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By It I See Everything Else: Founding Scientific Inquiry Upon God and His Word

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ABSTRACT

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BY IT I SEE EVERYTHING ELSE: FOUNDING SCIENTIFIC INQUIRY UPON GOD AND HIS WORD

Advisor's Name: Dr. Kristi Penheiter

Reader's Name: Dr. Julia Brumbaugh

Although conversation frequently arises between modern scientific understandings and Christian theology, especially concerning the origin and character of the natural world, we infrequently assess the foundational relationship between the two. Throughout the course of my own life, perspectives and opinions have come from friends, church, school, and a variety of other sources, each adding its own complexities to my pursuit of Biblical and scientific unity. Certainly, it is essential to recognize that the Bible, while composed for the primary purpose of testifying to salvation in Jesus Christ, pursues this end in the context of proximate events and realities and thus serves as a foundation for our thinking all areas. However, while some might argue that scientific study stands apart from God effective experimental inquiry actually relies upon the regularity of the natural world consistent with and resulting from Him. Thus, in our continued pursuit of God and ongoing study of the natural world it is paramount that we found our explorations upon His Word so that we may know, ultimately, the truth of the world we inhabit.

***By it I See Everything Else:
Founding Scientific Inquiry upon God and His Word***

**A thesis submitted to
Regis College
The Honors Program
in partial fulfillment of the requirements
for Graduation with Honors**

by

Timothy Wanninger

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A work such as this is not the result of a single mind, but rather stands as the product of a collective effort brought to fruition over the past three semesters.

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I also thank my thesis reader, Dr. Julia Brumbaugh, for being ill-content with superficial answers to complex questions. Though I never took a class with her, she welcomed the opportunity to guide this pursuit. In her enthusiasm and expertise, she brought to question my own assumptions underlying this project, ensuring that I explored the sources and influences founding my thinking. Furthermore, I would like to thank her for the many references she suggested I explore throughout the thesis process as well as for her willingness to lend them to me from her own personal collection. As a result, I learned a great deal about the complexities of the breadth of Christian thought and now have a foundation for the continued exploration of both my own relationship with God as well as how others understand and serve Him.

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Lastly, thanks be to God for His guidance and for the work that rests in your hands. It is a work not merely of my own mind and hand, but the collective efforts of those already introduced to you, each of whom, over the past three semesters, contributed diligently to the now finished product. As you explore the pages to come, please consider and test, dear reader, all that is written in the light of God's Truth.

These Various Threads: My Quest for Biblical and Scientific Unity

Throughout the course of my younger years I was never introduced to Neodarwinian evolution or Cosmic Inflation as viable explanations for the state of the universe and organisms as we see them today. It was not that these ideas were regularly and directly countered, but rather that they were assumed to be inaccurate in light of the interpretation of the Bible, particularly in this case, the Book of Genesis, that argued for the Creation of the world as comprising six days of activity followed by a seventh day where God rested from His work (Gen. 1:1-2:25). Interestingly, for many years, this never tainted my interest in dinosaurs, even though their presence on Earth was listed in the hundreds of millions of years ago. I do not think this was a case of not understanding what I was reading in either case, but rather that I never made the assumption that the “week” of Creation had any bearing on the age of the Earth, as is so often debated today.

While one might think that I would be well off by incorporating the full gambit of the Bible into my understanding of the world, the fact of the matter is that this text often collides with other ideas in ways that create great divisions in my thought. Looking to the example of the Red Sea crossing, researchers have explored the wind and water mechanics that could result in the phenomenon recorded in Exodus 14 and suggest that, under the right conditions, the formation of a land bridge for the Israelite crossing is possible (Drews and Han, 2010). While such efforts to demonstrate the physical feasibility of this biblical miracle might be heralded as a demonstration of the Bible’s validity, calculations such as these also bring up the question of whether divine action is

necessary to explain the occurrence. Indeed, a scientific explanation, such as this, really serves double duty in that this can be used to argue that, while the event may have happened, it was not orchestrated by God. As a result, Christians may be tempted to shy away from these kinds of explanations because they can be used to argue against the Biblical perspective.

The first substantive exposure to biological principles of evolution that I can recall came in high school, where I began both to understand the “accepted” position in regards to this topic and witnessed the response of one of my Christian classmates to this section of the course. Likely on the first day of our discussion, my classmate asked the teacher if we would discuss Evolution (the full gambit of models, hypotheses, and experiments held to explain the descent of all organisms from a single common ancestor) as a theory rather than fact. While more scientifically-minded readers will recoil at this request due to their understanding of the word theory as a “thoroughly tested model of a broad phenomenon supported by experiments from a variety of disciplines,” allow me to clarify that I believe her intent was simply to ask that Evolution would be discussed as of yet unsubstantiated claim rather than an accepted model. The teacher acknowledged her concern, but never went so far as to agree to her request and the remainder of the course progressed rather smoothly. Yet, this encounter struck me because of the fact that my classmate was willing to defend her faith in such a public way. I wondered if I would be willing to do the same and even to support her in her argument.

Though I did not second her motion and remained somewhat wary of the material and its implications, what I learned that year was significant in that it changed the question I was asking. Initially, given that I had minimal exposure to the ideas and

evidences put forth for Evolution, my query was along the lines of “how could someone believe this?” Hardy-Weinburg equilibrium was one of the ideas that got me thinking differently because the model made logical sense and appeared to reasonably explain why the genetic composition of a population changes over time. For those unfamiliar with this model, the concept of Hardy-Weinburg equilibrium seeks to explain mathematically how allele frequencies (the relative ratios of different versions of genes within a population) change through each generation. Along with the allele frequency equation come five assumptions concerning a population that will not display any change in allele frequencies. These are: large population (insignificant influence of genetic drift on allele frequencies), no migration (no transfer of genes from one population to another), random mating (no preferential genetic inheritance due to mate choice), no natural selection (no environmental pressures that favor the reproduction of some individuals over others based on different inherited characteristics), and no mutation (no introduction of new genetic information from changes in DNA bases). It is a fair amount to take in, but the end result was that these ideas made sense to me. As a result, my overarching query changed. Now I wondered: “How far can I take these ideas?”

This wrestling between increasing understanding and the safety and “sacredness” of what I already knew is well illustrated with an example from my summer research in an evolutionary biology lab studying the origin of vertebrate cartilage and the genes that regulate cartilage and notochord development, where I confronted the question of whether or not I was working against God by contributing to this research. I isolated and amplified DNA sequences for two different genes in two different organisms, amphioxus and sea lamprey, and used that DNA to generate RNA for use in

in situ hybridization, which is used to visualize cells expressing the genes of interest. The work was fantastic and I very much enjoyed conducting the entire protocol, even when we had to repeat experiments again and again before finally isolating the genetic material we needed for the hybridization steps. However, in considering the full gambit of evolutionary theory, I naturally wondered whether and how these ideas could fit together with Biblical explanations, particularly those found within the first few chapters of Genesis. In light of my interpretation of Scripture, I quickly came to the conclusion that the seven days of creation proposed a very different picture than the millions and billions of years proposed by evolutionary biology, not to mention the existence of Adam and Eve and their origination from dust and rib, respectively. I thus brought this all into consideration of the research I now conducted.

My concern was that, as the goal of this research was to understand the difference in mechanisms of neural crest development between the vertebrate lamprey and the chordate amphioxus, these data would be used to provide greater support for a scientific understanding that did not fit with my understanding of the Bible. I further considered whether or not this might be a sin as such a result could very well be a denial of the truth of God by furthering evidence against the very same book. However, on the other side of my internal argument, I decided that, while evolutionary theory certainly holds a great deal of support for its position, the only way that the truth of its extent will be determined is to conduct further research into its claims. I thus justified my work within this lab on the grounds that the data are not what goes against God, but rather my interpretation thereof with respect to His Truth. In other words, as long as I truly continued to serve God and work to better understand Him, I was not working against Him by conducting experiments in this lab. However, I drew my line at supporting a

theory which I was, as of yet, unsure of its accordance with God's Word. In the first place, my understanding of the science of the matter was minute and, in the second, I was wary of the apparent naturalistic assumptions that went along with Evolutionary Theory, namely that God's efforts were not required for the creation of any organism. Yet, while I remained in my former ideological camp, I soon learned that the response of Christians to this same question is varied, and the opinions as broad as the sea.

