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Our Pale Blue Dot: Scientific Naturalism, Catholic Theology, and Finding Meaning in Light of Modern Science

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OUR PALE BLUE DOT:
SCIENTIFIC NATURALISM, CATHOLIC THEOLOGY, AND FINDING MEANING IN LIGHT OF MODERN SCIENCE

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Dedication

I would like to dedicate the pages that follow to my parents, who have instilled in me the values, the curiosity, the desire for knowledge, and the drive to succeed that have allowed me to be able to write this thesis in the first place. Every day you push me to be the best student, the best son and brother, and the best person I can be. It is through your support and your love that I derive my understanding of the *magis*.

I would also like to thank my wonderful advisors and readers, Dr. Cath Kleier and Dr. Gary Frank (Father Chryss) for their guidance, their expertise, and their support throughout the process of writing this thesis. Dr. Frank, your class inspired this thesis, and I sincerely appreciate your support as I try to make sense of this universe and my place in it. You have truly changed the way I perceive myself and the meaning I carry as human being. Dr. Kleier, you have been one of my biggest supporters throughout my time at Regis, and there is no thank you that I could ever give that would do justice to how much you've meant to me as an Honors Student, a student of biology, a lifelong learner, and a person in this world. Thank you for your guidance, your wisdom, your enthusiasm, your kindness, and your patience throughout this journey. And lastly, to my beloved Honors cohort, thank you for challenging me, engaging me, and pondering the world with me. Your thoughts and wisdom have allowed me to shape and cultivate thoughts and wisdom of my own.

If we do discover a complete theory of the universe, it should in time be understandable in broad principle by everyone, not just a few scientists. Then we shall all, philosophers, scientists, and just ordinary people, be able to take part in the discussion of the question of why it is that we and the universe exist. If we find the answer to that, it would be the ultimate triumph of human reason -- for then we would know the mind of God.

-Stephen Hawking

Introduction

"Look tonight at the stars. Let them overwhelm you in the postures of their bright dance. Face the vastness which they dot like silver bees, and sound with your own brain the mystery, hazarding at the inscrutable plan of things." - Robert H. Barlow

The universe has always perplexed me - its vastness, its complexity, its mysteriousness. But at the same time, it carries with it an air of intimacy such that we are stuck here together for no obviously apparent reason, left to wonder, imagine, and contemplate as a single human race. And it is indeed human nature to contemplate one's place amongst the vastness of it all. Why are we here? Do we serve any greater purpose? These are questions that have stumped thinkers and intellectuals for centuries, and continue to spark debate and controversy today. Controversy aside, I would indeed argue that to contemplate purpose, meaning, or existence is fundamental to what it means to be a human being. Said differently, living without contemplation or wonder is to live pleading ignorance to our humanity. Humans, unlike any other creature on Earth, are unique in the sense that we do ask these questions, we do question our existence, and we search relentlessly for answers or vehicles by which these answers might one day be revealed.

I've never been a particularly religious person; and perhaps 'particularly' is a poor choice of words. I don't believe in a God; I don't believe in creation, and I attend Mass but twice a year. That being said, the search for meaning in my life or that which lies within the fabric of the universe seems to have been thwarted by my lack of faith. Until just recently, I insisted that everything in life and in the universe was absolutely and undoubtedly meaningless. And I was content with that. I will live my life, procreate, and

die just as everyone else (and likely the universe as a whole) will do. That's just how it is. But as I've grown as a student, as a thinker, and as a learner, I have come to believe that this is an extremely depressing way to live your life. And I have come to realize that attempting to justify with science my belief in purposelessness is simply a tactic to avoid or plead ignorance to life's biggest questions.

Science, throughout its evolution (no pun intended) has allowed us to explain life's "miracles" and phenomena with incredible detail. As science has progressed, we have been able to break down life further and further into the component atoms and molecules and processes that coalesce to form a single entities; and we can explain it in such a way such that what once confounded man can now be explained relatively simply and without much mystery. From the biochemistry that allows our body to function ceaselessly and reliably, to the quarks and muons and gluons that give structure to all the matter in the universe, science has revealed to us a reality that is stunningly and astonishingly complex (not to mention beautiful). But in an extreme sense, isn't matter all we are? Are we not simply a clump of atoms, molecules and cells that perform basic, natural processes according to natural laws, and that have no special, inherent meaning beyond those basic functions. This is the basic principle of Scientific Naturalism, which says that 'matter is all there is, nothing more.' Everything we see and experience is just what we see and experience - neither the life in the universe, nor the universe as a whole, holds any special meaning. This school of thought effectively eliminates the possibility of the existence of God and allows each person to prescribe meaning to his own life as he feels appropriate. Natural disasters, natural processes, genetic diversity, and astronomical phenomena can be explained, even

predicted by science with astounding precision, and no longer necessarily need to be attributed to the hand of an all-powerful deity. A total solar eclipse, for example, is no longer God punishing humanity for our sins, or fulfilling some sort of divine prophecy, but is rather a somewhat common event that happens every couple of years somewhere on Earth, and whose patterns can be predicted down to the second. This is just one of countless examples of this paradigm shift. All of this being said, scientific findings throughout history have made it far too easy to buy into the idea of Scientific Naturalism and feel worthless in our boundless and ever-expanding universe. Modern science has forced us to ponder the idea that we are but tiny beings on a tiny rock in the vastness of space whose actions play no greater role in the scope of a universe that itself will end. Through this lens, any meaning that we find in the universe is meaning that we project unto it, such that something carries meaning because I want it to, not because life in general serves a greater purpose. Purpose to the naturalist would simply be to acknowledge death and the finitude of our own individual existence, and attempt to live our best life according to our own created value system so as to prolong life while we can before we cease to exist forever. And this is this train of thought that I myself subscribed to for several years.

Things started to change for me though, as I sat on the shores of the Atlantic Ocean on the southern coast of Ghana. I recall a specific night. The sun had set, and I sat on the porch of a cobblestone hut beneath a roof of grass reading a book simply titled “The Universe.” It was quite an ironic moment for me though. I remember staring up into the sky and being so mystified, so enthralled with space and all its vastness and my place in it. I recall looking at the stars and the moon and being fascinated, filled with wonder and

imagination. But at the same time, I was reading a book that boiled all of these phenomena and wonders down to basic science, such that the science of it all seemed to strip away any of the mystique that it held for me. Said differently, seeing the universe as a scientist only rather than a romantic - as a dreamer, or a human - somehow took away my idea of purpose and uniqueness in the universe. It was then that I realized that perhaps limiting my pursuit of meaning and purpose to solely science, would only lead to a dead end. I realized that no matter how hard I tried, science would never explain to me why things are the way they are. It can easily explain what and how the universe is, but the question of why is nevertheless unanswerable by science alone. In the words of theologian John Polkinghorne, "there is no universal epistemology, no single sovereign way in which we hope to gain knowledge" (Polkinghorne 74). If I was to find meaning, my search would undoubtedly need to transcend science. This is where my dilemma gets the trickiest.

Science can readily tell us how or what something is, or how something operates in the universe abiding to its laws, but it falls short of explaining why something exists revealing its purpose in the grand scheme of the universe. Religion, on the other hand, is far better equipped to handle the questions of purpose and meaning in ways that science cannot. In this sense, science and religion need not be at odds with one another, for they can in many ways supplement each other quite nicely. Where science stops - at the moment of asking why - religion can often pick up and attempt to answer the question. It then seems that it is not science as a whole, but rather *scientific naturalism* and religion that are wholly incompatible. For the naturalist, the universe is inherently meaningless such that humans serve one purpose and that is to live while we are able until we die, and that we serve no

greater purpose in grand scheme of the universe. From this perspective, there is no God, there is no afterlife, there is no eternal existence, and thus there is no greater cosmic purpose. These ideas go back to the days of Democritus, who said that "everything consists of atoms and the void." Physicist Stephen Barr takes that a step further and suggests that the naturalist claim is that "because the ultimate reality is matter, there cannot be any cosmic purpose or meaning, for atoms have no purposes or goals" and that "the human race can no longer be thought of as 'central' to a purpose that does not exist" (Barr 20).

This idea is stated differently and more bluntly by renowned atheist Daniel Dennett: "Not a single one of the cells that compose you knows who you are, or cares" (Dennett). There is then no need to ask the question 'why' because there is no 'why' in the first place - we just are. According to naturalism.org, "Existence, in itself, necessarily transcends the meaningful/meaningless distinction – it simply is." Said differently, it ought to be enough simply to exist. Despite our desire or need to feel a sense of purpose, we should try to accept that our existence should be enough to drive us to live a good, appreciative life without feeling pressured to live for a greater, grander purpose.

This being said, if I indeed seek something more and want to find a greater meaning beyond my own existence, I am left with only religion as the only apparent vehicle through which a purposeful life in a purposeful universe can be realized.

