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Humans and Nature: Finding Meaning through Metaphysics

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Humans and Nature: Finding Meaning Through Metaphysics

*A Project Submitted in Partial Fulfillment
of the Requirements for the Degree of
Master of Liberal Studies*

*by
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Introduction

Such, in outline, but even more purposeless, more void of meaning, is the world which Science presents for our belief. Amid such a world, if anywhere, our ideals henceforward must find a home. That man is the product of causes which had no provision of the end they were achieving; that his origin, his growth, his hopes and fears, his loves and his beliefs, are but the outcome of accidental collisions of atoms...

- Russell Bertrand

Before the 19th Century, individuals who studied the natural world were called natural philosophers. To explore and understand the inner workings of nature and humanity, natural philosophers used many different modes of thinking such as logic, mathematics, physics, and metaphysics, or “the ‘science’ that studied ‘being as such’.”¹ The incorporation of these varied concepts brought about a comprehensive understanding of nature and how humans relate to nature. Theories were devised from incorporeal ideas, data was gathered from the human senses, and concrete evidence was pursued to support philosophy.

However, through the years from ancient times to modernity, natural philosophy slowly limited its use of revelation and metaphysics, restricting the quest for knowledge to the methodical gathering of empirical data. Science, as humans now call this procurement of knowledge, relies strictly on observation and calculation. And, because metaphysics has been removed from the process, true associations between concepts and observations are no longer identified, and all meaning is lost. Modern science often appears as a flood of raw data that does not seem to apply to everyday life or connect one theory to another. Thus, humanity is left with a one-sided empirical view of nature, and the relationship between humans and nature is reduced to mechanistic coexistence. This thesis will argue that metaphysics, or the study of the fundamental nature of being, is a

¹ Van Inwagen, Peter, "Metaphysics," *The Stanford Encyclopedia of Philosophy* (Winter 2012 Edition), Edward N. Zalta (ed.), <http://plato.stanford.edu/archives/win2012/entries/metaphysics/>.

necessary component of natural philosophy in order for humans to understand and find meaning in nature.

The word “metaphysics” comes from the Greek words *meta*, meaning “beyond” or “after,” and *physika*, meaning “physics.” The fourteen books presently called Aristotle’s *Metaphysics* was originally named by the ancient philosopher: ‘first philosophy,’ ‘first science,’ ‘wisdom,’ and ‘theology.’ However, the initial use of the word metaphysics occurred one hundred years after Aristotle’s death. Editors then entitled Aristotle’s fourteen books *Metaphysics* to warn students that these advanced topics should not be read until after reading and understanding *Physics*, his books concerning the natural world.²

Aristotle claimed that change is the defining characteristic of nature and the natural world; and on the other hand, the role of metaphysics in philosophy is to explain the meaning of things that do not change. Peter van Inwagen argues that “in the seventeenth century ‘metaphysics’ began to be a catch-all category, a repository of philosophical problems that could not be otherwise classified: ‘not epistemology, not logic, not ethics...’.”³ Consequently, metaphysics over time has boiled down to everything that *isn’t* directly a question of science, eventually leading to the abandonment of metaphysical thought by the natural sciences. Without metaphysics in modern science, scientists are limited to gathering empirical data and drawing inconsequential conclusions, thus missing the significance of how humans relate to their surroundings.

To prove that modern science is in need of metaphysics to connect humans with nature, this thesis will trace the history of natural philosophy and signify the problems

² Van Inwagen, Peter, “Metaphysics,” *The Stanford Encyclopedia of Philosophy* (Winter 2012 Edition), Edward N. Zalta (ed.), <http://plato.stanford.edu/archives/win2012/entries/metaphysics/>.

³ Ibid.

that arise with the shift from comprehensive natural philosophy to strictly empirical modern science. Starting with his explanations of being and nature, the Forms, Plato established a first cause and final purpose for all natural phenomena. Plato's Forms are timeless and unchanging, unlike the physical world that humans experience with their senses. The Forms are also Plato's metaphysical source for abstract objects such as the soul and mathematics. The Forms provide a universal picture of nature and human interaction with nature.

Aristotle, Plato's pupil, then observed many properties of nature and named his observations *Physics*. To explain his concept, Aristotle created a metaphysical system rooted in what is known as his four causes. These four causes explain changes within, and causes of, natural phenomena. Aristotle was the father of teleology. Teleology, the description of occurrences by their purpose rather than by their suggested cause, explains all physical accounts of nature as existing for a final cause. Aristotle asserted that there is a design and purpose to all natural entities, and he addressed the fact that humans have a desire to understand their existence and their world through both their senses and their ability to reason. Through his incorporation of metaphysical ideas with quantifiable observations, Aristotle proposed a balanced view of natural philosophy that led to many advances in knowledge.

The theories of Plato and Aristotle endured into the Medieval period of history in the Western World, which was largely influenced by the Catholic Church. Ongoing conversations amongst church scholars furthered the understanding of being and the world. This thesis will follow the evolution of natural philosophy through Augustine of Hippo and Thomas Aquinas during the Medieval time period.

Augustine advanced the understanding of human existence and nature through his theories stemming from Plato's philosophies. He recognized the importance of human revelation; however, Augustine limited knowledge within the confines of Christianity. Subsequently, Aquinas championed Aristotelian thought, and exemplified how revelation and particularly deductive thinking can be used together to further the understanding of natural phenomena.

Aquinas' teachings prompted a surge in experimentation during the Renaissance, resulting in an astounding amount of scientific discoveries. Subsequently, the Scientific Revolution was the beginning of the rejection of ancient authority and metaphysics. Separating the physical world from the incorporeal, or divine, natural philosophers of the time held science as a separate entity from theology, in order to keep from threatening church doctrine. For instance, Rene Descartes separated the human body from the human mind by binding science to the physical world and theology to the metaphysical world. Through his view of natural philosophy, Descartes conceived his own version of dualism, subsequently called Cartesianism, which completely altered scientific views from the comprehensive balance of natural philosophy to a more fixated empirical science concerned only with matter, viewing nature as a complex machine. For other philosophers, such as Francis Bacon, science was merely a tool for progressing technology and the manufacturing of goods. Thus, the foundation for modern science was rooted in the separation of philosophy and observation, and the goal-oriented production of data.

The final dissolution of ancient natural philosophy, which was originally comprised of both metaphysics and natural science, originated with the works of Baruch

Spinoza. Spinoza was fascinated with the rise of mechanical philosophy and materialism. His book, *The Ethics Demonstrated in Geometrical Order*, portrayed a system that created a mathematical explanation for existence and being, where the incorporeal world reflected the material world. Spinoza presented a convincing argument as to why natural philosophy no longer needed theology or metaphysical thought. Questions regarding meaning and purpose were dismissed and natural philosophy was diminished to mechanistic experimentation. Furthermore, he purported that nature does not work in a teleological fashion; it has no first cause or final cause. And, purpose is a concept created by humans to explain natural phenomena that cannot be understood through the senses. Spinoza, and others who relate to his theories, brought about the definitive division of philosophy and science. Mechanical philosophy is thus the end of metaphysical and teleological thought, and the permeation of modern empirical science.

To argue for the return of metaphysics in modern science, this thesis then demonstrates the shortcomings of modern science. As seen through the works of Martin Heidegger, questions of being are no longer addressed by modern science. Instead, a rapid production of technology has threatened to reduce humanity itself to a mere resource. Heidegger argues that humans are not machines and science can no longer ignore the human experience. He addresses the mind-body problem by proclaiming that the human being is indivisible, thus dismissing Cartesianism. His philosophy of *Dasein* is a concept that refers to the experience of being, as it pertains to humans. Heidegger addresses the scientific community, proclaiming that scientists must once again address issues of being, morality, and how natural phenomena relate to humankind.

This thesis will evaluate the progression of natural philosophy to explain the origin of modern science, where it broke from the tradition of metaphysics in combination with natural science, and why it must return to the conversation started by the ancient philosophers. Natural philosophy has lost sight of meaning and mechanical philosophy has oversimplified science. Metaphysics must be reincorporated within modern science so that science may better serve humanity through answering questions pertaining to how humans find meaning in nature. Modern science, stemming from mechanical philosophy, is problematic because it concentrates solely on the study of the physical world; it views everything—including humans and other living things—as a machine, and it neglects investigations into cause and purpose for existence. As humans are conscious of their own existence, they are inherently curious about why they exist and how they interrelate with nature. To ignore questions pertaining to meaning is to disregard purpose for humans and nature.

Chapter 1

Ancient Thought: Plato and Aristotle

We do not regard any of the senses as Wisdom; yet, surely these give the most authoritative knowledge of particulars. But they do not tell us the 'why' of anything—e.g. why fire is hot; they only say that it is hot.

– Aristotle

Metaphysical deductions and scientific discovery are both essential for humans to comprehend and relate to nature. This chapter establishes the foundations of natural philosophy and proves that metaphysics in combination with empirical science brought deeper understanding to the ancient world. Thus, to understand how science and metaphysics diverge as history advances, this chapter begins with a focus on the roots of topics such as being, the soul, and other various metaphysical ideas. This chapter will also establish the ancient meaning for nature as an important concept that is explored throughout the history of philosophy.

Classical thought is often found at the root of philosophical arguments and scientific discoveries. Ancient philosophers studied almost every topic imaginable, including natural science. They did not limit themselves to observation alone. Ancient philosophers were able to find connections between different phenomena through inference and deduction.

Theories from Plato and his student, Aristotle, exemplify the knowledge gained from the combination of metaphysics and observations of the physical world. While there are similarities between these two philosophers' ideas, there are also many vital differences. Plato's ideas affect the early Christian world and Aristotelian concepts then become more prevalent by the late Medieval period. The change from Platonic to

Aristotelian thought gives rise to the popularity of teleological explanations for nature which define physical phenomena as having a purpose and a final cause.

Plato and Aristotle both wrote at great length about metaphysics. The two most relevant ideas for the arguments of this thesis contained within their respective corpora are Plato's "Form of the Good" and Aristotle's "Four Causes." Both of their formulations explore nature and the cause and effect of natural phenomena, referenced often throughout history by many great thinkers. To comprehend philosophical thoughts about nature and humanity's role during later thought, it is important to first understand the foundational arguments arranged by these ancient philosophers.

Plato's Forms

Plato's complex theory of Forms is at the very center of almost every argument he makes. As Plato describes, the Forms are eternal and changeless entities that populate a realm that is more real and more perfect than the world that appears to human senses. Plato argues that because the corporeal world is defective and confusing, humans should value the greater reality of the Forms. Because no one has ever seen a perfect circle, Plato maintains that using the Form of a circle as a model is closer to perfection than modeling a product from something corporeal. When a carpenter builds a wheel, he does so by shaping his materials into the Form of a circle as best he can. Plato states that the Form of the circle does not come from the mind or the will of humans:

The artisan must discover the instrument naturally fitted for each purpose and must embody that in the material of which he makes the instrument, not in accordance with his own will, but in accordance with its nature.⁴

The Forms are the non-material ideas of objects in the known world. The Form of the circle is the metaphysical idea of a perfect circle. Richard Kraut states that the forms are

⁴ Plat. *Crat.* 389c.

“paradigmatic for the structure and character of our world.”⁵ Plato claims that something is beautiful because it “partakes” in the Form of beauty.⁶ Beauty is an idea (a Form) and therefore intangible, belonging to no single physical object.

The Forms provide causation to nature.⁷ The way that humans understand physical objects is through each object’s relationship with the Forms. A single object in the material world is comprised of many properties. For instance, a tree is tall, green, and strong. Tall, green, and strong are the unchanging Forms of which the tree is associated. Material objects are constantly changing and will one day cease to exist. The Forms, however, are eternal and unchanging. The universal ideas of tall, green, and strong do not change, but changes are observed in the tree. Changes perceived in nature are therefore explained by objects shifting which Forms they associate with. Plato then claims, through this logic, that only the Forms truly exist and therefore knowledge can only be obtained through the study of Forms.⁸ Ian Bruce further explains that: “the forms are eternal and changeless, but enter into a partnership with changeable matter, to produce the objects and examples of concepts, we perceive in the temporal world. These are always in a state of becoming, and may participate in a succession of forms.”⁹ The metaphysical theory of the Forms offers universal traits for each object that can easily be understood as the cause of properties found in human perception.

To clarify his theory of how humans perceive the Forms, Plato uses his “Analogy of the Cave.” Plato first imagines several humans in a cave which is lit by a fire from

⁵ Kraut, Richard, "Plato," *The Stanford Encyclopedia of Philosophy* (Summer 2012 Edition), Edward N. Zalta (ed.), <http://plato.stanford.edu/archives/sum2012/entries/plato/>.

⁶ Plat. *Phaedo* 100c.

⁷ Ibid. 100b.

⁸ Plat. *Rep.* 480a.

⁹ Bruce, Ian, “Plato’s Theory of Forms” (1998), <http://www.ccs.neu.edu/course/com3118/Plato.html>.

behind. These humans are prisoners and can only face forward. All they have ever known is the shadows that dance on the walls in front of them.¹⁰ Next, one of the prisoners is freed and shown the cause of the shadows for the first time. The fire light is blinding and the cause of the shadows, what he held to believe as reality, is too bizarre for him to immediately grasp as true.¹¹ By force, the prisoner is then taken to the outside world. While his eyes are adjusting to the light, he can only see the reflections of objects in a lake. Slowly, he is able to see the objects directly and finally, he is able to see the sun for the first time. Plato argues that the physical world is like that of the cave—merely shadows. People who only study the shadows are not taking part in true knowledge.¹² As demonstrated through the Forms, knowledge is universal and certain, unlike the flickering and changing images of the shadows.