My next major encounter in the pursuit of how far the roots of Evolutionary Theory and Christianity intertwined came, interestingly enough, from a series of presentations on Science and Christianity given by one of the members of my church. I attended these talks out of interest in the subject, and certainly to see another Christian's take on the subject. Working through the text of Genesis 1, the presenter outlined his take on the biblical account in light of Cosmic Expansion and its associated theories as well as Evolutionary Theory. One of the first things we talked about was the Hebrew word, *yom*, and the interpretation thereof within the Genesis account. While this word has traditionally been translated to mean day, as seen in most translations of the Bible, he argued that *yom* could also be understood as an extended period of time and thus that the Creation account in the first chapter could accommodate a much longer view of the history of the Earth and the Universe. Likewise, the presenter also shared how the accounts for each of the "days" aligned with current understandings. For example, during the first day, where God said "let there be light," he argued that this statement aligned with the first 380,000 years of the Universe, where afterglow radiation (light) prevailed (Gen 1:3; Spergel et al., 2003). In both cases, the claim was that the Genesis account fit with modern understandings of the natural world.

As I was unfamiliar with this position concerning the debate over the interpretation of Genesis in light of current scientific theory, my regular ponderings drove my interest in the question that lingers to this day. The particular draw for me was the fact that this perspective offered a way in which my understanding of the Bible could remain largely unchanged in order to accommodate the existing scientific interpretations of the Universe. Yet, the tweak seemed just a bit too easy because, while it got rid of the time issue, a new problem arose: that of the order of Creation. This question of order is most clear on Day Four, where “God created two great lights: the greater light to rule the day, and the lesser light to rule the night. He made the stars also” (Gen 1:16). While this does not in itself appear problematic with respect to the two different time interpretations, the fact that the sun is created after plants, which are brought into existence on Day Three, does appear to contradict the spans of time interpretation because plants require sunlight for the production of glucose by photosynthesis (Gen. 1:11-13). If celestially-derived light is absent for many years after the creation of plants, how then could they have survived to this day? In response to this critique, it has been posited that Genesis 1:1 refers to God’s creation of the entire Universe, consisting of both “the heavens and the earth” and that the “days” that follow give an account of the creative occurrences on Earth that can likewise be united with current scientific explanations (Gen 1:1; Moore, 2007). Within this framework, the light pronounced by God on the first day is light from the sun that now filters through the very dense early atmosphere of the Earth. Thus, with respect to the creation of the sun on day four, this perspective argues that the sun already existed, but now, from the perspective of the Earth, the atmosphere cleared even further such that the Sun, Moon, and stars were now clearly visible in the sky and could be used to track the “seasons” (Gen 1:14). When faced with this approach to the

text, it seemed that yet another plausible interpretation existed that maintained the authority of the Bible and, as such my position was less sure.

To make matters more complicated, a similar position stems from yet a third interpretation of the Bible, which takes the position that the Creation account in Genesis is not strictly accurate, but instead functions in a broader sense to convey God's Creation of the Universe as well as Man's relationship with God. An example of this take comes from the Catholic tradition, which states that "The account of the fall in *Genesis* 3 uses figurative language, but affirms a primeval event, a deed that took place at the beginning of the history of man" (Vatican, 1993). It must be made abundantly clear that the Catholic Church still considers Genesis and its initial contents to be a certain kind of historical account, in which the overarching themes and events, namely the creation of the Universe by God and the sin of our earliest human forefathers, are held to have occurred. The difference between this interpretation and other more direct interpretations is that, in this case, Genesis is not held to outline the exact process by which these events unfolded. The fact that "figurative language" was used in this account is especially important because such an interpretation both speaks to the overarching interpretation of the earlier chapters of Genesis and sets the stage for the remainder of the works contained within the Bible.

Two separate Popes received marked attention for their addresses concerning this particular interpretation and its influence on Church members' acceptance and exploration of scientific theories, such as Evolution. First came Pope Pius XII's encyclical, *Humani Generis*, in which he acknowledges both the freedom Catholics have to further pursue Evolutionary Theory while at the same time admonishing certain inappropriate extrapolations that have resulted therefrom. Beginning with the latter, Pius

XII argued that “fictitious tenets of evolution,” including assertions that it “explains the origin of all things” and that “the world is in continual evolution,” “paved the way for the new erroneous philosophy” which “concerns itself only with existence of individual things and neglects all consideration of their immutable essences” (Pius XII, 1950). Taken together, these statements make it clear that the worry in this Pope’s mind is that certain individuals and groups have gleaned a Naturalistic paradigm from Evolutionary Theory, in which all is material and no transcendence, in this case God and the eternal souls derived therefrom, is held to exist. However, Pius XII does not go so far as to block members of the Catholic Church from further enquiry. Instead, he states that in the context of proper application of scientific and theological methods “research and discussions...with regard to the doctrine of evolution, in as far as it inquires into the origin of the human body as coming from pre-existent and living matter” can be conducted (Pius XII, 1950). In other words, provided that those exploring and applying Evolutionary Theory to their work properly conduct their studies without overstepping the theological bounds laid down by the heads of the Church. This sentiment was more recently ratified by Pope John Paul II in his 1996 “Message to the Pontifical Academy of Sciences: On Evolution,” where he agrees with Pius XII that “there is no conflict between evolution and the doctrine of the faith regarding man and his vocation, provided that we do not lose sight of certain fixed points,” including proper regard for revealed truth from the Bible (John Paul II, 1996). In reflecting on the statements of these two Popes, I share a similar position with regard to their pronouncements concerning the ongoing analysis of Evolution. Such an exploration is certainly rooting in an understanding of the Scriptures contained within the Bible, but also does not lose sight of the fact that, given the extensive study that has led to the acceptance of this theory, consideration of the

work thus far, including both data and root assumptions, must be taken seriously in order to determine the proper course of action.

In pursuing such a path, I became interested in what the arguments might be for the position that the Earth is only a few thousand years old and thus began my exploration by watching the debate between Ken Ham and Bill Nye. Though I avoided watching this debate for quite some time because I thought that it would only give me a little useful information to go off of in terms of deciding the truth of the matter, I viewed it anyway, both because I had some free time on my hands and because I wanted to see what arguments would be used on both sides. One argument that intrigued me was Mr. Ham's distinction between observational science and historical science, the former defined as "using the scientific method" and the latter as "knowledge concerning the past," which is generated by observing the results of past events that are extant in the present (Answers in Genesis, 2014). I thought this separation was important because it separated scientific analyses into what we know based on controlled experiments and assessments that we have made by extrapolating data to describe past situations. Much like using experimental data to predict what might happen in the future, which we have not yet experienced, studying processes in the deep past requires extrapolation to postdict what occurred. An example of this comes from radiometric dating, which is based on the decay of certain elemental isotopes. Based on the rate of decay for a particular isotope that we have measured, we can generate ratios between parent and daughter isotopes that indicate the time of decay. We can then predict that a certain ratio in a sample will be present at some time in the future, or we can back-calculate and estimate the ratio that we would expect to be present in a past time. In either case, the

time is outside of our current experience and so any number we generate assumes that the processes occur uniformly across the timeframe in question.

This brings me to the second item I found particularly interesting, which was that we must check the assumptions involved in any claim that is being made and determine whether or not those assumptions are valid. These assumptions not only include statements concerning the logic and relationship between cause and effect that we must hold in order to even consider the feasibility of using experiments to explore the natural world, but also include assumptions concerning the techniques themselves. To go back to the radiometric dating example, a proper date for any sample assumes that no daughter material was present in the sample in its original state, or at least that we can accurately account for any daughter material present in the original state. Likewise, we must assume that no daughter or parent material was added or lost from the sample during the decay process and that the decay rate is constant from beginning to end. An example that Ken Ham cited in order to question these assumptions concerning radiometric dating described incompletely petrified wood contained within a tertiary basalt layer. While the basalt dated between 39.1 ± 1.5 Ma (one sigma) to 47.9 ± 1.6 Ma (one sigma), the wood itself dated to between 29544 ± 759 Years Before Present (one sigma) and 44700 ± 950 Years Before Present (one sigma) (Snelling, 2000). This was certainly intriguing given the fact that the wood was encased within the layer suggesting that the dating methods employed might be faulty should these dates be confirmed as accurate calculations based on method. I am thus interested to explore this and other such claims further in order to determine if they have any merit, for if they do, they would very much bring into question current assumptions regarding radiometric dating. As this paper was published over a decade ago, I hope to find that many other scientists have

commented on these findings and have attempted to replicate their results so that we might better understand the truth of the matter.