Catholicism, similar to Naturalism, would acknowledge our fleeting existence, but rather than using death as an endpoint that drives us to live a 'purposeful' life, death serves to inspire us to prepare for whatever comes next by means of a value system in the form of tenets put in place by God. But what happens in a case like mine, for an individual who

isn’t necessarily religious? Can something other than religion fulfill my desires and yearnings for a sense of meaning? Can I, in a godless universe, still maintain a sense of Purpose? This conversation (and what is at times a heated, divisive debate), has endured for decades, even centuries. And both sides are armed with intriguing arguments. Thinkers, scholars, theologians, priests, scientists and philosophers have all contributed in different ways to this ongoing cosmic drama that is eternally unfolding, yet questions remain unanswered. Does the universe and the life contained within hold any inherent purpose? And if so, can that meaning or purpose only be revealed by way of religion? My goal is to propose that this is not the case. And it is my goal, as I embark on this intellectual and spiritual journey myself, to propose that Purpose does not necessarily need to be coupled with religion. I intend to propose new ways to perceive modern science such that our pursuit of science and discovery ought not lead us down the path of naturalism depriving mankind of his sense of Purpose in the infinite and expanding universe, but rather offer us a sense of belonging, uniqueness, gratitude, and Purpose on the little blue dot we call home.

Science has served a fascinating and indispensable place in human history, for it is true that the development of science has in turn shifted how we understand and view the universe. But beyond changing our understanding of the universe, it has also necessarily changed and challenged our understanding of ourselves - what it means to be human in this universe. The new cosmology and modern genetics in particular, though, have made this understanding particularly complicated. It is quite astounding to realize that our galaxy is one of trillions of other similar galaxies, each possessing trillions of stars and planets much like our own. So it might be easy now to see how a sense of smallness or worthlessness

might arise for many, and why one might feel the need to ask “what makes us so special here on Earth?” And it is equally perplexing to realize that our existence stemmed from single celled organisms through the process of natural selection. Modern genetics, furthermore, begs similar questions regarding what it might mean to be human. Technology like CrisprCas9, for example, allows us to make edits - cuts, substitutions, additions, etc. - to the code of life that is our DNA. What were once life threatening and debilitating genetic diseases are on the verge of becoming eradicable simply by editing the one thing that makes us who we inherently are. Technology like this forces us to challenge our idea of what it means to be human, for it has implications for religion, for medicine, for philosophy, and for ethics, and to deny or ignore controversial scientific advances like these would be to live in an idealized, unchanging world without progress. If we are to accept these discoveries as truth, as reality (as they are), we must also be willing revisit and reshape aspects of religion and philosophy and ethics in order to conform, or rather adapt and evolve, according to our new understandings of the universe and life itself. Science and its pursuit of knowledge will never cease, and our disposition to innovate and create and progress will only become fiercer. That which we do not now know will likely be known in the future - it is simply a matter of time. Catholic theology, I believe, ought to follow this trend, or at least be willing to use this unavoidable science in its teachings if it seeks to offer a vehicle by which meaning is found.

Humanity is uncomfortable with being static, for it is in our very nature to evolve and discover, to push boundaries, to innovate, to disregard the notion of ‘impossible’ and reach towards the *magis*. A man walked on the moon, and will soon walk on Mars, perhaps

even live there. But when advances like these are made, however, we must not pick and choose which to consider when adapting our idea of what it means to be human. Religion, and Christianity in particular, must be willing to consider each and every one of these discoveries in their entirety, and consider the implications on faith and humanity. My argument then is this: modern science, particularly genetics and cosmology, seems to be drastically changing what it means to be human in this universe. Humans are then faced with a choice - to give in to the temptation of naturalism and accept complete worthlessness as a heap of atoms, or search for something more. This search may lead us towards religion, which itself must adapt to the changing reality that science reveals. If this path is yet unattractive, as it is in my case, we must continue to search for other modes of finding meaning and purpose, for I do not believe that denying religion or God necessarily means to fully accept naturalism either. It is my goal to collapse this binary between Catholic theology and Scientific Naturalism, but what this new path might look like, well, I do not quite have an answer. But inasmuch as it is human nature to search and discover, I also intend to search, and vehemently so, for a vehicle for meaning shaped by modern science that does not take the form of pure Scientific Naturalism nor the form of religion. I do not intend to change the world or the entire conversation regarding the meaning of life with this thesis, but rather, I intend to simply add a voice to it. This is a personal exploration which I hope will allow me to maintain a better sense of what my purpose is and how I can use science to solidify that idea. And it is my hope that my search will allow others in similar positions to continue and succeed in their own search for meaning.

As a freshman in the Honors Program, we each wrote a sixty second lecture about something profound, however profound we could be in a minute's worth of spoken word. We were, however, cut off at the end of sixty seconds, such that if one continued to speak at the one-minute mark, he/she was sentenced to silence despite the insights that may have followed. And I recall that at the end of my sixty seconds, the last words that escaped my lips were "and perhaps the meaning of life is…" - cut off by the raised right hand and stern stare of my contemporary, Andy Horner. So in my eyes it seems only right, and how ironically so, that this thesis, the culmination of my time at Regis and the representation of my intellectual and spiritual journey throughout the last four years, attempts to provide an appropriate conclusion to the unfinished lecture with which this journey first began.

I

Mankind's Changing Idea of the Universe

"We can add to our knowledge, but we cannot subtract from it" - Arthur Koestler

The relationship between the Catholic Church and the faculty of science has been a tricky one, rooted in inherent, necessary opposition. Or has it? It would seem reasonable to believe that science and religion are natural enemies, for at times the debate has be fierce and adamant on both sides. Today, religion is to be kept out of the public science classroom and rather inhabit its own isolated sphere far from a microscope or a telescope, at least in our public education system. And this system might seem to suggest that religion and science ought to be kept separate altogether, suggest that the two faculties are undoubtedly incompatible, or suggest that religion has nothing to offer to science and vice versa. But this has not always been the case, and is in fact a relatively new concept.

For centuries science and religion were nearly indistinguishable from one another. Ancient civilizations, from the Greeks to the Romans, from the Babylonians to even the ancient Aztecs, were simultaneously deeply spiritual and driven by a thirst for knowledge that was quenched by a pursuit of scientific discovery. In fact, religious centers doubled as centers for education, which included scientific education, and throughout history some of the most profound thinkers and prominent scientists, from Copernicus to Gregor Mendel, were also deeply religious people.

Mankind's pursuit of knowledge of the heavens has its roots in religion; perhaps spirituality is a better term. The first known records we have of ancient stargazers were from the Babylonians and later the Assyrians (McEvoy 5). These civilizations were deeply concerned with the movements of the heavens, including stars and other celestial objects, and they began to record their observations on now preserved clay tablets. It was their thinking that if they could know more about the heavens and the way they behaved, they would in turn know more about the Gods which inhabited those heavens (McEvoy 8). Abnormalities, such as solar and lunar eclipses, in the behavior of the heavens often signaled bad omens like drought and famine. And so they wrote. They gazed and recorded and tried to make sense of what they saw, and starting in the year 747 BC these observations were made on a regular basis for centuries. These ancient stargazers believed that tracking these celestial movements was a vehicle to understanding their Gods, and it was their thinking that their own destiny could indeed be revealed through celestial observation and record-keeping (McEvoy 8). The idea of an afterlife may have even been born out of these early observations of the heavens … in the words of Carl Sagan:

> "The reappearance of the crescent moon after the new moon; the return of the Sun after a total eclipse; and the rising of the Sun in the morning after its troublesome absence at night were noted by people around the world; these phenomena spoke to our ancestors of the possibility of surviving death. Up there in the skies was also a metaphor for immortality." (Sagan 44)

In this way, the idea of an afterlife was cemented in humanity through their earliest scientific and natural observations. This metaphor for rebirth in nature became central to

their spiritual beliefs, and indeed may have laid the foundations for our modern idea of an afterlife. And so, over the next few centuries of adamant record keeping and detailed observation, what was once thought of as a 'cult of astrology' really became the foundation upon which modern astronomy was built (McEvoy 17).

With the decline of the ancient Babylonians, Assyrians, and Chaldeans came a new era of scientific thought. Though thousands of scrolls were destroyed in the burning of the Library at Alexandria or in wars of religion, some records survived, and it was with the ancient Greeks and Romans that the field of astronomy began to flourish. The faculty arose in these ancient civilizations starting with Hipparchus, who historians today generally recognize as the link between the ancient Babylonian astrologers and the incoming Greek astronomers. It was Hipparchus that took the myriad observations made by Babylonian stargazers and synthesized them into what later became is astonishingly accurate model of the motion of the sun and moon. He set the stage for a blossoming of astronomy and natural philosophy, and initiated an era that would see the emergence of some of history's greatest minds such as Aristotle and Thomas Aquinas, as well as Ptolemy, who some regard as the greatest astronomer of antiquity (McEvoy 21).

Science in Western Europe during these early ages, however, went somewhat dark. After an initial flourishing of mathematics and astronomy by ancient Romans, Greeks and Arabs, centuries worth of religious turmoil put the pursuit of science on the back-burner. Countless records were either lost or destroyed, and what was at first an evolving faculty of scientific discovery became characterized by Natural Philosophy in which the universe was thought to operate under a very specific set of divinely inspired laws. Other fields such

as alchemy and natural medicine dominated throughout this period. During this time heavy emphasis was placed on religious education and practice, and much less so on the practice and education of science. Furthermore, the scientific education that persisted was taught by clergymen in places of worship and religious education. And so, for nearly 1000 years during these 'Dark Ages', science for the most part, remained in hibernation - a place of quite literal darkness plagued by the Black Death that wiped out a third of all Europeans.