The Form of the Good

The sun, the original source of light, is the symbol Plato identifies as the origin of the Forms in his cave allegory. The Form of the Good is the immaterial source of everything found in nature. The Good is the greatest of all Forms, and creator of all other Forms.¹³ To illustrate the Form of the Good, Plato uses the sun as a metaphor:

I imagine you'd claim that the sun not only endows the visible things with their power to being seen, but also with their coming into being, their growth, and their nurture, though it's not itself coming-into-being."¹⁴

Plato states that the strongest and best source of light is the sun. Sunlight grants the ability to see, but it is not vision itself. Instead, sunlight is a universal idea of light. Objects illuminated by the sun directly are clear and are not cast in shadows.

¹⁰ Plat. *Rep.* 514a.

¹¹ Ibid. 515d-e.

¹² Ibid. 517a.

¹³ Ibid. 508e.

¹⁴ Ibid. 509b.

Explanations for the shadows can vary from person to person. Plato states that the source of varying interpretation stems from fixating focus on traits that vary between one observer and the next.¹⁵ To merely study what is observed “deals in seeming and grows dim, changing its opinions up and down, and is like something that has no intellect.”¹⁶ The Forms give humans an idea of why opinions about the same object differ from one person to the next.

Aristotle’s Four Causes

The Forms and the Form of the Good are very complicated ideas. The Forms do not suggest meaning for the physical world, but merely indicate the cause for perception. This lack of meaning does not satisfy the human desire to find reason behind occurrences in nature. Human actions are accomplished with a purpose in mind, and thus it is easier for a human to understand the actions of nature in a similar fashion. Aristotle looked beyond his teacher’s theories for a teleological explanation for natural occurrences—he believed it was important to understand both *what* something is and *why* something exists. Aristotle illustrates, in his *Physics*, that nature has purpose and works in much the same way as a human being through his explanation of causes. Nature is defined by Aristotle as that which exists and is changing or has the potential to change.¹⁷ Whereas Plato analyzed nature through his Forms, Aristotle investigated the causes of change to understand nature.

There are four causes for change described in Aristotle’s *Physics*.¹⁸ The material cause is “that out of which” or from that which an object is made. For example, the

¹⁵ Plat. *Rep.* 508d.

¹⁶ Ibid.

¹⁷ Aristot. *Phys.* 2.1; 192b 15.

¹⁸ Ibid. 2.3; 194b 17-34

material cause is the bronze of a statue. The formal cause is “the form” or genera of an object. It is the shape of a statue. The efficient cause is “the primary source of the change or coming to rest.” Aristotle names a father as the efficient cause of a child. The final cause is “that for the sake of which a thing is done.” It is the teleological ending purpose or final goal. Aristotle states that true knowledge of nature comes from understanding all four of the causes.

The material and efficient causes are empirical in their nature; and they answer the questions regarding *what* something is and what led to its production. The material cause of a house is the wood and nails that were used to build the house. The efficient cause of the house is the carpenters, plumbers, and other workers who built the house. Modern science is primarily associated with these two causes, as the material and efficient causes are data-driven and observable. The material cause examines the matter from which an object is comprised, while the efficient cause examines what modern science considers the source (or cause) of the production of the object. Nonetheless, Aristotle was also concerned with *why* the house was built. Understanding the physical properties of an object only provides a physical description, but it fails to answer questions of purpose. Andrea Falcon points out that:

Aristotle recognizes the explanatory primacy of the final/formal cause over the efficient and material cause. Of course this does not mean that the other causes can be eliminated. Quite the contrary: Aristotle is adamant that, for a full range of cases, all four causes must be given in order to give an explanation. More explicitly, for a full range of cases, an explanation which fails to invoke all four causes is no explanation at all.¹⁹

The formal and final causes, on the other hand, clarify *why* an object exists, thus offering an explanation of the object’s origination and purpose, respectively. The house was first

¹⁹ Falcon, Andrea, "Aristotle on Causality," *The Stanford Encyclopedia of Philosophy* (Winter 2012 Edition), Edward N. Zalta (ed.), <http://plato.stanford.edu/archives/win2012/entries/aristotle-causality/>.

represented on a blueprint of its design (the formal cause) that explained how the wood and nails were fashioned into the form of the house. And, the house ultimately provides shelter for human beings, thus denoting the final cause of the house. According to Aristotle, the four causes provide a complete understanding of an object—*what* it is and *why* it exists.

To merely describe the house as an object made of wood and built by a construction crew does not reveal the house’s purpose, or how the builders worked together to form the house. The formal and final causes reveal the purpose of the house and from where it originated. These two causes go beyond the strict study of matter, and are later separated from modern science in the 17th century. In subsequent chapters, this thesis analyzes the implications associated with the removal of the formal and final causes from science.

Aristotle’s Substance

According to Aristotle, nature “belongs primarily in virtue of itself and not in virtue of a concomitant attribute.”²⁰ That is to say, nature clearly exists because humans are able to interact with it. Aristotle believes it is absurd to question the reality of nature and the physical world.²¹ For Aristotle and other ancient philosophers, nature and the causes of nature are interconnected. To attempt to prove otherwise is “the mark of a man who is unable to distinguish what is self-evident from what is not.”²² Such a man as Aristotle just described will be introduced in the third chapter of this thesis.

To understand Aristotle’s definition of nature, he introduces his idea of “substance” to describe what exists. The idea of substance is contemplated by

²⁰ Aristot. *Phys.* 2.1; 192b 21-24.

²¹ *Ibid.* 2.1; 193a.

²² *Ibid.* 2.1; 193a 5.

subsequent scholars over the next 2,000 years, and this thesis will later show the progressing ideas surrounding the concept. Aristotle himself defines the all-important building blocks of existence as that which primarily exists with no other thing or idea that is needed to define it. Howard Robinson further explains Aristotle's substance:

Aristotle acknowledges that there are three candidates for being called substance, and that all three are substance in some sense or to some degree. First, there is matter, second, form and third, the composite of form and matter.²³

Form, as discussed previously, is the unchanging idea of an object. Matter is what associates with a form to give it a physical presence—the undifferentiated “other.” An example of form and matter is a house (form) made of wood (matter). The combination of both form and matter make up the house. Aristotle claims the composite of form and matter cannot be a substance. Furthermore, Aristotle believes that a substance must be separable and identified individually. Matter is neither separable nor individually identifiable because matter owes its individuality to the substance it compromises. If the house made of wood was destroyed, and the wood was used to make a boat, then the wood is subsequently identified by the boat it comprises and no longer by the house.

This means that form is what Aristotle calls a substance.²⁴ The form of a house does not rely on particular matter to exist. For instance, if one of the walls of the house was replaced with a new wall made of bricks, it would still be the same house. Matter, on the other hand, cannot be described by itself. For example, if the wood was burned, the matter would then take on the form of ash and smoke.

²³ Robinson, Howard, "Substance," *The Stanford Encyclopedia of Philosophy* (Summer 2013 Edition), Edward N. Zalta (ed.), <http://plato.stanford.edu/archives/sum2013/entries/substance/>.

²⁴ Aristot. *Met.* 7,5;1031a

Aristotle's Prime Mover

Aristotle believes that nature, defined as the composite of form and matter in the *Metaphysics*, cannot be understood through the study of the physical alone. And, most importantly, Aristotle's describes a particular form as the final cause of everything in nature. Istvan Bodnar suggests that:

Were there no separate forms—entities such as the unmoved mover at the pinnacle of the cosmos—which are without matter and are not part of the physical world, physics would be what Aristotle calls *first philosophy*. As there are such separate entities, physics is dependent on these, and is only a second philosophy.²⁵

Aristotle and Plato both believe that there are forces beyond physical matter at work in nature. This is an important distinction between the natural sciences during ancient times and science in modernity. In the ancient world, natural philosophers questioned what an object *is*, *why* it exists, and what *purpose* it serves for humanity. Modern science is more concerned with questions regarding what an object *is* for the sake of understanding the object, without necessarily taking into account how humans interact with the object.

Aristotle theorizes that motion is the primary cause for changes observed in nature. Something that is in motion has to be put into motion by something else. Furthermore, something that is put into motion had the potential to move before it moved and is in a state of actuality once it is moving. Thus, it is impossible for something to be both in a state of potentiality and actuality at the same time.²⁶

Aristotle then points out that all things in nature are not in motion at the same time. Both potential for motion and actual motion are observed regularly:

It is because, while some things are moved by an eternal unmoved mover and are therefore always in motion, other things are moved by something that is in motion and

²⁵ Bodnar, Istvan, "Aristotle's Natural Philosophy," *The Stanford Encyclopedia of Philosophy* (Spring 2012 Edition), Edward N. Zalta (ed.), <http://plato.stanford.edu/archives/spr2012/entries/aristotle-natphil/>.

²⁶ Aristot. *Phys.* 3.2; 202a.

changing, so they too must change. But the unmoved mover, as has been said, since it remains simple and unvarying and in the same state, will cause motion that is one and simple.²⁷

Motion is not successive, but continuous, according to Aristotle's theory of the prime mover. Motion does not have a starting point, but it is infinite. Aristotle takes his concept of motion and conjectures that there must be an "eternal unmoved mover" that was never moved but causes motion in everything else. His unmoved mover, or prime mover, is eternal and, the final cause of everything found in nature.²⁸

To the modern reader, Aristotle's "prime mover" is an easier concept to explain than Plato's Forms. Everything in motion was placed in motion by something else. While Aristotle claims that motion is infinite in nature and not successive, if a final cause is sought, then the concept of infinity must be avoided. Therefore, there must be something that moved without itself being moved by something else. The "prime mover" is a frequently referenced explanation of nature throughout history and is later used by Thomas Aquinas to define God. Aquinas' successful adaptation of Aristotelian thought contributes to the swing from Platonic thought to Aristotelian theory as the foundation of medieval thought in the Western world.

Plato on the Soul

The idea of nature, as seen in the Form of the Good and the Prime Mover, also comes into play when Plato and Aristotle explore the nature of humanity—the soul (or mind) and the body. Cleaving the relationship between these two entities, Rene Descartes later separates science from incorporeal metaphysical ideas. This is an idea that pervades modern notions of empirical science. However, it is first important to

²⁷ Aristot. *Phys.* 8.6; 260a.

²⁸ *Ibid.* 8.6; 259a.

understand the ancient view on the connection between the mind and the body. Both Plato and Aristotle argue that the soul is eternal and defines human nature. The ancient philosophers differ, however, regarding the function of the soul. They agree that every living thing in nature has a soul, and that the soul is what gives life. Furthermore, they both seek to understand the nature of humankind so they can then, in turn, understand humanity's place in nature.

Much like his Forms, Plato's idea of the soul is a complicated one and involves many parts. His idea of an immortal soul is not a common thought during his time, as is evident in *the Republic*. When Socrates relays Plato's idea that the soul is immortal, Glaucon responds in awe and wishes to know more.²⁹ To Plato, the soul is an everlasting entity. His idea of the eternal soul plays a huge role in the ancient Christian movement discussed in the next chapter.

Along with its eternal quality, Plato also depicts the soul as the cause of life and that which animates a body in *Phaedo*. Plato argues that the soul controls the body but its purpose is to deal with the invisible things (Forms) that can only be grasped with reason.³⁰ Furthermore, when the soul spends too much time using the bodily senses, "then it is dragged by the body to things which never remain the same, and it wanders about and is confused and dizzy like a drunken man."³¹ The soul is interested in wisdom, which is the unchanging, pure, and everlasting thing of the cosmos—the Forms.

In the *Republic*, Plato splits the soul into three parts; appetite, spirit, and reason. Appetite is the part of the soul that deals with the bodily senses and cravings. It is

²⁹ Plat. *Rep.* 10.608d.

³⁰ Plat. *Phaedo* 94b-94e.

³¹ *Ibid.* 79c.

concerned with food, drink, and sex.³² Spirit, on the other hand, is the motivating force interested in honor and the recognition of others. It thrives on prestige and promotion, rather than physical reward. Plato calls the spirit the “honor-loving part” of the soul.³³ Reason, accordingly, is charged with guiding life and its tools are truth and knowledge. It is the source of human thirst for wisdom.³⁴

In *Phaedrus*, Plato claims that the appetite and the reason parts of the soul are constantly opposing one another. He uses the analogy of a chariot pulled by two horses to explain his theory. The first horse is white and clean. It is described as honorable, modest, and needing no whip.³⁵ The other horse is dark in color and described as prideful, poorly groomed, and insolent.³⁶ And, as stated in the *Republic*, the appetite part of the soul is not rational and needs a ruler to keep it in check.³⁷ Reason is the charioteer, who wishes to guide his horses toward wisdom.³⁸ Appetite is the dark horse and will cause ruin and disaster if it cannot be reined under control. The spirit is the white horse which, while rooted in the visible world, shares reason’s love for truth and depends on reason to bring it to glory. When the appetite is ignored, irrational behavior occurs. And when the spirit is ignored, emotional responses, such as anger, are triggered.

The appetite part of the soul is drawn to the physical world and physical pleasures. The reason is concerned with understanding nature, its universal and divine aspects. And, the spirit wishes to gain honor and glory in the material world and uses reason’s understanding of truth to do so. The appetite, the reason, and the spirit are three

³² Plat. *Rep.* 4.439d.

³³ Ibid. 9.581b.

³⁴ Ibid. 9.580e.

³⁵ Plat. *Phaedrus* 253d.

³⁶ Ibid. 253e.

³⁷ Plat. *Rep.* 4.442b.

³⁸ Plat. *Phaedrus* 254b.

parts of a single soul. Hendrik Lorenz points out that the soul, as defined by Plato in both the *Phaedo* and the *Republic*, is responsible for both thought and emotions:

the functions of reason and of the soul are not restricted to cognition, but include desire and emotion, such as desire for and pleasure in learning, and so the functions of the non-rational soul and of the body are not restricted to desire and emotion, but include cognition, such as beliefs (presumably) about objects of desire, 'descriptive' or (rather) non-evaluative ("there's food over there") as well as evaluative ("this drink is delightful").³⁹

In this regard, Plato has defined how humans are connected to nature and the divine at the same time. Humans are capable of desiring both tangible things like nourishment (connection to nature) and intangible concepts such as beauty (connection to the divine) at the same time.