These various threads combine into the bits and pieces of a variety of claims regarding this discussion of the ultimate origins of the Universe and everything in it. In exploring them, I realize that I have much to learn in moving forward in terms of both my own perspective as well as the claims that these various sources are making. The most important place to begin is with the assessment of my own perspective, particularly because this question involves two things that I care about very deeply. The first is God and my relationship with Him because I believe that God sent His Son, Jesus, to take on the penalty for my sin by His death, resurrection, and ascension into Heaven. Since the Creation account in the first several chapters of Genesis discusses the first sin of the human race, how I understand this story is paramount because it influences my understanding of sin and the nature in which it plagues both my life and the lives of those around me and thus helps me to better understand what exactly Jesus' taking of my place did for me. Likewise, I am also very interested in understanding the natural world through the various fields of science, where I think a great number of people have done excellent work and continue to do so in this regard. Thus, while I search for the truth, I also hope that the truth does not necessitate the removal of large swaths of scientific study. At the end of the day, my goal is to determine the best way in which I can unite what I believe to be a truthful interpretation of God's Word as recorded in the Bible with the claims that scientists have made based on the data they have collected over many years.

The Ultimate Guide: God's Word as the Foundation of Our Thinking

Despite the centrality of the Bible within Christian tradition, the fact of the matter is that this collection of texts did not always exist. Irrespective of one's view concerning human history, the fact of the matter is that the 66 texts Protestants recognize as Bible (Apocryphal texts are not universally accepted) were written down at some point in time. As a result, it is certainly compelling to ask why we should even bother with the Bible. After all, if people recognized and followed God before the existence of these works, it seems logical that they may not be the necessity they are often made out to be. What is it that is so special about this book that it should so influence our understanding of and interaction with God?

As a collection of texts, the Bible stands out as the foremost divinely inspired source for all Christians. As it says in 2 Timothy 3:16 that "all Scripture is given by inspiration of God, and is profitable for doctrine, for reproof, for correction, for instruction in righteousness, that the man of God may be complete, thoroughly equipped for every good work." This verse highlights that the Bible and the texts contained therein are inspired by God, which means that God has ensured that the contents of these texts accurately expound the truth of reality. Given the variety of works, whether of poetry, written correspondence, or historical records and accounts and whether the writings are from first-hand sources or the result of second-hand work, God's guiding of a great span of human efforts resulted in the robust text that we have today.

By careful study of this text, the Christian will be well on his way to understanding his relationship with God and living for Him. From 2 Timothy, we see

that, through attention to the Scriptures, that the Christian will be “complete, thoroughly equipped for every good work.” This equipping principally allows the Christian to “make disciples of all nations, teaching them to observe all things that I [Jesus] have commanded” so that all people might live in the love and service of God (Matt. 28:19-20). This desire of God’s, for “all men to be saved and to come to the knowledge of the truth,” is the root of His not only providing writings containing His Word, but also active guidance on His part through the Holy Spirit (1 Tim. 2:4). In 1 Corinthians 2:13-14, Paul writes that “these things we also speak, not in word which man’s wisdom teaches...but the natural man does not receive the things of the Spirit of God, for they are foolishness to him...” Apart from listening to God Himself, we are thus unable to understand His truth, which means that, when we approach the Bible, we must be in conversation with God, through prayer and careful reflection, so that we might understand what God says about this book He has brought together.

Such an approach is essential because, through it, the reader will not only engage with the text itself, but also with his own presuppositions that are brought to the table, creating a dialogue wherein understanding, both of the text and one’s self, increase. As Robert Grant and David Tracy explain in their book, *A Short History of the Interpretation of the Bible*, “interpreters cannot abandon their preunderstanding, nor can the claims of texts to the attention of that preunderstanding be abandoned” (Grant and Tracy, 1973). Within this interaction stands the realization that the Bible is not engaged within a vacuum. Instead, each of us brings our own situation to the texts, a culmination of what we learn from the many other sources and contacts we interact with throughout our lives.

Yet, while one might consider this as grounds for the subjective nature of Biblical interpretation, it is also important to recognize that the texts themselves and the God ultimately behind them push back. The texts brought together in the Bible have been carefully maintained and translated throughout the centuries because Christians “believe in Jesus Christ with the apostles” (Grant and Tracy, 1973). In other words, Christians center themselves around the revelation of Jesus as the Son of God who, through His death and resurrection, took the penalty of our sin upon Himself. This revelatory event, recorded in texts that directly or indirectly testify thereto, were passed on to us from the apostles by way of the ongoing Christian community. Thus, rather than dispensing with these texts as we see fit, it is paramount that, in affirming the belief in Jesus Christ, that the believer recognizes the witness to Him via the apostles and engages with these texts in order to better understand what God has done and what that means in our own lives.

For my own part, this conversational engagement with the Scriptures contained within the Bible is ongoing and, for the purposes of this work, engages with the texts in regards to how modern scientific understandings of the natural world interact with the Biblical perspective. I do so bringing key suppositions to the table. The first of these is that the texts comprising the Bible are God-inspired and thus convey His truth, first and foremost for the witness to salvation through Jesus Christ as the Son of God. In addition, as the exposition of the means of salvation within the Bible incorporates texts from a variety of genres, including poetry, letters, proverbs, government records, and other historical and literary forms, these writings likewise present authentic testimony within these genres. The Bible is thus accurate and true, not only in terms of the heavenly realities it presents, but also with respect to the earthly things bound thereby. As such,

the nature of scientific inquiry and its relationship to God and His Word in the Bible must begin with an assessment of the character of this book.

Any attempt for the Christian to use the Bible as a source of information concerning matters of the faith must begin with an assertion of the truth that it references, beginning with Jesus Christ. In Matthew 20:18-19, during His return to Jerusalem, Jesus says “Behold, we are going up to Jerusalem, and the Son of Man will be betrayed to the chief priests and to the scribes; and they will condemn Him to death, and deliver Him to the Gentiles to mock and to scourge and to crucify. And on the third day He will rise again” (Matt. 20:18-19). Here we see that Jesus predicts three key pieces of His demise: He will be crucified, He will die, and He will be resurrected on the third day. These events are corroborated within the Gospels (Matthew 26-28, Mark 14-16, Luke 22-24, John 18-21), several of Paul’s Epistles (1 Cor. 15:3-8, Romans 1:3-6, Philippians 3:8-11, 2 Timothy 2:8), and various details surrounding these events were prophesied in Isaiah 53 and Zechariah 12:10-14 as well as Psalm 41 and other passages. The extensive biblical testimony as comprised by at least eight different authors across several centuries provides a strong biblical foundation for the existence of Jesus and the mechanism of His death and resurrection.

Yet, for readers unfamiliar with the intricacies of Christianity, this rooting of the Bible in the person of Jesus may come across as a bit odd because He comes in near the end. However, it is because Jesus is the irremovable part of the Christian faith that makes Him my starting point. The reason that Jesus is held in such high esteem is, first and foremost, that He is God incarnate. This is testified by the Gospel of John, which states that “in the beginning was the Word [Jesus], and the Word was with God, and the Word was God...And the Word became flesh and dwelt among us” (John 1:1,14a).

While equating “Word” with “Jesus” is certainly not straightforward, the reason for John’s usage of this term comes from the context in which he was writing, namely the Greek perspective. Philo of Alexandria, a first century Jew, held that the “Word,” or “Logos,” was “the ‘divine mediator of God’s power in the world’” (Kling, 2013). John connected Jesus with an idea familiar to his audience. He then goes beyond their understanding of Logos by stating that Jesus came to Earth and took on a physical form. It is then as a human, beginning at infancy, that He, through His death, resurrection, ascension into Heaven, “is the propitiation [appeasement] for our sins, and not for ours only but also for the whole world” (1 John 2:2). Thus, Jesus, God Himself, paid the penalty for our sins. If this were not true, then the remainder of the Bible would be in vain, for if Jesus is not Who He claimed to be then the hope of Christianity is founded on false pretenses.

As Jesus did take our sins upon Himself, this suggests that humans have sins to begin with, a fact which is duly noted and first chronicled in Genesis 3, which outlines the first instance of sin and the consequences that resulted. While the literal existence of Adam and Eve is debated among different denominations, this text is widely accepted as a description of humanity’s rejection of God’s authority. This chapter recounts the decision of Adam and Eve, the first humans that God created, to eat of “the tree of the knowledge of good and evil” against the command of God (Genesis 2:17,3:6). As a result of their flouting of God’s command, both Adam and Eve were banished from their life in the Garden of Eden. Not only did they lose the intimate presence of God described in Genesis 3:8, but they, and all other people became spiritually separated from God. As Paul explains it: “all have sinned and fall short of the glory of God” (Romans 3:23). However, all is not lost, for “if we confess our sins, He is faithful and just to forgive us our sins, and cleanse us from all unrighteousness” (1 John 1:9). Thus, while we are unable

to overcome our own sins, which have plagued humanity since its inception, freedom therefrom can yet be achieved if we ask God for forgiveness and accept that Jesus' sacrifice on the cross and His resurrection are sufficient to cover our sins.