To say that the Dark Ages were completely dark, however, would be incorrect. While it is true that little scientific progress was made, this period indeed laid the foundations for the Enlightenment and the emergence of modern science. In his novel *The Foundations of Modern Science in the Middle Ages*, historian Edward Grant states that "it is indisputable that modern science emerged in the seventeenth century in Western Europe and nowhere else" and that it was "the creation of a societal environment in the Middle Ages that eventually enabled a scientific revolution to develop in the seventeenth century" (Grant 168-171). According to Grant, aspects of this "societal environment" included the foundation of the medieval university as well the translation of scientific works from Arabic into Latin. The foundation of numerous universities throughout Europe paved the way for the advent and development of the scientific method, and allowed for the development of a more or less standardized curriculum based in science and natural philosophy that would eventually evolve into modern science in the Enlightenment. Despite relatively little tangible advancement made in this era, these foundations indeed allowed humanity and the suppressed scientific community to emerge at last from its

millennium-long hibernation. And in the centuries that would follow, man's perception of the universe would begin the first of its many seismic revisions.

The periods of Reformation and Enlightenment saw some of the most prolific and profound thinkers in history. From Galileo to Copernicus to Isaac Newton, the Age of Enlightenment set in motion a new kind of thinking, one where logic and reason predominated and where science became a respected and heavily valued discipline. Prior to this period it was the elite class - the nobles and the rich - that enjoyed the luxuries of education. But with the advent of a printing apparatus in 1439, access to education, access to books, and access to new schools of thought became readily available to the general public. Science became mainstream, and the thinkers behind the science were at last able to distribute their work and enlighten their peers. And with this foothold in the general public, science at last took its first steps toward changing on a massive scale how humans thought of their existence in the Universe (Whipps).

Prior to this Age of Enlightenment, the Earth was the center of the Universe. In a divinely designed universe everything was perfectly spherical - from the orbit of the planets to the Earth itself. Philosophers like Ptolemy and Aristotle saw the Universe as a series of concentric spheres (55 to be exact), where the Sun and planets revolved the Earth in perfectly circular orbits, outside of which laid the fixed stars and lastly the "sphere of the Prime Mover" (rochester.edu). This system was set in motion by the hand of an all-powerful God, or "Prime Mover," in the same way that a watchmaker set in motion his creation. But after all, didn't the Earth have to be at the center? As humans created by God we were the center, and the purpose of our lives was to transcend the Earth at the center

and move outwards toward the heavenly bodies and realms where God Himself resided. This certainly appeared to be the case, for the sun did appear to move through the sky, along with the planets and stars, as if Earth were at the center. They moved . . . we did not. In this world, there were five elements: Earth, Water, Air, Fire and celestial ether. Earth, being the heaviest of elements, attracted all other things - everything converged towards Earth (Williams). One can only imagine the eruption of sheer horror and blasphemy when in 1543, Copernicus stated the impossible: the *sun is central,* and Earth moves round *it*. Surely that must be nonsense! Nevertheless, the geocentric model of the universe was put on trial, and this was the time of judgment.

The overhaul of this model, however, was not as rapid as I may have made it seem. Small changes over a vast period of time such as the implementation of epicycles, among other edits, were made to the existing geocentric model that initiated the transition. Even the later observations made by Galileo did not seriously threaten the system, relatively speaking. His discovery of outer planets as well as sun spots challenged the notion that all celestial bodies were perfectly and divinely created, but geocentrism persisted (McEvoy 115).

And so the revolution began. Copernicus placed the Sun in the center of the Solar System, effectively removing Earth from its central place of prominence and mankind from its divine placement at the heart of the Universe. And I think that it is interesting to note here that Copernicus' great work, *De revolutionibus orbium coelestium* (On the Revolutions of the Heavenly Spheres) in which he describes his model, was not published until his death for he feared the repercussions that might stem from the Church, as he was

a deeply religion man himself (McEvoy 69). Nevertheless, this dissertation on planetary revolutions indeed began a revolution itself both for science and for humanity. Imagine that for just a minute. Imagine maintaining such a strong and unwavering faith in God and the scriptures, and soon making a discovery that has the potential to overthrow the teachings of one of the most powerful and influential institutions in the world - one that you yourself subscribe to. This was a reality that even Galileo also faced through his work after concluding that "the bible teaches us how to go to heaven, not how the heavens go."

Many may know the story of the Galileo Affair. Galileo, a deeply religious man, was himself a fervent supporter of this Copernican system and believed that anyone who did not subscribe to it was ignorant and uneducated. In his later years, Galileo was accused of heresy by the Church for making and supporting such claims and was sentenced to house arrest for the remainder of his life (McEvoy 121). A 1615 letter from Cardinal Bellarmine to Galileo himself confirms this hesitancy of the Church to accept this new model:

> "to want to affirm that the Sun, in very truth, is at the centre of the universe and only rotates on its axis without traveling from east to west, and that the Earth is situated in the third sphere and revolves very swiftly around the Sun, is a very dangerous attitude and one calculated not only to arouse all Scholastic philosophers and theologians but also to injure our holy faith by contradicting the Scriptures" (Koestler 454).

Despite this tension scientists persisted, and scientists after Copernicus and Galileo continued to build upon this model. Astronomers like Tycho Brahe and Johannes Kepler

amended his model to give heavenly bodies elliptical orbits rather than perfectly circular ones - yet another complication for Holy Scripture. At first the Church remained silent on these issues, unsettled and unsure how to proceed in the face of these new models. This hesitation and discomfort is again exemplified through another 1615 letter from Cardinal Bellarmine:

> “not only the Holy Fathers, but also the modern commentaries on Genesis, the Psalms, Ecclesiastes, and Joshua, you will find all agreeing in the literal interpretation that the sun is in heaven and turns around the earth with great speed, and that the earth is very far from heaven and sits motionless at the center of the world...Nor can one answer that this is not a matter of faith, since if it is not a matter of faith 'as regards the topic,' it is a matter of faith 'as regards the speaker': and so it would be heretical to say that Abraham did not have two children and Jacob twelve, as well as to say that Christ was not born of a virgin, because both are said by the Holy Spirit through the mouth of prophets and apostles.”

Following this disposition, the “Qualifiers of the Holy Office” would emerge in 1616 to give their official decree. To say that the Earth moves and the Sun in central is “foolish and absurd, philosophically and formally heretical inasmuch as it expressly contradicts the doctrine of the Holy Scripture in many passages, both in their literal meaning and according to the general interpretation of the Fathers and Doctors” (Koestler 462).

And still others, such as Martin Luther, had their qualms:

> "There is talk of a new astrologer who wants to prove that the earth moves and goes around instead of the sky, the sun, the moon, just as if somebody were moving in a carriage or ship might hold that he was sitting still and at rest while the earth and the trees walked and moved. But that is how things are nowadays: when a man wishes to be clever he must needs invent something special, and the way he does it must needs be the best! The fool wants to turn the whole art of astronomy upside-down. However, as Holy Scripture tells us, so did Joshua bid the sun to stand still and not the earth” (Luther)

And I am tempted to believe that Copernicus must have felt extreme contempt for Luther when he referred to him as an astrologer rather than an astronomer. Copernicus' postulations were frequently scoffed at by fellow scientists and church members alike, and it would take another century for his hypothesis, his model, to tackle pre-existing notions and models of the Universe. In fact, Copernicus was not alive to witness the turbulence that his ideas cause in their full form, and indeed it would not be until 1820 that the Church would allow astronomer Joseph Settle to make the final say regarding the movements of celestial bodies - it was then that the Sun was rightfully placed at the center of the Solar System, orbited by several planets (including Earth) which move not in perfect circles, but in ellipses.

Fast forward a couple of centuries and our perception of the Universe undergoes an even more shocking transformation. We discovered what lies within the solar system and how it is oriented, but what about that which lies beyond? As I stated above, ancient philosophers believed that the universe existed as a series of concentric spheres with our solar system residing in one of those spheres with all of the planets, their moons, and the Sun. Beyond that was the realm of fixed starts where all of the stars in the night sky resided without movement. And beyond these was the realm of the 'Prime Mover' where God himself resided. These spheres held all the bodies and all of the mass contained within the universe. But our understanding of God and how these celestial bodies existed would be complicated when Isaac Newton made understandable planetary movement in his work. According to astrophysicist Neil DeGrasse Tyson, "when Newton breached this philosophical barrier by rendering all motion comprehensible and predictable, some

theologians criticized him for leaving nothing for the Creator to do" (Tyson 34). To many, it would seem that science (in general) has removed God from His place of prominence and omnipotence and replaced Him with theories and postulations backed by observable, testable, and quantifiable science. New observations made as a result of improved observational techniques and technology put to use by great minds such as Newton, Einstein and Hubble began to challenge yet again our idea of God and everything we thought we knew about the structure of the Universe.