Aristotle on the Soul

Aristotle agrees with his teacher, Plato, in his assertion that the human soul is eternal:

The intellect seems to be born in us as a kind of substance and not to be destroyed. For it would be destroyed if at all by the feebleness of old age, while as things are what happens is similar to what happens in the case of the sense-organs. For, if an old man acquired an eye of a certain kind, he would see as well as even a young man. Hence old age is not due to the soul's being affected in a certain way, but to the happening to that which the soul is in, as in the case in drunkenness and disease.⁴⁰

Aristotle does not believe that the soul is attached to the physical and psychological functions of the body. To Plato, the soul is at war with itself. It is through this idea that he accounts for a human wanting to perform two different actions at the same time. For example, a soldier guarding his post might be scared and wish to flee, but at the same time he feels obligated by honor to stay and perform his duty. Aristotle, by contrast, does not view the soul in this manner. He claims that the human soul is the form or principle of the human body. Aristotle states: "For, if the eye were an animal, sight would be its

³⁹ Lorenz, Hendrik, "Ancient Theories of Soul," *The Stanford Encyclopedia of Philosophy* (Summer 2009 Edition), Edward N. Zalta (ed.), <http://plato.stanford.edu/archives/sum2009/entries/ancient-soul/>.

⁴⁰ Aristot. *De Anima*. 1.4; 408b 20.

soul; for this is an eye's substance—that corresponding to its principle.”⁴¹ The body of a human being is the physical embodiment of the soul and the soul is the principle for the body.

The human body represents the potential of the soul. And, it is the soul that gives the body its abilities. It is important to note that Aristotle labels the soul as “a kind of substance.”⁴² The body is given life by the soul and therefore the body needs the soul to exist. “The soul is the actuality of a body.”⁴³ To further his idea, Aristotle then uses his theory of the soul to define the human. He states: “Matter is potentiality and form actuality. And since the product of the two is an ensouled thing, the body is not the actuality of the soul, but the latter is the actuality of a certain kind of body.”⁴⁴ A human is the product of the form (soul) and the matter (body) combined.

Aristotle argues against Plato's disregard for the bodily senses because he feels they are necessary for understanding the way humans experience nature. Yet, he agrees that the soul is naturally drawn to theoretical kinds of knowledge that explains the purpose and final cause of objects and nature.⁴⁵ Aristotle defines knowledge as knowing the four causes of the subject, giving purpose to nature. Unlike Plato, Aristotle argues that the body's senses can and should be used to find wisdom:

All men naturally desire knowledge. An indication of this is our esteem for the senses; for apart from their use we esteem them for their own sake, and most of all the sense of sight. Not only with a view to action, but even when no action is contemplated, we prefer sight, generally speaking, to all the other senses. The reason of this is that of all the senses sight best helps us to know things, and reveals many distinctions.⁴⁶

⁴¹ Aristot. *De Anima*. 2.1; 412b 20.

⁴² Ibid. 2.1; 412a 20.

⁴³ Ibid. 2.1; 412a 22.

⁴⁴ Ibid. 2.2; 414a15.

⁴⁵ Aristot. *Met.* 1.1; 981b 30.

⁴⁶ Ibid. 1.1; 980a.

Plato and Aristotle both agree that the body and the soul work together and one cannot function without the other. Aristotle's theory, however, gives the physical world more importance than Plato's philosophy. Plato's Forms are his explanations of what causes change in nature. The Forms are intangible and can be contemplated, but not seen. Aristotle's Four Causes, on the other hand, can all be witnessed in nature. His ideas of form and matter both become visible once they are joined.

In conclusion, through their writings Plato and Aristotle theorize the ways humans live inside of nature. Plato gives an account for how and why humans identify with the world through his Forms, and Aristotle gives meaning and purpose to nature through his four causes, specifically through the formal and final causes. Both philosophers tie the human soul directly to nature and the divine, and they each give an account as to how the mind and the body work together through their explanations of the soul. And, as discussed previously, questions regarding nature and existence are clarified through teleological explanations and the concepts of the Forms and substance. Natural philosophy in the ancient world successfully incorporates the physical aspects of nature along with the incorporeal forces that cause change in nature to form a more complete understanding of nature as it relates to humans. Plato's idea of the soul connects humans directly to both the physical world and the divine. The formal and final causes are missing from modern empirical science and thus humans are not able to connect to nature through science alone.

Chapter 2

Medieval Philosophy: From Augustine to Aquinas

The truth of our faith becomes a matter of ridicule among the infidels if any Catholic, not gifted with the necessary scientific learning, presents as dogma what scientific scrutiny shows to be false.

– Thomas Aquinas

The Medieval period philosophers further the studies started in the Classical age and use the wisdom of the ancient cultures to support medieval Christian ideas. Natural philosophy becomes confined within theology during this time, leaving its previously broader scope as an exploration of the natural world. Natural philosophy is now tied exclusively to the Christian God, and with the prohibition of questioning of church doctrine, the acquisition of human knowledge is stifled. Because metaphysical deductions and scientific discovery are both essential for humans to comprehend and relate to nature, this shift in natural philosophy is detrimental to human understanding of the physical world. This chapter explains how Augustine of Hippo and Thomas Aquinas connect humans to nature through God, limiting the acquisition of knowledge to the confines of Christianity and aimed at the advancement of the Church.

While Plato was driven by his wish to obtain knowledge and Aristotle sought knowledge through the causes for change in nature, Augustine and Aquinas were motivated by their religion. Both Augustine and Aquinas contributed to many of the same ideas explored by Plato and Aristotle, such as the human soul and the idea of substance, but they are most notably responsible for tying natural philosophy directly to Christianity. Christianity became the primary focus of these thinkers, and an understanding of nature was secondary to and subservient to Christianity.

Augustine and God

Augustine of Hippo was a Catholic bishop during the early years of the 5th Century. Augustine uses many of Plato's ideas to further advance Christianity in the Western world and his writings exemplify how the Western world defines God, the soul, and happiness for almost 900 years. Because of Augustine's influence on European culture, revelation is deemed a higher form of thought than observation and deduction: "I say believe. For understanding is the recompense of faith. Therefore, seek not to understand so that you may believe, but believe so that you may understand; for unless you believe, you will not understand."⁴⁷ Augustine believes that God will reveal Himself to those who believe. Thus, it is impossible to observe God without faith. His disregard for the human senses causes problems for later natural philosophers because they are limited to metaphysical thought without empirical science. Thus, they formulate theories but lack evidence through observation to support their revelations. Although Augustine uses Plato's theories as a foundation for his ideas, he diverges from Plato's recognition of observation as a natural human tendency, albeit lesser in prominence than revelation:

When I was young I was tremendously eager for the kind of wisdom which they call investigation of nature. I thought it was a glorious thing to know the causes of everything, why each thing comes into being and why it perishes and why it exists.⁴⁸

Plato does not entirely dismiss the need for gathering knowledge through the senses, as he understands that investigation of nature is a common way of learning, in addition to higher level thinking. Augustine believes nature can only be understood through knowledge of God, and God can only be understood through revelation.

⁴⁷ Augustine. *The Fathers of the Church*. Trans. by Rettig, John W. (Washington, DC: CUA Press, 1993) 18.

⁴⁸ Plat. *Phaedo* 96a.

Plato's Form of the Good and Augustine's God are very similar—each one is the creator of all things and the ultimate source of being and knowledge. Both Plato's Form of the Good and Augustine's God are separated from nature in the sense that they are the cause of nature, not part of it. Nature, according to early Christians, is simply the physical world, and much like in Greek philosophy, there is a connection between the physical world and the divine. However, Augustine believes that knowledge cannot be gained through sight or the other senses. Rather, one must focus solely on the source of all things. Plato's influence on Augustine's idea of God is evident in the following passage:

And see, you were within and I was in the external world and sought you there, and in my unlovely state I plunged into those lovely created things which you made. You were with me, and I was not with you. The lovely things kept me far from you, though if they did not have their existence in you, they had no existence at all.⁴⁹

Augustine describes a world that is created by God, but the physical world is only a distraction—a shadow of God's presence at best. Plato's Form of the Good from the *Republic* is clearly the inspiration for Augustine's God: "the objects of knowledge not only receive from the presence of the good their being known, but their very existence and essence is derived to them from it."⁵⁰ Augustine is using Plato's Form of the Good to explain the physical world and define his Christian God as well.

Augustine synthesizes Plato's ideas with another ancient source, *The Book of Psalms*, to add additional Christian support to his Platonic foundation. It is this combination that produces Augustine's God, the Creator of all things:

The way, God, in which you made heaven and earth was not that you made them wither in heaven or on earth... Nor did you make the universe within the framework of the universe. There was nowhere for it to be made before it was brought into existence...

⁴⁹ Augustine. *Confessions*. Trans. by Henry Chadwick (New York, NY: Oxford University Press, 1991) 201.

⁵⁰ Plat. *Rep.* 6.509b.

What is it for something to be unless it is because you are? Therefore you spoke and they were made, and by your word you made them.⁵¹

Like Plato's Forms, God creates the ideas of perfection, the "framework" as Augustine calls it, and the physical world is a product of God's thought. Therefore, Augustine has changed the focus of natural philosophy to the search for God through the natural world, instead of the universal quest for understanding how humans relate to nature. The last line of Augustine's passage is taken from the 33rd Psalm: "For He spoke, and it came into being; He commanded, and it came into existence."⁵² Here, Augustine mixes Platonic ideas with Christian doctrine, thus narrowing the scope of inquisition by eliminating the empirical data necessary to fully support theory in general.

Augustine states that all things are created by God, but man cannot find the truth of God in earthly things:

You, Lord, who are beautiful, made them for they are beautiful. You are good, for they are good. You are, for they are. Yet, they are not beautiful or good or possessed of being in the sense that you their Maker are. In comparison with you they are deficient in beauty and goodness and being. Thanks to you, we know this; and yet our knowledge is ignorance in comparison with yours.⁵³

Augustine's Platonic view of the source of true beauty and wisdom is almost identical to Plato's idea of the Forms. God is the ultimate source of beauty, goodness, and being. To know these things is not to see them in nature, but to know them as God knows them. For Augustine, God is the Form of the Good, everything is created by God, and God's creations are only shadows of his goodness. Nature and humankind spring forth from God's design. Thus, Augustine establishes that true wisdom comes from God only, and understanding of merely the physical world is "ignorance."

⁵¹ Augustine. *Confessions*. Trans. by Henry Chadwick (New York, NY: Oxford University Press, 1991) 225.

⁵² Ps. 32:9.

⁵³ Augustine. *Confessions*. Trans. by Henry Chadwick (New York, NY: Oxford University Press, 1991) 224.

Augustine on the Soul

To understand the connection between God and humanity, Augustine explores the features of the soul. Augustine believes that the human soul is immortal and that death is something that only affects the body. Just as Cebes questions the fate of the soul in Plato's *Phaedo*, Augustine addresses the fears of death in his *Confessions*:

But put aside that death can be like that. It is not for nothing, not empty of significance, that the high authority of the Christian faith is diffused throughout the world. The deity would not have done all that for us, in quality and in quantity, if with the body's death the soul's life were also destroyed. Why then do we hesitate to abandon secular hopes and to dedicate ourselves wholly to God and the happy life?⁵⁴

Augustine argues that the soul is unaffected by the body's death. He uses the success of the Church and how quickly Christianity has spread to strengthen his argument.

Augustine states that God would not allow the teachings of the Church and its doctrine of the immortal soul to spread if they were not based in truth. But, Augustine realizes that human curiosity is not satisfied until it has seen evidence to support such claims.

The fear of death is what Augustine uses to explain the wickedness of man.

Augustine states that what keeps humans from embracing full dedication to God is the fact that "secular successes are pleasant."⁵⁵ There is a part of the soul, much like Plato's appetite, that yearns for earthly things. It longs for the pleasures that the world has to offer:

What else should we be seeking for? I did not realize that that is exactly what shows our great wretchedness. For I was so submerged and blinded that I could not think of the light of moral goodness and of a beauty to be embraced for its own sake-beauty seen not by the eye of the flesh, but only by inward discernment.⁵⁶

However, as Plato states before Augustine, the soul's natural place is among the Forms, or in Augustine's case, with God. Spending too much time among earthly things causes

⁵⁴ Augustine. *Confessions*. Trans. by Henry Chadwick (New York, NY: Oxford University Press, 1991) 105.

⁵⁵ Ibid.

⁵⁶ Ibid. 110.

the soul to become confused. As Plato believed, knowledge and beauty should be sought for knowledge and beauty's sake. Per Binde describes the different relationships between the body and the soul, as described by Plato and the stoics, and how this corresponds with Augustine and early Christian thought:

Plato drew a sharper distinction between the soul, akin to the divine, and the body, as a seat of evil animalistic drives and irrationality. In a similar vein the stoics considered man, because of his faculty of reason, to be a divine being, a ruler and master of the world of matter and the inferior soulless animals. The dualism between mind and matter was incorporated early into Christian doctrine, mainly through the theology of St. Augustine.⁵⁷

Augustine does not believe that humanity is doomed to fall victim to appetite, though. The soul of a human being should be controlled by reason, not the appetite. Augustine explains that it is the human mind that reasons and not the body. Furthermore, the body is unable to help the mind to understand God and His creations:

And, when we reason, it is an act of our mind; for only that reason which understands can reason. Neither the body understands, nor the mind, aided by the body, understands, because when the mind wishes to understand, it is turned away from the body.⁵⁸

As Ludwig Schopp states, “Augustine is here under the strong influence of the reality of the Platonic realm of ideas.”⁵⁹ True wisdom comes from knowledge of the unchanging and the eternal. The body is neither unchanging nor eternal, and therefore cannot comprehend either status. However, as Plato warns, Augustine has lost sight of the importance of the appetite and an overall balanced soul—he is denying the soul physical pleasures. He believes that humans should not seek to understand the corporeal world (appetite), but instead seek to understand God (reason through revelation). This lack of balance is as detrimental to natural philosophy as modern science falling victim to the appetites versus having a balance of appetites, with spirit and reason. Modern science

⁵⁷ Bind, Per. “Nature in Roman Catholic Tradition.” *Anthropological Quarterly* 74 (2001): 16.