Yet, beyond the simple salvation aspects of the Bible stand a number of other claims and inferences that span history, science, and other fields. If the foundation of the Bible in Jesus is accurate, this may suggest that these other claims are also true due to the fact that the Bible is divinely inspired, given its accurate testimony to the events surrounding Jesus and their importance for the human race. Yet, at the same time, what would it mean for these other claims to be true and in what ways might this change how we understand the world we inhabit? To begin with the former charge, science concerns itself with the workings of the natural world, undisturbed by outside influences. As such, if the Bible were to make a "scientific" claim, then the events or mechanisms that it postulates should provide more accurate explanations of the true mechanism than other competing hypotheses. With regards to the latter, the way in which this would influence our understanding of the way the world operates would vary based on the situation. However, the overarching idea that would likely come as a result of such inquiries, should they be accurate, is that God plays a role in the workings of the world. In other words, if Jesus is who He says He is, then as Jesus claims to be God, then God is who He says He is. Furthermore, with the Person of God identified, we must then determine whether or not He has completed the acts attributed to Him and determine what that might mean for how we might see Him work in the present age.

As Jesus is the cornerstone from which all else follows in the Christian tradition, we will return to the pivotal moment in His life on Earth to determine what we might glean from His supposed Death, Resurrection, and Ascension with respect to God's

interaction with His Creation. Beginning first with His death, Luke records in his Gospel that around “the ninth hour” Jesus “breathed His last” (Luke 23:44, 46). From there, Jesus was removed from the cross and “laid in a tomb that was hewn out of the rock” (Luke 23:53). In addition, Matthew notes that the “chief priests and Pharisees” requested that the tomb be protected in order to prevent Jesus’ followers from “stealing Him [His body] away” and thus prevent proclamations of a resurrection when indeed none could have occurred (Matt 27:62, 64). The request of these men was granted and they “made the tomb secure, sealing the stone and setting the guard” (Matt 27:66). Thus, Jesus’ tomb was to be under guard until sufficient time had passed such that the claim of Resurrection on the third day could in no way occur as the disciples would be unable to obtain the body and fabricate the situation.

Moving forward from the attestations to the fact that Jesus suffered bodily death as a result of His crucifixion, that His body was placed in a tomb, and that this tomb was put under guard in order to ensure that His followers could not fabricate what was thought to be a false prophecy, we come to the morning of His Resurrection. The first upon the scene the morning following the Sabbath were various women who were followers of Jesus (Matt 28:1; Mark 16:1; Luke 24:1; John 20:1). As Matthew records in his Gospel, the guard which had been set in place at the entrance to the tomb was cleared by an “angel of the Lord” preceding their arrival after which, this same angel told them that Jesus “is risen from the dead” and they saw the place where His body had been laid (Matt. 28:2-4, 6-7; Mark 16:6; Luke 24:3; John 20:1). Furthermore, Peter and the Beloved Disciple, whom some identify as John, likewise attested to the empty tomb when they arrived (John 20:6-8). Following these events, Jesus appeared to His followers on a variety of occasions (see Mark 16:12-20; Matt. 28:16-20; John 20:11-

21:25). Moreover, amongst these events, Thomas was shown Jesus's pierced hands and side, Jesus prepared food for His disciples, and He was seen returning to Heaven. Thus, from all of this, it can be determined that Jesus did, in fact, rise from the dead on the day He predicted, that His Resurrection was not simply a spiritual return, but bodily as well, and that He has returned to His rightful place in Heaven, whence He will return in the last days.

Still, this remains all well and good, but the application to the question of the Bible's response to science has yet to be unfolded. Given the Resurrection of Jesus in both body and spirit, the contradiction between what would occur as the result of natural processes and that which requires the effort of God immediately becomes clear, for those that are dead for several days do not come back to life. While some might argue that Jesus was never truly dead, but instead merely appeared as such, this does not explain how He managed to escape from a sealed tomb guarded by Roman soldiers nor does it remove the angel from the picture or His twice entering a locked room to appear to His disciples, something impossible for a merely resuscitated human (John 20:19-29). Thus, a conundrum is on our hands, for if the Bible is to be taken merely as a book of salvation, a witness to God's taking of our sin upon Himself and the forgiveness available to us, without also acknowledging the foundation of this testimony on events that occurred throughout human history, how can it perform such a function without also making a claim that goes against our empirical understanding of material processes? Even if one were to concede that the Resurrection was only spiritual, this would still contradict our orthodox scientific understandings because the self is not held in any way to be able to transcend the body. Furthermore, it would highlight that our understanding of science exceeds its competence, meaning that this method bears limitations in its

scope. In either case, Jesus should be understood for Who He claims to be, namely that He is God incarnate.

While this highlights the centrality of Jesus, it only provides an initial explanation the totality of God's interaction with His Creation. Even within the Bible itself, God is cited as the cause not only of the broad scope of the created world, but also many proximal events, both with respect to Jesus as well as other individuals, such as Moses. Beginning with the former, another of the more well-known miracles within the ministry of Jesus, comes from John's Gospel, where He transforms water into wine at a wedding feast (John 2:1-11). While this event seems to be something of a side note given that the purported miracle was relatively simple and was not followed by any teaching, the reality is that, in this case, the simplicity makes for its power. Jesus simply told the servants to fill several large "waterpots" with water and when He told them to "draw some out...and take it to the master of the feast" the aforementioned steward had no idea where this new wine came from (John 2:7-9). Unlike the events surrounding the crucifixion, which intricately span several days, this miracle took place within a few hours and leaves little room to the imagination with respect to alternative hypotheses concerning the origin of this new wine. Somewhere in the process of filling the containers and drawing liquid from them, the matter contained therein was converted into something new. Thus, while some may take advantage of the broader scale of events surrounding the death and resurrection of Jesus in an attempt to discredit Him, this less central miracle reiterates the fact that Jesus was God and bore His power on Earth.

In addition to Jesus, other Biblical characters were involved in miraculous occurrences, particularly in the Old Testament. One of the more well-known stories is the Red Sea crossing found in Exodus 14, which allowed Moses and the Israelite people

to escape captivity in Egypt. With the Egyptian army bearing down on them and their backs to the sea, God speaks to Moses, telling him to “lift up your rod, and stretch out your hand over the sea and divide it” and “the Lord caused the sea to go back by a strong east wind all that night” (Exo. 14:16, 21). The study by Drews and Han (2010), which I mentioned previously, describes their success in modelling a scenario in which a powerful and persistent easterly wind is capable of clearing space within a body of water by a process called wind setdown. While I likewise noted earlier that this study could be used to suggest that God Himself was not involved in this act, I think that I may have been mistaken concerning that reality because, while a certain wind appears capable of causing this separation event, this study does not proscribe the origin of the wind itself. While it may be argued that the insertion of God into this account simply acts as a “God in the gaps” explanation, such a categorization is only appropriate if it can be shown that the event was merely the result of natural processes inappropriately ascribed to God. The reader will agree that we are rather unaware of the exact weather conditions leading up to this event and thus are unable to state whether this would have occurred of its own accord, with God simply getting the Israelites to the right place at the right time, or if He Himself manipulated the atmospheric conditions in just such a way as to generate this wind which blew throughout the night. For lack of instrumental data and sure interpretation thereof in a way which God could not have possibly acted, God has not been removed as the author of this miraculous parting of water as a part of His efforts to preserve His chosen People.

Foremost in the continuing debate is the argument from the Naturalist, who claims that God does not exist and therefore plays no part in the origin of Universe. Such a position certainly denies any level of biblical authority, especially concerning what

might be referred to as “primordial” times, before the common advent of written history. Concerning the Genesis accounts specifically, the Naturalist would argue that all of it is completely irrelevant, while the account may mark some of the orders of appearance of different features or organisms correctly, this is not due to any “revelation” on the part of God, but rather, if anything more than lucky guesses, came from observations of the natural world and extrapolations therefrom. Pure material explanations are better received in this case, given that they do not invoke anything beyond Nature itself, for all is matter and energy.