Perhaps the most widely known thinker in history, Albert Einstein made profound advances in the fields of astronomy, physics and mathematics, and further complicated our understanding of man's place in the Universe in the early twentieth century. His Theory of General Relativity, one of the most important scientific theories ever devised, fashioned a new universe, one that at times seems like something from science fiction. Space itself, the very fabric of the universe upon which we and all other objects sit, was no longer flat but rather curved and warped and locally asymmetrical. Black holes existed, engulfing everything including light, which was confirmed in part by the recent detection of gravitational waves. But perhaps more pertinent to the conversation here, the Universe was not static but rather expanding and infinite - an idea that Einstein himself was so perplexed by that he refused to believe it. He was so tremendously perplexed in fact that he felt the need to add a constant to his set of equations - 'The Cosmological Constant' - effectively eliminating the possibility of an expanding universe (Barr 42). But perched atop Mount Wilson stargazing through the lens of one of the largest telescopes in the world, Edwin Hubble saw something quite different.

From his mountaintop perch, Hubble came to several shocking conclusions about our Universe. After the discovery of Cepheid Variable star clusters in 1908 by Henrietta Swan Leavitt, Hubble used and expanded upon this work to bring about a discovery of his own (McEvoy 207). These Cepheid Variable stars are unique, for they pulsate in very regular intervals, and this pulsation period (the time from one pulse to the next) was discovered to have a direct correlation with the luminosity - or brightness - of a star. Using these two variables, Hubble was able to determine the distance to thousands of stars in the sky. And in a way, these stars became a tool for astronomers, a cosmic yardstick if you will, allowing professional stargazers to have a rough estimate about just how large the observable universe truly is. At this point one might be asking "well what is so controversial about this? We knew the universe was large, so why does this matter?" Well Hubble identified numerous Cepheid Variables in other nebulae - specifically Andromeda and Triangulum - and concluded that these nebulae existed at such great distances away from planet Earth that their existence as part of our own galaxy - The Milky Way - was highly improbable. These observations led him to conclude that the universe is far larger than we once thought; inexplicably and incomprehensibly large in fact. He concluded that trillions of galaxies exist, each containing trillions of stars and likely planets that are both similar and dissimilar to our own. What's more is that he later discovered that not only is the universe incomprehensibly large, but it is also expanding, and rapidly so (McEvoy 243). And this idea was in stark contrast to Einstein's proposition that the universe was, and had to be, static. Einstein would later admit that the addition of a Cosmological Constant that prevented the expansion of the universe was his life's greatest blunder. For

more complex than the original model of concentric spheres, this new model drastically altered our place in the cosmos. Now, for one of the first times in history, Earth was not only laid outside the center of the Solar System or the Universe, but in fact was a very average planet, a tiny rock amongst a sea of stars and galaxies in an infinite and continually expanding Universe. And couple this idea with the discovery of the microwave background radiation by Arno Penzias and Robert Wilson in 1964 - detectable microwave radiation that emanated from the Big Bang itself - and mankind seems to now hold a very different, less special place in the Universe.

Today our exploration of the cosmos continues, and feverishly so. Just this year scientists discovered a new planet - Ross 128b - that possesses many of the necessary characteristics to harbor life. This star, comparable in size, mass and temperature to our Earth, lies within the 'habitable zone' of its host star, Ross128, and is considered to be one of the best known candidates outside our solar system to harbor life, or at least the ingredients for it. And this is just one of many planets that have been discovered of late that could carry the precursors to intelligent life. Furthermore, for the first time in history, scientists recently witnessed the collision of two neutron stars, providing us with insight as to how a number of elements, like gold and platinum, are formed. And lastly, human exploration of Mars is becoming more and more of a reality; and man will likely step foot on the Red Planet within the next decade or two, not to mention the possibility of colonizing a new planet. We may, in the next several years, find ourselves leaving our God-given home and transporting our species to a new planet altogether.

This being said, it is evident that science will continue to explore new frontiers throughout the cosmos and push boundaries that were once believe to be the extent of human capability. As we have seen, mankind's place in the cosmos has been challenged by countless striking observations and discoveries made by incredible, brave, and daring minds. We have found ourselves in a vast and growing expanse of darkness, orbiting around an object that at one time we perceived as revolving around us. And throughout these centuries we have seen Earth and its place among the stars grow smaller and smaller, and less and less significant with every new discovery that is made. We now then have two clear choices regarding how we interpret these findings, for each and every discovery has major implications for humanity from a religious perspective and a scientific one. On the one hand, we can take this history of science and mankind's evolving view of the universe to signify meaninglessness, purposelessness, and insignificance. We can allow it to strip us of our humanity and reduce us down to atoms behaving in a very predictable way according to the laws of nature and quantum physics. We can allow it to deprive mankind of a feeling of significance and purpose and accept naturalism and eternal nothingness. And we can accept the fact that if any meaning exists at all in the universe, it will be meaning that we create ourselves rather than a special meaning that the universe might offer in its very fabric. On the other hand, we can take all these beautiful discoveries as vehicles, windows into the eyes of God, who created this universe and everything in it with intention, love, and purpose. In this sense, we can uncover our meaning and use science to do so, and feel at home - unique and special - in the cosmos, rather than insignificant and

tiny. But what if neither of these options is attractive? Both of these options as well as an alternative will be explored deeper in the chapters to come.

II

Modern Genetics: Engineering what it means to be Human

"Every time you understand something, religion becomes less likely. Only with the discovery of the double helix and the ensuing genetic revolution have we had grounds for thinking that the powers held traditionally to be the exclusive property of the gods might one day be ours. . . ."

- James Watson

"Genetic code is a divine writing." - Toba Beta

Religion and science have not always existed to oppose one another, and even today the two exist harmoniously in many ways. Indeed many scientists throughout history were simultaneously deeply religious and found no problem pursuing their studies in the face of their faith. Still yet, scientific progression has been profoundly problematic for many, not only for scientists but for members of the general public. For many, the continually emerging and undeniable science has prompted many to lose sight of their faith or even abandon it completely. And this was indeed the case for Charles Darwin who, after spending two years studying the remarkable adaptations of South American finches (among other things), lost sight of the faith he once cherished.

Charles Darwin, an orthodox Christian and member of the Anglican Church, began his journey on the H.M.S Beagle as a zealous natural scientist in search of "centers of creation," - small hints of God that help to explain species diversity in different environments. Raised in a devoutly Christian family and pushed toward clergy

membership, Darwin instead chose to seek out God in nature by devoting himself to scientific studies. Despite his intentions, however, Darwin returned to England losing his faith, adopting an agnostic perspective of the Universe, and subsequently finding himself under fire from many church members who rejected his findings and claims. Having opposed the first words of the Nicene Creed, "We believe in one God … maker of heaven and earth, and of all things visible and invisible," Darwin himself was deeply troubled by what his findings postulated about creation. He would later say that he felt as though his work was akin to "confessing to a murder" - the murder of a God that was once the watchmaker, the intelligent designer, and the creator of the life we observe and the universe in which is it housed.

On the Origin of Species would come to be one of the most controversial scientific works in history. No longer was God the hand by which creatures came to be; instead, the process of natural selection over the course of millions of years and billions of generations was the invisible hand giving rise to remarkably well-adapted and diverse organisms. Both revolutionary and controversial, Darwin's work, much like that of Galileo and Copernicus before him, would both threaten the church and scriptures as well as pave the way for many scientists to come. The Reverend Dr. Malcom Brown insists that "the church made that mistake with Galileo's astronomy, and has since realized its error. Some church people did it again in the 1860s with Charles Darwin's theory of natural selection" (Brown). But much in the same way that the church eventually accepted the reality that the Earth revolved around the Sun, the church has since proclaimed that Darwin's work on evolution and natural selection is indeed compatible with Christianity, and Dr. Brown suggests that the

initial rejection seemed to be born out of emotion and fear of loss of tradition rather than intellect and logical reason.

As I have said previously, science and religion need not be at odds with one another. And though Darwin indeed lost sight of his religion through his work, I do not necessarily believe this had to be the case. Countless scientists, despite their work, maintain a passionate faith, and the renowned Jesuit scientist Teilhard de Chardin is just one example. According to theologian John Haught, Teilhard "realized that the discoveries of the natural sciences can contribute to a bracing new spiritual vision" (Haught 49). Teilhard was firm in his beliefs, and to him, his pursuit of science and understanding of nature through geology and paleontology was simply another lens through which he could view God and His creations. And although two of the most significant and controversial concepts in history - heliocentrism and natural selection - did indeed complicate the relationship between science and religion, the Church has nonetheless evolved and transformed in such a way as to accept this science that seems to be nearly undeniable. With mankind no longer at the center of the universe, nor directly created by the hand of God, the Catholic Church has been challenged to find ways to incorporate these findings into their teachings. The church remains one of the most powerful and influential institutions in the world, and though it may have some hesitations toward various scientific developments, the incorporation of science into the teachings has nevertheless been essential for the growth of the church. This challenge will only continue, and the relationship may only grow more and more complicated as science continues to rapidly advance.