⁵⁸ Augustine of Hippo. *The Immortality of the Soul*. Trans by: Ludwig Schopp (D.C.: CUA Press, 1947) 16.

⁵⁹ Ibid.

also does not allow for revelation in its studies; instead, it strictly seeks to understand the physical world through observation. Consequently, revelation is a feature of the intangible soul, rather than the tangible body, a popular thought until the 16th century, explaining why revelation and deduction are proclaimed as higher forms of thinking than experimentation and observation.

Thomas Aquinas

Several centuries following Augustine, the works of Thomas Aquinas cause a shift in European culture, from Platonic thought to Aristotelian philosophy. In the 13th century, Aquinas, a priest of the Dominican Order, uses Aristotle's theories (and the human senses) to support his theological doctrines and findings on the human condition in *Summa Theologica*. Aquinas employs the teachings of Aristotle in the Western world to explain God and nature. Unlike Augustine, who believes that God can only be seen through revelation, Aquinas believes that God can be directly observed in nature. Belief in God is not needed for Aquinas to prove that God exists. Aquinas states that "the existence of God, in so far as it is not self-evident to us, can be demonstrated from those of His effects which are known to us."⁶⁰ His successful use of Aristotelian logic over Platonism also gives rise to the acceptability of experimentation and observation beginning in the Renaissance.

Aquinas and Aristotle

Before discussing why Aquinas references Aristotle, it is important to understand why Aquinas's use of Aristotle's theories is so radically different from other scholars. Prior to Aquinas, Plato is the prevailing philosopher of the ancient world through the influence of Augustine. The Church believes that ultimate wisdom comes through divine

⁶⁰ Aquinas, Thomas. *Summa Theologica*. Kindle Edition. (B&R Samizbat Express: 2009) 30.

revelation, not observation of the physical world. Aristotle, Plato's student and champion of reason, is then reintroduced to the Western world through Muslim and Jewish scholars. Wyatt North argues: "the writings of St. Thomas were influenced by Averroes, the chief opponent whom he had to combat in order to defend and make known the true Aristotle."⁶¹ Because Averroes, a Muslim scholar, was the first to introduce Aristotle's ideas to medieval Europe, Christianity initially views Aristotle's teachings as paganistic. However, Aquinas elicits value from Aristotle's use of reason to find purpose in nature. And, Aquinas proves that reason and revelation are not at opposition with each other, in order to bring Aristotle's teachings into his faith. Peter Blair states:

Christianity's engagement with non-Christian thought proceeds from the Christian belief that reason and faith are complementary, not oppositional. Thomas Aquinas' synthesis of Aristotle and Christianity is a vital chapter in this engagement. His interaction with the philosophy of Aristotle demonstrates both the harmony of reason and faith and the oneness of truth, which are both central to the Christian intellectual tradition.⁶²

Despite resistance from Platonists, Aquinas succeeds in using Aristotle's model for understanding God and nature, rather than Plato's complex Idea of the Forms. Aquinas reveals nature more efficiently through Aristotle's model, rather than the popular Platonic one, thus marking a turning point in Western thought. Because of Aquinas, the Church and its philosophers move from Platonic thought to Aristotelian ideas. Aquinas's handling of Aristotle's theories is deeper than merely "adding God to [Aristotle's teachings] to allow for more acceptances from our Christian society," Melissa Atkinson explains. She continues to say:

Aristotle and Aquinas both see God as the highest being and believe that the highest life is one that acts for the sake of heeding to this highest being. However, their views on exactly how God is are different. Aristotle was not a religious person.⁶³

⁶¹ North, Wyatt. *The Homilies of St. Thomas*. (New York: Wyatt North Publishing, 2012), 16.

⁶² Blair, Peter. "Reason and Faith: The Thought of Thomas Aquinas." *Dartmouth Apologia*. (2010): <http://www.dartmouthapologia.org/articles/show/125>.

⁶³ Atkinson, Melissa. "Aristotle and Aquinas: Intrinsic Morality Versus God's Morality." *Rebirth of Reason*. (2011).

For Aristotle, there is no Heaven motivating him to be a good person. To the ancient philosopher, simply being a moral person is reward enough. Aquinas differs with Aristotle in this respect as it is God who motivates humans to lead a righteous life and God is the driving force behind nature. Therefore, the study and observation of nature is directly linked to God. Still, natural philosophy is bound by the Christian God and, even though Aquinas acknowledges the value of observation, he continues to limit the scope of natural philosophy.

Aquinas on God and Nature

Aquinas uses Aristotelian wisdom to prove the existence of the Christian God. He connects his physical observation with the divine and argues that for humans to understand the first and last causes of nature, logically God must exist. Aristotle before him makes a similar argument about the existence of a singular eternal “prime mover.”⁶⁴ However, Aristotle’s ideas for the purpose of nature are very different from those of Aquinas. Instead, Aristotle considers nature itself as an internal principle of change and his explanations focus on what is inherently good for natural bodies themselves.⁶⁵ Such explanations are needed in empirical science because Aristotle believes that the human desire to know the cause of being cannot be satisfied purely through physical observations.

While infinity is a possibility for Aristotle, he claims that humanity would never be able to understand nature if it does not clearly have a beginning and an end. Consequently, the Classical idea of the “prime mover” as described by Aristotle is used

⁶⁴ Aristot. *Phys.* 8.6; 259a 10.

⁶⁵ Johnson, Monte Ransome. *Aristotle on Teleology*. Oxford Scholarship Online: 2005.
<http://www.oxfordscholarship.com/view/10.1093/0199285306.001.0001/acprof-9780199285303>.

by Thomas Aquinas to prove that there is a God, that He is eternal, and that He is the creator of all things. Aquinas elevates Aristotle's theories above Plato's teachings for the first time in the Western world, but he has misrepresented the meaning behind Aristotle's *Physics* as he has connected the "prime mover" with Christian doctrine. For Aristotle, the four causes are not linked to theology, and the "prime mover" does not concern itself with the morality of a human being. Aquinas, on the other hand, ties morality directly to the influence of God.

Aquinas on the Soul

To Aquinas, the idea of the soul is at the very center of what defines humanity and ties humans to both God and nature. But what is the soul and what is its function? Aristotle claims that the soul is the form of the body and is a substance.⁶⁶ Aquinas has a different answer, however. He defines substance as objects in nature or "the enduring things", such as trees, humans, and animals that come into being and will some day cease to be.⁶⁷ The idea that the soul, unlike the body, is eternal comes from Aristotle's assessment.⁶⁸ Aquinas agrees that the soul is eternal. It is not a substance, though; it is something that can continue to exist after the body (a substance) has died. Thus, Aquinas has changed the definition of substance and has implied the possibility for a separation between body and soul. This idea will be addressed again by Rene Descartes in the subsequent chapter of this thesis.

Thomas Aquinas again uses Aristotle's theories to advance his Christian ideas. He employs the Classical idea of forms, in much the same way as Aristotle, to describe

⁶⁶ Aristot. *De Anima*. 2.1; 412b 20.

⁶⁷ McInerny, Ralph and O'Callaghan, John, "Saint Thomas Aquinas," *The Stanford Encyclopedia of Philosophy* (Winter 2010 Edition), Edward N. Zalta (ed.), <http://plato.stanford.edu/archives/win2010/entries/aquinas/>.

⁶⁸ Aristot. *De Anima*. 1.5; 411b.

the connection between the mortal body and the eternal soul. “It is one and the same man who is conscious both that he understands, and that he senses,” Aquinas explains. “But one cannot sense without a body: therefore the body must be some part of man.”⁶⁹ For Aquinas, the substance is the body, but “man” is capable of existing without the body.

Aquinas concludes that the soul alone is not a human, but rather the soul (the form of man) and a body, together, defines the human being. “This proposal puts the disagreement between Aquinas and the ancient naturalist in a stark light,” Robert Pasnau argues. “To their way of thinking, certain simple elements are the most basic and general explanation for why a thing is the way it is.”⁷⁰ Pasnau points to the first article of question number 75 of the *Summa Theologica* where Aquinas states: “the philosophers of old believed that nothing existed but bodies, they maintained that every mover is moved; and that the soul is moved directly, and is a body.”⁷¹ Aquinas’ reply simply asserts that the soul is not a body; rather it is the cause of the body’s actions, thus creating an important distinction for Aquinas to connect humans with nature and also connect “man” with God. Aquinas has altered an Aristotelian thought as Henry Veatch states:

[Aquinas creates] a psychology that is far more Aristotelian than it is Platonic or Augustinian; a subtle theory that takes off from Aristotle but ends in a theory that is distinctively Thomistic; an ingenious adaptation of the Platonic doctrine, coupled with a thoroughgoing rejection of the Platonic Theory of Ideal Forms.⁷²

Aquinas’ theories become the foundation of education in the Western world—thus, to argue with Aquinas or Aristotle is to argue against God.

⁶⁹ Aquinas, Thomas. *On Politics and Ethics*. Ed. by Paul E. Sigmund (New York: Norton and Co, 1988), 615.

⁷⁰ Pasnau, Robert. *Thomas Aquinas on Human Nature*. (Cambridge:Cambridge University Press, 2002), 35.

⁷¹ Aquinas, Thomas. *On Politics and Ethics*. Ed. and Trans. by Paul E. Sigmund (New York: Norton and Co, 1988), 603.

⁷² Veatch, Henry. Review of *Aquinas’ Search for Wisdom*, by Vernon J. Bourke. *Speculum*, Vol. 41, 3 (Jul 1966), 522.

To conclude, through the works of Augustine and Aquinas, natural philosophy was subject to Christian theology during the Medieval period. Augustine claimed that only revelation is pertinent for acquiring knowledge, completely disregarding the importance of the intake of information through the human senses. Aquinas, on the other hand, acknowledged the need for perception of the senses, but continued to limit natural philosophy to the search for God in nature. Both philosophers deviated from the Greek notion of acquiring knowledge for knowledge's sake and limited the information available to comprehend the physical world. Because metaphysical ideas and empirical science are both important components for understanding how humans relate to nature, this change from Greek accounts of the physical world removed all theoretical explanations that are not part of the Christian view of God as the creator and sustainer of the world.

Chapter 3

The Scientific Revolution: Descartes and Bacon Redefine Nature

Nature is inexorable and immutable; she never transgresses the laws imposed upon her, or cares a whit whether her abstruse reasons and methods of operation are understandable to men. For that reason it appears that nothing physical which sense—experience sets before our eyes, or which necessary demonstrations prove to us, ought to be called in question (much less condemned) upon the testimony of biblical passages which may have some different meaning beneath their words. For the Bible is not chained in every expression to conditions as strict as those which govern all physical effects; nor is God any less excellently revealed in Nature's actions than in the sacred statements of the Bible.

– Galileo Galilei

The Scientific Revolution following the Medieval and Renaissance periods ushers in a wave of new scientific discovery. Through Christian tradition, science as natural philosophy is a part of philosophy, and therefore scientists must match their new findings to the metaphysics of the Church. Divinity is an integral element of natural philosophy and those who do not conform are excommunicated, jailed, or sentenced to death. In response, Galileo, Descartes, Spinoza, Bacon, and other thinkers of this time endeavor to remove theology from natural philosophy. However, with the removal of the parts pertaining to meaning—as in theology, metaphysics, and ontology—natural philosophy lacks significant associations between observations of natural phenomena and their effect on a human's daily life. Science no longer concerns itself with finding meaning in nature, and its focus becomes an object-centered system of measurements. Thus, modern empirical science is born.

This chapter focuses on the theories of Rene Descartes and Francis Bacon, and examines the separation of science from philosophy. Descartes, like Aristotle and Aquinas before him, provides his own definition of “substance.” Descartes’ uses his dualistic substance theory to separate the human body from the human mind—the body remains in the physical world and the mind is separated from nature, in the realm of

thought. Bacon, on the other hand, theorizes that humans are dominant over nature. Together, both Descartes and Bacon argue against ancient metaphysics in their scientific theories, forever changing natural philosophy and morphing it into the discipline of science as it is known presently, thus creating the current limitations for science's interpretation of reality.

Rene Descartes

Rene Descartes was born in France in 1596. He spent most of his life in the Dutch Republic where questioning religion was permissible. Descartes felt that only numbers were truly universal and therefore pressed the use of mathematics as a universal language for science. Nevertheless, making the connection to the Church was important to Descartes, as he was a devout Roman Catholic by faith.

To further complicate the matter, Descartes was not a theologian. He received no advanced degree in divinity, nor was he a member of the clergy. Unlike today, in the 16th century, science, philosophy, and Christian theology were all interrelated. Those who studied natural phenomena although were not theologians, like Descartes, began to secularize natural philosophy. Amos Funkenstein explains the challenges Descartes faced:

Their theology was secular also in the sense that it was oriented toward the world. The new sciences and scholarship, they believed, made the traditional modes of theologizing obsolete; a good many professional theologians agreed with them about that. Never before or after were science, philosophy, and theology seen as almost one and the same occupation.⁷³

Unlike Aquinas before him, Descartes did not have the authority of the Church behind his findings, and had to demonstrate that his theories were compatible with Church doctrine.

Descartes believed that he could align his theories with the Church, and saw no reason

⁷³ Funkenstein, Amos. *Theology and the Scientific Imagination: From the Middle Ages to the Seventeenth Century* (Princeton, 1986) 3.

why his method for discovery should conflict with theology. However, his findings were highly controversial and caused a split in the scholastic world between those who found merit in his method and those who did not.

