receptacle with prime matter. I think he would still need to sort and classify where Platonic Forms stand in relation, whether by analogy or disanalogy, with Aristotle's metaphysical basics.

Furthermore, I propose that his reasoning in how he interprets the Aristotelian evidence is lacking in two ways. First, Claghorn uses the *Timaeus*, which exists as an entire complete treatise, and only the testimony via the various brief comments or digressions by Aristotle. Second, there is the possibility that Aristotle has taken his master's intellectual material and then sculpted and given it form, but that Aristotle's reconstitution has produced a genuinely related, but conceptually distinct doctrine of space and matter. Overall, I propose this is insufficient evidence for Claghorn's strong conclusion, that Aristotle so closely aligned with his teacher in the account of space and matter. I think the missing piece that would strengthen Claghorn's case is to incorporate the testimony of the 'excessively Pythagorean' Platonists, specifically the contemporaries of Aristotle, who would thereby provide a fuller picture of the general reception of the *Timaeus*, its interpretations, and even potential rebuttals against Aristotle in where he might have deviated from Plato's teachings. I also criticize Claghorn's conclusion in how it seems to be incongruent with Aristotle's intellectual career and Claghorn's own proposal that Aristotle sought to preserve Plato's teachings. Why would Aristotle found his own school of learning that operated in separation from Plato's original Academy if Aristotle really was "consciously defending the doctrine he had received from Plato"?[138] I suspect that Aristotle would have had better success in

[136] Plato, *Timaeus* 52a-52b.
[137] Aristotle *Metaphysics*. 7.8, 1033b20-1034a8.
[138] Claghorn 1954, 38.

preserving his dear master's doctrines by teaching and attempting reform within the Platonic Academy. He would have three useful tools to defend Plato's doctrines. Aristotle would have a Platonic education to justify his defense of Platonic doctrines and the intimate personal connection to philosophical peers (teachers and students alike) at the Academy to vouch for his character and good intent of preserving Plato's teachings.[139] However, to fully settle this matter would require historical evidence and testimony of why Aristotle separated from his old 'alma mater'. Such evidence would include the testimony of students who stayed in the Platonic Academy and how they understood, interpreted, and developed Plato's philosophy, which in turn would clarify Aristotle's position on the matters of space and matter within his own system of thought and that of Plato. Once again, I think Claghorn's conclusion does reveal subtle points of agreement between Plato and Aristotle, but it still requires more textual and historical evidence.

Section 1.4 – Modern Interpretations – Gregory's Analysis: Geometric Atomism

Now, I turn to a more recent study of how Aristotle approaches (and reproaches) Plato's teachings in the *Timaeus*, as well as later commentators on both Plato and Aristotle. In his study of Aristotle's commentary on the *Timaeus*, Andrew Gregory proposes that the nature of the Receptacle and its geometric elemental content can be elucidated with the aid of Aristotle and commentators of Aristotle.[140] He names Plato's geometric account of the four elements as 'geometric atomism' and he gives a lengthy analysis of potential solutions to reconciling the nature and characteristics of the Receptacle and geometric atomism.[141,142] Gregory says that by atom, he

[139] For the sake of argument, I can propose a hypothetical explanation of why there are no large extant classical analyses on the *Timaeus* from Aristotle. My hypothetical is that Aristotle wrote a full treatise with the 'correct' interpretation of the *Timaeus*, but it is now a lost work alongside his treatise on comedy and the lost Aristotelian dialogues. For more scholarly details on the status and history of the Aristotelian corpus at: Shields 2023, Section 2. The Aristotelian Corpus: Character and Primary Divisions.
[140] Gregory 2003, 29.
[141] Ibid 29-36.
[142] I will discuss Gregory's view in great detail in the later chapter focused on *Timaeus*.

means atom "in the modern sense".[143] Atoms are the basic indivisible particles that constituent all material and things in the world.[144] For my later analysis, I do not use the term 'geometric atomism' due to the conceptually loaded sense of the word 'atom'. Luc Brisson and Salomon Ofman[145] have argued that using the term 'atom' or 'atomism' in the context of Plato strongly risks, or even falls into, anachronisms because the sense of 'atom' by an author or commentator on Plato depends on the scientific accounts of matter and chemistry in their own time. Therefore, in my analysis I use the more neutral and descriptive term of the 'geometric construction' of the four elements.

In Gregory's analysis of the reception of the *Timaeus* by Aristotle, he remarks on how Aristotle characterizes Plato alongside atomists like Democritus and Leucippus in Book 1 of *On Generation & Corruption*. Gregory remarks that Aristotle's characterization of Plato reveals "a broader dispute between Plato and some of the Presocratics", like Democritus and Leucippus, in whether the cosmos is the result of accidents and motion of atoms or as the product of teleological design, which Plato proposes in form of the Demiurge's geometric construction of the four elements.[146] He notes how in Book 2 of *On Generation & Corruption,* Aristotle criticizes Plato for failing to use the all-receiving Receptacle after claiming that it is a substratum of matter. Yet, Gregory points out the oddness of Aristotle's remark because Plato stops referencing the Receptacle after introducing the geometric atomism, which Gregory proposes parallels the critique of Anaxagoras in Plato's *Phaedo* for introducing the entity of intelligence into the cosmos, but failing to assign it any causal function.[147] Gregory brings in the testimony of Philoponus, who wrote a commentary on Aristotle's text *On Generation & Corruption.* Philoponus defends Plato's

[143] Gregory 2003, 29.
[144] Although 'atom' has a strict technical sense of the composite of neutrons, protons, and electrons, I think it is clear that Gregory uses atom in its original Greek sense of the smallest piece of indivisible stuff.
[145] Brisson, Luc, and Salomon Ofman. 2020. "The mathematical anti-atomism of Plato's *Timaeus*." *Ancient Philosophy* 42 (1): 1-28.
[146] Ibid. 38-39.
[147] Ibid. 39-40.

geometric acumen and says that Plato does think that things that come to be, the phenomena of the four elements, have matter, revealing that for Philoponus, Plato's Receptacle is some sort of matter.[148] Gregory reports the views of another Greek thinker, Alexander of Aphrodisias, who argued that the two basic triangles are types of matter and not forms because Plato denies that the two triangles ever change into each other. Afterall, they are the fundamental basic units in Plato's geometric account of matter, which makes the underlying and basic matter of the elements.[149] Last, Gregory looks at a passage from Book 4 of *Physics*, where Aristotle says Plato identifies space with matter. Aristotle refers to matter as 'that which participates'. Gregory notes that Plato does not use the terms 'matter' nor 'participant' which means Aristotle is interpreting the intent of Plato without using words or terms that Plato himself said. Furthermore, Gregory notes the context of Book 4 of *Physics* is that Aristotle is discussing his own theory of space and place and that Aristotle states that Plato gives a consistent account of space and place, while critiquing Plato for being wrong for equating matter and space.[150] Overall, Gregory thinks that the comments of Aristotle, Alexander of Aphrodisias, and Philoponus reveals that, even in antiquity, there were disagreement and variations in how people interpreted the Receptacle and to Plato's geometric account of the four elements. Their overall testimony reveals a strong preference to critique the *Timaeus* in terms of the geometric atomism, while falling into puzzlement about how the Receptacle might constitute the underlying matter for the triangles.[151] Of note is that Aristotle does not speak much about the specific nature of the triangles and spends his time critiquing how they might constitute the

[148] Ibid. 41.
[149] Ibid. 41-42.
[150] Ibid. 43.
[151] Ibid. 46-47.

underlying matter of the four elements, which Gregory suggests signals Aristotle's principled rejection of the triangles. [152]

As seen in the analysis of Claghorn and survey of Gregory, Aristotle provides a rich starting ground for probing and investigating Plato's Receptacle, the geometric construction of the elements, and the connection between the two things. However, it is more prudent to seek out Platonic principles on Platonic terms and to develop an understanding of Plato without an excessive Aristotelian framing, while keeping in mind bewilderment of Aristotle and later scholars. Throughout the works of Claghorn, Gregory, Alexander of Aphrodisias, and Philoponus, the investigation of the Receptacle and Plato's account of the four elements was a quest for a Platonic account of matter and to frame the definition of matter in Aristotelian terms as the underlying substratum of change and phenomena. Therefore, the next chapter is devoted to a non-Aristotelian study of the *Timaeus* and my account of 'Platonic compounds', which will build towards a concluding evaluation and comparison of the natural philosophies concerning matter and space of both Plato and Aristotle.

[152] Ibid. 46-47.

Chapter 2 – Plato – The Receptacle, Becoming, and Platonic Compounds

Introduction

This chapter explores the nature and role of the Receptacle in *Timaeus* and its relationship with the Platonic account of the sensible four elements,[153] as described in the form of the geometric construction of the four elements. I answer three core questions: One, what is the Receptacle? Two, what is the account of four elements presented in the *Timaeus*? Three, what is the relationship between the Receptacle and four elements? Ultimately, I argue that the Receptacle is space and the Receptacle is not itself the elements.[154] I argue for a conception of Platonic compounds, where I distinguish between two types of Becoming, ordered or disordered Becoming. There are two varieties of Platonic compounds. One, there are disordered Platonic compounds, which are instances of disordered Becoming. Two, there are ordered Platonic compounds, which are the union of the Receptacle, disordered Becoming, and images of Being. The sensible ordered Platonic compounds of the current cosmos are generated from geometric and mathematical order being imposed on disordered Becoming. The geometric and mathematical proportionality of ordered Platonic compounds are an image or resemblance of intelligible Being produced via the geometric construction of the sensible four elements. Since Platonic compounds are fundamentally Becoming, both the ordered and disordered variety, Platonic compounds must be located in the Receptacle due to the fundamental ontological difference of transient Becoming and eternal Being. Overall, the Receptacle, Being, and Becoming are fundamentally separate entities,[155] however a fourth

[153] I define 'sensible substance' as the four elements and the collections, aggregates, and compounds of the four elements that are perceived and experienced by people in ordinary life like air, wind, water, soil, stone, fire, animals, and plants.

[154] The question of how 'sensible substance' relates to Aristotle's conception of matter will be explored in the last chapter.

[155] Johansen, T.K. 2015. "A Triptych in Plato's Timaeus: A Note on The Receptacle Passage (Timaeus 48e–52d)." *The Classical Quarterly* (Cambridge University Press) 65 (2): 885-886. Johansen gives a truly concise summary of the metaphysical distinction between the three kinds in only two pages.

entity, the current cosmos and its collection of ordered Platonic compounds, are the product of the three kinds in the *Timaeus*.

I approach these questions with the following interpretative lens. First, I base my arguments on textual evidence from the *Timaeus*. However, when I do draw on texts outside the *Timaeus*, it is purely to clarify, illustrate, or contrast a point made by me, using a pertinent argument, analogy, or idea from another work of Plato. I do such comparisons since Plato sometimes presents and explores similar ideas across his texts. I do not assume that Plato is necessarily bringing in the exact same metaphysical or epistemological categories seen in his other works like *Republic*, *Parmenides*, or *Phaedo*. At most, I am drawing useful analogies for potential deeper comparisons and studies between Platonic works. Second, as noted in the introduction, Timaeus begins his account for a second time by incorporating the influence of Necessity.[156] I consider the concepts and major points about the nature of the cosmos (the presence and role of the Demiurge,[157] the construction of the World Soul,[158] etc.) to still be part of the overall account, even after Timaeus incorporates the influence of Necessity and the Receptacle. Thus, although the "new starting point in my [Timaeus's] account of the universe need[s] to be more complex than the earlier one",[159] it still carries over earlier parts unless explicitly stated otherwise. In the following section, I give explicit definitions of specific major concepts and words, as intended for the analysis in this chapter.

In this chapter's analysis of the *Timaeus*, there are many terms with potentially ambiguous meanings that result from the nature of contemporary connotations of words, in contrast to their

[156] Plato, *Timaeus* 48e.
[157] Ibid. 30a.
[158] See the metaphysical and mathematical construction of the World Soul out of three entities: Being, the Same, and the Different at *Timaeus* 35a-37a.
[159] Plato, *Timaeus* 48e.

strict denotations. By 'element', I am strictly referring to the four elements of Plato, which are fire, air, water, and earth. By 'sensible substances, I refer to the directly perceived and experienced sensible objects of everyday life, including the four elements and aggregates of the four elements. The sensible objects are things which bear the commonly perceived common qualities like colour, location, temperature, texture, mass, and so forth that emerge from their being in great number. Sensible substances are the naïvely and commonly perceived stuff of human life like soil, water, air, clouds, iron, copper, gold, plants, animals, flesh, and bricks.[160] By 'basic triangle(s)', I refer to the two basic constituents of the four elements as presented at *Timaeus* 53c-54d. Related to the basic triangles are the '(elemental) solids', which are the three-dimensional solids of the tetrahedron, octahedron, icosahedron, and cube.[161] Last, I coin the term of 'Platonic compound', which is the general account, the principles, and the nature of sensible substance and the elements as expressed in the *Timaeus*, based on my analysis.

Section 2.1 is a brief overview of the Receptacle passage and the passage which I refer to as the 'geometric construction' of the four elements. In Section 2.2, I situate the reader with major interpretations of the nature of the Receptacle, the nature of sensible elements, and the Receptacle's relationship to the geometric construction of the four elements. In Section 2.3, I argue for my interpretation of the *Timaeus* with respect to the fundamental nature of the Receptacle and Platonic compounds in five parts. One, I argue for why the Receptacle is entailed from the initial metaphysical framework of the *Timaeus*. Two, I argue for my categorization of sensible Becoming into ordered versus disordered Becoming and I provide my definitions for ordered and disordered. Three, I argue for my concept of Platonic compounds, where I identify Becoming with the sensible

[160] My definition of sensible substances is intended to provide a conceptual basis for my later claims about the metaphysical nature of Platonic matter and its relation to the Receptacle, eternal Being, and images of eternal Being.
[161] For simplicity, I put aside the twelve-sided dodecahedron since this solid is not used for any element in the account. Plato, *Timaeus* 55c.

four elements, and I explain the relationship between Platonic compounds and the Receptacle in light of the wider metaphysical framework of *Timaeus*. Four, I argue that the Receptacle is space. In Section 2.4, I summarize my arguments and findings on the natural philosophy of the *Timaeus*.

Section 2.1 – A Brief Summary: The Receptacle & Geometric Construction (*Timaeus* 48a-57d)

Following his vivid account of the Demiurge's construction of the body and soul of the universe, Timaeus pauses from his speech. He explains that the entire account up until this point has been the production of Intellect and it now requires an account that incorporates the influence of Necessity, since the cosmos is "of mixed birth: [as] it is the offspring of a union of Necessity and Intellect".[162] This second beginning requires a careful analysis as to the nature of the four elements and their characteristics as Timaeus specifies that the four elements of fire, air, water, and earth are not the true underlying principles of the cosmos because men do not properly know what the four elements are.[163] Mirroring the start of the account by Intellect,[164] Timaeus calls upon a god to guide him and the listeners through a difficult metaphysical and epistemological discussion. He proposes a 'third kind' of metaphysical thing alongside the two kinds stated earlier: the intelligible eternal model, Platonic Being, and the ever-changing and becoming imitation of the model, Platonic Becoming. He says that this third kind "is a receptacle of all becoming – its wetnurse, as it were."[165] Timaeus begins his account of the third kind by posing an apparent problem: the nature of the four elements of fire, air, water, and earth and how humans describe their ontological status and their inter-transformations. Throughout the natural world the elements appear to cyclically transform into each other. Air appears to condense into clouds, which produce

[162] Plato, *Timaeus* 48a, translation modified from Zeyl.
[163] Ibid. 48b-48e.
[164] Ibid. 27c-27d.
[165] Ibid. 49a.

rain water. The water falls to Earth and eventually condenses into stone and rock. Air ignites into fire and dissipates back into air.[166] However, throughout these ongoing perceived cycles of elemental transformation, he asks, "which one of them [some instance of phenomena] can one categorically assert, without embarrassment, to be some particular thing, this one, and not something else?"[167] He answers that one cannot speak about dynamic unstable phenomena without frequently falling into the conceptual error of assigning ontological stability to specific instances of fire, air, water, and earth.[168] One easily falls into the habit of naming instances of dynamic and unstable phenomena as 'this water' or 'that fire'. Timaeus argues that all perceptible and ever-changing phenomena be referred to as 'what is such'.[169] Rain ought to be called 'what is such like-water' and fires ought to be called 'what is such like-fire', such that "generally everything that has becoming, it is safest to call [each and every instance of the elements] 'what is altogether such.'".[170] From this conceptual analysis, Timaeus advises that we reserve the terms 'this' and 'that' to the Receptacle because it is in the Receptacle that the '*such-likes'* of the four elements and binary qualities, like hot and cold or white and black, come to be and pass away.[171]

Next, he turns to yet another metaphor to describe the Receptacle of Becoming.[172] He imagines a goldsmith constantly and continuously reshaping a lump of gold into various shapes. For example, from the shape of a triangle to a torus, to a flower, and so-forth. The nature of the Receptacle is likened to the underlying material of gold, in how it is malleable and "available for anything to make its impression upon, and it is modified, shaped, and reshaped by the things that

[166] Ibid. 49b-49c.
[167] Ibid. 49d.
[168] See both Zeyl's introductory essay (Zeyl 2000, lvi-lix) and Lee (1967, 2-12) for detailed analysis of this much-disputed passage.
[169] Ibid. 49d-49e.
[170] Ibid. 49e.
[171] Ibid. 50a.
[172] Later in my analysis I explain how the Receptacle is the receptacle or seat of Becoming and that all changing phenomena is one fundamental characteristic of the universe.

enter it"[173]. Timaeus then explicitly states a basic property of the Receptacle. It is inherently devoid of all sensible qualities and characteristics, such that it cannot be said to be any of the four elements, their compounds, nor the constituents of the elements. By being devoid of an innate traits, the Receptacle can take on any set of binary opposing properties, one after the other, such that it may truly receive and copy images of intelligible things.[174]