Darwin was the pioneer that allowed us to get a glimpse of how the life around us has (and continues to be) formed. He shed light on the invisible force of natural selection that creates, modifies, tweaks, and adapts creatures over vast periods of time, and played a major role in setting the stage for the development of modern genetics. Over the past few decades, humanity has made gigantic strides in this field. From the discovery of DNA and its helical structure, to the mapping and cataloguing of the entire human genome, mankind knows more about mankind (between our origins, evolution, and components) than ever before. And while it is indeed human nature to discover and to advance, many of these modern capabilities are at the same time very troubling and concerning to many. Is the human genome sacred? And is it ethically sound to edit and tweak our DNA, the gossamer molecule that makes us human? The theist and the naturalist might have differing answers to these questions, and at this point I would like to further explore the root of such questions by examining advances at the forefront of modern medicine and technology, mainly the prospect of regenerative technologies and immortality as well as the blossoming of CrisprCas9.

The first technology that I would like to discuss briefly is revolutionary in its own right. It has to do with the prolonging of life. The way this can occur is really twofold, and both avenues may have profound implications about what it means to be human. The first way that immortality is theoretically possible is through the use of quantum computing - uploading a person's consciousness onto a computer. In doing so, this person can continue to live on in a virtual world, or even be programmed into a completely new body to live

another life in this world. While the theory is yet to become reality, and quantum computing still decades away, this concept may indeed become a reality in the not-so-distant future.

Immortality in a different sense is likely more attainable in the near future, and involves the regeneration of human tissue. The emerging field of tissue generation and regenerative medicine is on the forefront of medical technology, allowing humans to virtually bypass the aging process and live out a full life in a healthy thirty year old body. This technology offers the prospect of not only repairing damaged tissue, but creating entire organs to replace a failing or malfunctioning one with the use of a 3D printer. To do so, a scaffolding of the organ or tissue in question is created from either proteins or bioplastics. This scaffold is then immersed in a solution of biomolecules, growth factors, and other proteins from the patient's own body, such that a new organ or tissue is modeled around this protein skeleton and transplantation can take place. Researchers have successfully recreated a functioning kidney, and are currently working to generate a new, fully-functioning liver in lab. The prospects are potentially endless; imagine a world in which a failing heart can simply be replaced by a newly-generated one that may take just hours in lab to create. An individual would not necessarily die waiting for a transplant from another human being, which may even be rejected by the body of the recipient. We have the ability and (nearly) the technology to create life, to prolong it indefinitely, and to effectively avoid the aging process altogether by rejuvenating our naturally degrading bodies. Though this technology is relevant to the topic at hand, and much more can be said regarding this topic, I will refrain from expanding any further, for my focus for this thesis indeed lies elsewhere.

The second concept I would like to examine is the idea of gene editing by way of a technology called CrisprCas9. Over the next several years, CRISPR has the potential to revolutionize the field of genetics and biology in general, and is considered by many to be the future of medicine. CRISPR, which stands for 'Clustered Regular Interspaced Short Palindromic Repeats,' was originally part of a bacterial genome, and served as a defense mechanism protecting against invading viral threats. These repeated DNA segments are separated by sections of viral DNA that has incorporated itself into the bacterial genome such that the bacterial DNA (with incorporated viral DNA) can work to defend against the known viral threat. When the segment of DNA is transcribed, the transcribed RNA associates with the Cas9 protein complex, an endonuclease that serves to cut RNA at specific locations, typically where the viral DNA segments were incorporated into the genome, resulting in smaller pieces of viral RNA attached to a CRISPR repeat section. When a virus invades the cell, these smaller fragments of cut RNA will search for newly invading, matching viral DNA, attach to it, and cleave it, resulting in a dysfunctional virus. Scientists have since isolated this system, and have used it to edit our own human genome by creating specific RNA spacer sequences to target our own genes. This extraordinary piece of technology allows for the removal or insertion of certain genes into the genome of germ cells, embryos and adult somatic cells, such that a mutant allele that may contribute to the development of sickle cell anemia or HIV, can effectively be spliced out, replaced, or silenced, essentially curing or preventing an individual's disease. For example, HIV, on a cellular level, is characterized by the over exploitation of a cell-surface receptor called CCR5. This CCR5 receptor is coded for by the CCR5 gene in the nucleus. One can then

begin to see that if gene were absent or knocked down, there would be no receptor to over-exploit, thus eliminating the opportunity for HIV to attack in the first place. This is a phenomenal concept as lethal, “uncurable” diseases, be it viral or genetic, can now be “cured” or alleviated by way of CrisprCas9. Taking it a step further, this same sort of technology is allowing new parents to effectively choose the phenotype of their child; traits such as hair color, eye color, and height, among other basic phenotypes, can be chosen, resulting in a “designer baby.” And as beneficial as this advancement may be, it nevertheless forces us to reexamine what it means to live, what it means to die, and what it means to be human.

Prior to the use of CrisprCas9, the human genome was permanent. Aside from natural genetic mutations, our genes were immutable - we could not change, delete, edit, or repress our genes, at least not as effectively and efficiently as we can now. In other words, prior to this technology, we had to play with the hand we were dealt. Some diseases could be treated by way of vaccination or medication, while genetic diseases could only be managed after the fact rather than prevented. Our genome (along with the environment in which we were raised) defined who we became. Today, CRISPR is forcing us to rethink what it means to be human, for we can now change the very script, the very blueprint that makes us human. Unlike medical procedures like transplants or grafts, CRISPR allows us to change and manipulate the molecular code that produces everything in us, from cells to organs. So what then does it mean to realize that the very fabric of our physical being is now mutable - the script that was once set in stone is now revisable? And in doing so, have

we effectively compromised the “human” aspect of humanity? At first glance this might seem to be the case, but perhaps it is not.

Imagine yourself in West Africa, where Malaria devastates entire communities, individuals young and old. I have seen it firsthand, from my American companions contracting it several times, to witnessing countless Ghanaians battle the disease. Now imagine that we have a technology that allows us to modify the genome of mosquitoes in such a way that would cause the mosquito to reject the parasite that causes malaria. This gene would be passed on to every single future generation, driving the gene through the population ideally eradicating malaria altogether. Though there are likely some unforeseen ecological consequences to performing such modifications, it is hard to understand why humans might not desire this route. To the utilitarian, this would be a reasonable, if not necessary step forward as it would eradicate a disease that affects nearly 500 million individuals annually and kills one million per year. Editing these mosquito genomes would provide millions with a higher quality of life for not only themselves but for each subsequent generation.

Now consider another deadly disease - a disease that will kill more people this year than any other: cancer. Imagine a cancer patient, battling through devastating chemotherapy. Numerous genes are involved in the highly complex cancer signaling pathways, and it is common for genes to be constitutively active or shut off completely as to deregulate cell division, immortalize cells, and give rise to deadly tumors. These mutated genes, however, can be targeted by CRISPR. By modifying a patient’s T-cells (a technique called ‘immunotherapy’), certain genes can be inserted that target the mutated cancer genes

to destroy the cancer cell. Moreover, this technology, unlike chemotherapy, targets only cancerous tissue rather than attacking also normal, healthy tissue.

So far CRISPR has been used to treat HIV, as well as Muscular Dystrophy and blindness, and was found in a recent study to be highly effective in restoring some hearing to deaf mice (Gao et al. 2018). In these scenarios is it easy to see how advantageous and revolutionary the technology would be to the medical community.

Many ethical issues have arisen over the development of the CrisprCas9 technology, and understandably so. For example, there is a case in which two deaf parents seek to have a child whom they also wish to be deaf. To them, their deafness is not necessarily a disability, but rather a unique characteristic, and one that they wish to share with their child. To the whole of society on the other hand, the hard of hearing are technically disabled, and thus they would be putting their child at a severe disadvantage with no opinion from the child. Should these parents be allowed to edit the genome of their unknowing child, 'disabling' him/her for the sake of sharing this unique bond? Countless ethical issues like these have arisen over the course of the development of CRISPR, and the conversations persist. CRISPR lies at the heart of a heated debate in the scientific, religious, philosophical, and bioethical communities, drawing comparisons to Aldous Huxley's "Brave New World" and Nazi Germany's blond-haired, blue-eyed, idealized world of eugenics. And while the utilitarian might say that the technology ought to be implemented if it will benefit a majority of individuals, ethical issues reach a deeper level than simply utilitarianism - not all ethical issues are utilitarian issues. And the fact that ethical issues exist at all seems to suggest that there is an aspect of humanity, a special,

unique quality in humans and human nature that forces us to examine issues more extensively rather than simply acting in such a way as to benefit a large number of people.