Descartes's Method

Aristotle, thanks to Aquinas, offered the accepted model for philosophy leading up to the Scientific Revolution. But, because Aristotle viewed mathematics as an insufficient language to describe the physical world, mathematicians were largely overlooked by the Church. John Henry explains:

According to the Aristotelianism prevailing among scholastic natural philosophers, mathematics was essentially irrelevant to natural philosophy, because it did not, could not, deal with physical causation, and so could not provide the kind of physical explanation in terms of causes which was the aim of natural philosophy.⁷⁴

Aristotle was concerned with the causes for change in nature. His *Physics* concentrated almost exclusively on why changes occurred, or ontology. Descartes' works argue that science should only be concerned with observable, empirical data. Descartes defines modern sciences as the study of matter.

The study of the physical in describing the natural world through only empirical data is championed by a philosophical view called mechanical philosophy. Mechanical philosophers, such as Descartes, believe that everything is comprised of small bits of matter. Change and motion are caused when one bit of matter bumps into another. All occurrences are thus explained through the study of matter and motion (the material and efficient causes), according to mechanical philosophers, and Aristotle's causes pertaining to meaning (the formal and final causes) are not considered relevant. Descartes believed that the formal and final causes should be assessed by the Church. Presently, modern

⁷⁴ Henry, John. "Metaphysics and the Origins of Modern Science: Descartes and the importance of Laws of Nature." *Early Science and Medicine*, Vol. 9, 2 (Nejmegen: BRILL Publishing, 2004) 93.

science does not recognize theology as a part of science; and philosophy has been reduced to superfluous opinion. Science is only concerned with how nature works, and therefore greatly reduces the human power of explanation with the removal of justifications containing purpose and meaning.

Descartes turns away from ancient philosophy to find the answers that remove all doubt from what is being questioned: "I compared the disquisitions of the ancient moralists to very towering and magnificent palaces with no better foundation than sand and mud."⁷⁵ He believes that Mathematics provides universality and certainty—there is no doubt that two plus two equals four. Descartes then proposes a method to find truth and knowledge that begins with questioning all previously accepted knowledge. To alleviate doubt, Descartes suggests breaking down a problem into its most simplistic parts. By first solving these smaller problems, Descartes believes he can then find the answer to the original larger problem. Even through the 21st century, Descartes' form of skepticism defines the philosophy of empirical science's interpretation of the physical world. His theory contends that human knowledge is only a collection of immediate sensory data.⁷⁶

To further his preoccupation with the removal of all doubt, Descartes suggests that everything should be called into question and held against his new method for finding truth. Descartes proposes a complete tearing down of Western thought so it may be rebuilt on a new mechanical foundation. Edward Slowik explains Descartes' ambitions:

⁷⁵ Descartes, Rene. *A Discourse on Method* (1637). Project Gutenberg.

⁷⁶ Hatfield, Gary. "René Descartes," *The Stanford Encyclopedia of Philosophy* (Summer 2011 Edition), Edward N. Zalta (ed.), <http://plato.stanford.edu/archives/sum2011/entries/descartes/>.

Like many of his contemporaries (e.g., Galileo and Gassendi), Descartes devised his mechanical theory in large part to refute the widely held Aristotelian-based Scholastic explanation of natural phenomena that employed an ontology of “substantial forms” and “primary matter.”⁷⁷

Descartes calls into doubt the entire Aristotelian system and creates his own mechanical system. Descartes describes nature as a large, complex machine, removing purpose from the study of the physical—nature is merely input and output. Aristotle’s formal and final causes are absent in the empirical notions of matter and motion, and are therefore not a part of mechanical philosophy. To understand how Descartes introduces mechanical philosophy and creates modern science, his separation of the human mind and the human body needs to be analyzed.

Descartes and the “Malignant Demon”

The introduction of doubt initiates Descartes’ dilemma with the Church and ultimately leads to the separation of science from philosophy in modern thought. To defend his new method, Descartes published his *Meditation on First Philosophy* in 1641. He holds true to his skepticism and proclaims that he cannot be sure of anything, including his own senses:

All that I have, up to this moment, accepted as possessed of the highest truth and certainty, I received either from or through the senses. I observed, however, that these sometimes misled us; and it is the part of prudence not to place absolute confidence in that by which we have even once been deceived.⁷⁸

Descartes proves that God has not deceived him through a series of realizations. First, Descartes states that he did not create himself; therefore something else must have created him. Next, he defines God as the infinite, independent, perfect, and all-knowing

⁷⁷ Slowik, Edward. "Descartes' Physics," *The Stanford Encyclopedia of Philosophy* (Fall 2009 Edition), Edward N. Zalta (ed.), <http://plato.stanford.edu/archives/fall2009/entries/descartes-physics/>.

⁷⁸ Descartes, Rene. *Meditations on First Philosophy*. <http://oregonstate.edu/instruct/phl302/texts/descartes/meditations/Meditation1.html>. M1, 3.

power that created all that exists.⁷⁹ This creator, being perfect and all-knowing, cannot be a deceiver as deception is an imperfection.⁸⁰ Descartes then acknowledges that something else must be deceiving his senses: “I will suppose, then, not that Deity, who is sovereignly good and the fountain of truth, but that some malignant demon, who is at once exceedingly potent and deceitful, has employed all his artifice to deceive me.”⁸¹ Descartes understands that his senses may deceive him just as a dream may appear tangible, but upon awakening, he realizes that it is merely a dream. Then, what is *real*? Descartes calls into question everything that he sees, including his own body. Everything is possibly a deception by the demon he has created.

Descartes on Mind and Body

To prove the existence of anything or everything, Descartes starts by proving his own existence: “Doubtless, then, I exist, since I am deceived; and, let him deceive me as he may, he can never bring it about that I am nothing, so long as I shall be conscious that I am something.”⁸² Because Descartes is conscious of his own existence, he concludes that he must therefore exist.

Descartes then questions what types of existence are real. Like many before him, he uses the concept of substance as a building block for nature. Descartes asserts that substance is “a thing which exists in such a way as to stand in need of nothing beyond itself in order to its existence.”⁸³ He also allows for an existing thing to be called a substance if its only need to exist is God: “Created substances, however, whether

⁷⁹ Descartes, Rene. *Meditations on First Philosophy*.
<http://oregonstate.edu/instruct/phl302/texts/descartes/meditations/Meditation1.html>. M3, 22.

⁸⁰ Ibid. M3, 38.

⁸¹ Ibid. M1, 12.

⁸² Ibid. M2, 3.

⁸³ Descartes, Rene. *The Principles of Philosophy*. Gutenberg Project. LI.

corporeal or thinking, may be conceived under this common concept; for these are things which, in order to their existence, stand in need of nothing but the concurrence of God.”⁸⁴

Descartes labeled the two created substances as mind and body in his *Meditations*.

The body of a human is an “extended substance;” it can be described mathematically and observed with the senses.⁸⁵ The mind, on the other hand, is something completely different than the body. Descartes proclaims, “Thinking is another attribute of the soul; and here I discover what properly belongs to myself. This alone is inseparable from me. I am--I exist: this is certain.”⁸⁶ Thus, he concludes that a human is a “thinking thing,” and not a “rational animal,” as the ancient philosophers previously declared.⁸⁷ To further separate humans from nature, Descartes states that only humans have a soul and that everything outside of the human mind should be viewed as a machine. The ancients believed that every living thing has a soul, but as Gary Hatfeild points out: “Descartes altered all such debates by applying his animal-machine hypothesis to the control and direction of behavior. He argued, on both metaphysical and scientific grounds, that although animals exhibit complex behaviors, they are unfeeling machines.”⁸⁸ It is through this view that Descartes substantiates the mechanical philosophy claim that nature and everything in it, alive or otherwise, is a machine.

Even though the mind can imagine things that are untrue, the reality of the thought is real and separate from that of the physical world.⁸⁹ Howard Robinson points

⁸⁴ Descartes, Rene. *The Principles of Philosophy*. Gutenberg Project. LII.

⁸⁵ Descartes, Rene. *Meditations on First Philosophy*.

<http://oregonstate.edu/instruct/phl302/texts/descartes/meditations/Meditation1.html>. M2, 5.

⁸⁶ Ibid. M2, 6.

⁸⁷ Ibid.

⁸⁸ Broughton, Janet and Carriero, John Ed. *A Companion to Descartes*. (Oxford, Wiley-Blackwell Pub: 2011) 418.

⁸⁹ Descartes, Rene. *Meditations on First Philosophy*.

<http://oregonstate.edu/instruct/phl302/texts/descartes/meditations/Meditation2.html>. M2, 9.

out that Descartes' idea of the mind-body problem is quite different from that of Aristotelian tradition: “For Aristotle, there is no exact science of matter. How matter behaves is essentially affected by the form that is in it.”⁹⁰ Descartes, conversely, declares that matter is an independent substance which possesses its own set of qualities or function, which he calls attributes. Through his definition of substance, Descartes creates his own version of dualism, subsequently called Cartesianism, completely shifting scientific views from the all-encompassing balance of natural philosophy to the more focused empirical science which is only concerned with raw data collection. Science is now defined as that which studies matter. Matter, according to Descartes, is strictly mechanical and can be described in mathematical terms alone.

Science, as it was evolving during the 16th century, shifted focus from the theology-centered concentration of the Medieval period. Descartes played a large role in the creation of modern empirical science as he established a new method for gathering data and conducting observations. Gary Hatfield points out that:

Descartes himself contributed some specific new results to the mathematical description of nature, as co-discoverer of the sine law of refraction, and as developer of an accurate model of the rainbow. Nonetheless, as significant as these results are, his primary contribution to the “new science” lay in the way in which he described a general vision of a mechanistic approach to nature and sketched in the details of that vision to provide a comprehensive alternative to the dominant Aristotelian physics.⁹¹

Descartes argues against Aristotelian thought as a whole. Mechanical philosophy contends that the physical world can be described in mathematical terms and all of its components are like machines. Purpose and meaning are not important—ideas like the soul, which explains purpose and meaning in life, are removed. Instead, life is described

⁹⁰ Robinson, Howard, "Dualism," *The Stanford Encyclopedia of Philosophy* (Winter 2012 Edition), Edward N. Zalta (ed.), <http://plato.stanford.edu/archives/win2012/entries/dualism/>.

⁹¹ Hatfield, Gary. "René Descartes," *The Stanford Encyclopedia of Philosophy* (Summer 2011 Edition), Edward N. Zalta (ed.), <http://plato.stanford.edu/archives/sum2011/entries/descartes/>.

as a mechanical function. Descartes explains his concerns with Aristotelian physics in a letter to fellow mathematician Marin Mersenne: “I wish this mainly on account of theology, which has been so deeply in the thrall of Aristotle that it is almost impossible to expound another philosophy without its seeming to be directly contrary to the Faith.”⁹² To prove that new metaphysical ideas can be formulated without the use of Aristotelian thought, Descartes writes *The Discourse on the Method of Rightly Conducting the Reason, and Seeking Truth in the Sciences*, published in 1637.

By separating the mind and the body so absolutely, Descartes suggests that science should be concerned only with the extended substances and theology should be pushed out into the realm of thought. Through his assertions, Descartes has reduced the world to an infinite geometrical realm without sense or purpose. Because matter is purely a physical thing, descriptions of the physical world that are not mechanical in nature would be considered explorations of the mind, rather than the study of the physical. The fate of human thought is described by E. A. Burtt:

The universe of mind, including all experienced qualities that are not mathematically reducible, comes to be pictured as locked up behind the confused and deceitful media of the senses, away from the independent extended realm, in a petty and insignificant series of locations inside of human bodies.⁹³

Accordingly, Descartes has created the foundation for modern empirical science. He has separated science from theology and philosophy to avoid criticism from the Church and to allow for the study of science without the interference of the Church. He places science harmlessly inside the world of perception and matter, which should not threaten the Church, and places theology and thoughts about meaning inside the mind.

⁹² Cottingham, J., R. Stoothoff, D. Murdoch and A. Kenny (eds.), *The Philosophical Writings of Descartes, Vol. III: The Correspondence* (Cambridge, 1991), 14.

⁹³ Burtt, E. A. *The Metaphysical Foundations of Modern Science*. (Atlantic Highlands: Humanities Press, 1980) 123.

Francis Bacon

While Descartes seeks to separate the mind from the material world to justify his method to the Church, Francis Bacon is politically motivated and proclaims that humans have dominion over nature. Bacon asserts that the rightful place for humans is above, and thus in control of, the physical world. It is a metaphysical statement that is politically motivated.

Bacon was an influential member of the English Court in the early 17th century. Because he did not answer to the Catholic Church, but rather to the much more king-centered English Protestant church, Bacon's motives were political in nature. His ideas predate Descartes, but only influenced the smaller protestant European community. The English king and his government were very interested in any ideas that placed the king and humans above all of God's other creations. And, the King was pleased to elevate Bacon who believed that humans should have complete dominion, or control, over nature. Bacon created his "New Philosophy" rooted in Protestant Christian tradition. Furthermore, his interest in science stemmed from his belief that science could provide humans with greater control over nature.

Bacon's New Philosophy

As a Protestant, Bacon stated that natural philosophy and divinity are rooted in outdated ancient thought—true wisdom about nature could be gleaned directly from the Bible as well as through observing nature. Like Descartes, Bacon also heralded mathematics as a superior method for describing the natural world. And, he believed that disregarding any tool that may help explain the natural world, mathematics or otherwise, was a mistake.

Francis Bacon published the *Novum Organum*,⁹⁴ or *True Directions concerning the Interpretation of Nature*, in 1620. He defined the Four Idols of the Mind, or beliefs without merit, which were direct attacks against ancient philosophy. The purpose of his Four Idols is to tear down old ways of thinking and learning. Bacon summarizes: “in my judgment all the received systems are but so many stage plays, representing worlds of their own creation after an unreal and scenic fashion.”⁹⁵ He implied that ancient thinking is unrealistic and the scholastic world is merely charmed by its age and beauty. His new philosophy is grounded in experimentation, rather than reasoning and deduction, employing a method that forgoes ancient ideas and incorporeal thought.