Keeping with the conversational style of this second beginning, Timaeus inserts another brief aside. He asks whether there are things by themselves, independent of one's sense perception of some entity. In a moment of incredibly self-aware epistemic self-criticism, Timaeus asks: "is our perpetual claim that there exists an intelligible Form for each thing a vacuous gesture, in the end nothing but mere talk?".[175] Timaeus reaffirms his initial Being-Becoming metaphysics and concludes that since there is a difference between rational understanding and non-rational beliefs, then the ontological distinction between intelligible Forms and sensible phenomena is preserved.[176,177] Immediately after, he states explicitly the three kinds and their basic properties. Being is that which is eternal, unchanging, can never be destroyed, and is grasped by rational understanding. Being can never enter anything else nor have anything enter it. Becoming is that which is non-eternal, every-wending, perishable, and grasped by sense perception and opinion.[178] Last, Timaeus states that the Receptacle, the third kind "is space, which exists always and cannot be destroyed".[179] Space always exists and cannot be destroyed and it "provides a fixed site for all

[173] Ibid. 50c.
[174] Ibid. 50d-51b.
[175] Ibid. 51c.
[176] Ibid.
[177] Zeyl notes that this section is the only time Plato gives a worked-out argument for the existence of Forms. Zeyl points out that even in the well-known and celebrated texts of the *Republic* and *Phaedo*, Plato discusses Forms, but he does not give full argument for their existence (Zeyl 2000, lxiv). To me, the very terse and frankly self-aware tone of this passage suggests Plato acknowledges the genuine conceptual difficulties of understanding and even articulating his Ideal theory.
[178] Ibid 52b.
[179] Ibid.

things that come to be".[180] Furthermore, space is grasped by neither rational "understanding nor sense perception, but by "a kind of bastard reasoning that does not involve sense perception, and it is hardly even an object of conviction [pistis]".[181] Timaeus comments on another aspect of space, which is the common belief that everything that exists must be in some place.[182] Timaeus gives one last argument for his characterization of the three metaphysical kinds. He remarks on the conceptual and ontological distinction between an image or copy, versus the model, source, or original. An image must be different from its source, otherwise it would simply be the source entity. Yet, an image must also be located in something (which would be different from the source as well) to properly stand in for the source or model.[183]. He concludes his exposition on the third kind and casts his vote concerning the nature of the three metaphysical kinds, which are "being, space, and becoming, three distinct things that existed even before the heavens came to be". [184] Subsequently, he exposits briefly on how the Receptacle takes on the qualities of earth, water, air, and fire (in accordance with its power to bear qualities and phenomena) and that it initially swayed and was shaken by the motion of the elements before the Demiurge encountered it. In this god-forsaken state of affairs, the four elements became and passed away within the Receptacle, but gradually settled and were winnowed into various regions of the universe, like towards like.[185] The Demiurge intervened upon the disorderly motion of the Receptacle and its contents and fashioned these four elements into "their distinctive shapes, using forms and numbers". In the following section, the geometric construction of the four elements, Timaeus presents the two basic triangles and explains how they combine and constitute the four Platonic solids, the three-dimensional

[180] Ibid.
[181] Ibid. This translation by Zeyl is not modified.
[182] Ibid.
[183] Ibid 52c-52d. Zeyl gives the example of how a statue of a man represents, or stands in for, a man. Yet, the statue must not be a man to avoid ontologically collapsing into an actual man (Zeyl 2000, 42 n.57).
[184] Plato, *Timaeus* 52d.
[185] Ibid. 52e-53c.

figures which become the corpuscles of each of the elements.[186] With this brief summary of the Receptacle passage, I move to the reception and scholarly interpretations of this enigmatic section to further situate the reader.

Section 2.2 – Scholarly Reception of the Receptacle & 'Geometrical Atomism'

The *Timaeus* has been one of the few Platonic texts available to the European West since classical antiquity.[187] However, the precise nature and function of the Receptacle described in *Timaeus* 48e-53b has been varied and highly contentious for centuries. In his survey of Aristotle's comments on the *Timaeus*, Andrew Gregory says that it "is unclear whether the receptacle is supposed to be matter, or whether it is supposed to be space, or whether it is in some way both matter and space".[188] Thus, determining the nature and function of the Receptacle and subsequent geometric construction passage would clarify a major early account of matter and/or space and understanding the passage could clarify Plato's metaphysical distinction between the Platonic Forms and the sensible world. The hypothesis that the Receptacle is matter,[189] space,[190] or both derives from three aspects of the passage. One, the description of the Receptacle begins (and is conceptually framed in relation to) investigating the nature of the four elements.[191] Two, the elements are constructed into the form of geometric solids in the passage immediately following the description of the Receptacle,[192] which has puzzled readers as to whether the geometric

[186] Ibid. 53c-57d. For the sake of brevity, I go into much greater detail of the geometric construction of the four elements and the geometric origins of their sensible qualities in a later section.
[187] Somfai, Anna. 2002. "The Eleventh-Century Shift in the Reception of Plato's "*Timaeus*" and Calcidius's "Commentary"." *Journal of the Warburg and Courtauld Institutes* 65(1): 1-21.
[188] Gregory 2003, 29.
[189] For our present inquiry, I use an ostensive definition of matter. Matter is the underlying stuff or the substratum, of which the sensible world is composed.
[190] For the nature of space, I leave its meaning open-ended since interpretations of the Receptacle as space do not necessarily align with common-sense ideas of space.
[191] See the multiple sections at: Plato, *Timaeus* 48b-48d, 49b-50a, 52e-53b.
[192] Gregory 2003, 29.

construction passage, [193] (or the system of 'geometrical atomism'[194]) introduced at *Timaeus* 53c is supposed to derive from (or further develop) the attributes and nature of the Receptacle.[195] Three, the four elements are later described being the constituents of perceptible objects in the world like fire, water, ice, air, clouds, metals, flesh, and so-forth.[196]

At the highest level, there are two general recurring interpretations of the Receptacle and its relationship with matter.[197] One, the 'traditional interpretation', as it is reported by Donald Zeyl[198] and Christopher Buckels[199], is that the Receptacle is both space and matter, such that space can be identified as the substratum. In this view, the Receptacle is a neutral stuff, analogous to Aristotle's idea of underlying prime matter, which continuously takes on different characteristics in participation with Platonic Forms. Two, the other view is that the Receptacle is space, but matter is something different from the Receptacle. The Receptacle is the space, or the medium, in which phenomena and sensible characteristics happen as images, reflections, or resemblances to Platonic Forms and move about and through the Receptacle container.[200] However, this view requires one to specify the nature of matter within the text and how matter relates to the geometric construction of elements and whether the Receptacle and geometric construction are in tension.[201] One stance on the nature of matter in the *Timaeus* is that it presents an atomist theory of matter.[202] For example,

[193] Plato, *Timaeus* 53c-57d.
[194] Gorey, Matthew M. 2018. "Atomism and the Receptacle in Plato's Timaeus." *Phoenix* 72 (1/2): 105-118.
[195] I will not use the term 'geometrical atomism'. I use the more neutral and descriptive term: 'geometric construction'. Brisson & Ofman (2020 The mathematical anti-atomism) argue that the term "atomism" is an incredibly loaded term. They present a historical review of ascribing atomism to Plato's *Timaeus* and how ascribing atomism to the text is often very misleading and anachronistic.
[196] Plato, *Timaeus* 55e-57d, 58d-61d.
[197] An overview of these two interpretations is given in by Zeyl 2000, lix-lxiv.
[198] Ibid.
[199] Buckels, Christopher. 2016. "Making Room for Particulars: Plato's Receptacle as Space, Not Substratum." *Apeiron* 49 (3): 303-328. See Buckels 2016, 303-307 for overview of the 'traditional view' of the Receptacle being space and matter.
[200] Zeyl 2000, lxi-lxiii.
[201] Gregory 2003, 33-36.
[202] Ibid 36-37.

Aristotle explicitly classifies Plato as an atomist who "differs from Leucippus inasmuch as the indivisibles of Leucippus are solids, while those of Plato are planes, and [Leucippus's solids] are characterized by an infinite variety of figures, while the characterizing figures employed by Plato are limited in number".[203] Even various scholars after antiquity, as surveyed by Brisson and Ofman, have concluded that Plato presents a system of geometric atomism, emphasising how the four elements of matter are constituted by four Platonic solids.[204] More recent work in the twentieth century has often tended towards fully understanding internal logic of the geometric construction in *Timaeus*. Consider the following wide range of views. In Brisson and Ofman's recent geometric analysis, they offer a new geometric composition of the different grades of the basic triangles, contra Cornford, which can generate the indefinite diversity of elemental matter. [205] Robert Llyod argues that Plato considered geometric symmetry as a guiding principle for the particular arrangement of triangles in the construction of the four elemental solids.[206] John Visintainer's argument is that the text entails an infinite number of smaller and smaller basic triangles.[207] Matthew Gorey argues that the Receptacle passage is a subtle Platonic critique of non-teleological materialism and the mechanistic atomism of the Presocratics such as Democritus. Gorey proposes that Plato corrects the mechanistic materialism by introducing the teleological intervention of the Demiurge in its geometric construction of the elements.[208]

The earliest interpretation that the Receptacle is both matter and space was proposed by Plato's student Aristotle. In *Physics*, he reports that the *Timaeus* claims that "matter and space are

[203] Aristotle, *On the Heavens* 1.8, 325b12-325b33 modified from translation by J. L. Stocks.
[204] Brisson and Ofman, The mathematical anti-atomism of Plato's Timaeus 2020, 5-8.
[205] Brisson and Ofman, "The Two-Triangle Universe of Plato's Timaeus and the In(de)finite Diversity of the Universe." 2020, 493–518.
[206] Lloyd 2007, 99-118.
[207] Visintainer 1998, 117-128.
[208] Gorey, Matthew M. 2018. "Atomism and the Receptacle in Plato's Timaeus." *Phoenix* 72 (1/2): 105-118.

the same; for the 'participant' and space are identical".[209] Likewise in *On Generation & Corruption*, he affirms that Plato's omni-recipient[210] "is a substratum prior to the so-called elements—underlying them,"[211] like how golden jewelry is composed of gold metal. The sense of matter which Aristotle ascribes to his teacher is given earlier in *On Generation & Corruption*. He places his master alongside Greek atomists like Leucippus and reports that Plato conceived of the four elements as being built from some finite number of indivisible two-dimensional figures.[212,213] Thus, Aristotle sees the Timaeus as identifying space and matter and as presenting an atomic theory of matter. A similar view was proposed by the nineteenth century English classicist Archer-Hind, who read the Receptacle passage as arguing that "materiality in its ultimate analysis reduced to space or extension"[214], though he interprets the function of Receptacle-as-space as Plato's solution to how individual souls might grasp the Platonic Forms.[215] Archer-Hind characterizes the geometric construction of the elements as Plato's "atomic theory (if so it may be called), [which] we shall find it exceedingly peculiar and totally unlike any other"[216].

A more modern interpretation of the Receptacle is Gregory's modified geometrical atomism. Geometrical atomism is his name for the geometric construction of the four elements from the two basic triangles into the four solids at *Timaeus* 53c-56c.[217] He proposes that the Receptacle presented "between 48e-53b is indeed both material and spatial"[218]. He emphasises

[209] Aristotle, *Physics* 4.2, 209b11-209b16.
[210] Aristotle, *On Generation & Corruption* 2.1, 329a5-329a24. In this passage, "Omni-recipient" is Aristotle's term for the Receptacle.
[211] Aristotle, *On Generation & Corruption* 2.1, 329a5-329a24.
[212] Ibid. 1.8, 325b12-325b33.
[213] Aristotle's claim about the two-dimensional figures, the two basic triangles, is a fairly straightforward reading of Plato, *Timaeus* 53c-55c .
[214] Archer-Hind, Richard Dacre. 1888. *The Timaeus of Plato.* Cambridge University Press.
[215] Ibid. 182-183. Archer-Hind proposes that Plato's account of space provides the principle or cause of the individuation of rational souls and the limited rational being's perception of phenomena within the universe.
[216] Ibid. 189, translation modified from Archer-Hind.
[217] Gregory 2003, 29.
[218] Ibid. 35.

that the description of the Receptacle is a mixture of both spatial and material terms, ranging from the material metaphors (gold, wax-impression, and neutral scentless perfume) to the outright statement that the Receptacle is a space or seat, all of which generate multiple interpretive problems when taken altogether.[219] Gregory proposes that the system of geometrical atomism is a modification of the Receptacle, which thereby unites space and elemental matter, where the basic triangles are moving entities within space (the Receptacle). The two basic triangles are either non-material geometric entities, but they are impenetrable and act as proper basic units of stuff or they "might simply be material in the same way that the particles of atomists were material"[220]. Either way, all qualitive change and phenomena of the four elements are due to the movement, formation of bonds, and dissolution of bonds of these triangles, which would solve the question of how sensible phenomena can change while the Receptacle remains unchanged.[221]

Another hypothesis for the unity of space and matter comes from Ondřej Krása.[222] He identifies space as the Receptacle and proposes that the basic triangles are modifications of space, where the elemental bodies are entities within the third kind, the Receptacle. Furthermore, Krása proposes that the bodies are themselves modifications of the Receptacle, and that the geometric modifications are consistent with permitting the occurrence of other subsequent modifications to the Receptacle.[223] He argues that due to the receptive and malleable nature of space, Becoming is a kind of modification of space via the geometric division of space.[224] Furthermore, since Becoming is always in the third kind (space) and the four elements are instances of phenomena and Becoming characterized by geometric constructions (that is, divisions and boundaries imposed

[219] Ibid. 31-32.
[220] Ibid. 35.
[221] Ibid. 35-36.
[222] Krása 2021, 137-140.
[223] Ibid. 131.
[224] Ibid. 133-137.

on space itself), then "we can consider corporeal entities to be a modification of space."[225] The Receptacle is likened to a mirror, as although a mirror always reflects objects, a previous reflection of a face never prevents the mirror from taking on the image of a hand.[226] Thus, the Receptacle functions as a mirror, having unending malleability to continuously receive and take on new modifications in the form of changing elements and phenomena. Krása's view is different from Gregory's geometric atomism in two ways. One, in Gregory's geometric atomism, the basic triangles are separate from space, the Receptacle.[227] Meanwhile, Krása unites space and the geometric modifications of space itself via the basic triangles. Two, Krása proposes that the seemingly contradictory material and spatial metaphors of the Receptacle are resolved by specifying that the Receptacle accepts geometric modifications upon itself in a manner which never prevents the Receptacle from taking on any new geometric modifications.[228] This stands in contrast to Gregory's proposal that the triangles are qualitatively stable and move around the Receptacle, thereby constitute new phenomena.[229]

The high level second interpretation is that the Receptacle is space and that matter is something different. Here, the specific views on the nature of matter vary. Against Zeyl's proposal that the Receptacle could be both space and a substratum,[230] Buckels argues that this traditional view described above is untenable as the stated attributes of the Receptacle are conceptually incompatible with it being both space and a substratum.[231] The Receptacle must be identified as space for all particular phenomena, although Buckels is agnostic as to the specific ontological

[225] Ibid. 144.
[226] Ibid. 144-145.
[227] Gregory 2003, 35
[228] Krása 2021 138-139.
[229] Gregory 2003, 35-36.
[230] Zeyl 2000, lxiii.
[231] Buckels 2016, 312-318.

details of Plato's conception of space.[232] He considers the hypothesis that there are two 'Receptacles' (one is space and the second thing is the substratum of matter) but concludes that this hypothesis unnecessarily introduces redundant entities in the Platonic cosmology, since a Receptacle-as-space and a Receptacle-as-substratum both would perform the same functions.[233] Buckels draws on two metaphysical and conceptual arguments by Schaffer. One, the argument from parsimony is that in the hypothetical case of two Receptacles (the Receptacle-as-space and the Receptacle-as-substratum) phenomena and proprieties are duplicated.[234] For example, at some volume of space, one may observe the phenomena of fire, which entails that there are fire tetrahedron particles at that region of space. But how does one distinguish between the phenomena of fire at some location and the presence of fire particles at the same location? One cannot in the case of having two Receptacles. Two, the argument from harmony is that there is a strange metaphysical coincidence that every instance of some phenomena, say fire as a piece of the Receptacle-as-substratum bearing fieriness, always shares the same location as fire-shaped regions. In the two Receptacles view, the underlying substratum of some phenomena is never separated from volumes of space that always have the same prototypical shape or outline as the phenomena.[235] Thus, Buckels concludes that separating the Receptacle into two sub-varieties, a space and a substratum version, unnecessarily duplicates all phenomena and proprieties and fails to account for the harmony and constant tracking of phenomena to particular phenomena-specific volumes of space. Buckels proposes a solution that by-passes the need for a material substratum and concludes that the Receptacle should be understood as a mirror reflecting images of Platonic Forms and that "there is no indication that Timaeus thought it necessary for material particulars to

[232] Ibid. 303-304.
[233] Ibid. 318-325.
[234] Ibid. 321-321.
[235] Ibid. 323

have substrata"[236]. He concludes that is some sort of matter, or rather matter-like, phenomena in the *Timaeus*, but it does not require any substratum to be in space, as the phenomena and becoming are images reflected upon the Receptacle.[237]

A more radical view of the (non-)nature of matter is to reject the idea that the *Timaeus* presents any view of matter and to reframe the Receptacle in light of this non-material interpretation.[238] The earliest instance of this hypothesis is by Francis Macdonald Cornford,[239] who says that "there is no justification for calling the Receptacle 'matter' - a term not used by Plato"[240]. After analysing the entire Receptacle passage, he concludes that the basic nature of the elements must be "identified ultimately with Space, [and space] is qualified by the main characters"[241] of the four elements (or qualities) of fire, air, water, and earth. The Receptacle is reduced to the place for perpetually fluctuating qualities to happen in, such that Cornford says that readers ought "get rid of the notion of material substance".[242]

Gerd Van Riel[243] develops this stark interpretation of non-matter by proposing that *Timaeus* lacks an account of matter. He proposes that Plato's system of geometric atomism is a non-material account of the elements and that "the triangles and their combinations do not in fact constitute a theory of matter"[244]. The elemental bodies simply are those geometric bodies described in *Timaeus* 53c-55c. The later section about the geometric construction of the elements should understood simply as the mathematical (geometric) construction of the elements, whereby the geometric

[236] Ibid. 327.
[237] Ibid. 325-327.
[238] This view is proposed by Riel 2021, 169–186.
[239] Cornford, Francis Macdonald. 1997. *Plato's Cosmology - The Timaeus of Plato.* Indianapolis / Cambridge: Hackett Publishing Company Inc.
[240] Cornford 1997, 181.
[241] Ibid. 199. Translation modified from Cornford.
[242] Ibid. 180-181.
[243] Riel 2021, 169-172.
[244] Ibid. 178.

structure of elements accounts for their inter-transformations and qualities.[245] Since "a mathematical description always remains void of material connect" then a geometric construction of the elements posits no underlying material content. This interpretation[246] solves four problems with the Receptacle, taken as empty space, and its relationship to the geometric elements and basic triangles. First, a pure geometric nature for the elements avoids the (material-focused) problem of what "fills" the four solids. Second, empty space is removed as the basic triangles become "markers of mathematical structures within continuous bodies".[247] Riel proposes that Platonic bodies are mathematical abstractions of volume delineated by the basic triangles.[248] Third, the existence of traces of the four elements within the Receptacle before the intervention of the Demiurge is clarified since the Demiurge is only imposing mathematical structure onto something lacking mathematical order. Last, Riel argues that his mathematical interpretation of the four elements in the *Timaeus* corrects a potential mistranslation of *Timaeus* 81c-d by Zeyl.[249] Riel says that in Zeyl's translation the triangles seem to be destroyed over time by wear,[250] but under Riel's mathematical reading, the combinations of triangles which constitute the solids disconnect from each other and remain in the world.