Many, such as theologian Ted Peters, have toyed with the idea that the human genome - our God-given code for life - is perhaps sacred and ought not be altered. He states that the genome "carries a potent cultural valence. Like a sacred object, our genetic code has become identified with our essential being" (Peters 1). He goes on to say that "much more than merely a chain of chemicals, our DNA has become identified with the ground of human being in general and of our individual personhood in particular" (Peters 1). From this lens, it is clear why many believe that humans are unrightfully playing God and overstepping a divinely drawn line by tinkering with our genetic codes. Those who subscribe to the 'argument from design' explanation of the origin of the universe and intelligent life might argue that altering our very own design is an insult to God, that it is egregiously unethical, unpredictable and dangerous, and highlights humanity's hubris. Our ability to engineer these 'designer babies' is perhaps an example of this hubris. In his book *Physics of the Future,* renowned physicist Michio Kaku quotes E.O. Wilson: "*Homo sapiens,* the first truly free species, is about to decommission natural selection, the force that made us . . . Soon we must look deep within ourselves and decide what we wish to become" (Kaku 159). This new technology allows parents to effectively pick and choose traits for their children, and if the human genome is in fact sacred, perhaps such action should be forbidden. But is there an ethical distinction between picking traits like height and hair colors, and defending against a debilitating, life-threatening illness? If the genome

is sacred, how can one be allowed and not the other? How might we go about deciding what can and cannot be changed in our genome? Many have tried to tackle these problems, but I believe a certain passage may offer the best explanation. Despite his words above, Peters outlines his argument in an article titled "Should CRISPR Scientists Play God." In response to the naysayers as to whether the human genome is 'metaphysically off limits to gene editing':

> "No, because nature is not sacred, at least for biblical believers. 'Creation is the work by which God establishes and sustains the existence of beings that are other than God,' writes biblical scholar Ian McFarland. Neither we human beings nor our genomes are divine, sacred, and untransformable. In addition, as theologian Cynthia Crysdale notes, 'God's creation is already changing and evolving with new things emerging.' Nature is already on the move, so to speak. Therefore, no one violates the being of God let alone the created order through technological innovation. Moral values are formulated by ethicists in light of their vision of a future that is good for humanity and good for the encompassing creation." (Peters)

I believe that this passage works wonders for the conversation at hand regarding how we might find meaning in the science that changes our humanity. While many may retain that the human beings and our genes are indeed sacred (expressing their own bit of hubris) then perhaps our understanding of the word 'sacred' must be modified. While sacred to many might necessarily suggest a representation of the divine, it may not necessarily mean un-transformable, immutable, or stagnant. Perhaps the genome is a representation of the divine, but if we can accept that the human race is continually changing and progressing,

then we can acknowledge that the human genome is not sacred in that sense and move forward (cautiously and deliberately) with the technology.

Though both sides of the argument seem to accept the use of gene editing, the subtle difference between the naturalist and the Catholic lies, however, in how the technology pertains to their overall capital P Purpose. To the naturalist, the human body is but a mass of cells and atoms and molecules performing basic functions and processes that exists to serve one purpose: survive - prolong life before our existence ceases forever. CRISPR serves as a tool with which we can do just that - prolong our life and live out our human existence developing, evolving, progressing and advancing as a human race. We can cure genetic disease, prevent outbreak of transmissible disease, and live out our Purpose, which a naturalist views as prolonging life and living it happily before eminent death and subsequent nothingness strikes. Despite the numerous ethical dilemmas that arise through its implementation, our developed societal values and sense of ethics will nonetheless allow for appropriate use of the technology. Thus, the naturalist, in sum, will view CRISPR as a means to survive and prolong life, editing nucleotides for the purpose of advancement and progression and survival. In this way, CRISPR allows them to fulfill and live out their Purpose. Alternatively, the Catholic may view CRISPR as a way to become more and to advance (like the naturalist), but do so with God in mind. It allows us to become more and develop as a human race with God as the goal in an afterlife. If it is indeed the Catholic Purpose to live out a happy life in preparation for a transition to the afterlife, and CRISPR can assist with that and do so ethically, then we should by all means implement this technology. The fact that we can change the code of our life ought not affect our sense of

ethics or our behavior according to those principles. And with a strong sense of ethics, we must not allow the technology to alter our sense of humanness nor the values that we hold as members of this human race. A transgender individual is a human nonetheless, as is someone “edited” using CRISPR. Our ability to ‘love thy neighbor as yourself’ and ‘treat others as we wish to be treated’ remains unchanged, for underneath the changes, beneath the technology, we are still human. Whether our death is final or we continue on into an afterlife, gene editing should not detract from our ability to live out what one would consider a ‘happy’ life.

So while the two schools of thought may use the technology with different goals or ideas in mind, the underlying intention is similar: to become more, to advance, to survive, and to thrive as humans just as we have done with technology throughout our history. If this is part of what it means to be human, (which I firmly believe it is) then CrisprCas9 allows us to do just that regardless of which side of the argument one falls on.

III

Cosmology: The Infinitesimal in the Infinite

"We are just an advanced breed of monkeys on a minor planet of a very average star. But we can understand the Universe. That makes us something very special."

-Stephen Hawking

Mankind's place among the cosmos has undergone a most diminishing transformation. Starting from the center, mankind has been pushed to the fringes by scientific discovery and the pursuit of cosmological truth. Stephen Barr, physicist and astronomer at the University of Delaware, and President of the Society of Catholic Scientists, states that "Science has dethroned man. Far from being the center of things, he is now seen to be a very peripheral figure indeed. Every great scientific revolution has further trivialized him and pushed him to the margins … all of recorded human history is a fleeting moment in the eons of cosmic time" (Barr 20). From Copernicus and Galileo to Einstein and Hubble, humans seem to have become smaller and smaller, and less and less significant. To use an analogy from author Annie Dillard, humans and Earth itself are just one of countless tiny dots in a vast ocean of cold darkness. Theologian John Polkinghorne acknowledges this, saying "We human beings are the inhabitants of a mere speck of cosmic dust" (Polkinghorne 51). The smallness of our existence is more apparent now than it has ever been, and in no way can we avoid the conversation about how to move forward with such knowledge. We are quite literally a "speck of dust", unfathomably small and suspended in an unimaginably large universe. And the perception of what these discoveries mean, including the smallness of our own race, will differ greatly between the naturalist

and the theist. Let me begin with the perception of the universe through the eyes of the scientific naturalist.

The more we understand our universe and our origins, the more we ought to feel a sense of insignificance and meaninglessness in the eyes of the naturalist. Prior to the discoveries of Hubble, our galaxy was *the* galaxy. Our galaxy, to take it a step further, was *the universe*. Our Sun and the planets which surround it lied at the heart of the universe while the fixed stars operated in a domain outside of our own. But it is now apparent that our galaxy is one of countless similar galaxies. Our Sun is just one of billions of other similar stars in our galaxy, and one of trillions of stars throughout the universe. In the words of renowned astrophysicist Neil DeGrasse Tyson, "After nine billion years of such [chemical] enrichment, in an undistinguished part of the universe (the outskirts of the Virgo Supercluster) in an undistinguished galaxy (The Milky Way) in an undistinguished region (The Orion Arm), an undistinguished star (The Sun) was born" (Tyson 29). Furthermore, we know that the life on Earth was, in a basic sense, born out of the explosive end of other stars - we are merely stardust. And lastly, though our own planet Earth is the only planet we know of that contains intelligent life, countless other planets and moons have been discovered that have the potential to harbor life themselves. It would then seem ignorant to believe that among the infinitude of space, Earth, this location only, is home to the only intelligent life forms in the universe. All of this, to the naturalist, seems to point to insignificance and meaninglessness.

Again, the naturalist will insist upon a meaningless, purposeless universe born out of billions of years of natural processes. The life we observe on Earth is no different than

any other entity in the universe in the sense that it too was simply the product of atoms and molecules taking part in a long series of processes that eventually gave rise to intelligent life. To them the universe was absolutely not designed or created with any intention, but instead exists as a gigantic cosmic accident in which we crave answers and a sense of belonging and purpose. Stephen Barr quotes *The First Three Minutes by* theoretical physicist and Nobel Laureate Steven Weinberg in an attempt to capture this idea:

> "It is almost irresistible for humans to believe that we have some special relation to the Universe, that human life is not just a farcical outcome of a chain of accidents. It is very hard for us to realize that [Earth] is just a tiny part of an overwhelmingly hostile universe . . . The more the universe seems comprehensible, the more it also seems pointless" (Barr 115).

To the pure scientific naturalist, meaning and purpose are nothing more than a human construct created in order to gain a sense of comfort in the otherwise hostile, unforgiving and infinite universe, and organized religion is the vehicle by which this comfort can be found. To naturalists like Weinberg, only science can reveal truth in the universe, and that truth is simply that the universe is pointless. It is difficult for many to fathom a reality that is simply "a chain of accidents" or that life on Earth fails to maintain a special relationship with anything in the universe. On the other hand, numerous thinkers and scientists, from Richard Dawkins to Daniel Dennett to Christopher Hitchens, stand behind science as the only source of truth and that it undoubtedly reveals a truth rooted in pointlessness.

Renowned atheist Richard Dawkins claims that science "gets rid of meaningless notions of 'purpose', 'God', and so forth" and that "nothing is lost by their elimination

except the deviousness that keeps psychics, astrologers and other peddlers of dishonest nonsense in business" (McGrath 148). Dawkins, among numerous others, use science as a tool for maintaining a sense of purposelessness. And though these thinkers often acknowledge that science cannot *disprove* the existence of anything beyond what we observe, it certainly suggests that it is highly, highly improbable.

In their opinion, we must not be fooled by 'finely-tuned' nature of our universe. To the naturalist, the fact that the universe seems to be perfectly tuned for the existence of life does not point to the existence of an intentional God. Prescribing such design to God, in their opinion, is to prescribe meaning to something inherently meaningless. Instead, the universe must necessarily possess the characteristics it does, the constants it does, and the values it does in order for us to exist at all. If it did not, we would not be in a position to contemplate it. In other words, just because we do indeed exist does not mean that the universe was designed with us in mind - we exist because the universe is the way it is.