Bacon and Protestant Tradition

Bacon rooted his claim that humans have dominion over nature in passages from the King’s Bible. Completed in 1611, the King James Bible reads: “And God said, Let us make man in our Image, after our likenesse: and let them haue dominion ouer the fish of the sea, and ouer the foule of the aire, and ouer the cattell, and ouer all the earth, and ouer euery creeping thing that creepeth upon the earth.”⁹⁶ Bacon drew special attention to the word “dominion.” The true faith, Christianity, states that man is given complete ownership and dominance over nature by God himself. This argument is successful thanks to the Protestant literal interpretation of the Bible, rather than the Catholic symbolic view of the scriptures. The protestant Christian tradition, and its importance to Bacon, is elaborated by Elenora Montuschi:

Bacon explicitly placed his conception of knowledge and of a new science within the Christian tradition. He conceived his project as an “advancement of learning”, aimed at reproducing the original dominion of man over nature as symbolically represented in

⁹⁴ This title is no doubt a reference to Aristotle’s *Organon* and expresses his wish to supersede it.

⁹⁵ Bacon, Francis. *Francis Bacon: The Complete Works*. (Nook Edition: 2012). 484.

⁹⁶ Gen 1:26.

Genesis, when God asks Adam to give names to the animals. Whatever the original sin ruined, knowledge can largely mend.⁹⁷

Bacon claimed that concrete concepts, such as mathematics, must be employed to ensure human domination over nature. Due to Adam's fall from grace, humans must seek both actions and knowledge to restore man's rightful place as ruler over all the earth. If his philosophy is sound, then humanity has dominion over everything on the planet, humans answer to God, and God has proclaimed the king as the ruler of both the church and the state. Thus, God has given humans dominion over nature.

Bacon and Nature

Bacon is perhaps best known for his views on nature and humanity's role in nature: "Human knowledge and human power meet in one; for where the cause is not known the effect cannot be produced. Nature to be commanded must be obeyed; and that which in contemplation is as the cause is in operation as the rule."⁹⁸ Nature was created by God for humans to command, according to Bacon, but first the laws of nature must be understood. Bacon believed that nature works like a machine. Everything found in nature can be reduced to mechanical principles, such as motion.

Arguing against what he believed are antiquated ideas in natural philosophy, Bacon championed experimentation over revelation and deduction. R. W. Serjeantson writes:

In a series of works, Bacon lambasted his contemporaries for their ignorance and complacency about the natural world, and proposed a series of increasingly bold plans to remedy the situation. In his grand encyclopedia of human ignorance, *The Advancement of Learning*, he anatomized the failings in the contemporary human understanding of the natural, human and divine worlds.⁹⁹

⁹⁷ Montuschi, E. "Order: God's, Man's and Nature's." (2010)

<http://www2.lse.ac.uk/CPNSS/projects/orderProject/documents/Publications/MontuschiBacon.pdf>.

⁹⁸ Bacon, Francis. *Francis Bacon: The Complete Works*. (Nook Edition: 2012). 44.

⁹⁹ Serjeantson, R.W., "Natural Knowledge in the *New Atlantis*." In *Francis Bacon's New Atlantis*. Ed. Bronwen Price, (Manchester: Manchester University Press, 2002). 83.

Ancient and medieval natural philosophers were interested in knowledge for knowledge's sake or to reveal God in the natural world. Plato and Aristotle proclaimed reason and deduction as the highest levels of human thought. Bacon, on the other hand, declares that ignorance of the natural world comes from the belief that experimentation is beneath a natural philosopher and wisdom is only revealed through revelation and deduction.

Furthermore, as E. A. Burttt describes, Bacon's:

Conception of science as an exalted co-operative enterprise, his empirical stress on the necessity and cogency of sensible experiments, his distrust of hypothesis and general analysis of inductive procedure, all penetrated the leading scientific minds of the middle of the century.¹⁰⁰

Bacon demonstrates the power and importance of experimentation in his Christian utopian novel *New Atlantis*. In *New Atlantis*, experimentation is found throughout Salomon's house and kingdom. There are instruments that generate heat and sound, while motion is produced by engines. Experimentation is prevalent in chemistry labs producing medicine, areas designated for the study of plants and animals, and "perspective-houses" that create lenses. Serjeantson further explains:

Salomon's House has a permanent staff of fellows who carry out various specialized tasks, almost all of which involve "experiments" in some way. The purpose of the institution is to produce knowledge; the kind of knowledge sought is, without exception, the knowledge of nature.¹⁰¹

Bacon's Christian utopia is made possible through scientific experimentation that advances human control over nature. Here, Bacon illustrates the purpose of science as an industry for advancing technology and providing goods, rather than seeking knowledge to advance human understanding of nature.

¹⁰⁰ Burttt, E. A. *The Metaphysical Foundations of Modern Science*. (Highlands: Humanities 1980) , 125.

¹⁰¹ Sterjeantson, R.W., "Natural Knowledge in the *New Atlantis*." In *Francis Bacon's New Atlantis*. Ed. Bronwen Price, (Manchester: Manchester University Press, 2002). 82.

To conclude, Descartes and Bacon are responsible for the roots of modern science. Both philosophers face the challenge of overcoming the Aristotelian concept that experimentation and mathematics are lower levels of thought. And, they each attempt to overcome obstructions from the Christian faith. Descartes separates the worlds of matter and mind to escape persecution from the church. By disconnecting theology, metaphysics, and ontology from natural philosophy, he has eliminated the tools natural philosophy once used to provide meaning for its discoveries—science is reduced to mechanical philosophy and is no longer interested in relationships between empirical data and the human experience. Science is the strict study of physical matter. Even though religious persecution is not a concern for scientists in the modern Western World, science continues to separate itself from metaphysics. Bacon, on the other hand, is primarily interested in experimentation for the sake of producing technology and goods. He claims that humans have dominion over nature and do not need to be concerned with reason and deduction. In both cases, the incorporeal mind is no longer a part of the study of the physical world, thus natural philosophy changes into modern science through removing or separating the human mind from nature.

Chapter 4

Spinoza: God in the Machine

There is no such thing as perpetual tranquility of mind while we live here; because life itself is but motion, and can never be without desire, nor without fear, no more than without sense.

- Thomas Hobbes

Descartes and Bacon champion a new kind of natural philosophy, mechanical philosophy, which argues against ancient scholarship. Their ideas recognize the doctrines of theology, but claim that God, or any other theological or metaphysical thoughts, are not needed to understand the study of nature as a physical entity. As a result, nature is treated like a machine. Humans, the only living creatures with a soul, are tasked to understand and dominate nature.

From Descartes and Bacon, new ideas emerge during a time of great political change, driven by new theology and a philosophy that rejects ancient authority. This chapter examines the shift in theory from separating humanity from nature to understanding both humans and nature as machines. And, questions of meaning addressed through theology and philosophy are thus removed, ignoring the human experience of nature.

The Reformation destroyed the unity of the Christian religion and violent wars were fought over difference in doctrine. Philosophers depicted nature as a mechanical process which could be described through the language of mathematics. J. Thomas Cook explains the inevitable issue regarding how humans relate to mechanical philosophy: "It was not long before people began to ask whether the sort of mechanical explanations that

the new sciences offered could be applied to human beings and human society as well.”¹⁰²

The stage was set for the complete separation of natural philosophy from theology and the incorporeal. Baruch Spinoza, a Jewish scholar living in Amsterdam during the latter half of the 17th century, takes great interest in Rene Descartes’ dualism. Spinoza’s most influential work, *Ethics*, argues against dualism and lays out his mechanical explanation of God, nature, and humanity. And, his growing interest in secular ideas eventually leads to his expulsion from the Jewish community.

Spinoza and Substance

Rene Descartes explains that the mind and the body are two different entities. The body is a material thing and therefore must abide by the rules of nature, while the mind is nonmaterial and is not bound by nature. Each is a separate substance. Spinoza, however, rejects this idea and proclaims there is but one substance in the universe. His counter-view to Descartes’ dualism is called “substance monism” and is outlined in Book One of *Ethics*. To prepare his argument, Spinoza first defines “substance,” “attribute,” “mode,” and “God,” giving operational definitions for the terms he uses to illustrate the foundations of his philosophy.

Spinoza begins with substance: “By substance I understand what is in itself and is conceived through itself, that is, that whose concept does not require the concept of another thing, from which it must be formed.”¹⁰³ There are two parts to his definition. First, while other things may exist as qualities of a substance, substance exists only in itself. Second, no other idea is needed for a substance; it is what is conceived through

¹⁰² Cook, J. Thomas. *Spinoza’s Ethics: A Reader’s Guide*. (London, GBR: 2007) 6.

¹⁰³ Spinoza, *Ethics*, I D3.

itself. In other words, a substance is an independent entity both conceptually and ontologically.¹⁰⁴ Similarly, Descartes defines substance as an independent entity, however he allows for all substances to stem from the existence of God.

Using his idea of substance, Spinoza then defines mode: “By mode I understand the affections of a substance, or that which is in another through which it is also conceived.”¹⁰⁵ A mode is dependent upon a substance in order to exist; it is the way a substance can be represented in a particular example. Unlike substance, a mode is defined by something else and not by its own essence. For example, large, purple, and content are modes that need a substance which is large, purple, and content in order to exist as a description. Large, purple, and content cannot exist on their own. Steven Nadler suggests that:

the modes of a thing are concrete manifestations of the attribute or nature constituting the thing. They therefore cannot be conceived without also conceiving the attribute or nature that underlies them.¹⁰⁶

An attribute, according to Spinoza, is “what the intellect perceives of a substance, as constituting its essence.”¹⁰⁷ Thus, an attribute is the way a substance is observed. Finally, Spinoza defines God as “a being absolutely infinite, that is, a substance consisting of an infinity of attributes, of which each one expresses an eternal and infinite essence.”¹⁰⁸ God is infinite in that His attributes are infinite and there is no attribute that He does not possess.

¹⁰⁴ Waller, Jason, "Spinoza's Metaphysics," *Internet Encyclopedia of Philosophy* (Summer 2009 Edition), University of Tennessee, <http://www.iep.utm.edu/spinoz-m/#H2>.

¹⁰⁵ Spinoza, *Ethics*, I D5.

¹⁰⁶ Nadler, Steven. *Spinoza's Ethics: An Introduction*. (Cambridge, Cambridge University Press: 2006.) 58.

¹⁰⁷ Spinoza, *Ethics*. I D4.

¹⁰⁸ *Ibid.* I D6.

In a nod to Descartes, Spinoza also claims that the only attributes understood by humans are thought¹⁰⁹ (mind) and extension¹¹⁰ (material objects). He justifies this claim by stating that humans are composed of two attributes, thought and body (an extended thing): “We neither feel nor perceive any singular things, except bodies and modes of thinking.”¹¹¹ Only the mind of a human can comprehend other minds and only the body of a human can relate to other bodies, according to Spinoza. When further questioned about this in a letter from a friend, Tschirnhaus, Spinoza replies:

the mind's power of understanding extends only as far as that which this idea of the body contains within itself, or which follows therefrom. Now this idea of the body involves and expresses no other attributes of God than extension and thought.¹¹²

Accordingly, Spinoza claims that humans cannot find two or more substances in nature with the same attribute.¹¹³ As previously discussed, the reason humans can relate to the attributes of the mind and extension is because they are attributes of the same substance. Steven Nadler further explains:

Like Descartes before him, Spinoza thus makes ontological independence the hallmark to substance. Unlike Descartes, however, Spinoza is not willing to compromise and say that there is a secondary degree of substantiality, whereby a finite thing can be caused by an infinite substance and still qualify as a substance, just as long as it is not dependent for its being on some other finite thing.¹¹⁴

Substances must be completely independent from one another. Because of his definition of substance, Spinoza claims that “God, or a substance consisting of infinite attributes, each of which expresses eternal and infinite essence, necessarily exists.”¹¹⁵ Through his logic, God is the only substance and He possesses every attribute.¹¹⁶ If another substance

¹⁰⁹ Spinoza, *Ethics*. I P21.

¹¹⁰ Ibid. I P11.

¹¹¹ Ibid. II A5.

¹¹² Spinoza, Benedict de. *The Ethics and Other Works*. Ed. Edwin Curly. (Princeton, Princeton University Press: 1994)270.

¹¹³ Spinoza, *Ethics* I P5.

¹¹⁴ Nadler, Steven. *Spinoza's Ethics: An Introduction*. (Cambridge, Cambridge University Press: 2006.) 83.

¹¹⁵ Spinoza, *Ethics*, I P11.

¹¹⁶ Ibid. I P14.

besides God exists, then it shares an attribute with God, which by definition of substance, is impossible. Spinoza proclaims: “Whatever is, is in God, and nothing can be or be conceived without God.”¹¹⁷ Thus, God is everything and everything is God. If all things conform to the same substance, furthering the idea of mechanical philosophy, then Spinoza has removed the need for metaphysical concepts outside of God.

Spinoza on Mind and Body

If God is the only substance, then how does Spinoza explain the differences between the mind and the body? According to Spinoza, minds are modes of God and are seen as the attributes of thought. Bodies are also modes of God and they are viewed as attributes of extension.¹¹⁸ Through his explanation, mind and body are two aspects of the same thing. Furthermore, he states: “The object of the idea constituting the human mind is the body, or a certain mode of extension which actually exists, and nothing else.”¹¹⁹ The mind is the idea of the body, and the body is the blend of various ideas of the mind.

Spinoza’s explanation of how the mind and body work together is called “parallelism.” Parallelism maintains the importance of physical science, but also finds answers as to how the mind seems to affect and is affected by the physical world.

According to the Stanford Encyclopedia of Philosophy:

The parallelist preserves both realms intact, but denies all causal interaction between them. They run in harmony with each other, but not because their mutual influence keeps each other in line. That they should behave *as if* they were interacting would seem to be a bizarre coincidence. This is why parallelism has tended to be adopted only by those who believe in a pre-established harmony, set in place by God.¹²⁰

¹¹⁷ Spinoza, *Ethics*. I P15.

¹¹⁸ Ibid. II P10.

¹¹⁹ Ibid. II P13.