Similar to the views of Riel, Cornford, and Buckels, the scholar Richard Mohr[251] proposes that Plato's Receptacle is only space and not any sort of matter. Furthermore, Mohr argues that

[245] Ibid. 176-180.
[246] Ibid. 182-184.
[247] Ibid. 183.
[248] Ibid. 181-182.
[249] Riel is referring to *Timaeus* 81c-d from Zeyl's translation (Zeyl 2000, 76).
[250] For the reader's convenience, I quote *Timaeus* 81c-d: "But when the roots of the triangles are slackened as a result of numerous conflicts they have waged against numerous adversaries over a long period of time, they are no longer able to cut up the entering food-triangles into conformity with themselves. They are themselves handily destroyed by the invaders from outside. Every living thing, then, goes into decline when it loses this battle, and it suffers what we call "old age." Eventually the interlocking bonds of the triangles around the marrow can no longer hold on, and come apart under stress, and when this happens they let the bonds of the soul go." (Zeyl 2000,76).
[251] Mohr, Richard D. 1980. "Image, Flux, and Space in Plato's "Timaeus"." *Phoenix* 34 (2): 138-152.

there has been an anachronistic tendency of readers to view "Plato's conception of space as a failed formulation of Aristotle's conception of matter"[252] by failing to clearly distinguish the highly specific function and concepts of space and matter within the philosophical systems of Plato and Aristotle.[253] He argues that after carefully analysing how Plato describes the predication of phenomena in flux (the four elements) and the function of the Receptacle as space, all sensible phenomena appears in (and are in) the Receptacle as non-substantial images of the Platonic Forms.[254] Mohr concludes, quoting Cherniss, that "in Plato's theory, there is no material principle even for sensible objects".[255]

Now I summarize the two major interpretative camps about the Receptacle and the question of matter in the *Timaeus*. One, the Receptacle is space and is matter. That is, space is also the substratum of the elements, which is modified and shaped by geometric modifications into particular elemental phenomena. Two, the Receptacle is space and it is not matter. However within this view, the *Timaeus* lacks an account of matter and the phenomena of the four elements have a different status that distinguishes them from both space and Platonic Forms. The exact relationship between the Receptacle-as-space and the four elements depends on the author in question. As we see this brief overview of the Receptacle, the status of matter and the relationship between the Receptacle and elements continues to produce starkly different interpretations with diverging implications for Plato's natural philosophy of sensible objects and space.

Section 2.3 – An Interpretation of the Receptacle & The Case for Platonic Compounds

In this section, I present and argue for my interpretation of the Receptacle, the meaning of the geometric construction of elements, the nature of 'Platonic compounds' and the relationship

[252] Mohr 1980, 146.
[253] Ibid. 146-147.
[254] Ibid. 144-152.
[255] Ibid. 152.

the Receptacle, geometric construction, and Platonic compounds. For organization, I label my arguments as propositions and sub-propositions.

Proposition 1 - The Nature, Function, & Implications of the Receptacle

Proposition 1.1 – The *Timaeus* Relies on the Metaphysics of Being & Becoming

In the beginning of the cosmogony, Timaeus prefaces his speech on the origin and nature of the universe with an ontological-epistemological framework that guides and grounds the entire account.[256] This metaphysical framework, which I henceforth refer to as the 'Being-Becoming metaphysics', establishes two categories. First, there is Being, which always is and never becomes. Second, there is Becoming, which never fully is and is always changing. Being is grasped by understanding, which involves a reasoned account. Becoming is grasped by sense perception, which constantly changes and varies and thereby lacks a reasoned account.[257] Furthermore, anything which comes to be, "must of necessity come to be by the agency of some cause, for it is impossible for anything to come to be without a cause.".[258] The metaphysical entity, which I have labeled 'Being', is a case of Plato's Forms, given the attributes of eternity and intelligibility.[259] Overall, this metaphysical framework deeply blends ontology and epistemology by directly linking the ontological status of a thing with its epistemic status, in terms of how rational beings come to grasp said thing.

Proposition 1.2 – The Universe Came to Be & Has a Cause

Timaeus establishes that our universe has a beginning and it "has come to be"[260] because it is "both visible and tangible and it has a body".[261] The qualities of visibility and tangibility

[256] The introductory conversation between Socrates and his friends presents the story of Atlantis and prehistoric Athens. Plato, *Timaeus* 17a-27b. The proper beginning of the cosmology, when Timaeus first begins to speak, is at *Timaeus* 27c.
[257] Plato, *Timaeus* 27d-28a.
[258] Ibid. 28a.
[259] Zeyl 2000, lxiv-lxvi.
[260] Plato, *Timaeus* 28b.
[261] Ibid.

characterize all sensible things, such that humanity grasps the cosmos by sense perception. This characterization of the universe clearly accords with one's sense perception of the unending variety of phenomena and transformations in the natural world. Also, later in the text Timaeus states our cosmos as "this whole universe of becoming"[262]. Following the metaphysics of Being-Becoming, I refer to the universe as the 'realm of Becoming', since it is sensible and always changing.

Proposition 1.3 – The Demiurge is the Cause & Creator of the Universe

Since the universe is sensible and always changing, it must have a cause. The Demiurge is introduced as the cause of the universe.[263] This entity is referred to as the most excellent of all causes[264] and is explicitly called the "maker and father of this universe [to pan]".[265] The active role of designer and framer of the cosmos is unambiguously and emphatically stated throughout the remainder of the section on the creation of the universe.[266]

Proposition 1.4 – The Demiurge Designs the Cosmos according to two Intelligible Models

As the most excellent of cause and maker of the cosmos, the Demiurge chose to use an intelligible eternal being as the model for the universe.[267] The standard interpretation is that the Demiurge uses only an entity called the 'intelligible Living Thing' as the one and only model for the creation of the universe.[268] The Living Thing is an intelligible being used as the primary model for making the cosmos. First, the Demiurge only selects an eternal intelligible thing as its model as for making the universe. Furthermore, anything crafted after an intelligible model is beautiful and the universe is seen to be beautiful, and so the creator had to have used an intelligible model.[269]

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[262] Ibid. 29e.
[263] Ibid. 28a.
[264] Ibid. 29a.
[265] Ibid. 28c. This quotation from Zeyl's translation is unmodified.
[266] Ibid. 29e-47e.
[267] Ibid. 29a.
[268] Zeyl 2000, xxxvii-xxxviii.
[269] Plato, *Timaeus* 28a-29a.

Second, the Demiurge "reasoned and concluded"[270] how to best build the world. The only objects of reason and intellectual grasping are eternal intelligible beings. Third, since the creator sought to make the universe as beautiful and complete as possible, it chose to "make the world like the best of the intelligible things, complete in every way, [thus] he [the Demiurge] made it a single visible living thing"[271] in imitation of the Living Thing. In summary, the Demiurge used the intelligible Living Thing as its model for creating the cosmos.

However, I propose that there is a subtle nuance in how Timaeus describes the contribution of the Demiurge and the Living Thing to the design of the universe. I argue that the Demiurge used two models, one primary and one secondary to build the universe. By primary and secondary, I mean that when the Demiurge made the cosmos, it sought to make the cosmos resemble one model, the Living Thing, as much as possible, while having a secondary constraint of making the cosmos like itself too. First, the craftsman uses "what is always changeless" as the model for making the cosmos.[272] Second, the Demiurge is stated to be "the most excellent of all that is intelligible and eternal".[273] Since the god is intelligible and eternal, then he is one instance of an intelligible Being, which makes him potential candidate for a cosmic model. Third, I argue that the god did use itself as a model. The Demiurge is described as being good and never jealous. Since the craftsman is "free of jealousy, he wanted everything to become as much like himself as was possible"[274]. The Demiurge seeks to make the universe as good as possible and so he constructs the universe only according to changeless, i.e. intelligible Beings. So the god himself is the most excellent of intelligible things, it is consistent with the Demiurge's good nature to make the universe both like

[270] Ibid. 30b.
[271] Ibid. 30d.
[272] Plato, *Timaeus* 28b.
[273] Ibid. 37a.
[274] Ibid. 29e.

himself and in imitation to the model of the Living Thing. Thus, I think it is fair to conclude that the god did use itself as a model. Therefore, I conclude that the Demiurge uses both itself and the Living Thing, two intelligible eternal beings as models, one primary and one secondary, for constructing the universe.

Proposition 1.5 – The Specific Design Parameters of the Cosmos are to have a Body, Soul, and Mind, to be Divine and Singular, & to Resemble Intelligibility

The design parameters of the ordered universe come from three sequentially related sources: the nature of the Demiurge, the cognitive reasoning of the Demiurge, and the nature of the Living Thing. The Demiurge has five traits pertinent to this analysis. One, the Demiurge is a god.[275,276] Two, the craftsman is an intelligible eternal being, since it is the "most excellent of all that is intelligible and eternal."[277] Three, the Demiurge is an intellect. He engages in prototypical activities for an intellect when initially constructing the world. He reasoned and concluded how best to build the world.[278] Also, the god reasoned when he looked at "what is always changeless"[279] and "looked at the eternal model"[280] to design the universe; both of these objects of looking are intelligible beings.

From the traits of the Demiurge, we can more aptly describe its design parameters for our universe, which come from the god's deliberation. He reasoned that "in the realm of things naturally visible, no unintelligent thing could as a whole be better than anything that does possess intelligence as a whole"[281] and concluded that the universe requires a body and a soul. Thus, the deity looked to the intelligible being of the Living Thing as the guiding model to design the

[275] Ibid. 30a.
[276] Unambiguous references to the Demiurge being a god or specifically "the god" are found at multiple instances at: *Timaeus* 30a-30b, 30d, 31b, 32b, 33d, 34b-34c, 38c-38d, 39e, 42d, 46c, 47a-47b, 53b-53d, 55c, 56c, 69b-69c.
[277] Plato, *Timaeus* 37a.
[278] Ibid. 30b.
[279] Ibid. 28a.
[280] Ibid. 29a.
[281] Ibid. 30b.

universe.[282] The Living Thing is an eternal intelligible being, which "comprehends within itself all intelligible living things"[283], and is numerically unique.[284] The Living Thing is an eternal intelligible being since the Demiurge only looks at unchanging intelligible beings as the model for creating the universe.[285] The universe must be an image like its two source models. From the Demiurge, six purely potential traits to share in common includes: being the cause of the universe, divinity, intelligibility, eternity, being an intellect, or being a god. Clearly, the list can be reduced to the four traits of: divinity, intelligibility, being an intellect, and being a god. The universe is not eternal nor did it create itself. The Demiurge explicitly begets the universe[286] and thus made it only sempiternal[287]. The Demiurge reasoned that in the realm of Becoming, a thing with intellect is better than a thing lacking intellect. However, intellect requires a soul and a soul requires a body.[288,289]From the Living Thing, our universe must be a "single visible living thing, which contains within itself all the living things whose nature it is to share its kind."[290]. That is, the universe must contain all forms of living things within it, so our universe can imitate the intelligible Living Thing. In summary, a coherent set of design parameters for the universe are as follows. The universe must resemble a god and intelligibility. It explicitly must be numerically singular, have an intellect, soul, and body, and it must comprehend within it all varieties and kinds of living things.

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[282] "When the maker made our world, what living thing did he make it resemble? ... Rather, let us lay it down that the world resembles more closely than anything else that Living Thing of which all other living things are parts, both individually and by kinds." Plato, *Timaeus* 30c.
[283] Plato, *Timaeus* 30d.
[284] Ibid. 31a-31b.
[285] Ibid. 28a-28b.
[286] Ibid. 34b.
[287] Ibid. 38b-38c. A thing is sempiternal if it has a temporal beginning. But it continues to exist onwards into the unbounded and infinite future. This contrasts eternity, which encompasses the infinite past and infinite future simultaneously.
[288] Ibid. 30b.
[289] The condition that an intellect in the realm of Becoming requires a soul and body might suggest there might be a different condition for intellects in the realm of Being, i.e. the heaven of the Platonic Forms. The question of if the Demiurge has a soul and/or a body, in addition to its intellect is beyond the scope of this thesis.
[290] Ibid. 31a.

Proposition 1.6 – The Universe is an Image & The Image-Model Distinction

After outlining the distinction between Being and Becoming, Timaeus concludes that "by unquestionable necessity that this world is an image of something".[291] As shown in the previous proposition, the cosmos is modeled after the Demiurge itself and the intelligible Living Thing. I explain a provisional conceptual framework of an image and its model, based upon a later section of *Timaeus* 52c-52d. First, I think an image resembles and *is like* its model in some set of characteristics. To be an image, the image should have a minimum of one characteristic in common with the source model. If the image is completely different in every aspect from the model, then this image is not an image of that model. This bad image would just be a totally different object from the supposed model. In the ideal case, a good image would share multiple characteristics which maximize the resemblance and imitation of the model. For example, an image of exactly one red scalene triangle must at least have lines and colour. If this image did not even have lines and was transparent, it would be an incredibly deficient image, failing to be like a triangle in the crucial property of having lines. An image of a blue scalene triangle would be better, but still lacks in the colour trait to be a good image. Second, an image must be ontologically different from its source model. It stands in for, or represents, another thing; otherwise, the ontological distinction between the two things collapses and they become one and the same object.[292] If the image were totally identical in all features to its model, then the image and model are simply the same entity, or they would be two instances of the same type. Thus, according to the Being-Becoming metaphysics and the nature of images and models, the Demiurge is metaphysically required to create our cosmos with as many features in common (or in imitation of) the intelligible Living

[291] Ibid. 29b.
[292] Ibid. 52c.

Thing and itself. However, the cosmic crafting must not result in the image, the universe, and the models ontologically collapsing into each other.

I suggest that the distinction (and failed distinction) between image and model is exemplified by Plato's Allegory of the Cave. In Book 7 of *Republic*, Socrates describes a dark cave filled with prisoners chained in place, forced to only look forward and to look at a large wall. Behind the prisoners is a pathway and then a fire, which casts shadows of people, animals, and objects traveling on the pathway onto the large wall. The prisoners observe only imitations and shadows of the 'real' objects and so conclude that things like men, oxen, and amphoras are those shadows and their associated sounds and smells.[293] Analogously, within this image-model framework, there is a fundamental difference between the image of something (a shadow of a horse) and its source (a true horse). This distinction between image and model is affirmed in the *Timaeus*, at the onset of the cosmogony. Timaeus describes the creator deity as the craftsman who looks to the model of intelligible Being.[294] Also, he states that by the questioning necessity of the metaphysical distinction between Being and Becoming, that the cosmos is an image of something.[295] Since the Demiurge is the craftsman who looked to eternal Being, then the cosmos is an image of Being. This Being is primarily the Living Thing and secondarily the Demiurge himself, as I argued in Proposition (1.4), such that the cosmos resembles the Living Thing and the Demiurge.

[293] Plato, *Republic* 514a-515c.
[294] Plato, *Timaeus* 28a-28b.
[295] Ibid. 29b.

Proposition 1.7 – The Receptacle is Entailed from the Initial Being-Becoming Metaphysics & The Image-Model Distinction

The ontological separation between Being and Becoming generated the need for a cause of the beginning of our cosmos.[296] Timaeus describes the craftsman Demiurge as the creator of the universe, who requires a model to guide the design of cosmic creation.[297] Although Timaeus suggests later on that the account is lacking and requires a metaphysical third kind[298], I argue that the necessity of the third kind directly follows from the nature of images and models and Plato's metaphysics of Being and Becoming. An image must be somewhere or be in something. However, at the start of the cosmogony, there is only Being and Becoming and Being can never enter into nor receive anything into itself.[299] Yet, to maintain the ontological distinction between Being and Becoming, it must be the case that "neither of them ever comes to be in the other in such a way that they at the same time become one and the same, and also two".[300] If Being and Becoming were ever put together, then they would have the paradoxical nature of being both two entities and one entity at the same time. But this mixing would destroy Being, since Being would then become something else. This axiomatic ontological distinction between Being and Becoming prevents their intermingling or mixture in terms of being "in" or standing in each other.[301,302] Therefore, to avoid the ontological collapse explained earlier in Proposition (1.6) and the destruction of the very foundational metaphysics of the *Timaeus*, the third kind of the Receptacle is entailed. With the

[296] This is Proposition (1.1) and (1.2).
[297] Plato, *Timaeus* 28a-28b.
[298] Plato, *Timaeus* 48e-49a.
[299] Ibid. 52a-52b.
[300] Ibid. 52c-52d.
[301] This idea might elucidate the seemingly bizarre ingredients of the World-Soul, which are Being, the Same, and the Different. This section states there are two varieties of Being, the Same, and the Different. There is the indivisible eternal variety of Being, the Same, and the Different and a divisible corporeal form which comes to be in the universe (Plato, *Timaeus* 35a-37c). It is unclear to me what a 'divisible corporeal' form of Being even is.
[302] Timaeus seems to suggest that the ontological collapse of sensible Becoming and Being entails a form of subjective idealism when he ponders the nature of sense perception: "are the things we see, and whatever else we perceive through the body, the only things that possess this kind of actuality?" (Plato, *Timaeus* 51c).