In contrast, other perspectives, namely that of the Theist, argue that something or someone does, in fact, exist outside of Nature and, in some cases, that this same entity interacts with the system we find ourselves in. First among this group is the Deist perspective. This argument concerning the nature of God claims that He is “not immanent” and thus, not an active influence on the course of events (Miller, 24). This position makes little headway with respect to the Naturalistic perspective because of the “distance” between the deity and the created world. While such a being may have set the entire show of matter and energy off, it is not concerned with the affairs therein. From this perspective, the Genesis account likely follows more of a mythic retelling, in that, while the events described may highlight real events, they are not written in such a way that one could pull directly from them like one might out of a history book. Furthermore, because God no longer plays an active role in the life of humans or the Universe, Jesus is not the divine figure Christians say He is. As a result, Deism almost entirely fits into the Naturalistic perspective, the difference occurring at the initiation of Nature. At that point, early in the history of our Universe, the two were inextricably linked, for God brought the created realm into existence. However, since that point, the

Creation and the Creator have had no contact and thus, in our current time, such a relationship harks back to the essentially isolated system we now inhabit. There is no need to concern one's self with the influence of God on Nature when studying Creation, for such an interaction no longer exists. Instead, everything was set in motion and then left to its own devices.

Beyond the Naturalistic and Deistic positions, a variety of different claims stand along a scale measuring the level and style of God's involvement, both at the time of Creation as well as now. While the connection between current conceptions of God's activity and those that occurred during the birth of the world might seem a different discussion entirely, how we think about God's efforts in the here and now influence what we are willing to accept with respect to the Creation account. For instance, across this portion of the spectrum of perspectives, God is held to be involved in the imposition of the soul upon the physical body and is thus required for the creation of a human being in all of their fullness. However, beyond the agreement upon this idea, some go on to argue that Evolutionary Theory fits with this as a God-directed phenomenon while others claim that this very reality is evidence against such a progression and thus has no bearing on humans with respect to their origin. Indeed, it is around verses like "the Lord God formed man of the dust of the ground, and breathed into his nostrils the breath of life; and man became a living being" that the debate kicks in, for what is this to mean in light of the modern popular scientific opinion (Gen. 2:7)? May we acceptably stick to the extreme root of the matter that God is the origin of what makes us particularly human, or must we also accept the direct understanding, that God did not merely give us a soul, but originally formed Adam out of the soil, and Eve out of his rib? Moreover, what would it mean for the concept of original sin if Adam and Eve did not exist, but rather are stand-

ins for the group of beings resulting from other beings before them, into which God first implanted a soul?

While anyone with any stake in this debate, whether Christian or not, disputes the exact meaning of these passages, it is important to remember that, despite the fact we have both the Bible as well as the whole of Creation to study, we must decide which will root our understanding of the natural world and its relationship with God. As Jesus stated with respect to the relationship between God and money, that “no one can serve two masters; for either he will hate the one and love the other, or else he will be loyal to one and despise the other. You cannot serve God and mammon [Man]” (Matt. 6:24). Thus, while I might desire to unify my understanding of Nature with my understanding of the Bible, there will still be times in which clashes arise between the truths that each proclaims if I do not set my thinking upon the proper foundation. At these moments, I must choose which source I am going to root myself in, particularly if the difficulty and argument becomes stagnant and protracted. Out of the two, I believe that the Bible, as it “is given by inspiration of God,” is the better option of the two as a foundation for our understanding of the natural world in the context of the whole of reality (2 Tim. 3:16). While some might argue that the natural world itself is a clearer teacher, one must remember that it is from the Bible that we even know that Creation speaks clearly of God to all who are exposed to it. Thus, as we move forward, both in this written work as well as beyond, the Bible, next to God Himself, is to be the ultimate guide in these matters, there can be no other.

Of Its Own Accord: Scientific Understanding in Light of Our Creator

Much of what led to the modern assumptions about physical interactions with respect to the Divine comes in response to Ptolemy's explanation of the motion of the planets. This Egyptian took his cue from Aristotle's Platonic roots and built his study of the solar system around the assumption that the motion of the heavenly bodies was unchanging, taking perfect circular motion to heart as the only possible way to describe the planetary paths that astronomers traced through the sky (Koestler, 69). Since, as we recognize today, the planets do not follow perfect circular orbits, Ptolemy was forced to combine several different circular motions, much like a multi-tiered mobile, in order to more effectively trace the slightly oblong orbits of our neighbors. Adding up the individual circles required to approximate the motion of each planet within the entire solar system (Saturn being the outermost identified planet) resulted in a massive earth-centric assemblage made up of 40 different nested wheels (Koestler, 71). Given the gaping difference between this and the current conception of planetary motion, it may be surprising to learn that Ptolemy's explanation held reign for almost 2000 years as the leading theory concerning the motions of the heavens. While some readers might scoff at this foolishness, one must remember that the ideas of an age, especially when they are a staggeringly close approximation, are generally useful and thus self-perpetuate in the minds of up-and-coming thinkers, whose dream it is to tie off the stray ends of the platform of understanding. Even Copernicus, who is highly regarded for his argument in favor of a perspective similar to our current heliocentric perspective, managed to add wheels to Ptolemy's already complicated troika because he retained the circular motion

to the planets (Koestler, 198). In both of these instances, it was not merely the observations that were the primary driver of the model, but also their preconceived ideas concerning the Universe that directed their efforts.

It is in the light of these understandings of the universe that Johannes Kepler introduced a novel way of understanding the entirety of nature through his writings on the solar system. In the first place, his very ideas challenged several centuries of thought, going back, most prominently, to Ptolemy and his epicycles. Two of his three major contributions, the notions that planets moved along elliptical orbits and that these same bodies did not traverse the heavens at a constant speed, spoke against the Divine, unchanging motion of the heavens (Koestler, 317). Looking back, the entire controversy seems rather silly, for our understanding of planetary motion, as derived from Kepler, retains endless motion as the ellipse likewise returns back unto itself. Yet, the issue with the ellipse from the point of view of the immutable heavens is that the manipulations required for such a path change over time rather than being the same at all times. Furthermore, the fact that Kepler argued these laws were generally applicable to any sphere in orbit around another laid another new facet to the perception of the natural world. Previously, as was the case with the Ptolemaic and related systems, each planet had its own specific set of motions that drove its course through the sky. Now any planetary motion could be described according to a common set of rules. Most importantly, nowhere in these laws is any divine being or force invoked. Rather, each of these principles is proved in mathematical terms and attributed to forces inherent in the planets themselves rather than spirits present within the core of these celestial phenomena (Koestler, 534). Thus Kepler, who himself was a man after God's own heart,

paved an important part of the path toward the modern separation of the divine and the natural world.

Today, the study of the natural world remains in full swing, even here at Regis University, where we not only conduct the experiments, but also explore a bit of the basic idea of modern scientific understanding. In the first semester laboratory course for Principles of Biology, science is defined as “the *belief* that phenomena have natural, theoretically predictable, causes that can be revealed through empirical (sensory) evidence” (Ghedotti, 2014). Perhaps astonishingly, this definition notes that science is a “belief.” While this might seem odd or even unnecessary, given the epistemological connotations of the word, I think that it is important to recognize this aspect of scientific thought. When this definition states that science is a “belief” this means that it is held to be true. In the same way, Christians believe, or recognize as true, that God exists and center their lives on serving Him. Though, in each of these cases, the evidence in question primarily differs, in each case the principle of belief functions along the same lines. Taking on this idea of belief, the definition next turns to what this acceptance entails, namely that phenomena have natural causes that we can observe.

This idea that the events that we experience have causes derived from natural sources is especially important because it defines the scope of what science explores. The definition put forth by Ghedotti (2014) argues that science assumes that events have “natural” causes. In other words, events are rooted, according to our current understanding, on the existence of matter, energy, and the interaction between the two. As a result, anything that exists outside this sphere is not accounted for within the magisterium of science. Furthermore, because these events are held as “theoretically predictable,” the patterns or “Laws” that explain these events are assumed to be

consistent across time. This ability to make predictions is one of the keys to the scientific framework because it is an indicator of how well our understanding of the patterns of the natural world fit what is actually occurring and is thus an indication of the truth of the ideas and models that explain a phenomenon.