¹²⁰ Robinson, Howard, "Dualism," *The Stanford Encyclopedia of Philosophy* (Winter 2012 Edition), Edward N. Zalta (ed.), <http://plato.stanford.edu/archives/win2012/entries/dualism/>.

For Spinoza, the mind and the body are mirror reflections of one another, merely two modes of two attributes that describe the same substance.

Moreover, to complete his reduction of humanity to that of motion and mechanics, Spinoza addresses the idea of free will. Descartes states that the human mind, unlike that of an animal, exists outside of nature and because of this, humans enjoy free will. Spinoza disagrees with Descartes. He believes that free will is only a possibility for a substance, and because God is the only substance, humans do not possess free will. Also, everything exists inside of God, so therefore everything is constrained by God.

Spinoza explains:

That thing is called free, which exists solely by the necessity of its own nature, and of which the action is determined by itself alone. On the other hand, that thing is necessary, or rather constrained, which is determined by something external to itself to a fixed and definite method of existence or action.¹²¹

As previously discussed, there is but one substance that exists in this manner, God, and free will is a myth. In Book Three of *Ethics*, Spinoza begins by addressing the popular thinkers before him:

Most of those who have written about the affects, and men's way of living, seem to treat, not of natural things, which follow the common laws of Nature, but of things which are outside of Nature. Indeed they seem to conceive man in Nature as dominion within a dominion. For they believe that man disturbs, rather than follows, the order of Nature, that he has absolute power over his actions, and that he is determined only by himself.¹²²

Descartes, according to Spinoza, uses clever language to create free will (or thought which is not created by an external cause), and the idea that humans have complete control over anything is erroneous: "But my reason is this: nothing happens in Nature which can be attributed to any defect in it, for Nature is always the same, and its virtue and power of acting are everywhere and one and the same."¹²³ Human beings then,

¹²¹ Spinoza, *Ethics*, I D7.

¹²² Ibid. III Preface.

¹²³ Ibid.

according to Spinoza, do not have free will. They are a part of nature and are therefore defined by nature. Spinoza concludes: “I shall consider human actions and desires in exactly the same manner, as though I were concerned with lines, planes and solids.”¹²⁴

Humans are simply another mode that exists with other modes, occurring in and defined by nature.

Spinoza and Nature

Spinoza capitalizes the word “Nature” throughout *Ethics* because to him, Nature is God and God is Nature. Thomas Aquinas also addresses this issue,¹²⁵ but concludes that while nature is a part of God, it is only connected in the sense that an arm is a part of a human being. The properties of a human being cannot be discerned merely from the study of the arm. Spinoza believes that God is not above nature, nor is He beyond substance. God is the only substance and therefore Nature is God.¹²⁶

Consequently, God as Nature is an important concept in understanding Spinoza’s promotion of the physical sciences. In his work *Theologico-Political Treatise*, Spinoza contends that the belief in miracles goes against the belief in God. He begins by stating that miracles exist in the Church only to oppose students of the sciences. He claims that the Church is wrong to insinuate that God works above natural causes. According to Spinoza, everything is a mode or attribute of God, and therefore the laws of nature cannot be broken. He writes:

We can conclude that a miracle, whether in contravention to, or beyond nature, is mere absurdity; and, therefore, what is meant in Scripture by miracle can only be a work of nature, which surpasses, or is believed to surpass, human comprehension.¹²⁷

¹²⁴ Spinoza, *Ethics*. III Preface.

¹²⁵ Aquinas, Thomas. *Summa Theologica*. Kindle Edition. (B&R Samizbat Express: 2009) 129.

¹²⁶ Spinoza, Benedict de. *The Ethics and Other Works*. Ed. Edwin Curly. (Princeton, Princeton University Press: 1994) 57.

¹²⁷ Spinoza. *Theologico-Political Treatise*. Trans. by R.H.M. Elwes. Gutenberg Project.

Science is a method used to comprehend God. True knowledge, for Spinoza, is not found in superstition but in understanding the world at a more concrete level. Even God is bound by the laws of nature, as they are His essence, and miracles are simply as yet unexplained acts of nature. God's mechanics can be observed and revealed through the study of nature. Spinoza argues that knowledge is gained through advanced understanding of nature.

In conclusion, Spinoza presents a very strong argument as to why natural philosophy no longer needs theology or the metaphysical. If God is everything and everything is God, then the study of the physical is all that is needed to understand God. And, if humans and nature are truly mechanical, what need is there for the study of the incorporeal? Questions regarding meaning and purpose are no longer addressed and natural philosophy has become completely empirical. Spinoza has included the human mind in Descartes' claim that everything in nature, living or not, is a machine. Finally, if God is Nature and God himself abides by the laws of nature, it stands to reason that the best way to understand God is to advance human knowledge of nature through observation alone. Therefore, modern science has removed metaphysics entirely and discounted any contributions from theology or philosophy.

Chapter 5

Heidegger: Return of Metaphysics

Then since we are in perplexity, do tell us plainly what you wish to designate when you say "being." For it is clear that you have known this all along, whereas we formerly thought we knew, but are now perplexed. So first give us this information, that we may not think we understand what you say, when the exact opposite is the case.

– Plato

Modernity is shaped by rapid growth in science and technology. The popularity of mechanical philosophy continues as Spinoza brought the mind-body problem to its logical conclusion. To explain how the thoughts of the mind and the actions of the body relate, they have both been defined as belonging to the same substance. The natural sciences offer strictly a physical account of nature. Modern science defines the physical world by a single substance—matter. The metaphysics of natural philosophy has been removed from the study of science, and questions pertaining to meaning and purpose are no longer relevant. This chapter argues for the return of metaphysics to science so that the questions of *why*, such as in reference to Aristotle's formal and final causes, can be answered. Mechanical philosophy, which disregards explanations of origin and purpose, does not elucidate meaning for humans and nature. Without exploring the questions pertaining to why an object exists and how the object relates to a human being, it is impossible to fully understand the object of study.

Elements of Descartes' dualism remain in modern science. If humans only have access to the world through their senses, how can knowledge be defined? Even though Spinoza rejected the idea that the mind is different from the body, in the sense that it is not a unique substance, mechanical philosophy does not offer a satisfying explanation for the connection between mind and matter. Furthermore, it rejects the substance of mind as Descartes defined it, and treats even human thought as mechanical. This mechanical

view of humans denies the existence of the soul and free will. The absence of ontological answers, an account for how one entity relates to another, in science creates disconnect between humans and nature. This chapter will, with the help of Martin Heidegger's theories, define modern metaphysics through phenomenology and ontology and argue for the need for metaphysics in science.

Heidegger and Modern Metaphysics

Heidegger, a mid-20th century philosopher, observes that people are confused by modern science, and he addresses the issue in the opening sentences of his work *Being and Time*. The problem, as Heidegger sees it, is that not only are metaphysical questions not being answered, but the right questions are not even being asked. Heidegger isn't interested in the definition or characteristics of a being; he wants to know what it actually means "to be." *Being and Time* addresses the question of being and its importance to humanity.

To ancient philosophers, metaphysics explored the reality of an object. Thomas Sheehan explains: "Plato, Aristotle, and Aquinas agree on calling a thing "real" if it is and is something, i.e. if it exists and has a form or essence. For these three philosophers, the question 'What makes anything real?' is answered formally by 'being' and materially."¹²⁸ Aristotle first looked at the nature of an object and then searched for the first cause, or source, of that object. For Plato, the Forms are his divine, immaterial answer for the metaphysical source of all objects found in nature.

Heidegger, on the other hand, is not interested in an object-focused form of metaphysics. His metaphysics is human-centered and questions the meaning or purpose

¹²⁸ Dreyfus, Hubert L. and Wrathall, Mark A. Ed. *A Companion to Heidegger*. (Oxford, Blackwell Pub: 2005) 195.

of an object as it relates to a human being. Sheehan elaborates: “Heidegger abandons an object-focused theory of being for a correlation-focused theory of meaning—in a word, phenomenology.”¹²⁹

Heidegger and Phenomenology

Heidegger’s method of phenomenology is explained through his book *Being and Time*. He is searching for a basic understanding of the world and a human’s place in it. As Charles Guignon and Derk Pereboom explain, “it sets out to ask how entities in general come to show up for us as mattering in determinate ways—how they come to mean something to us in relation to our lives.”¹³⁰ Phenomenology, as Heidegger presents it, finds meaning in ordinary objects and occurrences in daily life. The methodology of Phenomenology is to explore experience, rather than how something can be empirically described. David Woodruff Smith elaborates: “It is that lived character of experience that allows a first-person perspective on the object of study, namely, experience, and that perspective is characteristic of the methodology of phenomenology.”¹³¹

Heidegger’s phenomenology, the study of experience through a human’s point of view, can be explained as “fundamental ontology”¹³² or the primary source of being. Fundamental ontology is Heidegger’s quest to find what gives meaning to that which exists. Like Aristotle, Heidegger realizes that “all men by nature desire to know”¹³³ and Heidegger questions the nature of what he calls meaningful. He is also curious regarding

¹²⁹ Dreyfus, Hubert L. and Wrathall, Mark A. Ed. *A Companion to Heidegger*. (Oxford, Blackwell Pub: 2005) 196.

¹³⁰ Guignon, Charles and Derk Pereboom, ed., *Existentialism: Basic Writings* (Indianapolis: Hackett, 2001), 188.

¹³¹ Smith, David Woodruff, "Phenomenology," *The Stanford Encyclopedia of Philosophy* (Fall 2011 Edition), Edward N. Zalta (ed.), <http://plato.stanford.edu/archives/fall2011/entries/phenomenology/>.

¹³² Heidegger, Martin. *Being and Time*. trans. John Macquarrie and Edward Robinson (Oxford: Blackwell, 1973), 34.

¹³³ Aristot. *Met.* 1.980a.

from where the meaningful originates. Nature, or the world as Heidegger denotes, is a network where all things with meaning exist. The world is the space where humans create meaning for themselves and their surroundings. An object acquires meaning when it is given human purpose. Sheehan explains the origin of meaning: “What constitutes the meaning of things is the context of human involvement within which those things are met, the matrix of human purpose ordered to human interests and ultimately to human survival—that is, a world.”¹³⁴

Heidegger contends that individuals are at the center of their own world, and because there are multiple people in existence, a singular person interacts with multiple worlds. In this sense, each person must live in a world that is not completely their own. Heidegger calls humans *Dasein*, a German word meaning “being-there,” and describes them as entities that recognize their own existence. Rather than exploring the world through planned scientific methods, Heidegger proclaims that humans are engaged in the world as they encounter it. However, Heidegger states that human beings are constantly searching for meaning, regardless of their level of interaction.

The search for meaning is at the very root of *Dasein*. Heidegger suggests that *Dasein* can be described as “Being-in-the-world.” This term describes both the subject (human) and object (what the human is interacting with) at the same time. Heidegger believes that splitting subject and object, as modern science does, does not describe human experience of the world. Heidegger conjectures there is no separate independent world, in and of itself. Furthermore, there is no independent separate self. The reality of human existence is that a human is constantly immersed in a world filled with other

¹³⁴ Dreyfus, Hubert L. and Wrathall, Mark A. Ed. *A Companion to Heidegger*. (Oxford, Blackwell Pub: 2005) 199.

beings. He expresses that *Dasein* is a “unitary phenomenon” and “must be seen as a whole.”¹³⁵ Throughout *Being and Time*, Heidegger attacks Descartes’ dualism and, also regardless of its popularity, refuses to take the modern stance that the mind can be reduced to matter. Guignon and Pereboom claim: “On the contrary, what he tries to show is that the whole assumption that we have to understand reality in terms of substances is suspect.”¹³⁶ Instead, Heidegger claims that the whole argument has no bearing on how humans comprehend the world.

To explain *Dasein*, Heidegger depicts a world filled with familiar things that are defined solely by their use. His example involves a door and a door knob.¹³⁷ Heidegger calls such objects “ready-to-hand.” Ready-to-hand can be further described as equipment that is defined by its use, purpose, or goal, and it is easily recognized without the need for reflection.¹³⁸ Heidegger states that humans view the world as a collection of ready-to-hand objects most of the time.

To illustrate ready-to-hand, Heidegger explores how a human interacts within a workshop. The workshop is filled with objects that have meaning and propose. The individual objects are experienced as equipment used to complete a project. The saw is used to cut wood; and the hammer and nails are used to attach the pieces of cut wood together. The environment defines the human as a craftsman, and the human experiences all actions and equipment associated with his work as a project to be completed.

¹³⁵ Heidegger, Martin. *Being and Time*. trans. John Macquarrie and Edward Robinson (Oxford: Blackwell, 1973), 78.

¹³⁶ Guignon, Charles and Derk Pereboom, ed., *Existentialism: Basic Writings* (Indianapolis: Hackett, 2001), 189.

¹³⁷ Heidegger, Martin. *Being and Time*. trans. John Macquarrie and Edward Robinson (Oxford: Blackwell, 1973), 96.

¹³⁸ Dreyfus, Hubert L. and Mark A. Wrathall, ed., *A Companion to Heidegger* (Oxford: Blackwell, 2005), 4.

Dasein is described by Heidegger as “Being-in-the-world.” The Being-in-the-world experiences nature much like a craftsman views a workshop. Within nature, every object presents itself as having meaning. The act of using a hammer to build a chair is an example of how a human sees and understands nature. All pieces of equipment—a hammer, nails, wood—have purpose for their existence and also define the person building the chair as a craftsman. In this regard, matter cannot be separated from thought. *Dasein* experiences the world as ready-to-hand.

Ready-to-hand is not the only form of being, however. Heidegger explores what happens when a craftsman working in his shop encounters a disruption to his work. For instance, a hammer is a “hammering-thing”¹³⁹ until it breaks. Once broken, it is no longer ready-to-hand, and the craftsman now views it as an object without worldly purpose. Heidegger calls this form of being “present-at-hand.” Present-at-hand objects are seen as existing independent of human purpose and function. The broken hammer now appears as existing independently of the craftsman because it is no longer is a functional part of the project to be completed. Scientists perceive an object of study as present-at-hand, which is not the way things are typically encountered in the world. Thus, present-at-hand is only observed without concern for its usefulness or history, such as would be the case if the object were ready-to-hand.