Receptacle, both Becoming and Being are separated and do not risk collapsing into a bizarre hybrid of Becoming and Being. In terms of images of the model of Being, any images of Being are safely put somewhere, in the Receptacle, and also the images of Being avoid ontological collapse into their source models of the Beings of the Living Thing and Demiurge. With this clarification of Being, Becoming, and the status of images (or resemblances) of Being in mind, I will later elucidate the nature of Receptacle is the space and place of ordered Platonic compounds, which are cast into an image of Being.[303]

Proposition 1.8 – The Metaphysics of Being-Becoming & the Image-Model Distinction Entails a Problem of Participation

I argue that the Being-Becoming metaphysics and the image-model distinction also generates another problem. If the Demiurge is to make the universe resemble the intelligible Living Thing and itself, then it seems that the god must somehow cause, bring, or impose some minimum set of qualities or characteristics of the intelligible object into the realm of Becoming. As shown in Proposition (1.4), both the Demiurge and the Living Thing are intelligible beings. Yet, it is incoherent to suggest that something, which 'came to be', can be given or gain intelligibility. This problem extends to the eternal nature of both beings, as again, something which 'came to be' cannot gain the trait of eternity because this is forbidden by the terms of the metaphysical distinction between Being and Becoming. However, the Demiurge need not bring Being into Becoming per-se. As I argued earlier, an image need only share one characteristic with its model to qualify as an image, albeit a very deficient image.

I argue that the underlying problem is it is unclear what the characteristics of an intelligible being that can be caused, brought about, or imposed into the universe of sensible Becoming. This problem is the problem of resemblance or of participation in intelligible Being. The realm of

[303] I explain my concept of 'ordered Platonic compounds in Proposition 4.

Becoming must be made into an image and that image must resemble its model of intelligible Being in some minimal way. I answer this problem in a later section on the nature of Platonic compounds. For now, I must first establish my distinction between ordered and disordered Becoming.

Proposition 2 – The Two Kinds of Sensible Becoming

Proposition 2.1 – The Universe is the Realm of Becoming

As shown earlier in Proposition (1.2), the universe came to be, is visible and tangible, and has a body. Likewise, Timaeus described the cosmos as the "universe of becoming"[304]. Following the metaphysics of Being-Becoming, I immediately identify our universe as the realm of Becoming, or simply Becoming, since it is sensible and always changing and because epistemic access to the universe is derived from sense perception.[305]

Proposition 2.2 – Becoming can Change from Disorderly to Ordered

I argue that Becoming has two forms, ordered Becoming and disordered Becoming. Timaeus states that Being, the Receptacle, and Becoming are the only "three distinct things that existed even before the heavens came to be"[306]. As the realm of Becoming, our universe was encountered by the Demiurge, "not at rest, but in [a state of] discordant and disorderly motion"[307] and only after the intervention and activity of the Demiurge was the initial state of disordered changed into a state of harmonious order, a world order or cosmos.[308] In the pre-cosmic universe, there are occasional and fleeting instances of proportionality in the elements that happen only by

[304] Ibid. 29e.
[305] For the rest of the chapter, I will clearly distinguish between the universe (or cosmos) of becoming and the metaphysical kind of Becoming. The' universe of Becoming' is intended to emphasize the dynamic nature of sensible qualities that characterize our current universe. Metaphysical Becoming is strictly the general phenomena of change and becoming, in opposition to eternal intelligible Being.
[306] Plato, *Timaeus* 52d.
[307] Plato, *Timaeus* 30a. This quotation is modified from Zeyl's translation.
[308] Maso 2018, 43-44.

chance.[309,310] Gorey describes the pre-Demiurge cosmos as "a multitude of unbalanced proto-elements of qualities, which shift haphazardly like grain and caff in a winnowing basket".[311] Vlastos[312] also describes the pre-cosmic state as one characterized by chaos, erratic motion, and a constant becoming and change of elements in a "vague, indefinite priority and succession".[313] It was only during intervention of the Demiurge, called "the ordering of the universe",[314] that the god found these traces of the elements lacking proportion and form and then gave "them their distinctive shapes, using forms and numbers."[315] Therefore, I conclude that there are two possible states or kinds of Becoming: ordered Becoming and disordered Becoming.

Proposition 2.3 – Becoming can also Change from Order to Disorder

Becoming is capable of being either ordered or disordered, changing from either state into the other. I argue this claim is supported by and consistent with the cosmogony in three ways. Foremost, we have shown in Proposition (1.2) that Becoming (or the universe) can become ordered cosmos via the activity of the Demiurge. Second, the Demiurge acknowledges the possibility of the ordered cosmos dissolving back into disorder and chaos. After generating the entire Hesiodic and Homeric pantheon of gods, the creator commands them to finish building the universe by creating three kinds of living animals and the human race to fill the universe with life.[316] The craftsman says that "anything that is bound is liable to being undone, still, only one who is evil would consent to the undoing of what has been well fitted together and is in fine condition"[317]. The god is referring to when it collected and bound together the four elements into the well-fitted

[309] Gorey 2018, 107-110.
[310] Petrucci argues that the pre-cosmic traces of the elements randomly participate in Platonic Being, but the chaotic traces constantly change and generate new instances of properties and participation in Being (Petrucci 2023, 51-63).
[311] Gorey 2018, 106.
[312] Vlastos, Gregory. 1939. "The Disorderly Motion in the *Timaios*." *The Classical Quarterly* 33 (2): 71-83.
[313] Vlastos 1939, 77.
[314] Plato, *Timaeus* 53a.
[315] Ibid. 53a-53b.
[316] Ibid. 40d-41d.
[317] Ibid. 41b.

body of the universe [318] and when it "divided up and bound together in various proportions"[319] the three ingredients of Being, the Same, and the Different to construct the soul of the universe.[320] Thus, by the Demiurge's own words, it could dissolve the bonds that hold together creation. However, due to its wholly benevolent nature, the father and maker of all Becoming would never undo his beautiful and excellent creation.

Third, Becoming is that which is always changing and never eternal. However, I argue that the idea of 'ordered Becoming' is not in contradiction with these fundamental traits of Becoming and is fully consistent with the general nature of Becoming. One case is simply any entity or phenome that changes over time in any characteristic. In a second case, a process or entity can be an instance of Becoming if it undergoes cyclical processes. A constantly changing, but regularly bound and repeating process still lacks eternity since there is always some coming to be and passing away of during the cyclical phenomena. Such a phenomena as a whole never really *is*. For example, butterflies have not always existed[321] and likewise the life cycle of a butterfly. Within the Platonic universe, the life cycle of butterflies and other winged insects are sempiternal, having been made at the beginning of time and carrying onwards into the future.[322] In conclusion, I have shown that there are two varieties of Becoming, ordered or disorderly Becoming, which can change from one form of order to another form of disorder, or vice-versa. In the next two propositions, I explain the nature and specific characteristics of order and disorder as characterized in the *Timaeus*.

[318] Ibid. 32b.
[319] Ibid. 37a.
[320] The exact nature of the entities of Being, the Same, and the Different are outside the scope of this thesis.
[321] This is true for both the creation account of *Timaeus* and contemporary evolutionary biology.
[322] See the creation of living things at Plato, *Timaeus* 41b-41d.

Proposition 3– The Nature & Characteristics of Order & Disorder

In this third set of propositions, I want to emphasize and clearly show how order and disorder in the *Timaeus*. I show that order is characterized by beauty, a sense of qualitative proportionality, and an explicit form of mathematical and geometric proportionality and regularity. Meanwhile, disorder is characterized by the opposite qualities held by order. This collection of sub-propositions on order and disorder will build towards my characterization of mathematical and geometric regularity as images of Being.

Proposition 3.1 – Order is Characterized by Beauty & Resemblance to an Intelligible Model

The orderly state of the cosmos is due to the Demiurge constructing and designing it according to an intelligible model. The god brought the initially chaotic and disordered universe into a state of order and it designed the new orderly cosmos according to an eternal changeless model. First, Timaeus explains that "all that is good is beautiful, and what is beautiful is not ill-proportioned".[323] The universe is beautiful, since both its elemental body is a "symphony of proportion"[324] and the World Soul is constructed and turns according to elegant mathematical proportions.[325] Furthermore, since anything that is crafted according to an intelligible model is beautiful,[326] and the Demiurge produced an ordered universe according to two intelligible models, itself and the intelligible Living Thing, the order and orderliness of the universe is characterized by beauty.

Proposition 3.2– Order is Characterized by Harmonious Proportionalities of the Body and the Soul of the Cosmos

The orderly state is characterized by how the Demiurge cast the universe's body and soul in various forms of proportionality. First, the god initially built the body of the universe out of

[323] Ibid. 87c.
[324] Ibid. 31b-32c.
[325] Ibid. 36d-37a.
[326] Plato, *Timaeus* 28a-28b.

tangible earth and visible fire. However, it reasoned that these two elements required a third element to unify and bind them together. Since the universe is three-dimensional, a fourth element was needed to bind the three initial elements together.[327] Thus, the craftsman made the qualities and powers of the four elements of fire, air, water, and earth proportional to each other so that "what fire is to air, air is to water, and what air is to water, water is to earth"[328]. Moreover, this harmonious configuration of the four elements is called a "symphony of proportion"[329]. Second, the god imposed mathematical proportionality to the World-Soul by blending together Being, the Same, and the Different into a single mixture and subsequently portioning the mixture according to a mathematically harmonic series of ratios associated with Pythagorean tuning.[330,331,332] Furthermore, the components of World-Soul, the two rings of 'The Same' and 'The Different', undergo proportional and balanced rotational motion with respect to each other as they push the seven planets and the firmament of fixed begin their regular motion around the Earth.[333]

Proposition 3.3– Order is characterised by Regular, Proportional Motion, especially Rotational Motion & Intellect

The orderly state of the cosmos is characterized by regularized and proportional motion. The regularized motion of the cosmos is seen in the design of the elemental body of the cosmos. Before the intervention of the Demiurge, the body of the universe originally had seven possible motions within three-dimensional space, which are up, down, left, right, forward, backwards, and rotation about an axis.[334] However, the Demiurge removed the six rectilinear motions from the

[327] Ibid. 31b-32b.
[328] Ibid. 32b.
[329] Ibid. 32c.
[330] Ibid. 35a-36c.
[331] The last proportion of the series of ratios is 256:243, which is the value for a semitone in Pythagorean tuning.
[332] The Pythagorean tuning is a musical tuning system where the musical intervals between tones within an octave are constructed using the interval of the fifth, or in ratio form 5:4.
[333] Plato, *Timaeus* 36d-37a.
[334] Ibid. 52e-53b. The universe is described as being shaken and swayed back and forth by the erratic motion of the chaotic traces of the four elements.

overall body of the cosmos and "set it turning continuously in the same place, spinning around upon itself".[335] Within the cosmos, there is still local rectilinear motion. This rotational motion of the overall body is associated with order in two ways. First, the rotational motion is described as being associated with understanding and intelligence.[336] The connection between rotational motion and intellect is seen in the exemplary of the living cosmos itself with its World Soul, which was "woven together with the body from the center on out in every direction to the outermost limit of the heavens"[337] and revolves within its body and so initiated a "divine beginning of unceasing, intelligent life for all time"[338]. The World-Soul in its sempiternal rotation "shares in reason and harmony"[339] and it cognizes, thinks, and comprehends sameness and difference when its component rings contact things "whose being is scatterable or else with something whose being is indivisible"[340]. It is by the governing of the World-Soul over its elemental body that these traits of order and rational regular motion are established.[341] Thus, the example of the cognizing cosmos and its rotational motion shows the close association between intellect and rotational motion.

Second, the rotational motion is itself orderly because it undergoes repeated, regular, and not random motion. The trajectory of the World-Soul and of rotational motion are stable and sempiternal, which therefore makes it predictable and orderly. From the close association between order and rotational motion, I also propose that order is characterized by intellect and reason.

[335] Ibid. 34a.
[336] Plato, *Timaeus* 34a.
[337] Ibid. 36e.
[338] Ibid.
[339] Ibid. 37a.
[340] Ibid. 37a-37c.
[341] Vlastos 1939, 77-83.

Proposition 3.4 – The Natural State of the Universe is Random Unstable Disorder

The natural state of the universe, before the Demiurge encountered it, is described as "thoroughly god-forsaken"[342] and described, even in the current age, as being "the whole realm of the casual and random"[343] by Timaeus. The random nature of the pre-Demiurgic universe is one where the occurrence and proportionality of the elements (and their powers) would randomly and sporadically become proportioned.[344,345] As noted earlier, limited and fleeting instances of proportionality in the elements occurred during the pre-Demiurge universe, but it happened only by chance.[346,347] In other words, the proportionality never is stable nor enduring, but always changes. It is only by the intervention of the Demiurge, as an ordering power, in a chaoskampf[348] with the chaotic realm of Becoming, that our cosmos is born.

Proposition 3.5 – Erratic Motion in Six Directions

Although the visible elements of the universe were initially in "discordant and disorderly motion",[349] as yet I have not clearly explained what constitutes disorderly motion. Disorderly and erratic motion is characterised by motion that involves combinations of the six rectilinear directions of motions. Again, the local internal motions with in our three-dimensional universe are motions in the directions of up, down, left, right, forwards, and backwards.[350] However, as noted in the previous section, these types of motion are contrasted with the seventh kind of motion,

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[342] Ibid. 53b.
[343] Ibid. 34c.
[344] Ibid. 69b.
[345] Gorey argues that such sporadic and random motion is one piece of evidence that the pre-Demiurgic cosmos is intended to be a demonstration of the nature of a purely 'materialistic' and non-teleological universe (Gorey 2018, 107-110).
[346] Ibid.
[347] Petrucci 2023, 51-63.
[348] A chaoskampf, German for chaos-struggle, is a recurring Old-World mythological motif where a god battles with, subdues, or kills the primordial chaos, often in the form of a sea serpent, dragon, or beast, and thereby establishes the beginning of a new cosmos order. Whitney, K. William. 2006. "The Chaoskampf in Modern Scholarship." In *Two Strange Beasts - Leviathan and Behemoth in the Second Temple*, 1-2. Brill.
[349] Plato, *Timaeus* 30a.
[350] Ibid. 43b.

rotational motion, the orderly motion of the cosmos as a whole, which is associated with understanding and intelligence.[351]

Proposition 3.6 – Absence of Intellect and Soul

In parallel with the characteristics of order, another major characteristic of disorder is the absence of both intellect and soul. The absence of regular orderly motion and the predominance of rectilinear motion in the chaotic phase of the universe entails an absence of intellect and soul. Thus, disorder is tied to the lack of both intellect and soul.

Proposition 4 – The Nature of Platonic Compounds & Platonic Matter

In the previous two major propositions, I have discussed the nature and qualities of order and disorder, as well as my characterization of orderly Becoming and disordered Becoming. In this proposition, I tie together my account of the Receptacle and my characterization of Becoming to construct my account of Platonic compounds. I argue, contra Riel, Cornford, Buckels, and Mohr, that the *Timaeus* has an account of matter, where Platonic matter is identified the Receptacle. However, Platonic matter is distinct from (and is a component of) Platonic compounds. Platonic compounds are composed of three parts: the Receptacle (which is both space and Platonic matter), (disordered or ordered) Becoming, and images of intelligible Being.

Proposition 4.1 – In the *Timaeus*, The Four Elements are Becoming

I argue that the sensible four elements are Becoming.[352] First, within the Being-Becoming metaphysics of the *Timaeus*, the totality of all metaphysical things consists of all intelligible Beings and sensible Becoming. Second, the universe is the realm of Becoming[353] and, as shown in my Propositions (1.7) and (1.8), intelligible Being cannot ever be mixed with sensible Becoming. Third, the current ordered cosmos, in which mankind inhabits, is sensible, consists of various

[351] Ibid. 34a.
[352] As given earlier, the sensible elements are the perceived tangible and visible stuff, the four elements and their compounds, which everyone observes every day.
[353] See my Proposition (2.1).

objects and materials, and the cosmos is visibly filled with the sensible elements of fire, air, water, and earth. Thus, the only viable metaphysical candidate for classifying all the sensible elements is Becoming. Furthermore, this conclusion is still valid even if one includes the Receptacle as a third potential candidate. The Receptacle is eternal and cannot be destroyed, but this immediately disqualifies identifying the four elements with the Receptacle because the four elements are constantly changing and transforming, such that any particular instances of the elements are always being generated and passing away into nothing. Therefore, I think it is fair to equate the sensible elements with only Becoming. Note, in the next sub-proposition, I explain the specific nature of Platonic compounds and the two varieties of sensible Platonic compounds.

However before moving on, I want to clarify my intent behind my definition of Platonic compounds further. All of my previous propositions have built up towards giving the specific qualities and attributes of the sensible objects, materials, and the four elements of the world and how Platonic compounds fit into the wider ontological framework of the *Timaeus*. First, in the literature around the *Timaeus*, namely the nature of the geometric construction of the elements, Plato's system is put in analogy with contemporary chemistry and even called "Platonic chemistry"[354] and the different grades of the basic triangles are referred to "isotopes"[355] of the atomic triangles. I propose that these authors have excessively framed Plato like a modern-age chemist and anachronistically framed his geometric construction in modern materialist lights.[356] Yet, this anachronistic framing smuggles in some vague and naïve meaning of 'matter' since matter is never explicitly defined in their works on the matter. For example, Visintainer calls

[354] See both Visintainer 1998, 117-120 and Lloyd 2007, 99-101.
[355] Vlastos 1981, 368.
[356] Visintainer says, "Plato's ideas appear more tenable when we consider that the way reactions take place in the Platonic chemistry are analogous to the way that chemical reactions are said to take place by modern chemistry". (Visintainer 1998, 17). Similarly, Lloyd states that in the second half of the *Timaeus*, "Plato sets out a scheme for what we now call chemistry, biochemistry, and human biology"(Lloyd 2007, 98-99).