Physical constants (also known as anthropic coincidences) such as the distance from the Earth to the Sun, the mass of the electron, the strength of the strong nuclear force and electromagnetic force and the number of spatial dimensions (to name a few) are not values on a dial that can be changed and tweak. Rather, these values were cemented in the early fires of the big bang. In a basic sense, the universe was not designed this way in order for us to exist, rather we exist simply because the universe happened to possess these qualities. To take is one step further, many naturalists will subscribe to the Weak Anthropic Principle (WAP) which maintains that our universe is just one in a large number, in fact an infinite number, of universes. This allows naturalists to avoid the argument from design in

the sense that every possible universe with every possible combination of values and constants exists. It just so happened that it was our universe in which these values and constants were able to harbor life, though that it not to say that life does not also exist in the infinite other universes. The naturalist will look at this theory and argue that while there is no evidence to support the existence of other universes, it seems likely that our universe is not alone, much as our own galaxy or our planet is certainly not alone. And they will use this to further extrapolate their idea of purposelessness, meaninglessness and insignificance. Purposelessness, meaninglessness, and insignificance, along with the superiority of scientific understanding: this is the creed upon which pure Scientific Naturalism is built, and it is the source from which countless individuals, scientifically minded and not, derive their sense of humanness.

But while the naturalist might look up at the night sky and see nothing more than stars and planets, the theist looks up and sees something much more, something beyond the stars and beyond all life in the universe. While Polkinghorne does realize that we humans inhabit nothing more than a cosmic crumb, he goes on to say that "size and significance are not necessarily the same thing" (Polkinghorne 51). To the naturalist, our size compared to the whole of the universe deems us insignificant, for our actions have but a minor, perhaps indistinguishable effect on the whole of the universe. We are but the smallest drop in the largest ocean. But if we take the word 'significance' to mean something else, we begin to see a different reality of our existence take shape. And it is this reality in which the theist will reside.

The Oxford English Dictionary gives one definition of 'significant' to be "The quality of being worthy of attention; importance; loaded with meaning" while a second definition is given as "noteworthy deviance from the normal or expected values; having a low probability of occurrence; unlikely to have occurred by chance alone." (OED). It seems to me that the scientific naturalist is narrowly focused on the former definition, rejecting it on the ground of the size of the human race compared to the rest of the universe. Our size, then, deems us unworthy of attention, and our inability to create significant change in the vastness of the universe deems us unimportant and void of meaning. But rather than looking solely at the first definition, the theist will look first to the latter, and then proceed to the former.

As far as we know, we are the exception in the universe. As far as we know, we are *the only* forms of intelligent life *anywhere* in this universe or any other. The human race is absolutely "a deviance from the normal or expected values" and "having a low probability of occurrence." Furthermore, we are the only creatures, in the universe and on Earth, that have the capability to understand and contemplate the universe and our place in it. And this ability is very special, very unique, and very meaningful indeed. So despite our smallness, the fact that we are extremely unique and uncommon fosters a sense of importance and meaning, as well as an existence "worthy of attention." And the fact that humans are small, comparatively speaking, does not necessarily mean that our existence was brought about by chance.

While the naturalist may believe that we exist because the universe and its characteristics allow us to exist, the theist will believe something different - that the

universe was designed, set up, and instilled with the freedom to unfold in such a way for our human existence to emerge. Religious physicist Stephen Barr points to the ubiquitous beauty and symmetry found throughout the universe, and the finely-tuned nature of the universe itself, to suggest that everything we see is absolutely not an accident. The orderliness and patterns found in the way molecules orient themselves, the logarithmic spiral shape commonly found throughout the natural world, and the alignment of nearly symmetrical planets and moons in the same plane are just a few examples of the symmetry and beauty found throughout the universe. While the naturalist would say that this had to be the case in order for it, or us, to exist at all, the theist would argue that there is something more, something grander behind the design of our universe. From a theological perspective, grace is found everywhere in nature and builds within nature itself; thus, studying nature, including its history, development, evolution, and inner workings will allow for a greater understanding of God and this relationship between grace and nature. Barr goes on to say that "the simple and absolutely undeniable fact is that the universe did not have to have the particular laws it does have by any sort of logical or mathematical necessity. In other words, God had a choice - in fact, an infinite number of choices" (Barr 148). In this sense, the theist would say that science is simply unable or insufficient to explain some aspects of the universe. From this perspective, the order and beauty found within our universe could only have been born out of increasingly more order and beauty, not by chance, and the source of that "more", according to Barr, is undoubtedly God. Lastly, the naturalist might acknowledge that the universe is indeed beautiful and complex, but may respond by asking "who designed the designer?" and request proof of such a claim. Conversely, the theist has

no problem asserting that such understanding or knowledge is not within human capabilities - it is a matter of faith that science falls short of explaining.

We can now easily see the divide between the naturalistic and theistic schools of thought when it comes to the larger scale of the universe and the cosmological insights that have allows us to understand it. To the Catholic, our imminent death and obvious smallness should not deprive us of meaning. To them, our significance is born out of the fact that humans are uncommon compared to the rest of the universe. Furthermore, our purpose is realized through the journey to reach a God calling us forward. Death need not remove meaning, for life persists. The naturalist, alternatively, maintains a sense of purposelessness by insisting that the past can accurately portray what will come in the future. Stars died to create us, much as our Sun will die to continue the cycle. Organisms are mortal, much as we are now, and will remain as such in the foreseeable future. The universe was born in a big bang, and will end with a 'big crunch'. The naturalistic worldview is comprised of many beginnings and endings, where the ending is what removes whatever sense of purpose or meaning could have possibly been born in the beginning. The fact that matter is simply cycled and recycled to make everything in the universe strips the meaning from it, for basic matter is unable to maintain a purpose.

Theologian John Haught has coined this perspective as the 'Archaeological Vision' of the universe. This 'metaphysics of the past' (as he also refers to it), is "a standard of research that looks primarily to what has already happened to find the key to understanding everything that is taking place now and in the future" (Haught 59). The naturalistic idea of finitude and meaninglessness and allows scientific naturalists to pursue research without

having to contemplate or incorporate a supernatural component to the work. Haught goes on to say that this perspective "rules out the existence of God … the universe is not a narrative but instead an aimless movement of mindless material stuff across vast periods of time" (Haught 59). But if humanity is to find meaning and purpose in the cosmic drama of the universe, this cyclical, retrospective way of thinking is not sufficient, according to Haught. Continually digging back into the past in order to gain a better understanding of the future effectively blinds us of the possibilities coming from the future - it prevents us from becoming 'more' by dwelling on what we have already been. According to Haught, "the materialist worldview, based on a metaphysics of the past, cannot ground a sense of dignity or motivate us to the pursuit of virtue since it formally eclipses the universe's aspiring toward new possibilities and 'more being' (Haught 112-113). We can now begin to see that if our idea of what it means to be human is to advance, progress and become more, as I have suggested in the previous chapter, then this metaphysics of the past is an unsuitable and insufficient vehicle through which to find meaning and purpose in the universe. On the other hand, the theist would reject this metaphysics of the past and let God call us forward into the future from ahead rather than push us from behind.

Philosopher Friedrich Nietzsche, in his "On the Advantages and Disadvantages of History for Life," warns against this dwelling in the past to which Haught alludes to. Nietzsche asserts that studying the past in order to determine how to move forward into the future is detrimental to one's intentions. He claims that an individual must transcend his or her own personal history in order to move forward and develop in the future. And I think that this idea can be easily applied to the story of our own universe and the history of the

human race. If we are to maintain a sense of purpose and meaning for our lives in the universe that goes beyond simply living a good life, then I think Catholic thought can provide us with a solid understanding about how to go about that. By studying (but not dwelling in) our past, as Nietzsche suggests, and rather focusing primarily on what lies ahead, we can begin to formulate a sense of greater meaning in the universe. In this way, the new cosmology and modern scientific discoveries regarding the universe and our place within it need not complicate what it means to be human. We can recognize our infinitude, our impending end, and our smallness, and use those realities to formulate an idea of meaning and purpose with God as the end goal. While humans may be small, the purpose we seek is not.

But how might one go forward and maintain a sense of purpose or inherent meaning while simultaneously not believing in God? This is the question that continues to perplex me, but now that I have laid out both arguments, the naturalistic and the theistic, it is now my goal to construct a middle road - a path forward that does not fall completely to one side. Instead, this path to meaning can use aspects of both to move forward into the future and maintain a sense of purpose even in the face of science that complicates our attempts.

IV

Reconciling the Two Perspectives: Catholicism vs Naturalism

"Science without religion is lame. Religion without science is blind." - Albert Einstein

"We are stardust brought to life, then empowered by the universe to figure itself out - and we have only just begun." - Neil DeGrasse Tyson

So here we are. I have examined several scientific findings and discoveries that seem to have changed, or at least complicated, what it means to be human. And in doing so, I have examined how two different schools of thought - the naturalistic and the theistic - might respond or might perceive such science. This being said, my goal at the present moment is to reconcile the perspectives - to find a way to think about science and our understanding of humanity that utilizes aspects of both schools of thought. I realize that I have stated previously that scientific naturalism and Catholic thought may indeed be 'wholly incompatible', but if being in Honors has taught me anything, it is to break these constructed binaries. And that is what I intend to do. First I will begin by revisiting at a very elementary level the terms 'meaning' and 'purpose'.