Yet, while there are many different routes by which thinkers pursue truth, as science concerns itself with the natural world, those who use this approach do so through empiricism. This technique, as noted in the definition of science, involves the use of all of our available sensory experience. Both throughout history and modern times we have expanded our “sensory” experience through the development of various instruments that detect events impossible for the unaided human being. These experiences are applied to the steps of the empirical, or scientific, method. Firstly, a question is asked based on an observed phenomenon, such as the reduction of a tumor following a patient’s infection with *Salmonella typhimurium*. The question might be formulated as follows: Is *S. typhimurium* responsible for this change in tumor size? Next, a hypothesis is generated as an explanation for why it may or may not be the source of infection. All other contingencies are assumed under a second hypothesis, referred to as a null hypothesis, which is required for the statistical analyses that follow. While I would not attempt to replicate such a result in a human patient at this point, I could begin to answer this question by culturing cells from a similar tumor in the lab and attempt to infect them with *S. typhimurium*. In this case, I might hypothesize that this bacterium will cause tumor cell death because it can intracellularly infect these cells. I would conduct an experiment where I exposed the tumor cells to the bacteria and then determined whether or not the cells died as well as whether intracellular infection was achieved. Following further experiments to understand other pieces of the mechanism, I would

then develop a working model of the infection of this tumor with *S. typhimurium*, from which I could begin predicting and further testing the types of conditions where this infection is successful at reducing tumor size. Through this example, along with the great many other experiments that have been conducted throughout the years, the goal of science, to understand, explain, and, ultimately, predict the events of the natural world is pursued and, piece by piece, achieved.

Next, we shall consider the appropriate scientific approach to dealing with the miraculous, for the assumption that natural processes (interactions between matter and energy) are the sole governors of the phenomena we encounter stands short of an easy incorporation of God. Looking back at the definition put forth above, as the reader will recall, science hopes to understand “natural...phenomena...through empirical (sensory) evidence.” Given our current perception of what Nature comprises, namely matter and energy, it follows that anything not comprised of these units stands outside of the realm of interest. While this idea is straight-forward in and of itself and may appear rather elementary, it is important to consider because, once our mental “field of view” is confined in this way, the question becomes: is there anything outside of this line we have drawn? If this question sounds nonsensical, I will clarify using an example from the field of thermodynamics involving a pan and a heat source. When beginning a thermodynamics study, the “system” is chosen in order to define what it is we are measuring. If the experimenter is interested in measuring the temperature of the pan over time, the pan is selected as the system. Thus, the experimenter is making the assumption that the temperature he is measuring is an accurate representation of the pan itself and that any changes to its temperature are now coming from the surroundings, or outside elements, namely the heat source. Following the study, the

experimenter will have a collection of data from which the heat exchange between the pan (system) and heating element (surroundings) is determined. If a temperature change was indeed measured, this would indicate an exchange of “information,” in this case energy, between the system and surroundings. If no temperature change occurred, this would suggest that the system and surroundings had not interacted or, if for some reason the experimenter was unable to actually see the heating element, whether it was even present. With respect to the Nature studied by science, an analogous situation ensues, for it may be important to recognize what may or may not stand separate from Nature in order to better understand what is occurring within the system of study.

Science itself comes at this question from the Naturalistic assumption, from which it argues that such a question is irrelevant because Nature is everything. From this perspective, the object of study, Nature, is held as a “vast process in space and time which is *going on of its own accord*” (Lewis, 214). As a result, anything that occurs comes about as a product of the system itself. Each event that occurs within Nature can thus, in principle, be traced back throughout “space and time” to determine the string of events that led to that event. Furthermore, what is particularly important to notice is that this claim suggests that the stuff of the Universe, matter and energy, function without any outside input or interference, both now and in the future as well as the past. My application of the word “Universe” in this context may result in the reader bringing up Multiverse Theory however, in this case the term is applied to all matter and energy, whether in this universe we occupy or in another that exists outside of our own. While this idea that matter and energy sum up existence may appear straightforward and rather inconspicuous, it is important to note that the strict Naturalist perspective makes no place for things existing outside of Nature that could in any way interact with it. Thus,

Nature becomes the sum total of all things. While one might argue that other independent systems might exist, this does not change the functional use of the Naturalistic perspective, for if two things can never interact, either directly or through an intermediary, they have no way of knowing that the other exists and any assumptions one way or the other are equally useless to conducting enquiries within the Nature we inhabit. Under such a paradigm, the present is a direct product of past system states, which have changed in accord with whatever rules or patterns govern it and, as such, all states, whether past, present, or future, are, in principle, calculable given a sufficient understanding of the present state and the rules that govern the system as a whole.

However, before we can decide whether or not anything that exists outside of Nature might interact therewith and thus require a reinterpretation of the assumptions of science, we must first deal with one of the most basic assumptions of the scientific process, that the events of Nature are orderly, for if there is no concept of order within the workings of Nature, then there can be no determination of whether or not an outside force has tampered with the machinery. Most simply, such an inquiry begins the exploration of the relationship between cause and effect within any single event and the relationship as such with our conception of the Laws of Nature.

In one of his more recognized works, *Miracles*, C.S. Lewis argues that, while the Laws of Nature are cited as the driving force behind events, these are really nothing more than a label for an independent event. One passage that particularly highlights this perspective on “laws of Nature” occurs where Mr. Lewis states that “we are in the habit of talking as if they caused events to happen, but...they analyze the motion after something else...has provided it” (Lewis, 2002b). As noted in the quote, colloquial phrasing of scientific explanations makes these interpretations into the active agent. For

example, if I were asked why a ball falls to the ground when released I might say, “the ball fell as a result of gravity.” However, gravity, as stated, does not exist, for it is simply the name given to an observed process. This reality is further highlighted by the fact that the goal of science is to understand the processes that govern Nature, not to alter them. If we thought that our scientific explanation was the laws of Nature, then we would expect that, as further experimentation led scientists to edit their existing theories that Nature would begin to function in a different way. Instead, we recognize that empiricism works the other way around, with further studies shaping our interpretation of how the events within the Universe play out.

This reality of the relationship between empiricism and the laws of Nature is more thoroughly emphasized by David Hume in his argument that our conception of cause and effect is entirely rooted in our experience. In his book, *An Enquiry Concerning Human Understanding*, Hume claims “were any object presented to us, and were we required to pronounce concerning the effect...without consulting past observation...the mind...must invent or imagine some event, which it ascribes to the object as its effect” (Hume, 1955). Hume argues from the perspective that causes and effects do not share a tangible link and thus, any pronouncement about the relationship between the two cannot be inferred without past experience with the same or similar circumstances to draw from, instead we must rely on arbitrary reasoning to hazard a guess as to what might happen. Even when we have some experience concerning a phenomenon the effect still remains separate from the cause because we can conceive that other results might also occur without invoking a contradiction. To say “*that the sun will not rise tomorrow* is no less intelligible a proposition and implies no more contradiction than the affirmation *that it will rise*” (Hume, 1955). Here, Hume makes the claim that we expect

things to happen a certain way because of how we have observed such events unfolding in the past. Thus, as the sun has risen according to a consistent frequency, we expect that it will continue to do as such even though we have not collected data at these future points. Thus, rather than knowing with certainty the trajectory of the Sun with respect to the Earth, each night we predict that a period of sun-initiated light will occur within the next several hours.

C.S. Lewis builds further upon this idea in his own discussion of Hume's construct, but ultimately argues that we can be assured of the relationship between cause and effect because we know that God, Who created all things, is also a being of Reason. Specifically, Mr. Lewis states that "if the deepest thing in reality...is a Rational Spirit and we derive our rational spirituality from It-then indeed our conviction can be trusted" (Lewis, 2002b). Instead of arguing that the existence of a rational source behind Nature, which we find ourselves in, C.S. Lewis suggests that God's existence as such confirms our assumption concerning the efficacy of logic because He created us with a rationality that is derived from His own mental faculties. Furthermore, he argues that "our repugnance to disorder is derived from Nature's Creator and ours," meaning that not only do we pursue a rational explanation for the normal workings of the Universe, but our very inability to complete this task so drives us to pursue the matter further because we implicitly realize that such a lack of understanding falls short of the true reality.

Indeed, this is the place where the orthodox definition of science begins to collide with our understanding of God, for if we are to base our acceptance of the repeatable cause and effect relationship on God rather than Nature itself, one of the key assumptions of Science, that all things are materially derived, has been broken. In defense of the Naturalistic paradigm one might ask: how can we be sure that God

exists? After all, many claim that they have not experienced God, which seems to be such an essential part of determining whether or not something exists.