Plato's geometric account of the four elements, "a great speculative advancement in the history of chemistry" after analogizing how the basic triangles, that constitute an octahedron of water element, are like the contemporary atomic elements of oxygen and hydrogen that constitute a water molecule.[357] Visintainer's analogy relies on the modern atomic theory of matter and chemistry, where the underlying matter of all objects is their chemical atoms. Two, other authors like Riel and Buckels,[358] explicitly analyse the *Timaeus* in light of how the text can be misread and mis-framed in Aristotelian terms. In brief, the question of whether Plato has a theory of matter becomes whether Plato has an Aristotelian theory of matter. Riel proposes that a careful study of the Platonic corpus reveals that Plato lacks a concept of matter, as Plato is fundamentally an anti-materialist.[359] However, the sense of matter used by Riel is in the context of rejecting an Aristotelian reading of the *Timaeus.* He notes that even the Middle Platonists, Neo-Platonists, and Aristotelians have insisted that Plato posits the Receptacle as matter. [360] Buckels aptly explains that the Receptacle is misconstrued as a substratum of ordinary materials where all particular objects and things are "form-matter compounds – like Aristotelian substances – to which Forms supply the properties and the receptacle supplies the matter"[361]. Keeping in mind Riel and Buckels, I propose that the definition of the elements as sensible Becoming avoids chemical anachronism and does not presume an Aristotelian definition of matter. Since I am only interested in (and defining Platonic compounds as) the four elements and the ordinary sensible compounds of the elements into common materials and objects, I am building my interpretation on Plato's terms and not on the terms of a later age. Now, I proceed to describe the two kinds of sensible Platonic compounds.

[357] Visintainer 1998, 117.
[358] See both Riel 2021, 169-172 and Buckels 2016, 313-314.
[359] Riel 2021, 169.
[360] Ibid. 169-172.
[361] Buckels 2016, 304.

Proposition 4.2 – The Two Kinds of Platonic Compounds: Disordered & Ordered Compounds

There are two kinds of Platonic compounds in *Timaeus*. One, disordered (or chaotic) sensible compounds are disordered sensible Becoming. It has the characteristics previously discussed, like being sensible, non-eternal, lacking regularity in structure, and undergoing chaotic random rectilinear motion and rotational motion, and spontaneous elemental transformations. By accident, it can mimic or resemble intelligible Being and be proportioned, but quickly dissolves back into chaotic becoming. The disordered aspect also refers to the lack of proportionality and therefore a lack of beauty. Two, ordered sensible compounds are regularized and ordered Becoming in the current geometrically constructed four elements. Ordered Platonic compounds undergo orderly motion within the body of the cosmos via the mathematically well-proportioned inter-transformations between the four elements in their current geometric constitution and in the rules of numerical proportions for how different elemental solids can decompose into basic triangles and later recombine into other elemental solids. These transformations are sempiternal[362] in how the Demiurge made the ordered cosmos continue spinning about itself[363] and live an "unceasing, intelligent life for all time".[364] However, an ordered Platonic compound's status as an image of intelligible Being, or of the eternal model, needs to be explained in greater depth in the following two propositions.

Proposition 4.3 – Ordered Platonic Compounds are Constructed in a Geometric Nature & Gain Ordered Sensible Qualities

After explaining the necessity and role of the Receptacle, Timaeus affirms that one proposition within his account must always be held true, that the Demiurge "fashioned these four

[362] A thing is sempiternal if it has a temporal beginning. But it continues to exist onwards into the unbounded and infinite future (Plato, *Timaeus* 38b). Eternity encompasses the infinite past and infinite future simultaneously.
[363] Plato, *Timaeus* 34a.
[364] Ibid. 36e.

kinds [the elements] to be as perfect and excellent as possible, when they were not so before"[365] in their distinctive shapes using number and forms. The numbers and geometric structure are the geometric instantiation and construction of the four elements. Thus, he presents the geometric construction of the four Platonic elements of fire, air, water, and earth, beginning with two basic triangles.[366] The first basic triangle is the right-angled scalene triangle which has sides of lengths $1: 2: \sqrt{3}$. The hypotenuse has a length of $\sqrt{3}$ units, while the remaining shorter sides have lengths of one unit and two units, respectively. This basic scalene triangle is half of an equilateral triangle with all three sides of two units of length. The second basic triangle is a right-angled isosceles triangle with sides of lengths $1: 1: \sqrt{2}$.[367] Its hypotenuse has a length of $\sqrt{2}$ units.

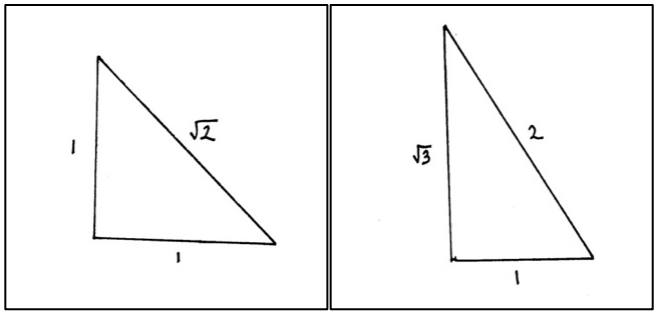


Figure 1 - The two basic triangles.
On the left is the isosceles and on the right is the scalene.[368]

Using the four isosceles triangles, a square is constructed. At the centre of the square, the right-angle corners of the four isosceles triangles touch each other. This square face forms one of the six faces of a cube, which is the geometric instantiation of the element of earth. Using six scalene triangles, a larger equilateral triangle is constructed. Two scalene triangles are connected

[365] Ibid. 53b.
[366] Ibid. 53c-54a.
[367] The definition of an isosceles triangle is a triangle with two sides of equal length. Thus, all right-angled ***isosceles*** triangles have the exact same proportions. They all differ only by the relative length of the two equal sides.
[368] These diagrams are taken from Cohen's website: Cohen, S. Marc. 2015. "Plato's Cosmology: The *Timaeus*." Philosophy 320 - History of Ancient Philosophy. University of Washington. 2015 July 25. Accessed June 9, 2024. https://faculty.washington.edu/smcohen/320/timaeus.htm.

along their shortest sides, such that both of their right-angles are in contact to form a straight angle of 180 degrees. This construction is done three times in total. Then three of these bigger triangles are connected. The corner (that is opposite and away from the two original right-angle corners) is placed in contact with the corners of the two other bigger triangles. The resulting large equilateral triangle, made of six scalene triangles, forms the basic face for fire, air, and water. From the large equilateral and square, the four elemental solids are constructed: Fire is cast as the tetrahedron, air as the octahedron, water as the icosahedron, and earth as the cube.[369]

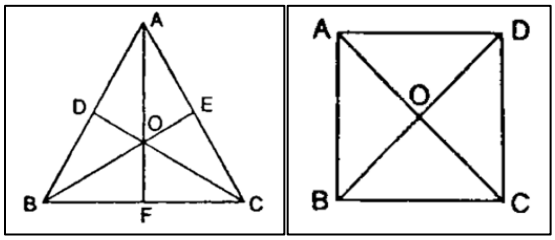


Figure 2 - The major faces of the Platonic solids.
The equilateral triangle (left) and the square (right).[370]

To account for the vast variety of sensible materials and objects of the world, Timaeus gives two explanations. First, that most materials are mixtures or compounds of various proportions of the four solids. Ice is a mixture of water and earth, whereby heating (or an attack by fire particles) liberates the earth particles from the ice mixture, allowing water particles to freely move about.[371] Second, there are different grades[372] of the four elements consisting of basic triangles of differing sizes, which are "both smaller and larger, numerically as many as there are varieties within a given form".[373] Two examples of such differing grades of an element are two

[369] Plato, *Timaeus* 54c-55c.
[370] The image of the large equilateral face is from Zeyl 2000, 45, n.62 and the image of the square face is from Zeyl 2000, 46, n.66.
[371] Plato, *Timaeus* 58d-59a.
[372] I suggest that the grades of the Platonic elements resemble, but are not identical to, chemical isotopes. In our system, elements differ by number of protons, which in turn determines the electronic (chemical) interactions. An isotope of an element bears a different number of neutrons, which do not affect the electronic interactions. Thus, an isotope of oxygen is an instance of oxygen, analogous to how one grade of tetrahedron-fire is an instance of tetrahedron-fire.
[373] Plato, *Timaeus* 58d-59a.

explicitly described grades of fire and the only two types of water. There is "both flame and the effluence from flame which, while it does not burn, gives light to the eyes".[374] Water is "divided into two groups, the liquid and the liquifiable",[375] where the first type is simple flowing water and the second type is a water responsible for solids like metals having a flowing nature.[376]

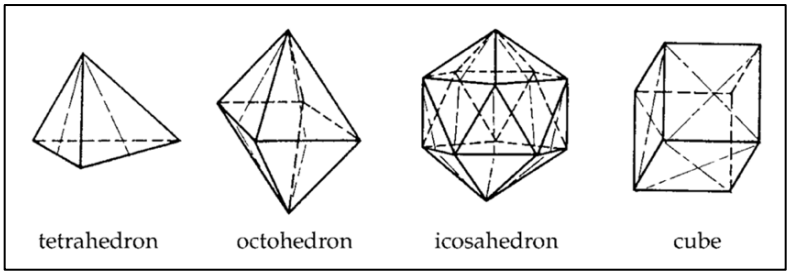


Figure 3 - The four Platonic solids used for the four elements.[377]

The geometric nature of ordered matter does not end at its mere construction. The geometric properties are tied into sensible qualities of the four elements. The perceived stability of the earth element and its resistance to motion is due to the relative stability of the elemental cube. The stability derives from the fact that the square face "holds its position with greater stability than does the equilateral triangle"[378]. Fire is naturally destructive and painful to touch because of the sharpness of its tetrahedron corners, which can strike, puncture, and dissolve other elemental particles into their constituent basic triangle. Timaeus assigns water to the twenty-sided icosahedron since water is the third most immobile of the elements and the icosahedron is the third most immobile solid.[379] The fewer equilateral triangle faces that an elemental particle has, the greater its mobility and ability to move around.[380] Thus, octahedron particles of air with their eight

[374] Ibid. 58d.
[375] Ibid. 58d-59a.
[376] The remaining third of the *Timaeus* presents an account of sense perception and biological organs derived from the Platonic theory of the elements. See: Plato, *Timaeus* 64a-92c.
[377] This is Figure 1 of Zeyl's introduction on the *Timaeus*: Zeyl 2000, lxvii.
[378] Plato, *Timaeus* 55e.
[379] Ibid. 554-56a.
[380] Based on the geometric properties of the Platonic solids, I would account for the flowing nature of water by assigning it to the twenty-sided icosahedron, a relatively round shape and the greatest geometric resemblances to the

faces (between the four faces of fire tetrahedron and the twenty faces of water icosahedron) are more mobile than water, but less mobile than fire.[381]

Proposition 4.4 – The Geometric Construction is an Image (Resemblance) of Intelligible Being

I argue that the geometric construction previously outlined is an image (or resemblance) of intelligible Being.[382] Also, I argue for a distinction between the intelligible Being, or Form, of 'geometry itself' and the geometric construction. First, Timaeus affirms that "there exists an intelligible Form for each thing"[383]. Therefore, for the geometric construction (the process of the constructing the basic triangles, larger faces, and solids, and the numerical relationships between the solid), there is an intelligible Form. I name the intelligible Form of the geometric construction as the intelligible Being of 'geometry itself'.

Second, ontologically the geometry construction cannot be any Being. The geometric principles, which underlie and order the geometric solids of the elements, and the elements themselves are instantiated inside our universe, in the universe of Becoming. However, Becoming cannot host nor hold any sort of Being, else that would violate the distinction between an image and its source model.[384]

Third, the geometric construction is only sempiternal and not eternal. Any candidate for a Being must be eternal. The geometric construction is the ordering principle which was impressed onto chaotic matter at the beginning of time at the creation of the universe.[385] The Demiurge

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sphere. With its round shape, it would explain why water natural flows, or rather rolls easily. Likewise, water would oppose fire in how the tetrahedron would the sharpest of the elemental solids, while water would be the bluntest solid.

[381] Ibid. 56a-56b.

[382] This view is shared by Archer-Hind, who says that though Plato establishes matter into "the ultimate geometrical forms, which are the law of its composition, but these are not properly speaking ἀρχή" (Archer-Hind 1888, 169).

[383] Plato, *Timaeus* 51c.

[384] Ibid. 52b-52c.

[385] The status of time in the *Timaeus* is disputed since the beginning of the cosmos might suggest a pre-cosmic time. See a study of the debate about question of a literal pre-cosmos time in Timaeus: Vázquez, Daniel. 2022. "Before the

modeled our ordered cosmos according to intelligible Being, which would make our universe beautiful.[386] Thus, he cast and ordered the chaotic disordered Becoming into "their [current] distinctive shapes, using forms and numbers".[387] Due to the distinction between images and their models, I cannot identify the geometric figuration of the four elements as the model, some intelligible Being. Rather, the geometric construction must be the image and instantiation of the intelligible Being of 'geometry itself'. Furthermore, the specific instantiations of the geometric construction, the elemental solids, are constantly dissolving into component triangles over time, moving through space, and forming different compound materials as they move through the world in their cycles of inter-transformations.[388]

Fourth, the geometric construction shares key features that make it resemble the intelligible Being of 'geometry itself'.[389] The geometric construction is sensible and non-eternal, but it is intelligible too. The sensible properties of the four elements is due to their geometric construction.[390] Although one initially grasps geometry with aid of visible perception via diagrams and tactile feedback by feeling objects with various shapes and sizes, 'geometry itself' is an intelligible Being. The intelligible Being of geometry and its propositions are rationally constructed and reasoned out, like in the case of Euclid's Elements[391], even though geometric reasoning and these propositions often use an initial base of sense perception. Thus, following the epistemic distinction between Being and Becoming, the perceptible geometry (that constitutes the elemental solids) does not fully qualify it as an instance of Being because this geometry is

Creation of Time in Plato's *Timaeus*" In *Time and Cosmology in Plato and the Platonic Tradition*, edited by Daniel Vázquez and Alberto Ross, 111–133. Brill.

[386] Plato, *Timaeus* 28a-28b.

[387] Ibid. 53b. This translation is modified from Zeyl.

[388] Ibid. 56d-58a.

[389] Plato, *Republic* 509d5-511e5.

[390] This was shown in Proposition (4.3).

[391] The entirety of Euclid's Elements consists of axioms, postulates, propositions, and geometric demonstrations: Euclid. 2008. *Elements.* Based on Greek text of J.L. Heiberg (1883–1885). Translated by Richard Fitzpatrick.

instantiated in the realm of Becoming. Instead, it is fair to conclude that geometric construction is an image of Being that resembles and *is like* the intelligible Being of geometry.

Proposition 4.5 – The Geometric Construction of the Elements Grants Perfection, Excellence, Beauty, and Proportionality

As stated in Proposition (4.3), the Demiurge's geometric fashioning of the elements made the four as "perfect and excellent as possible, when they were not so before"[392]. Furthermore, since the entire design of the universe is based on the intelligible model of the Living Thing and the Demiurge, all that the god made must be beautiful. Furthermore, "all that is good is beautiful, and what is beautiful is not ill-proportioned"[393], such that what is beautiful is well-proportioned. Thus, we know that the geometrically ordered elements are not only proportioned in the pure structural and geometric sense, but also well-proportioned in the sense of aesthetic beauty.

Proposition 4.6 – Ordered Platonic Compounds have an Epistemic & Ontological Status Between Disordered Becoming & Being

Ordered Platonic compounds (ordered Becoming) are distinct from disordered Platonic compounds (disordered Becoming). The regularized and geometric nature of ordered Platonic compounds grant it a resemblance and likeness to intelligible Being, I argue that the geometric nature produces a unique intermediate epistemic status between the pre-cosmic entities of chaotic sensible Becoming and intelligible Being. I identify this unique epistemic and ontological status with the middle sections of the Divided Line from Plato's *Republic*[394]. I think it is fair to borrow an analogy from the *Republic* because the true introduction[395] to the *Timaeus* begins with Socrates and his friends reviewing an imagined city-state with strong resemblance to Kallipolis.

[392] Ibid. 53c.
[393] Ibid. 87c.
[394] Plato, *Republic* 509a-511e.
[395] Plato, *Timaeus* 17a-19b.

In Book 6 of the *Republic*, Socrates presents a line composed of four sections representing four levels of ontological status. For simplicity, I name the four sections A, B, Γ, and Δ. Socrates describes how the upper line sections A and B are intelligible kinds, while the lower sections of Γ and Δ are visible kinds.[396] Section A is the Platonic Forms, intelligible Being. Section B includes geometric figures and mathematical objects of "the odd and the even, the various [geometric] figures, the three kinds of angles".[397] Section Γ is sensible objects in the ordinary world like animals, plants, and manufactured goods, and Section Δ is images or representations, like the reflections and shadows of sensible objects.[398] Socrates describes the relative epistemic status of the upper intelligible section (A and B) to the lower sensible section (Γ and Δ) as a ratio whereby "as what is believed is to what is known, so the likeness is to the thing it is like".[399] This description in the *Republic* mirrors a comment by Timaeus about images and their models. An account of stable things (Being) is itself stable and an account of things which are likenesses or models (Becoming) is itself only likely, such that the likely accounts stand in proportional relationship to the stable accounts. Timaeus concludes with an epistemic analogy that "what being is to becoming, truth is to convincingness",[400] which maps on well to the relative epistemic status of the upper intelligible and lower sensible sections of the Divided Line in the *Republic*.

As noted earlier in Proposition (4.4), the geometric construction of the elements is itself an image of the intelligible Being of geometry itself since Beings cannot be in the universe. Likewise, numbers are themselves also images of eternity since time, within our cosmos, is made to be a moving image of eternity according to numbers.[401] The ordered elements are cast into an image of

[396] Plato, *Republic* 509c10-510a.
[397] Ibid. 510b10-511b5.
[398] Ibid. 509d5-510a10.
[399] Ibid. 510a5.
[400] Plato, *Timaeus* 29b-29c.
[401] Ibid. 37e.