This disruption during the craftsman’s work can cause him to think that the world, at its basic level, is actually made of present-at-hand objects. Heidegger argues that the craftsman’s point-of-view, caused by a disruption in perception, is just an illusion. He

¹³⁹ Heidegger, Martin. *Being and Time*. trans. John Macquarrie and Edward Robinson (Oxford: Blackwell, 1973), 98.

describes a human being as an entity that is familiar with significance.¹⁴⁰ Objects are ready-to-hand: “No matter how sharply we just look at the ‘outward appearance’ of things in whatever form this takes, we cannot discover anything ready-to-hand.”¹⁴¹

Heidegger thus argues that ready-to-hand is more “primordial” than present-at-hand as there is no way to explain ready-to-hand exclusively in terms of present-at-hand characteristics because objects are given meaning through human experience. Heidegger has illustrated the flaw in Descartes’ separation of mind and matter. The mechanical account of matter does not describe how a human experiences an object in nature. Because ready-to-hand is a more elemental view of an object, Heidegger believes that science also should study an object as ready-to-hand, rather than simply present-at-hand.

Thus, when present-at-hand objects disappear into the background, it is precisely at this moment that human beings truly experience nature: “The wood is a forest of timber, the mountain a quarry of rock; the river is water-power, the wind is wind ‘in the sails’. As the environment is discovered, the nature thus discovered is encountered too.”¹⁴² It is from previous experiences with ready-to-hand objects that humans can define and give meaning to the present-at-hand.

Heidegger claims that the world at its most basic level is full of meaning, thus allowing humans to define themselves through their circumstance. For example, a human becomes a sailor when he or she is on a boat in a body of water. Heidegger’s problem with the natural, or empirical, sciences comes to light as he states: “The view of reality we get from modern natural science—the assumption that the world at the most basic

¹⁴⁰ Heidegger, Martin. *Being and Time*. trans. John Macquarrie and Edward Robinson (Oxford: Blackwell, 1973), 120.

¹⁴¹ *Ibid.* 98.

¹⁴² *Ibid.* 100.

level consists of inherently meaningless objects that we humans come to endow with significance and value does not reveal the most basic way of Being of entities.”¹⁴³

Heidegger claims, in contrast, that the world is filled with meaning and it is in this world where humans live out their everyday lives. Thus, it is vital that science recognizes the human experience when interpreting observational data.

Heidegger on Metaphysics and Modern Science

The rise of empirical science in the modern era starts with the rejection of ancient and medieval authority, along with its metaphysics, and adopts an “objectified” view. Descartes’ method can be seen in modern science’s skepticism and strict focus on the object of study. Object-centered study has regrettably trained scientists to think of the world as intrinsically meaningless. The separation of mind and matter, introduced by Descartes, leaves meaning, if there is any, only in the existence of the mind. And, mechanical theory rejects meaning by considering only Aristotle’s efficient and material causes.

Heidegger proclaims that science is the study of the characteristics of matter.¹⁴⁴ That is to say, that the world is comprised of only present-at-hand objects. Nevertheless, he asserts that he is not completely against science, and recognizes the advancements that science has made:

Where genuine and discovering research is done the situation is no different from that of three hundred years ago. That age also had its indolence, just as, conversely, the present leaders of atomic physics, Niels Bohr and Heisenberg, think in a thoroughly philosophical way, and only therefore create new ways of posing questions and, above all, hold out in the questionable.¹⁴⁵

¹⁴³ Guignon, Charles and Pereboom, ed., *Existentialism: Basic Writings* (Indianapolis: Hackett, 2001), 192.

¹⁴⁴ Heidegger, Martin. “What is Metaphysics?” (1953) Translated by Tomas Sheehan. Acumen Publishing: 2013. <http://essential.metapress.com/content/y115p7t77h62jm77/>. 8.

¹⁴⁵ Heidegger, Martin. *Natural Science and Metaphysics* (1967). Nook Edition. 2.

The subject of research becomes the center of knowledge in order for that object to appear as what it *is* (present-at-hand), rather than what a human *perceives it to be* (ready-to-hand). Heidegger states: “Scientific research and theory are beholden to their objects, and this is the reason why the sciences are able to assume a proper, if limited, role of leadership in the whole of human existence.”¹⁴⁶ Heidegger suggests that science is limited to answering observation-based questions, leaving out questions pertaining to meaning. While it is useful to understand what something *is*, Heidegger believes that a human’s perception of an object is much more important in matters pertaining to the question of existence. Much like Aristotle’s use of the four causes, Heidegger believes that it is significant to know both *what* something is and *why* it exists and, most importantly, how it is related to human experience.

Modern science’s rejection of ancient knowledge causes great limitation. Heidegger proclaims that modern science’s criticism of Aristotle—that his ideas are purely fantasy, lacking any research or evidence—is erroneous.¹⁴⁷ Aristotle said: “And that issue, which in the case of productive knowledge is the product, in the knowledge of nature is the unimpeachable evidence of the senses as to each fact.”¹⁴⁸ Here, Aristotle claims that he has deduced his theories from what he has witnessed in nature, and has not merely come upon his theories through mere speculation. His formal and final causes are aided by the material and efficient causes. The four causes together provide a complete picture of the object of study and the human experience.

The object-centered view of science is unnatural because it does not describe how humans experience nature. Positivism is the philosophical approach to interpret nature as

¹⁴⁶ Heidegger, Martin. *Natural Science and Metaphysics* (1967). Nook Edition.. 9.

¹⁴⁷ Ibid. 8.

¹⁴⁸ Arist. De Cael. III, 7, 306a 16-17.

only matter. The philosophy of positivism refers to knowledge gained from that which can be observed and measured. The positivism movement aspires to turn philosophy into a modern science and, in its most extreme expression, believes that the study of purpose or meaning is unscientific. A positivist believes that knowledge beyond observation and measurement is impossible.¹⁴⁹

A group called the Vienna Circle adopted logical positivism as its foundation. The Vienna Circle's influence in philosophy was immense during the early 20th century. In 1932, Vienna Circle member Rudolf Carnap published "The Elimination of Metaphysics Through Logical Analysis of Language." In his article, Carnap claims that: "Metaphysicians are musicians without musical ability."¹⁵⁰ And, thus, positivism labeled metaphysics as meaningless.

Heidegger continues to argue that the positivist line of thinking cannot help a human being find meaning within his self or the world. The human, described as *Dasien*, does not encounter meaningless independent objects as described by science. It is through metaphysics, the exploration of how humans experience an object in nature, that meaning is revealed.

Heidegger has redefined the role of metaphysics in modern science. He has removed metaphysics from the arguments rooted in the idea of substance and replaced it within the search for meaning. To escape the object/subject view of dualism, Heidegger describes the human, what the human is conscious of, and the world, as interconnected. By doing so, he also reconnects the human mind with the human body through his

¹⁴⁹ Fetzer, James, "Carl Hempel", *The Stanford Encyclopedia of Philosophy* (Spring 2013 Edition), Edward N. Zalta (ed.), <http://plato.stanford.edu/archives/spr2013/entries/hempel/>.

¹⁵⁰ Carnap, Rudolf, *The Elimination of Metaphysics Through Logical Analysis of Language*, trans Arthur Pap (1932) http://www.mnemoforos.ufrgs.br/AcidoCetico/RCarnap_Elimination1957.pdf.

concept of *Dasein*, thus solving the mind-body problem. Heidegger clearly demonstrates how humans are *part* of nature and *take part* in nature. Through his system of metaphysics with concepts of ready-to-hand and present-at-hand, Heidegger uncovers how humans understand and interact with nature, using both metaphysical concepts and empirical observations. Humans naturally view objects in nature as having purpose (ready-to-hand) and this is why the object-centered (present-at-hand) view of mechanical philosophy and logical positivism fail to provide meaning and purpose to their objects of study.

Conclusion

The supreme task of the physicist is to arrive at those universal elementary laws from which the cosmos can be built up by pure deduction. There is no logical path to these laws; only intuition, resting on sympathetic understanding of experience, can reach them.
- Albert Einstein

From ancient times through modernity, this thesis has analyzed the history of natural philosophy from its balanced origins in combining metaphysics with natural science, through its current status in modern empirical science where its goal has been reduced by mechanical philosophy to the study of only matter. Natural philosophy began with varied sources for information such as revelation, mathematics, logic, observation, reasoning, and metaphysics. The blending of these various concepts allowed for a comprehensive interpretation of nature and the relationship between humans and nature. However, the utilization of the concepts that give meaning, such as revelation, reasoning, and metaphysics, diminished over time. Modern science has arisen from the empirical, data-driven side of natural philosophy. Metaphysics has been removed entirely and relationships between humans and the objects of study are no longer relevant. Thus, purpose and meaning are lost. Humanity now struggles with a massive influx of experimental data, with no real significance to daily life, making it difficult to connect with nature, or anything else for that matter.

The account of natural philosophy began with Plato as he established his explanations of being with the concept of Forms. He proposed that the Form of the Good is the highest Form and the source of all wisdom. Timeless and unchanging, Plato contended that his Forms are more complete and more perfect than objects in nature, and they allow for abstract concepts like the human soul. Aristotle then introduced his four causes to describe changes within, and causes of, physical phenomena. His teleological

approach gave interpretation of cause and purpose for all natural entities, directly addressing the relationship between humanity and nature, and the acquisition of knowledge through the intake of information from the senses and through reason. Through Aristotle's integration of metaphysical philosophy with physical observations, he proposed a balanced foundation for natural philosophy to use all available tools for data-gathering.

However, during the Medieval period, the power of the Catholic Church produced a shift in philosophy. Christianity became the primary focus of these thinkers, and an understanding of nature was secondary to and subservient to Christianity. Augustine and Aquinas both championed the ideas of their ancient predecessors, but were limited within the constraints of Christian doctrine. Augustine was highly influential in developing Christianity for western civilization, but nonetheless lost sight of the importance of the physical world and an overall balanced approach to knowledge acquisition. Thus, he proclaimed revelation as a higher form of assessment than observation and deduction. After Augustine, Aquinas diverged from Platonic thought and delivered a more Aristotelian approach. Aquinas demonstrated how deductive thinking could be used in combination with experimentation and observation. However, Aquinas persisted in restricting natural philosophy to the search for God in nature. Both philosophers departed from the ancient concept of acquiring knowledge for knowledge's sake and limited the ways in which knowledge could be acquired. Because metaphysical thoughts and physical observations are both important mechanisms for comprehending how humans relate to nature, constraining natural philosophy within the limits of Christian doctrine restricted the topics for discussion.

The Scientific Revolution then furthered the division between metaphysics and science through the works of Descartes and Bacon. In theory, by separating the physical world from the divine, natural philosophers of the time were able to conduct their research without threatening church doctrine. In an attempt to please the Church and avoid persecution, Descartes separated the human body from the human mind and thus created a dualistic view of natural philosophy where science ascribed directly to the physical world and theology to the metaphysical world. He fashioned a more empirical system for data collection that rejected the need to find meaning in natural phenomena. Descartes' method championed mechanical philosophy and viewed nature as a machine. Only humans have a soul, according to his reasoning, and it is in the soul, or mind, where meaning is generated and found. Thus, Descartes reserved all studies of the realm of thought and meaning to the Church and philosophy. Bacon, on the other hand, was not influenced by the Catholic Church, but by the politics of the king-centered Protestant Church. Bacon perceived science as a means to advance technology and manufacture surplus goods. Therefore, humans procured dominion over nature through scientific knowledge, and nature was only viewed as a resource to serve a technological function.

Applying the concept of mechanical philosophy to natural philosophy, Spinoza then positioned a more distinct division between metaphysics and empirical science. He created a system that exemplified a mathematical explanation for existence and being, where all components ran like a machine. Spinoza argued that God is everything and everything is God, and therefore the study of physical elements is the only necessary component to understanding God. And, he purported that humans and nature are truly mechanical, so there is no need for the study of the incorporeal. Spinoza removed

meaning and purpose and replaced them with a mechanical account for God. Positivism also took a mono-substance stance and claimed that only matter exists. Therefore, metaphysics was removed from modern science entirely; and now any contributions from theology or philosophy are irrelevant.

In this thesis, the shortcomings of modern science were demonstrated through the works of Martin Heidegger. Through his phenomenological method, Heidegger sought meaning for humans, whom he believed to be conscious and concerned with being. Heidegger's metaphysics argued that nature, at its most primal level, is defined by meaning and purpose for the human interacting with it and observing it. And, furthermore, he proved that the human being is an indivisible entity, thus not a separate mind and body. With religious persecution no longer a threat to science in the Western World, Heidegger dismissed Cartesian theory as a solution for a problem that no longer exists.

Through evaluating the history of metaphysics, this thesis critically analyzed the reasons for the dissolving relationship between philosophy and science. Mechanical philosophy has proven inefficient in providing meaning to nature and humanity. To understand how humans and nature are interconnected and how nature affects humanity, metaphysics must be reintroduced as a part of the scientific vocabulary. Purpose and meaning must infiltrate the questions of science once again. This thesis has exposed the danger in disconnecting metaphysics from natural philosophy, leaving a mechanical view of nature and humans, devoid of meaning and purpose. Metaphysics is an essential element of natural philosophy, as Aristotle proved with his four causes and Heidegger demonstrated with *Dasein*, because it is necessary for humans to understand and find

meaning in their surroundings. Aristotle, through his four causes, both describes nature (material and efficient causes) and finds meaning (formal and final causes) in nature. Similarly, Heidegger elucidates meaning in a different way through his phenomenological approach by illustrating how humans are constantly experiencing the world, and therefore cannot be separated from the world. Metaphysics must be reintroduced to modern science so that science may better serve humanity through providing answers for questions pertaining to meaning and being—bringing the role of humans back to participating as an active part of nature, rather than just a detached observer.

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