The answer to this question comes from the Bible itself, whose writers argue that every person has sufficient evidence presented to them that God does exist. This assertion most clearly begins with Romans 1:20, where Paul states that, “since the creation of the world His invisible attributes are clearly seen, being understood by the things that are made, even His eternal power and Godhead, so that they are without excuse.” Simply put, the Universe itself is a testament to the existence of God, even to the extent of highlighting the overarching attributes of His Divinity. Yet, if this is true, why is it that scientists are not well-known for vocalizing their praises to the God behind this Universe? Certainly, if it were that simple there would be many more fervent Christians present in countries with established scientific exploration. Furthermore, it is also common knowledge that people cite scientific studies in whichever way suits them best, often leaving behind the truth of the matter entirely. While the evidence from the material world may not appear convincing (a discussion of which will appear later in this work), this is not the only claim that must be considered. In addition to revelation from the natural world, Paul states later on in the same chapter that “when Gentiles, who do not have the law, by nature do the things in the law... [they] show the work of the law written on their hearts” (Rom. 2:14, 15). In other words, the very lives we live, along with our thoughts, words, and actions, likewise testify as a universal revelation of God’s existence and his role in the creation of the Universe. As a result, while the orthodox understanding of the assumptions required for scientific reasoning and exploration may seem, in and of themselves, accurate, the fact that all people are implicitly aware of the

reality of God suggests that our assumption of naturalistic processes should be taken in a different light.

Thus, instead of holding the assumption that all material processes run only according to material mechanisms, we must more fully incorporate God into this set of starting points. Such an effort is of particular importance for two reasons. Firstly, it is a reminder to those that explore the processes of the Universe that all things result from the creative action of God, Who is not the result of, but rather independent of this material world, and secondly, that God retains the capacity to directly act within the created realm, as demonstrated throughout the Biblical accounts. While such an addition may frustrate those who do not accept the existence of God, I think it is especially important for those that do accept His existence and have accepted Him as their Savior because it reintroduces God into the very fabric of our examination of the natural world through the scientific method. As it stands, with the current assumption that material mechanisms exclusively govern the events that occur in the Universe, an implicit assumption exists stating that the Universe, or in more recent times, the Multiverse, is the sum total of reality. In contrast, "In the beginning, God created the heavens and the earth," meaning that He existed before the matter and energy we study today (Gen. 1:1). Furthermore, the recognition that this extant God has directly interacted with the events of the world following its inception suggests that we likewise must be careful to discern between what has come of its own accord and that which is the result of God's hand at work.

To say that this would go against the pursuit of science and the intelligibility built up thus far concerning the action of matter and energy within the Universe is incorrect and, in contrast, denigrates science itself, for as we better our understanding of how the

material world works of its own accord, we will be able to more clearly identify those cases in which God has indeed miraculously intervened. Previously, we discussed the nature of the miracle at the wedding in Cana, where Jesus converted water into wine by some miraculous means. However, how do we know that, if this event did indeed happen, that it was a miracle? To start with, we know that something odd is afoot because, as the reader will agree, water is not normally in the habit of changing into wine. Indeed it is only because we are aware of this fact that we see anything out of the ordinary at all. If it were the case that water spontaneously changed into wine quite regularly, then the event in Cana would be of little import. Thus, according to C.S. Lewis, our “belief in miracles, far from depending on an ignorance of the laws of nature, is only possible insofar as those laws are known” (Lewis, 2002b). This is not to say that all purported miracles are true, but rather that, in the case of biblical miracles, they were never intended to be held as the norm, but rather as the special acts of God. For the same reason that we reject the creation of wine from water, Peter and the disciples were incredulous at seeing Jesus walk on water (Matt. 14:22-33). Likewise, Joseph balked at the idea of Mary’s pregnancy as a virgin (Matt. 1:18-22). In contrast to scientific advancement decreasing the plausibility of these events, they ever increasingly highlight the fact that, they required the hand of God.

Starting Afresh: Viewing My Own Scientific Study Through a Biblical Lens

Although my own history exploring the relationship between science and God encompasses a broad range of experiences, a renewed mode of inquiry will aid my continuing exploration of this question. Certainly, a Biblical perspective inspired by God is required in order to reach a proper understanding of what can be learned about God and my relationship with Him. However, as a result of the interlocked nature of my understanding of God, the Bible, and Nature, this pursuit will only progress if it begins from proper footing in God Himself. Thus, rather than founding my understanding of the whole of reality on my knowledge of the natural world through modern scientific assumptions and working backwards to God, I must instead root this inquiry in my relationship with God, by which I will not only better know God, but also the nature of His creation.

First and foremost, across the breadth of my exploration I came to realize that beneath all ideas held by multiple individuals lays a transmission of information from one person to another, a sharing that roots the vast majority of our understanding on the testimony of others. C.S. Lewis plainly states that out “of every hundred facts upon which to reason, ninety-nine depend on authority” (Lewis, 2002a). While such a number may sound hyperbolic, the fact of the matter is that, despite the number of facts and ideas that one can draw from his mind at a moment’s notice the real source of the majority of these pieces of information comes from outside sources. One learns about God largely from the Bible and from weekly sermons, mathematics and science from school, papers, and textbooks, and the events of the world from the daily newspaper.

While this reality is recognizable following short reflection, the ubiquity of its nature may bring into question its exact importance, after all many of the sources consistently report accurate information. Though these different sources may indeed provide accurate accounts within their respective fields, the root of the matter remains that what we know is largely the culmination of the thoughts of others that are transmitted to us.

As a result of these exchanges of diverse ideas, choosing the correct stream of thought starts by determining the importance of the concept in play, particularly in terms of whether it can be left to personal choice or if it requires an objective truth. This is particularly important for the Christian because, as Paul writes in Romans 14:13, we ought not “to put a stumbling block or a cause to fall in our brother’s way” by citing requirements and doctrines that are not actually given by God to all people or go against what He has asked of us. An example of this comes from my research on *Salmonella typhimurium* pathogenesis in a glioblastoma cancer cell line in light of some of the foundational ideas behind the project. The long term goal and the essence behind this project is the idea that bacteria could be used to treat different types of cancer by stimulating an immune response against the cancerous cells. What brings this idea back into conversation with the Apostle Paul is the question of how bacteria such as *S. typhimurium* are able to function in this way given that many of these organisms are pathogenic (Nair, Kasai, & Seno, 2014). Thus, we enter a discussion of the biological history of *S. typhimurium*, bringing the contested Theory of Evolution into the picture and, along with it, the role of our Biblical foundation in understanding the natural world.

We begin with the identification of the different brands of empirical inquiry at play in order to determine which portions of these ideas concerning bacterial anticancer therapy may stand on contentious ground. In order to accomplish this, the concepts of

observational and historical inquiry come back to the fore. The former method of empirical exploration provides evidence of bacterial invasion and activity within cancerous environments through direct experimentation with the biological system in question. For example, Chang et al. (2013) present data supporting the efficacy of *Salmonella*-cisplatin combination therapy in treating melanoma as cancer cell survival decreases more rapidly with this therapy than with the independent application of cisplatin. With respect to such experiments as these, the Bible presents little direct commentary on the validity of these claims, which is hardly unexpected given that the texts contained therein were written well before the recognition of microorganisms. However, in regard to the historical science used to determine the mechanism of origin of these bacteria and the path by which they came into their present-day form, a hermeneutical, or interpretational, discussion arises because the Bible does discuss the origin of living things in the first two chapters of Genesis.

While it might be tempting to apply a single interpretive framework to the understanding of this passage, it is important to recognize that there are two different popular hermeneutics that scholars are likely to apply to this passage when assessing the origin of bacteria. The first comes from Purdom (2009), who states that bacterial pathogenicity is not a result of God's work during the first six days of creation, but rather a result of post-Fall alterations. Dr. Purdom further argues that the creation of bacteria occurred within the Creation Week, rather than as the result of millions of years of evolutionary processes following the rise of the original life form. The important difference between these two positions is that the former argues for the rise of current bacterial populations from certain original bacteria whereas the latter points to the origin of bacteria from a different, more ancient kind of organism. Furthermore, because God

called His creation “very good” these bacteria were not originally dangerous, for death is the result of sin and the Curse that followed Adam and Eve’s sin (Gen. 1:31, 3:19). Going by this interpretive framework, currently pathogenic bacteria would have originally performed other functions within the context of their environment. Though they may still participate in such activities to this day, these bacteria now also bear dangerous capacities.