Being via their geometric construction, while still being tangible and visible, continuously becoming and transforming in regularized cycles within numerically ordered cosmic time. Since the geometric construction is intelligible, but not eternal, it would be section B. Then chaotic and disorderly Becoming, which never is and always changes, with its sporadic resemblance to Being and the traces of the elements, would be section Δ. Thus, based on the identifications of the geometric construction with section B and the initial disordered Becoming of the pre-cosmic universe, the current ordered cosmos with its geometrically constructed elements can be identified as (or is well represented by) the middle sections of both B and Γ.[402] In short, I propose identifying the disordered pre-cosmic universe with section Δ, the current ordered cosmos with section Γ, the geometric construction of the elements, which is in the cosmos, as section B, and eternal intelligible Being, which is not in any place like the cosmos, with section A.

Due to this mixed epistemic and ontological status, ordered sensible Platonic compounds, in its most basic form of the four geometrically constructed elements, can and do aid in grasping intelligible Being. First, the geometric constitution of the elements is an image of intelligible geometry and by carefully studying the image, one can eventually come to grasp the source model. Timaeus explains how the study of the images of the world can aid in grasping intelligible Being. He says that the careful and reasoned visual observation of the regular and harmonious motion of the seven heavenly wanderers and the regular circular orbits of the fixed stars produces the concept of sensible numbers and time, which form the intelligible studies of astronomy and arithmetic.[403] Furthermore, Timaeus calls vision a "gift from the gods"[404] to mortal man because astronomy and arithmetic have produced philosophy, which he is "prepared to declare this to be the supreme good

[402] Another way to say this is that the ordered cosmos is the harmonious mean of eternal Being (sections A and B) and every-changing Becoming (section Δ).
[403] Plato, *Timaeus* 47a.
[404] Ibid. 47b.

our eyesight offers us. Thus, the fields of mathematics, geometry, and astronomy (which were produced by the study of the heavens and the invention of numbers), as sensible and empirical sciences), aid humanity in grasping intelligible Being via these ordered sensible images, or models, of eternal Being.

Second, the entire *Timaeus* account is itself a demonstration of how the study and probing of the sensible, orderly cosmos can lead one to grasping intelligible Being. At *Timaeus* 47e, the entire account up to that point is called an account produced by Intellect and the remainder of the text tells how Intellect "prevailed over Necessity by persuading it to direct most of the things that come to be toward what is best, and the result of this subjugation of Necessity to wise persuasion was the initial formation of this universe".[405] The cosmos is the product of an intelligible Being, the Living Thing, and the power of the Demiurge over the chaotic pre-cosmic Receptacle and its disordered Becoming such that our cosmos was formed. Yet, earlier at *Timaeus* 47, Timaeus points out that, without sight and the study of the heavenly bodies, then "none of our present statements about the universe could ever have been made".[406] He is referring to the account according to Intellect whereby intelligible Beings, like the Living Thing and Demiurge, are revealed and taught to the readers of the *Timaeus* itself. Thus, the investigation of the sensible cosmos has aided and successfully brought forth understanding and knowledge of two intelligible Beings and introduced the very concept of eternal Being too.

Now, I draw another analogy from the *Republic* by following a work by Terrenal[407] to clarify this connection between the orderly geometric nature of the cosmos and how it could allow

[405] Ibid. 48a.
[406] Ibid. 47a.
[407] Terrenal, Quintin C. 1976. "Numbers as Hypotheses in Plato's The Republic, Books VI-VII." *Philippine Quarterly of Culture and Society* 4 (2): 140-149.

humanity to grasp intelligible Being".[408] Terrenal argues that Plato views numbers in the form of studying sensible objects as "the pattern for the viable understanding of the world"[409] and that the subjects of arithmetic, geometry, and astronomy should "draw the soul towards truth by producing philosophical understanding, directing the mind's upwards instead of downwards".[410] In the *Republic*, Socrates and Glaucon discuss the nature of arithmetic, geometry, and astronomy.[411] First, Socrates and Glaucon agree that the study of number, calculation and arithmetic, "obviously lead toward truth"[412] and they clarify that this truth is to grasp intelligible Being when Socrates and Glaucon agree that the proper end of the study of geometry is "compel one to look at being".[413] Furthermore, Socrates characterizes astronomy as the initial study of the ornaments of celestial bodies in the heavens and their beautiful motions and that the true number and geometric figures of their motion "must be grasped by reason and thought, not by sight".[414] However, Socrates does not totally reject engaging with the sensible heavens and he proposes that humanity "should use the ornaments in the heavens as models to help us study these other things".[415] The other things he refers to are the study of the first principles, intelligible Being, in analogy with how geometers use visible diagrams and models as aids "in seeking to see those other things themselves that one cannot see except by means of thought".[416]

Second, as noted in the *Timaeus*, sensible images of intelligible Being, the cosmos, produced the greatest gift of the Gods, philosophy.[417] In the Analogy of the Divided Line,

[408] Ibid.
[409] Terrenal 1976, 142.
[410] Terrenal 1976, 142-144.
[411] Plato, *Republic* 524a5-530e5.
[412] Ibid. 525a5.
[413] Ibid. 526d5.
[414] Ibid. 529d5.
[415] Ibid. 529d5-529e.
[416] Ibid. 510d5-511a.
[417] Plato, *Timaeus* 47a-47c.

philosophy is the investigation and study of first principles and of intelligible Being and the fields of astronomy, geometry, and mathematics, the study of the heavens and the invention of numbers (as sensible and empirical sciences) consist of hypotheses.[418] Since the cosmos is an image of the intelligible, then the study of it gives one the starting point to begin seeking out "what is unhypothetical and the first principle of everything"[419] and the practice for begin ascending the Divided Line towards eternal Being and Forms. Therefore, sensible orderly geometrically constructed elements (and the cosmos as a whole) aids humanity in grasping intelligible Being, via the study of intelligible geometry and its sensible elemental model. My view can be aptly summarized by Claghorn's characterization of the geometric elemental solids: "ontologically, they delimit an existing body, and epistemologically, they are the means by which uniform nature and behavior are understood"[420], thereby providing a first step to grasping the intelligible Being.

Proposition 5 – The Fundamental Essence of Platonic Compounds

Proposition 5.1 – Platonic Compounds are not an Eternal; Platonic Compound is Ontologically Parasitic

Platonic compounds, both ordered and disordered, are fundamentally unstable and are not an enduring 'substance' nor any sort of prime matter. They lack an enduring nature or essence in two ways. First, both ordered Platonic compounds (the geometrically constructed elements) and disordered Platonic compounds (the pre-cosmic chaos with transitory traces of the four elements) lack any real underlying stable and enduring nature. Rather, Platonic compounds can only mimic or resemble eternal Being by being sempiternal. The true nature of Platonic compounds is the same as the shadows on the wall seen by the prisoners in the Allegory of the Cave, impermanent images

[418] Plato, *Republic* 509d5-511e5.
[419] Plato, *Republic* 511b5.
[420] Claghorn 1954, 37.

and derived objects of perception which have form only in resemblance and in relation to stable objects.[421]

Second, Platonic compounds are not enduring substances in how they have a parasitic ontological nature. One, Platonic compounds must stand in and become in the Receptacle, "somehow clinging to being, or else be nothing at all"[422]. Platonic compounds and all sensible phenomena require a place or substratum for its becoming and passing away, or else it becomes a pure nothingness. Thus, it is incorrect to propose that Platonic compounds are a stable underlying substance. Two, ordered Platonic compounds in particular have an even deeper parasitic relationship with intelligible Being via its image-model relationship, in comparison with disordered compounds. Without any intelligible Being, the Demiurge would have lacked anything model or reference to give order and structure to the initial chaotic universe. Rather, the pre-cosmic realm of Becoming would have remained random and disordered. Ordered compounds depend on their structure and regularity by being cast in the image of the source model of Being, while also relying on the Receptacle as its seat of becoming. Thus, ordered Platonic compounds are, at their roots, ontologically parasitic to both Being and the Receptacle.

Proposition 5.2 – The Ordered Cosmos is Currently Ontologically Independent from all Being, Except the Demiurge

Although both varieties of compounds, and thus whole universe, are always ontologically dependent on the Receptacle, the current ordered cosmos and its geometrically constructed elements do not presently ontologically depend on the general class of eternal Being. First, the initial dependence on Being for the universe was the use of the Living Thing as the primary model for framing the cosmos. Instead, the cosmos is presently ontologically dependent on the good will

[421] Plato, *Republic* 514a-518b5.
[422] Plato, *Timaeus* 52c.

of the Demiurge, since the symphony of proportions and elemental harmony can "not be undone by anyone but the one who had bound it together"[423]. The Demiurge is the only cause or agent that could undo the various metaphysical unions and bindings that brought together the cosmos in its current form. Second, the cosmos is partially self-sufficient in the following way. The Demiurge designed and framed the cosmos to be fully self-sufficient and self-regulating in the nature of its body, soul, and motions. The god made the body of the cosmos such "that it did or experienced it was designed to do or experience within itself and by itself"[424]. The construction and installation of the World-Soul into its body "initiated a divine beginning of unceasing, intelligent life for all time."[425]. The living cosmos is made cognisant, conscious, and alive after the union of its soul and mind. However, the duration of its divine existence is only sempiternal, since the universe as a non-eternal entity cannot be retroactively made into an eternal living thing.[426] At most, the cosmos indirectly derives its nature from the Platonic Forms, in the same way that a child derives its general characteristics from its parents, while not perpetually being ontologically dependent on the parents to merely exist in the world. Thus, the current cosmos is not ontologically dependent on the intelligible Living Thing, given its self-sufficient nature in its body and soul, but the cosmos is still in principle beholden to the will of the creator who might undo the bonds of creation.

Proposition 5.3 – The Ordered Cosmos is Truely the Offspring of Intellect & Necessity

Bringing together the characterizations of ordered Platonic compounds, I can explain how exactly our "ordered world is of mixed birth: [such that] it is the offspring of a union of Necessity and Intellect"[427]. Due to the ontological separation between Being and Becoming and the necessity of constructing a beautiful world, the Demiurge imposed geometric order and proportionality upon

[423] Ibid. 32c.
[424] Ibid. 33d.
[425] Ibid. 36e.
[426] Ibid. 38b-38c.
[427] Ibid. 48a. This is modified from Zeyl's translation.

chaotic Becoming. However, as shown in Proposition (4.4) the geometric construction of the elements, which constitutes the body of the cosmos, is itself an image of eternal Being, via intelligible geometry, the Living Thing, and the Demiurge. The geometric construction allowed this sensible variety of geometry to co-subsist with Becoming and then to tame and order chaotic Becoming into the mathematically well-proportioned elements. Now I borrow the Analogy of the Divided Line again and use Proposition (4.6). In the *Timaeus*, intelligible Being (A) is reconciled, or brought into a generative union, with sensible and disordered Becoming (Δ) and produces the offspring of the ordered harmonious cosmos (Γ). This child bears a resemblance to its parents in how it undergoes becoming and transformations. Yet, these myriad changes follow ordered geometric and mathematical regularities, such that formerly chaotic and random changes and motions are brought into a harmonious "symphony of proportions"[428].

Proposition 6– The Platonic Account of Space

Proposition 6.1– The Receptacle Is Eternal Space, a Substratum for All Becoming

The Receptacle is the first name given to the third metaphysical kind during the second beginning.[429] The third kind is described as "that in which they [the phenomena of the four elements] each appear to keep coming to be and from which they subsequently perish"[430]. It is cast in spatial and location terms for sensible compounds to be in and to exit from. Furthermore, Timaeus identifies the third kind as space itself, noting how space is eternal and provides a fixed site for all things to come to be.[431] Space is a vessel, a fixed site, or receptacle that holds sensible compounds. If Platonic compounds were not somewhere, then one would think it had no being or becoming at all.[432] However, space is in no way dependent on neither Becoming nor Being, since

[428] Ibid. 32c.
[429] Ibid. 49a.
[430] Ibid. 49e-50a. This is modified from Zeyl's translation.
[431] Ibid. 52b.
[432] Ibid.

space is eternal and can never be destroyed.[433] Thus, Becoming ontologically depends on space as the substratum or place for coming to be.[434]

I argue that Platonic space is empty and I qualify the sense of the emptiness of space in two ways. First, space or the Receptacle is empty of all *sensible* properties: space in and of itself is neither visible nor tangible. Timaeus states that the Receptacle could not function as the place for becoming if "it were not itself devoid of any of those characters that it is to receive from elsewhere".[435] Only Becoming (or the four elements) innately has the properties of visibility and tangibility that come to be in the Receptacle. Second, space has the fundamental metaphysical property that it can receive, host, or take on the sensible qualities of diverse and opposite kinds. [436] Timaeus says that the Receptacle must not only be empty of any innate characteristics, but that the Receptacle must have the power to always receive opposite characteristics within it. Otherwise the Receptacle would "be showing its own face as well"[437] rather than taking on the sensible phenomena of fire, air, water, or earth. Many sensible properties or phenomena, like hot and cold or softness and hardness, are present within the universe and space. The Receptacle is empty in that it can be filled or take on these myriad and opposing sensible properties. Thus, the Receptacle is like the neutral base of a perfume, being able to absorb and hold any scent, but lacking any scent itself, otherwise the base would be a deficient vessel for the desired perfume smell.[438]

Proposition 6.2 – Platonic Space is a Sphere & Finite

The shape of the Platonic universe is described during its initial construction. The Demiurge constructed the body of the universe as a sphere, so that the universe would most closely

[433] Ibid. 52a-52b.
[434] Buckels 2016, 325.
[435] Ibid. 50d-50e.
[436] Ibid.
[437] Plato, *Timaeus* 50e.
[438] Ibid.

resemble the intelligible Living Thing.[439] The spherical shape is reaffirmed during the discussion on the nature of various sensible qualities, specifically the relationship between heaviness-lightness and the directions of above-below.[440] Timaeus says, "given that the whole heaven is spherical"[441] and moments later that "For the whole universe, as we have just said, is spherical"[442], such that the terms of 'above' and 'below' must be fundamentally understood to mean: to the centre of the cosmos (below) and to the spherical edge of the cosmos (above).

However, these pieces of textual evidence do not necessarily establish a *finite* spherical universe. Since space is filled with (and co-extended) with the four elements,[443] it could be the case that the universe is infinite in space with an infinite reservoir of fire element. This unlimited reservoir of fire element would then surround a finite spherical volume of *local* fire, air, water, and earth particles, which would constitute our observable heavens. This configuration does not immediately contradict the *Timaeus* account of the elements. The exterior region of unlimited fire element is consistent with the Receptacle's innate shaking and motion which roughly sorted and sieved the four elements into their respective regions: earth at the centre, surrounded by water, surrounded by air, and the last exterior region of fire.

The cosmos is a finite sphere based on several lines of textual evidence and an application of the Platonic theory of sensible compounds. First, when the World-Soul was woven throughout the body of the universe, it was spread "to the outermost limit of the heavens, and covered it all

[439] Plato, *Timaeus* 33b.
[440] Ibid. 62c-64e.
[441] Ibid. 62d.
[442] Ibid. 63a.
[443] Timaeus states that the spherical shape of the cosmos constricts the four elements, such that it "allows no empty space to be left over" (Plato, *Timaeus* 58a-58b).

around on the outside"[444]. The limit of the heavens plainly entails that it is finite; otherwise, it is incoherent to say the World-Soul covered the outside of the heavens.[445]

Second, I argue that the idea of an infinite universe (with the infinite reservoir of fire element) contradicts the fact that our universe consists of varieties of all four elements. One efficient cause of inter-elemental transformation is when a larger quantity of any element surrounds a smaller quantity of a different element, such that aggregates of air, water, and fire can decompose and then transform into each other.[446] For example, a large quantity of fire particles can surround a smaller quantity of air or water particles and then decompose them into their elemental triangles. In turn the decomposed elemental triangles of the air or water bulk are recomposed into more fire particles. Applying this process of elemental breakdown to the infinite fire-reservoir universe, it would entail that the infinite bulk of surrounding fire particles decompose and crush the interior heart region of local fire, water, earth, and air. The local fire, water, and air would transform into more fire of assorted varieties and grades, while the earth particles would break up into their component isosceles triangles. Occasionally earth particles would reconstitute into cubes, but they would quickly be decomposed back into isosceles triangles by the mass bulk of surrounding fire. The end state would be a universe overwhelmingly consisting of fire and minute traces of briefly transient earth. Within the account, only the Platonic elemental processes are explicitly stated and the universe is not only a fiery mass. Thus, there cannot be an infinite universe with any sort of element in its outer unlimited region.

[444] Plato, *Timaeus* 36e.
[445] Note, that although a sphere with infinite radius is a conceptual possibility in our time and culture, Plato would not accept the idea of a sphere with infinite radius.
[446] Plato, *Timaeus* 57a-57c.

Proposition 6.3 – Space is a Plenum, Co-extended & Always Filled with the Sensible Elements

The Receptacle is a plenum of ordered sensible Platonic compounds (ordered Becoming), making space co-extended with the ordered Platonic elements. First, the intimate ontological relationship between the Receptacle and matter means the two are always co-extended. This was explained in the previous proposition; space is the substratum for all Becoming, and therefore a substratum for the four elements in their ordered and disordered types. However, the previous proposition shows only that the presence of the elements entails the substratum of space. It does not exclude the possibility of instances of truly empty space or Receptacle where all Becoming or the elements have left that particular spot.

Second, Timaeus states that space is always filled. The spherical shape of the cosmos "constricts them all [the four elements] and allows no empty space to be left over"[447]. The idea that the universe is fully filled with elements while lacking 'empty space' should not be conceptually difficult to accept. For example, consider the motion of circulating water in a cup. The water is able to fill the cup, while every quantity of water continuously moves into the space formerly occupied by another quantity of water.[448]

Third, the cosmos was designed to have nothing tangible nor visible outside of it. At first glance, this only entails that there are instances of the elements outside the cosmos. One possibility is that there is an empty space outside the cosmos. However, there cannot be any empty space outside of the universe because, as Timaeus notes "that everything that exists must of necessity be somewhere, in some place and occupying some space, and that that which doesn't exist somewhere, whether on earth or in heaven, doesn't exist at all"[449] To posit a piece of elemental stuff that is not

[447] Ibid. 58b. Modified from translation by Zeyl.
[448] Zeyl 2000, lxxxiii.
[449] Ibid. 52b.

somewhere is the same as saying it does not exist at all. Since everything that exists within the totality of the universe must be some place in some space, then all sensible compounds of the cosmos are always co-extended with space itself.

Proposition 6.4 – Space is grasped by Bastard Reasoning due to the Metaphysics of Being & Becoming

Timaeus makes the claim that the grasping of space is apprehended by a type of "bastard reasoning that does not involve sense perception"[450] and that one's apprehension of space is not even worthy of conviction. I argue that his characterization naturally follows from the initial Being-Becoming metaphysics. Becoming is that which is grasped by sense perception and is always changing. Being is grasped by intelligible understanding and is eternal and unchanging.[451] Anything that is non-Becoming is eternal and unchanging and thus is apprehended with some form of intelligible understanding or reason. Space is eternal and unchanging, which makes it a non-Becoming thing. Due to this common status as a non-Becoming, the apprehension of (or the judgements about) space will share "in a most perplexing way in what is intelligible"[452] and be *some* form of reasoning or understanding. The apprehension of space does not involve sense perception. However, since space's only two 'true' and unchanging properties are to lack all sensible properties and to have the power to receive Becoming, yet again space cannot be identified as Being or even a specific being. Keep in mind that Being "neither receives into itself anything else from anywhere else, nor itself enters into anything else anywhere".[453] Therefore, given space's non-Becoming status and its differing characteristics from Being, it stands out as distinct from both Being and Becoming at the same time. Ontologically, space is distinct from Being and

[450] Ibid.
[451] See the Being-Becoming metaphysics proposed at *Timaeus* 28a.
[452] Plato, *Timaeus* 51b.
[453] Ibid. 52a.

Becoming, but epistemologically it is apprehended by a non-pure form of reason and understanding normally reserved for Being. Thus, this non-pure epistemic status can be fairly called a form of 'bastard reasoning', completely uninvolved with sense perception.

Section 2.3 – Platonic Conclusions

Having established the previous major propositions, outlining the nature of the cosmogony, the metaphysics of Being and Becoming, the design parameters, and the geometric nature of Platonic chemistry, I can answer the three primary questions: what is the Receptacle, what is the nature of the four elements in the *Timaeus*, and what is the relationship between the Receptacle and the elements? The Receptacle is space itself, but is not identical to the four elements. Rather the four elements are basic instances of ordered Platonic compounds. The Receptacle is the underlying substratum, the matter Platonic, of the many ordered Platonic compounds of fire, air, water, and earth. In my account, I have equated ordered Platonic compounds with the geometrically ordered variety of Being, which is the four elements in their geometric casting. Just as Timaeus affirmed, there are only three basic ontological categories or entities in the totality of all things: Intelligible eternal Being, the eternal Receptacle, and sensible every-wending Platonic compounds. The Receptacle is a conceptual and metaphysical by-product of the binary distinction between sensible transitory Becoming and intelligible eternal Being combined with the nature of the Demiurge as the most excellent cause of the current, ordered cosmos. The Demiurge changed the initially chaotic and disordered realm of Becoming into our beautiful and ordered cosmos of Becoming. The Platonic elements (Becoming) and the Receptacle are intimately connected as they are co-extended and co-temporal with each other. They are mutually co-extended due to Becoming's parasitic ontological nature. Becoming is an image or resemblance of Being, such that Becoming must be in something, the Receptacle. Becoming and the Receptacle are co-temporal since both varieties of the Platonic elements, disordered and ordered, for all time have their

becoming *in* the Receptacle. The Platonic elements were initially disordered Becoming. However, disordered Becoming, ceased to exist (or rather ceased its processes of disordered random *becoming*) upon the generation of the ordered cosmos by the intervention of the Demiurge. The Demiurge imposed geometric proportion, harmony, and structure upon the disordered Becoming and transformed the chaotic elements into ordered Becoming, ordered elements. Thus, the geometric Platonic elemental system is another logical by-product of the entire metaphysical framework of Being and Becoming. Geometry, proportions, and number are the most excellent and beautiful images (or resemblances) of eternal Being, which the divine craftsman impressed upon chaotic element, the transitory elemental traces, to make the realm of Becoming into something resembling intelligible Being, namely the Living Thing, and to grant an orderly body, mathematically harmonious soul, and proportioned sempiternal-rotating World Soul. So, I have discovered through this reasoned account how our cosmos truly is a visible living thing containing visible living creatures, a perceptible god, and the most beautiful an excellent mathematically and geometrically ordered image of the intelligible Living Thing.[454]

[454] Plato, *Timaeus* 92c. This paraphrases the concluding line of the *Timaeus*.

Chapter 3 – The Synthesis of Plato & Aristotle

I have reviewed the relevant parts of natural philosophy of Aristotle and identified the Receptacle of the *Timaeus* as space. Furthermore, I have argued that the *Timaeus* presents an account of Platonic matter and Platonic compounds. Ordered Platonic compounds are the two basic triangles, the four elements, and the aggregates of the four elements, all the common objects and materials observed today. Ordered Platonic compounds are the mathematically and geometrically orderly progeny of the union of the indestructible Receptacle, every-wending Becoming, and images of intelligible Being. The Receptacle, or space, is the underlying stable Platonic matter of all Platonic compounds. In this final chapter, I establish my position as a way to reconcile the views of Claghorn, Krása, Gorey, Mohr, and Buckels. Furthermore, I answer three questions. One, what is Plato's conception of matter in comparison to Aristotelian matter? Two, what is Plato's conception of space in comparison to Aristotelian matter? Three, what are the fundamental differences in the natural philosophy of matter, space, and the four elements of these two eminent philosophers? In brief, I argue that the account of Platonic compounds prefigures Aristotelian hylomorphism, where the Receptacle corresponds to an Aristotelian prime matter and the geometric construction of the elements corresponds to an Aristotelian form. However, Plato's metaphysical entity of Becoming, which takes on the regularity and proportions via the geometric image of Being, has no clear counterpart in Aristotle's natural philosophy.

Section 3.1 – Platonic Compounds & Aristotelian Substances: Platonic Compounds Prefigures Aristotelian Hylomorphism

I argue that the system of Platonic compounds prefigures Aristotelian hylomorphism. In my interpretation of Platonic compounds, Plato's Receptacle is an Aristotelian material cause

(specifically it counts as an Aristotelian matter[455]) and the mathematical geometric construction of the four elements is an Aristotelian formal cause of sensible four elements of fire, air, water, and earth.[456] I show that the Receptacle is an instance of Aristotelian matter by applying Aristotle's definition of a substratum. Aristotle defines matter as "the primary substratum of each thing, from which it comes to be, and which persists in the result, not accidentally"[457] and matter "is itself not predicated of anything else".[458] The only enduring and stable component of a Platonic compound is the Receptacle, "which exists always and cannot be destroyed. It provides a fixed site for all things that come to be"[459] Note, this Platonic matter does not directly incorporate intelligible Platonic Being, which, at first glance, might seem to be a candidate for an Aristotelian substrate given its stability and eternity. The Receptacle matches Aristotle's idea of matter as a substratum in how the Receptacle always is, never perishes, and is that from which the sensible elements come to and pass away. Furthermore, since the Receptacle is one of the three ontological basics of the cosmos and the ultimate underlying substrate of phenomena, the Receptacle is an Aristotelian prime matter.

Likewise, I show how the images of Being (namely the geometric construction and the ordered transformations of the four elements) are an Aristotelian formal cause. Within the Receptacle, when an individual region is "ignited [it] appears on each occasion as fire, the dampened part as water, and parts as earth or air"[460] as the Receptacle receives or takes on images

[455] Note that Plato does not use the Greek word (ὕλη) in the *Timaeus* when critiquing the Receptacle or the geometric construction, rather here I am making a claim based on Aristotle's technical definition of Aristotelian matter (Gregory 2003, 40).
[456] Plato and Aristotle agree that the sensible world has the four elements. Therefore, I only use 'elements' to refer to the overall observable stuff in the cosmos, which are ordered Platonic compounds and the Aristotelian four elements.
[457] Aristotle, *Physics* 1.9, 192a25-192a34.
[458] Aristotle, *Metaphysics* 7.3, 1028b35.
[459] Plato, *Timaeus* 52b.
[460] Ibid. 51b. Modified from translation by Zeyl.

of intelligible Being, the intelligible Forms of the elements.[461] The Receptacle takes on these qualities of fieriness, wateriness, and so forth via the geometric constitution of the four elements into their respective solids. The sensible qualities of the four elements are derived from their unique geometric properties and shapes. They decompose into constituent triangles and the elements of fire, water, and air inter-transform due to their shared constitution by scalene triangles.[462] In other words, the geometric attributes of the elements is what orders and specifies the structure of the four elements, which is an Aristotelian formal cause.

My characterization of Platonic compounds as a prefiguration of Aristotelian hylomorphism stands at a bizarre junction between five views since it synthesizes a mixture of different specific conceptual and interpretative claims on the Receptacle and its ontological function in the *Timaeus*. My account of Platonic compounds reveals that the five views are not all mutually exclusive. Claghorn argues that Aristotle's prime matter and Plato Receptacle are the same entity and their disagreements come from Aristotle's attempt to excise Pythagorean leanings from Plato's characterization of the elements.[463] Riel argues that the *Timaeus* lacks an account of matter and only presents what is equivalent to Aristotelian forms.[464] Krása argues that corporal Becoming is both in space and is a modification of the Receptacle too.[465] Mohr claims that the sensible phenomena of Becoming is only an image of intelligible Being in space, such that Plato's concept of space is not identical to Aristotle's material substrate.[466] Buckels, in agreement with Mohr, argues that the Receptacle is space for Becoming and that there is no substratum for material

[461] Ibid. 52b-52e. Timaeus asks if there is "such a thing as a Fire by itself?" and affirms the existence of the Forms of based on the epistemological distinction between understanding and true belief.
[462] I have explained the geometric construction and the geometric origins of the Platonic elemental properties in Chapter 2, Section 2, Proposition 4.3.
[463] Claghorn 1954, 19, and Claghorn 1954, 37-38.
[464] Riel 2021, 184-185.
[465] Krása 2021, 145-147.
[466] Mohr 1980, 146-152.

particulars.[467] I argue that the views of these five authors, despite their disagreements, are actually reconcilable. I synthesize their views by clarifying the function of Platonic Becoming in my account of Platonic compounds and how Plato's conception of Becoming differs from Aristotle's conception of change and becoming.

Becoming and Change in Aristotle's Philosophy

In this section, I explain how Plato and Aristotle differ in their explanations of change and becoming. In Aristotle's hylomorphism, substances and particular things in the sensible world are composed of Aristotelian matter and form. I have argued, under my interpretation of Platonic compounds, that the sensible four elements (which constitute all the sensible objects of the cosmos) and their two component basic triangles, are fundamentally made of three things: the Receptacle, Becoming, and the geometric ordering of Becoming, which is an image of intelligible Being. As I explained above, the Receptacle is a material substrate, an Aristotelian material cause, and the geometric construction is an Aristotelian formal cause. However, since Plato has a third kind constituting his account of ordered sensible compounds, any attempt to translate between Platonic and Aristotelian natural philosophy will suffer from a serious incongruity. Now, I want to establish the potential causes of the sensible four elements in Aristotle's view, while keeping in mind Plato's general metaphysical distinction between the eternal Platonic Forms, or Being, and the ever-changing sensible world of Becoming.[468]

In Aristotle's general account of change and phenomena, he ascribes the causes of elemental change (and thus general sensible phenomena) to two cause: the material or efficient causes.[469] He says that source of perpetual coming-to-be is either the material cause, which the

[467] Buckels 2016, 325-327.
[468] For the moment, we can set aside the Receptacle since the metaphysical controversies are not due to the Receptacle.
[469] Aristotle, *On Generation & Corruption* 1.3, 317b33-318a12.

text *On Generation & Corruption* examines, or the source of motion which is "something immovable through all time"[470] He says that the underlying matter of the four elements (which constitute materials and objects) is the material cause of continuous coming-to-be, or phenomena, because "it is such as to change from contrary to contrary and because, in substances, the coming-to-be of one thing is always a passing-away of another, and the passing-away of one thing is always another's coming-to-be".[471] The underlying matter of the four elements is always co-extended and bound up with the two contrarieties,[472] such that the four elements undergo eternal and cyclical transformations into each other via changes of the two contrarieties of hot-cold and wet-dry.[473] As I understand these lines, Aristotle is saying that the constant and continuous changes in the contrarieties happen because any generation of a quality (hot, cold, dry, or wet) is necessarily a corruption, or cessation, of another quality. Likewise, the generation of a particular thing, an Aristotelian substance, is necessarily a corruption, or cessation, of another Aristotelian substance. Thus, an initial change in an elemental contrarieties necessitates subsequent changes in the contrarieties and produces the four elements over time. So far, I do not find this a satisfying answer to the metaphysical cause of change with respect to material causes because the material cause does not have a clear temporal beginning. However, now I turn to Aristotle's other cause of change in the universe, his prime mover.

In Book 8 of *Physics*, Aristotle explains the concept of the unmoved mover as the source of motion within the universe. The prime unmoved mover is "the cause of the fact that some things are and others are not and of the continuous process of change"[474] and, since motion within the

[470] Ibid.
[471] Aristotle, *On Generation & Corruption* 1.3, 319a17-319a28.
[472] Ibid 2.1, 329a25-329b2.
[473] Aristotle, *On Generation & Corruption* 2.2, 329b6-330aa29.
[474] Aristotle, *Physics* 8.6, 258b10-259a13.

universe is eternal, then the unmoved mover is itself eternal.[475] Aristotle emphasizes that "there would otherwise be no becoming and perishing and no change of any kind in other things"[476] if there were no source of motion, such as his unmoved prime mover, to initiate a change of motions in the universe. Thus, for Aristotle, change and becoming are eternal since the eternal motion of the prime mover is the ultimate source of all changes. In contrast with Aristotle's account of change, disordered Platonic Becoming lacks a clear cause, in both the generic sense of cause-and-effect and the Aristotelian sense of the four causes. However, again contextualizing within Aristotelian natural philosophy, I proposes that Plato's Demiurge is a teleological cause. The god is the teleological cause of the transformation of the disordered chaotic compounds into the ordered four elements.[477] As Petrucci argues, the Demiurge contributes to the formation of the ordered cosmos in its "determination of the teleological orientation of already existing dynamics"[478] since the god restricts the way that the pre-cosmic chaos transformed and changed. Specific, the Demiurge acts on disordered chaotic Becoming and imposes mathematically and geometrically ordered patterns, the images of Being, to create the ordered four elements and their regular transformations. Based on this line of reasoning, I propose that the incongruity between Platonic and Aristotelian matter is that in Plato's system, there is an explicit teleological force that aids in producing the ordered sensible compounds. I have argued that the intervening force is the Demiurge in its act of casting of geometric and mathematical structure and regularity onto the universe. Meanwhile, Aristotle's cyclical transformation of underlying matter between the four sensible elements is not necessarily due to an intellect or teleological cause, but rather only the innate structure of matter, the material

[475] Ibid 8.6, 259a14-259a19.
[476] Ibid 8.6 259b32-260a10.
[477] Petrucci (2023, 61-61) argues that the Demiurge is a teleological force, a being who is "the rationality of an organizing teleological principle".
[478] Petrucci 2023, 62.

cause, or the efficient cause of the prime mover. My conclusion mirrors the view that Aristotle lacks a teleological aspect in his account of nature by Ravilochan.[479] She proposes that Aristotle presents a de-psychologized account of craftsmanship and the nature of particular natural things in Book 2 of *Physics*. A human craftsman deliberates about how best to construct, sculpt, paint, or carve. However, the deliberation, the psychological component, and planning of the creation of a house or statues is independent from the skillful craft, the *techne*, of construction or artistic skill of sculpting statues.[480] Within Aristotle's account of craftsmanship, he often refrains from discussing the interior mental life of human craftsmen and instead focuses on the nature of the capacity and process of various crafts, like housebuilding or shipbuilding, to produce some product.[481] Thus, by noting the distinction between the deliberative component and the process of a craft, Ravilochan concludes that "Aristotelian natures rely upon no such reflection in order to determine the best ends to pursue"[482] and that a de-psychologized account of craftsmanship reveals how a lack of intelligent agency is compatible with a theory of natural teleology.[483]

In short, Aristotelian substance has a material and efficient cause, while lacking a teleological cause. Using Aristotelian categories, ordered Platonic compounds have a material, formal, and teleological cause. The Receptacle is the material cause, the geometric structure of the elements (as an image of Being) is the formal cause, and the Demiurge constitutes the teleological cause of ordered Platonic compounds and the wider cosmos. Meanwhile, disordered Platonic compounds can be characterized as always having a material cause, which is its own inherent tendency to change and transform as described in its god-forsaken state before the Demiurge

[479] Ravilochan, Aparna. 2023. "Unseating the Craftsman: Natural Efficient Cause in Aristotle's Craft Analogy." *Apeiron* 56 (1): 1-14.
[480] Ibid 5-8.
[481] Ibid 5-6.
[482] Ibid 4.
[483] Ibid 13.

imposed geometric order on chaotic Becoming.[484] Disordered Platonic compounds sometimes have a formal cause in how the chaotic pre-cosmic traces of elements "initially possessed certain traces of what they are now"[485] and resembled the Forms of the four elements.[486]

Thus, the reason that the Aristotelian and Platonic account of sensible objects, particularly the four elements, diverge is because Plato's system places change and phenomena (Platonic Becoming) as its own metaphysical category separate from the substratum of the Receptacle and from the specific qualities and properties of the four elements as observed in the current ordered cosmos. Meanwhile, for the moment, judging Aristotle in a Platonic lens, Aristotle could be characterized as effectively blending Platonic Being (in the form of his underlying two principles of elemental bodies, the contrarieties) and Platonic Becoming (in the form of continuous change of the contrarieties to account for observed inter-transformation of the four elements). As shown in Proposition 4.4 of Chapter 2, the properties and qualities of the current four elements are themselves images of resemblances of intelligible Being. Timaeus alludes to this when he asks, "is there such a thing as a Fire by itself?"[487] I argue that Timaeus is asking if there are intelligible Platonic Forms of all four elements of fire, air, water, and earth. He is referring to Platonic Forms for the elements because in the subsequent lines, he affirms that since understanding and opinion, which is rooted in sense perception, are different epistemic states, then "these 'by themselves' things definitely exist – these Forms, the objects not of our sense perception, but of our understanding only".[488] Since intelligible Forms (or Being) cannot be in the universe, the realm of Becoming, then the geometrically constructed elements must be images of their corresponding

[484] Plato, *Timaeus* 52e-53b.
[485] Ibid. 53b.
[486] Ibid. 51b-51e.
[487] Plato, *Timaeus* 52b.
[488] Ibid 52d.

elemental Forms. Furthermore, these images of the intelligible Forms are non-eternal and come to be and pass away within the universe. In contrast, the basic qualities or properties of Aristotle's four elements (the two contrarieties of hot-cold and wet-dry) and their transformation are eternal, since they derive from eternal change-induced motion of the prime mover. As is befitting of the system of hylomorphism, Aristotle has directly blended changing phenomena with matter in a manner that Plato would call a blending of Becoming and images of Being.