However, the other popular hermeneutic employs higher literary criticism to the Biblical writings and comes to the conclusion that passages, such as the first eleven chapters of Genesis, are not historical documents and should not be treated as such. The reason for this position is explained well by the 20th Century theologian, Paul Tillich, who suggests that this Biblical account should be understood in a mythic, rather than historical sense, because it “puts the stories of the gods into the framework of time and space although it belongs to the nature of the ultimate beyond time and space” (Tillich, 1957). In other words, myth is an attempt to explain an element of the ultimate, that which resides behind all else and is not bound by the constraints of time and space, using the familiar scene of our finite existence. As such, Tillich understands writings, like the Genesis account, to be accurate in terms of the overarching ideas that they imply, that God created Man, but not necessarily in terms of the mechanism expounded within the account, that God literally fashioned Adam from the dust. In his mind, this does not diminish the importance of the truth that humans are the product of God’s work because it accurately reflects the nature of the true ultimate. For Tillich, the literal interpretation of this verse is inappropriate because it “draws him [God] down to the level of that which is not ultimate” (Tillich, 1957). In other words, Tillich argues that we should not ascribe

direct, finite actions to God because they do not adequately reflect the reality that He is not contained within, but rather exceeds the finite world.

In placing these two views side-by-side, it is clear that they will not easily mesh and thus we must determine according to the relationships between God, the Bible, and the natural world how to assess their merits. Within the framework laid out in the previous two sections, this assessment must begin with the inspiration of God, for He is both the maker of the Universe and the one who guided the writing of the Biblical texts. While some might argue that, since the evolution of *S. typhimurium* pathogenicity has been thoroughly discussed in the scientific literature, the answer to this belongs to scientific inquiry, the fact remains that “the fear of the Lord is the beginning of wisdom” (Prov. 1:7; Bliven & Maruelli, 2012; Kisiela et al., 2012). As a result, the accuracy of our conclusions concerning the natural world, especially when we attempt to draw together large quantities of data across a variety of studies, will be impacted by our relationship with God, Who knows the truth of the matter. This reality is especially prevalent within the realm of historical science, which the basis for *S. typhimurium* pathogenesis certainly falls under, because we are forced to interpolate between historical points that we did not witness. This is true regardless of which hermeneutic one uses, for in either case humans have come late with respect to the other existing organisms. Thus, we need to especially trust that our assumptions concerning the proper interpretation are correct so that we can move forward and study the world.

As we engage with these assumptions, we should not shy away from assessing them to the full, for our concern should not be that God will become less mysterious, but rather than our understanding of Him is accurate. Richard Dawkins, in his book, *The God Delusion*, shares a similar sentiment when he states that “Mystics exult in mystery

and want it to stay mysterious. Scientists exult in mystery for a different reason: it gives them something to do” (Dawkins, 2006). Here, Dawkins points out the detriment of using mystery as a way to avoid dealing with the question at hand. Instead, we must bring them back to God, for “the natural man does not receive the things of the Spirit of God, for they are foolishness to him” (1 Cor. 2:14). In other words, we need to bring our base interpretations under God’s assessment, which will involve the complete breadth of His Word.

In doing just this, taking into account all God has said and applying it to our understanding of the natural world we come to a stronger conclusion about its true character. One commonly cited verse regarding the length of the days in the first chapter of Genesis is Psalm 90:4, which states that “a thousand years in Your [God’s] sight are like yesterday when it is past.” With respect to the Genesis account, this is used to demonstrate that the word *yom*, which both describes the six Creation “days” as well as “yesterday” is the Psalm, need not refer to a 24-hour period. However, 2 Peter 3:8 explains in the context of God’s fulfillment of His promises that “with the Lord one day is as a thousand years, and a thousand years as one day.” Rather than corroborating the hermeneutic applied to the Psalm, this latter verse brings the previous interpretation into question, for if the translation from days to years is acceptable, then the transition in the opposite direction is acceptable as well, for the grammatical structuring is nearly identical. Furthermore, Paul writes in 1 Corinthians 15:47 that “the first man was of the earth, made of dust; the second Man is the Lord from heaven.” The “second Man” refers to Jesus, the incarnate God, while the “first man” is a reference to Adam. As this is an instance where the same grammatical structure is used to describe both individuals, it follows that they should be understood in the same fashion. Therefore, as Jesus was

historically present Adam should also be historically present and, as this passage indicates, “made of dust,” an interpretation which is in accordance with the Genesis account.

While this hermeneutical approach to the Genesis account stands in contrast to the accepted interpretation of scientific evidence, this by no means suggests that all research related to this subject needs to be thrown out. Instead, given the data we currently have and that which we will collect in the future, the next step is to carefully examine and reexamine each piece and determine their consistency with what is expected from the Biblical foundation. As God and His Word stand as the lenses through which we understand the natural world, we should expect that, insofar as our interpretation of the Bible is accurate, that we are able to better understand the processes and history of the natural world. Indeed, bringing the conversation back to treating cancer with bacteria, some scientists have incorporated this line of thinking into their understanding of the role bacteria play in the natural world. In light of Francis (2003), which states that microbes were brought into existence in order to act as mediators between macro-organisms and their environment, Kim (2008) hypothesizes that bacteria may have played a more intimate role in maintaining tissue health, which may explain the presence of beneficial interactions, like cancer cell reduction in a more parsimonious manner than current microbial hypotheses. In light of my own research, this novel approach to bacteria-host interactions requires an inversion of convention, whereby symbiosis existed before pathogenesis, with the latter resulting from genetic degradation over time. Thus, the bacterial destruction of cancer may not be a serendipitous find so much as an original function retained throughout time.

However, despite the decency of fit between Biblical interpretation and scientific understanding in this example, it is essential to note that many such considerations, including microbial understanding, remain in their infancy. Upton (2011) notes that the wedding of Biblical understanding to scientific theories needs to make accurate predictions concerning the natural world rather than simply explaining away current theories. If we are going to pursue such theories in light of this Biblical hermeneutic such predictions remain indicators of accuracy, just like any other scientific theory. Hartnett (2015) published an initial cosmogony in light of this paradigm shift and it will be interesting to see what other studies and theories follow suit. I am even more intrigued by the thought of comparing these efforts with those put together by other scientists in order to see the different ways in which scientists approach these questions with or without respect to Biblical truth.

Ultimately, that is what this whole exploration comes down to: the pursuit of God's truth. Though the goal of science itself has been particularly focused on understanding the natural world through experimentation, such perspectives are of little use if we forget that God is concerned with how His truth is understood. The root of God's relationship with us has never been about understanding the intricacies of His Creation, but rather that we recognize our breaking of His commands and choosing of our own ways over those He has called us to pursue. This begins with strong reflection on the person of Jesus Christ and the recognition that He took our sins onto Himself in His death and resurrection and that God is willing to forgive and restore us if we repent and submit ourselves to His authority. As needed, we can look back to the creation account in Genesis to better understand the exact origin of our problem of sin. Beyond this we are to carry forth the truth of God concerning His willingness to forgive us. Jesus proclaims

in Matthew 28:19 that we are to “go and make disciples of all nations, baptizing them in the name of the Father and of the Son and of the Holy Spirit, and teaching them to obey everything I have commanded.” This pursuit must be rooted in God’s own Word, which is “discerned only through the Spirit,” that is God speaking to us by way of the Holy Spirit, and tempered in the fellowship of believers that participate in this same engagement with God’s truth (1 Cor. 2:14). Then, having understanding of what God has already explained, we can then share this understanding with those who have not yet heard, both through direct testimony as well as through the way we carry out our lives. For the scientist, this includes conducting thorough and robust experiments that are well-rooted in God’s perspective and build upon the accuracy of what is known. Such a pursuit will provide new insights that reveal the true majesty of God’s creation, which, in turn, directs us back to the direct testimony of God’s love for us.

Furthermore, we must not merely be content to break new ground, but likewise carefully assess the claims that have already been laid down, so that we might correct any errors we have made before we lose ourselves down a rabbit hole of ideas we have prepared for ourselves. When indeed we do err in our interpretation of God’s guidance, the Bible, experiments, or the events of the natural world we must not simply attempt to create the correct trail from our current position, but return to the proper path by performing “an about-turn and walking back to the right road” (Lewis, 2002a). In this way we will not only progress forward in the proper direction, but also clear out the framework of incorrect understandings that brought us to our current position.

Indeed, this exploration of the underpinnings of this interaction between our relationship with God and study of the natural world not only engages the root of what we know, but also how we know what we know. It is not enough to make proclamations

concerning the structure and function of reality, for if they have no basis, then they will never stand up to the pressures of existence. Instead, they will lead to confusion as these tenets align less and less with observed reality. Instead, by engaging with the epistemology founding this interaction, we can not only trace our current presuppositions to their ultimate roots but, from there, test them against God's own perspective.

In the end, we must remember that there is a Book...and if we do not heed that Book, then we do not heed God, for it is of His guided composition. However, it is not as simple as choosing, but also of allowing God to work through His Word and His Spirit so that we might live for Him in everything we do. If we are to know the truth of the matter, we must first approach truth Himself and step forward from the answer He gives.

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