Synthesizing the Five Authors

In this section, I present my own view on Platonic compound and matter by synthesizing the views of Claghorn, Krása, Gorey, Mohr, and Buckels and incorporating the above reasons for the incongruity between Platonic compounds and Aristotelian substance. Platonic compounds come in two kinds. One, there are the disordered compounds (Becoming), which are erratic unproportioned chaotic phenomena and elemental traces that happens in the Receptacle. Two, there are ordered Platonic compounds, which are the geometrically and mathematically regularised and proportional variety of Becoming that exists within the Receptacle. As shown earlier, Claghorn is correct: the Receptacle is an Aristotelian matter or substratum, the stable and unchanging part of the referent of sensible fire, air, water, and earth.[489] Riel is correct that the *Timaeus* lacks a *purely Aristotelian* account of matter.[490] However, once the three-fold nature of sensible ordered Platonic compounds are brought to light, it is clear that the *Timaeus* centrally focuses on showing how images of Being, which really are kinds of Aristotelian forms, in the form of the geometric order and regularity that characterizes the well-proportional elements of the current cosmos. Krása's view that corporal Becoming is both in space and is a modification of the Receptacle

[489] Claghorn 1954, 19 and Claghorn 1954, 37-38.
[490] Riel 2021, 184-185.

harmonizes with the previous two authors in my telling of Platonic matter.[491] The images of the intelligible Forms do function as modifications, individualizing or segmenting patterns, of the Receptacle (which is space) because the geometric extension of the elements is co-extended with space itself. The co-mingling of Form-resembling images in space necessitates the co-extension of ordered matter and space, such that Krása is fully right to say that different particular pieces of the Receptacle, which are "ignited appears on each occasion as fire, the dampened part as water, and parts as earth or air".[492] The phenomena of the elements are both in space and are a kind of characteristic or quality that the Receptacle bears.

Next, we have Mohr's view that the sensible phenomena of Becoming are only an image of intelligible Being in space, but Plato's concept of space is not identical to Aristotle's material substrate.[493] Both Mohr and Buckels propose that there is no material substratum for Becoming in the *Timaeus* and that the Receptacle is a mirror for images or resemblances of Platonic Forms.[494,495] However, this is a fairly accurate restatement of Aristotle's idea of a material substratum because an Aristotelian substratum remains unchanged despite various qualities or predications taking place upon that very substratum. Thus, an Aristotelian substratum functions in a very similar way to how well-polished mirror works. Reflections or images of objects appear or form upon the mirror's surface while the mirror itself remains fundamentally unchanged. Likewise, a mirror is always able to take on new images, one after the other, just like how Aristotle's underlying matter takes on the various combinations of hot-cold and wet-dry continuously for eternity.

[491] Krása 2021, 145-147.
[492] Plato, *Timaeus* 51b.
[493] Mohr 1980, 146-152.
[494] Ibid 326.
[495] Buckels 2016, 325-327.

As I have argued, the system of Platonic compounds presages hylomorphism such that, despite my harmonization of the views of the previous five authors, the points of agreement between Aristotle's substratum and Plato's Receptacle do not make the two overall accounts of matter and sensible objects identical. The five authors have focused, quite rightly, on the intriguing mystery of the Receptacle and the sudden textual turn to the geometric construction of the four elements in the *Timaeus*. However, I propose that these subtly disagreeing views are due to overlooking the basic question of how Plato defines eternal Being and sensible Becoming in the *Timaeus* and how this specific formulation of the Platonic Forms versus sensible phenomena differs from Aristotle's account of change and phenomena.[496]

Section 3.2 – Platonic Space & Aristotelian Space

In Chapter 1, I summarized Aristotle's conception of space. In Chapter 2, I showed that in the *Timaeus* that the Receptacle is space itself, the location and place of sensible phenomena and Becoming. Space is a finite spherical volume that is exactly co-extended with all ordered matter in the Platonic universe. Also, within my account of Platonic compounds, ordered Becoming always is in, or stands in, space so that matter can come to be and pass away somewhere. Both Aristotle and Plato agree on four general characteristics of space. First, that all sensible objects must be somewhere or else the particular piece of matter in question is nowhere and does not exist.[497] Second, that space has the six directions, or simply the three dimensions of length, width, and depth.[498] Third, the shape of space and the universe is co-extended into the finite spherical universe, although Aristotle explicitly developed a model with his forty-nine (or fifty-five)

[496] One point to note is that the Being-Becoming metaphysics proposes Platonic Forms. Yet, as noted by Zeyl (2000, lxiv), the *Timaeus* is the only Platonic text that "purports to be an argument for the existence of Forms". I think part of the difficulty in trying to straighten out where Plato and Aristotle disagree and agree on the nature of matter is due to the sparseness of sustained explicit arguments for the existence, and thereby the fundamental nature, of the Forms.
[497] Aristotle, *Physics* 4.1, 208a26-208a32, and Plato, *Timaeus* 52b.
[498] Aristotle, *Physics* 4.1, 208b9-208b26, and Plato, *Timaeus* 32b-32c.

celestial spheres.[499] Fourth, they both espouse a container theory of space, whereby space is that which contains and delineates the universe and particular objects within the cosmos.[500] Fifth, there is no vacuum nor empty space, rather space is a plenum that is always co-extended with elemental bodies.[501] Overall, as Claghorn aptly summarizes, "Aristotle's doctrine of 'place' exhibits many of the same characteristics" of Plato's general conception of space (the Receptacle) in terms of the five features described here. The major differences between Platonic space and Aristotelian space (the metaphysical function of the Receptacle as a component of sensible ordered Platonic compounds) was explained in the previous section. Note, the starkest difference is that Platonic space is an Aristotelian prime matter, while the Aristotle states that space or 'place' is not identical with neither the matter nor form of any object.[502]

Section 3.3 – Does Aristotle Misinterpret Plato ?

Aristotle makes three peculiar major claims about his teacher's natural philosophy. One, that "Plato in the Timaeus says that matter and space are the same; for the 'participant' and space are identical".[503] Two, that Plato "has not stated clearly whether his 'Omnirecipient' exists in separation from the elements; nor does he make any use of it"[504]. Three, that Plato "says, indeed, that it is a substratum prior to the so-called elements – underlying them, as gold underlies the things that are fashioned of gold. (And yet this comparison, if thus expressed, is itself open to criticism".[505] This third claim by Aristotle immediately follows the second claim. I argue that Aristotle's first and third claims are fully accurate and fair, but that the second claim is false.

[499] Aristotle, *Metaphysics* 7.8, 1073a1-1074a14.
[500] Aristotle, *Physics* 4.3, 210b23-210b30.
[501] Ibid 4.7, 214a17-214aa26.
[502] Aristotle *Physics* 4.2, 209b17-209b31. Translation by R. P. Hardie & R. K. Gaye is not modified.
[503] Ibid. 209b11-209b16.
[504] Aristotle, *On Generation & Corruption* 2.1, 329a5-329a24.
[505] Ibid.

In claim one, using my conception of Platonic compounds, Aristotle's comment is a fair and accurate report. Space and the entity that 'participates' in the Platonic Forms, via images of Being, are one and the same. The Receptacle is the substratum of the ordered sensible elements of the current cosmos. This comment by Aristotle shows that although he rejects Plato's metaphysics of Being and Becoming, he is able to fairly apply his definition of matter[506] to the *Timaeus* and recognize that Plato's Receptacle is space and an Aristotelian matter. However, although Aristotle agrees with the general conception and features of space in the *Timaeus*,[507] it is the differing views on the function of Becoming and change that prevents Aristotle from fully accepting Plato's identification of space and matter. Thus, once explicitly noting that Aristotle does not accept the Platonic conception of Being and Becoming, Aristotle's comment in Book 4 of his *Physics* is shown to be both fair and intelligible judgement.

In claim two, Aristotle says Plato does not use the Receptacle in relation to the four elements. Although Aristotle might be alluding to how the Receptacle ceases being referenced during and after the geometric construction of the elements,[508] I think he is wrong and has misinterpreted Plato. First, within my account of Platonic compounds, the Receptacle is one of three components of the ordered sensible elements of fire, air, water, and earth. Thus, Aristotle is wrong in that Plato does not use the Receptacle in the Platonic formulation of elements. Second, Aristotle, in the previous paragraph concerning his comment in Book 4 of *Physics*, says that matter is space in the *Timaeus*. I argue Aristotle has contradicted himself. According to Aristotle's own natural philosophy, matter is the substratum of the elements and in Book 4 of *Physics* matter is space within the *Timaeus*. Therefore, Plato actually is using space (the Receptacle) in his account

[506] Matter is "the primary substratum of each thing, from which it comes to be, and which persists in the result, not accidentally" (Aristotle, *Physics* 1.9, 192a25-192a34).
[507] See the previous section: Section 2 – Platonic Space & Aristotelian Space**.**
[508] Gregory 2003, 40.

as the matter, or the substratum, for the Platonic four elements. But now in *On Generation & Corruption,* Aristotle says Plato does not use the Receptacle in the nature or formulation of the elements. According to the account of Platonic compounds, the Receptacle is one basic and necessary component to produce the four sensible elements, which Aristotle's treatise *On Generation & Corruption* is centrally devoted to explaining. Therefore, under both Aristotle's own system of thought and the Platonic account, he is wrong to say Plato does not "make any use" [509] of the Receptacle with regards to the sensible four elements.

In claim three, Aristotle reports that Plato treats the Receptacle as a substratum of the elements. As I have demonstrated earlier in this chapter, the Receptacle is an Aristotelian substratum. Thus, Aristotle correctly characterizes Plato in this aspect. However, I argue that Aristotle has committed a faultless and honest mistake, by coming to the right conclusion by incorrect reasoning due to the terseness and grammatical difficulty of the Receptacle passage. Aristotle describes the Receptacle as a substratum and how it is "as gold underlies the things that are fashioned out of gold".[510] This reference to gold is clearly a paraphrase of the gold metaphor at *Timaeus* 50a-50b. I propose Aristotle mistook the gold metaphor as expressing a fundamental feature of the Receptacle. Aristotle is not the first of many scholars who have been puzzled by the intent of the gold metaphor, as Gregory comments that, based on the gold passage, there "appears to be a mixture of strongly material and strongly spatial descriptions of the receptacle".[511] Likewise, interpreting the gold passage is made even more difficult by the immediate preceding passage of *Timaeus* 49d4-49e7, which Lee calls "complex and often confusing".[512] In Lee's careful word-by-word philological analysis of *Timaeus* 49d4-49e7, he notes that the overall structure of the section

[509] Aristotle, *On Generation & Corruption* 2.1, 329a5-329a24.
[510] Ibid.
[511] Gregory 2003, 31.
[512] Lee 1967, 1.

is a three-part schema with an embedded interjection (or comment) that is itself another three-part schema or proposition. Furthermore, the reader must be careful to understand and parse "Plato's rapid alternations between the singular and plural" of pronouns in these lines.[513] My point is that the passage right before the gold passage is terse and grammatically and conceptually difficult to parse. Furthermore, this infamous disputed passage, helps to establish the semantic and metaphysical grounds for the Receptacle and its properties.[514] Also the gold metaphor, which immediately follows, requires one to grasp the points in *Timaeus* 49d4-49e7. Based on these features of *Timaeus* 49d4-49e7 (the grammatical and conceptual difficulty, the semantic and metaphysical analysis, and the proximity to the gold metaphor of the passage), I propose that any reader (including a native Greek speaker) and especially translator would misread the gold passage due to the highly sophisticated semantic and conceptual analysis that Plato is making at *Timaeus* 49d4-49e7. Thus, I suggest that Aristotle likely misinterpreted the "what is such" passage and mistook the gold metaphor as directly expressing the Receptacle's substratum properties. Yet, as I have shown, the Receptacle's substratum function is derived from its relationship between Being and Becoming, not anything based in the Aristotelian framework of natural philosophy.

In summary, I propose that Aristotle is fair, although on occasion wrong, in his characterization of the *Timaeus* in the passages analysed here. He errs partially due to his prior philosophical commitment of rejecting the basic Platonic metaphysics of Being and Becoming and partially due to the genuine difficulty and subtleness of his master's treatise of natural philosophy and cosmogony.

[513] Ibid 4-6.
[514] See Zeyl's explanation of the translation dispute (Zeyl 2000, lvi-lix).

Conclusions

In this thesis, I have tackled questions of substance, matter, space, and metaphysics as expressed in Plato's exquisite work of natural philosophy, the *Timaeus*. I have explored the account of the sensible world and its elemental contents and I have sought to reconstruct and present a Platonic account of compounds and matter. Fundamentally, Plato's universe consists of three metaphysical categories, the eternal intelligible Platonic Forms (Being), eternal enduring space (the Receptacle), and ever-wending and shifting sensible phenomena (Becoming). I have argued for a distinction between ordered and disorderly types of Becoming, where order is characterized by geometric and mathematical proportionality. These beauty-granting properties are the effect of the divine craftsman, the Demiurge, who encountered pre-existing chaotic and disorderly elemental traces, disordered Becoming. The creator grasped eternal Being and used the intelligible Living Thing as a model to sculpt and order the chaotic matter into the geometrically proportioned four elements of fire, air, water, and earth. These elements, ordered Platonic compounds, were constructed from two basic triangles (the scalene and isosceles) to form the four elemental solids. The geometric construction led to the four elements undergoing regular and cyclical transformations, although earth is excused from the cycle though still participating in decomposition. The geometric construction is itself an image or likeness of the Platonic Forms that grants structure, regularity, and beauty to Becoming, now tamed into orderly Platonic compounds. Ordered Platonic compounds are ontologically composed of three parts: the Receptacle (which is space itself), Becoming, and the images of eternal Being in the form of the geometric construction of the elements and their regular inter-transformations.

I also analysed Plato's natural philosophy through the lens of Plato's student Aristotle to grasp the *Timaeus*. In Aristotle's major works *Physics*, *On the Heavens*, and *On Generation & Corruption* he provides spare and short comments on the nature of space and matter as expressed

in the *Timaeus*. After studying Plato's conceptions of space and matter on his own terms in the *Timaeus* and studying Aristotle's conceptions on the same two topics, I compared the systems and evaluated Aristotle's judgement of his venerable teacher. I have argued that Plato and Aristotle share mostly the same view of space, as the three-dimensional container and finite extension of a spherical universe, which houses all matter and sensible objects.

Most surprisingly, I have argued that the system of Platonic compounds anticipates and presages Aristotelian hylomorphism. The Receptacle of Plato is both space and an Aristotelian matter and material cause, a substratum that takes on and bears phenomenological properties and qualities. The Receptacle is also an Aristotelian prime matter since the Receptacle of Becoming is the ultimate seat of all sensible phenomena and change. However, in Plato's basic metaphysics, sensible qualities like hot, cold, hard, soft, wet, and dry are themselves constrained and mathematically proportioned images of intelligible Being, not instances of intelligible Being itself. The geometric construction of the four elements, the images of Being, are an Aristotelian form and formal cause. The system of Platonic compounds constitutes an imperfect analogue of Aristotelian hylomorphism because ordered Platonic compounds have a third component (Platonic Becoming) which does not fit easily into the Aristotelian system. I have argued that this incongruity is due to Aristotle's rejection of Platonic metaphysics, the distinction between eternal Forms and sensible phenomena. In my analysis, I propose that the Aristotle account of the elements (ordered Platonic compounds) has a material, efficient, and formal cause, while ordered Platonic compounds have a material (the Receptacle), formal (images of Forms), and teleological cause (the rational Demiurge as the imposer of cosmic order).

In reflecting on the views of other authors likes Claghorn, Krása, Gorey, Mohr, and Buckels, I have shown that the answer to the central question of whether Plato has a theory of matter is yes,

both on Platonic terms and in Aristotelian terms. Likewise, I have shown that the disputes about whether it is proper to ascribe a theory of matter to Plato is due to a tendency to neglect the central role that Becoming has in the formulation of Platonic matter and the fact that the inquiry into Platonic matter, all too often, relies on applying the Aristotelian definition of matter and an Aristotelian rejection of the metaphysics of Platonic Being and Becoming. However, I suggest that scholars have misunderstood the *Timaeus* due to no fault of their own. My analysis has shown that the metaphysical and semantic analysis that the *Timaeus* (or rather Plato) engages in (as the groundwork for positing the existence and characteristics of the Receptacle) is incredibly rich and conceptually challenging for anyone of any age to intelligibly grasp.

Yet, I propose this entire exercise has shown the need for careful and critical analysis of Platonic (and of course Aristotelian) texts on their own terms to avoid anachronisms and to reveal beautiful truths buried within. So, my account of the ordered cosmos and the nature of both Platonic and Aristotelian space and matter has reached its close. I hope the *Timaeus* has left the reader in wonder and astonishment at the "grandness, goodness, beauty, and perfection"[515] of the Demiurge's masterful geometric and harmonious construction of the cosmos, for "it is owing to their wonder that men both now begin and at first began to philosophize".[516] Accordingly, by studying our harmonious orderly cosmos, in its sempiternal celestial motions and geometrically proportioned elements, humanity comes to have "philosophy, a gift from the gods to the mortal race whose value neither has been nor ever will be surpassed",[517] and we shall certainly gain that "most excellent life offered to humankind by the gods, both now and forevermore".[518]

[515] Plato, *Timaeus* 92c.
[516] Aristotle, *Metaphysics* 1.2, 982b11-982b28.
[517] Plato, *Timaeus* 47b.
[518] Ibid. 90d.

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