I have stated that Pure Scientific Naturalism rules out the possibility of the existence of meaning and purpose of human life, and any life at all, as well as rules out the existence of God. To them, the world portrayed by science has undoubtedly revealed precisely the world envisioned by the naturalistic community. According to religious physicist Stephen Barr, a naturalist might argue that "the universe more and more appears to be a vast, cold, blind, and purposeless machine. For a while it appeared that some things might escape the iron grip of science and its laws - perhaps Life or Mind. But the processes of life are now known to be just chemical reactions, involving the same elements and the same basic physical last that govern the behavior of all matter" (Barr 19). To the naturalist, the universe and the life within it is nothing more than a gargantuan accident with no inherent purpose. Purpose is, according to a naturalist, "a problem [for humanity] only because of our

psychology, not the world [itself]" (naturalism.org). In other words, purpose is a concept invented by humans in order to feel a sense of security and comfort throughout life rather than a concrete thing attainable by the human race. And this, to them, is just fine for with no purpose or meaning we are not pressured to play a greater role in the universe. We can just exist for the sake of existing and survive for survival's sake. Again, to them, "The human race can no longer be thought of as 'central' to a purpose that does not exist" (Barr 20). But I will push back for a moment, for I believe the words 'meaning' and 'purpose' must be fleshed out in order to fully understand this argument.

I firmly believe that life cannot be void of all meaning. But perhaps this meaning can take different forms. Before formulating what the meaning in my life might been light of the science I have discussed, let us first examine the different forms 'meaning' can take. The Oxford English Dictionary defines something that is 'meaningful' as "having a serious, important, or recognizable quality or purpose." (OED). And if we apply this definition to the perspective of a pure scientific naturalist, whose purpose I have suggested is simply to live and continue living, then surely their lives have meaning. In other words, it is 'meaningful' for the naturalist to survive, and this is why. Human beings, like other animals, have an instinct to survive. In a very basic, naturalistic sense, our brains receive signals from external stimuli that force our brain to decide whether or not to continue to seek out such stimuli or to avoid it. In this sense, those stimuli that are deemed 'useful for survival' are things that could also be considered 'meaningful' according to the above definition. I will refer to this kind of meaning as 'lower case m' meaning. Every human being maintains this sense of meaning, for we all attempt to seek out those things that we

think will make our lives more enjoyable or that will aid in our survival. These are things like food, water, shelter (in a very primitive, animalistic sense), but also human interaction, pursuit of work, among other things. Thus, every person, at their very core, could be considered a naturalist. The things in our life that make us happy, that we find useful, that we enjoy, all carry with it this lower case m meaning. Meaning for the naturalist, then, is born out of a sense of Hedonism - seeking pleasure and indulging in the things that we deem useful. Their sense of meaning, however, stops here.

The human race is unique, though, in the sense that the things that we deem useful or meaningful for our survival can transcend into something more - a passion - something that guides the way we live our life. Food, for example, is necessary for our survival, and would be considered 'meaningful' according to our definition. But humans, more than simply needing food to survive, can find passion in food, using it to create something more than a basic necessity. These meanings and passions, when put together, allow us to create an overarching sense of 'capital M meaning' or what I will refer to as "Purpose" - that which is the ultimate reason or reasons for living. It is passion, then, that links our lower case m meaning with our capital P purpose. This being said, the naturalist and the theist, while perhaps maintaining a similar sense of lower case m meaning will maintain vastly different perceptions of capital P Purpose (which I will refer to simply as Purpose from now on).

To the naturalist, our passions and our sense of meaning are simply a result of chemical reactions taking place in the brain. Everything in life that we deem meaningful, or that which aids in our development of passion, is nothing more than a series of complex

chemical reactions in the brain and hold no weight beyond that. It is these processes that determine what we like and dislike, what we enjoy and that which we do not, and allow us to make decisions that will allow us to live and prolong this life. The naturalist would argue that the things we love, desire, enjoy, and need can all be explained as such by science. In this sense, there is no meaning in life that can be extrapolated beyond the biological and emotional satisfactions we can glean from these things. In this sense, meaning and passion, for the naturalist, coalesce into their Purpose of simply living and prolonging life, which is derived from the biological responses to external stimuli.

To the theist, on the other hand, Purpose goes far beyond biochemical reactions and laws of nature. It may be true that the things that give our lives meaning - friends, family, food, music, etc - may be similar for the theist and the naturalist, for the same chemical processes in the brain are taking place. But the overarching Purpose of our lives is indeed different. Instead of simply satisfying biological instincts and primitive desires, the Purpose of human life for the theist is to live in such a way as to become fully alive, glorify God to achieve transcendence in this life on our way to the next. It is our duty to live according to understood dogma in an effort to prepare for the life that comes next and to prepare for eternal salvation, glorifying God along the way. I will repeat that, for I feel it is very important to understanding my argument in the coming pages: if the conventional Catholic is to find God, become ‘fully alive’, glorify God, and live out their purpose, dogma must be understood, accepted and followed. The theist acknowledges our smallness and the finitude of our existence, but rather than accepting that fact, accepting nothingness after death, and accepting a meaningless universe, the theist might ask “well how can we go

about life and think about the universe a bit differently, so as to not feel worthless?" It is this searching for something more in the world and the universe that the theist derives their sense of Purpose, and that Purpose lies in an all-powerful, benevolent deity that calls us through life into the afterlife and eternal salvation. To them, science cannot explain everything, for there are certain things in life and in the universe, like God, that are simply outside the realm of science. Theologian John Polkinghorne attempts to capture this perspective:

> "Ask a scientist, as a scientist, to tell you all that he or she can about music, and one will say that it is a neural response to the impact of sound waves on the eardrum. Of course, that is true, and in its own way worth knowing, but ask a scientist as a person to tell you all the he or she can about music and one will surely have much more to say about its mysterious power to communicate a timeless beauty and to evoke a range of feelings and desires" (Polkinghorne 93).

Polkinghorne suggests that God is inherently mysterious, and cannot be known completely, by science, theology, or any other faculty. While the naturalist will maintain that these 'feelings and desires' can still be explained by science, the theist will hold that there is an element in things like music that simply cannot be explained by science and are beyond the scientific method.

So, if it was not clear before, I will make it clear again. We can now easily see that the naturalist and the theist maintain two distinct ideas of Purpose - that which is the culmination of the things that give our lives meaning in a biological sense and that which we work to attain throughout life and fulfill upon death in hopes that there is something

more. How then can we reconcile these two distinct senses of Purpose as to create a new path forward on which we can still maintain a sense of purpose without a God figure and in the face of science that the naturalist claims deprives us of this Purpose? I believe that by turning to theologian John Haught, we can begin to formulate an answer.

Haught, in his book *Resting on the Future: Catholic Theology for an Unfinished Universe* continually refers as the naturalistic worldview as 'the archaeological vision'. By this he means that the naturalist will look toward the past in order to explain what will happen in the future. He states that naturalists "see no escape from death's finality … but they find solace in the self-esteem that comes from resisting the inevitable as long as they can" (Haught 116). Haught goes on to say that "occasional feelings of well-being during their journey toward the abyss … are only occasional bursts of light in an encircling doom" and that they "assume that the cosmic present and future have been deterministically set in stone from the start, and that all evolutionary outcomes are nothing more than the mindless uncoiling of earlier material states" (Haught, 117). From this perspective, modern science is just something that reminds us of our finitude. It is something that ought to be pursued, but it nevertheless points to a pointless universe and existence. As individuals abiding by a "metaphysics of the past" cosmology serves to remind us where we came from, as well as where we are going - infinite nothingness - while modern genetics forces us to contemplate that we may be nothing more than matter, like the rest of the universe, that can be changed and edited and tinkered with.

The Catholic perspective, according to Haught, takes on a different perspective. Rather than taking an archaeological vision toward the universe, the conventional Catholic

takes an analogical one, a 'metaphysics of the eternal present'. People who take on this perspective maintain a sense of "otherworldly optimism" in which they "acknowledge the fact of corporeal death and perishing, but it claims that humans have immortal souls that are infused immediately by God" (Haught 118). To them, the infinite nature of the universe, our tininess, and our short-lived existences do not take away from the significance of our existence, for our soul will continue to live on, tied eternally to God. According to Haught, "evolutionary biology and astrophysics, for example, may be intellectually interesting to them, but the unfinished universe is theologically inconsequential. If the only world that really matters, after all, is one that lies completely outside the reach of the empirical method, why should they be terribly concerned about the less important world discoverable by science?" (Haught 119). Modern science, from this worldview, does nothing more than solidify one's belief in God, and to some, it may even point to the existence of God himself. A greater appreciation for the universe through Cosmology, and a deeper appreciation from human life through modern genetics, allows the Catholic to use modern science as a vehicle through which he or she can glorify God to the highest degree. And while someone in this mindset will acknowledge our imminent death (and the imminent death of the universe itself), that fact does not strip meaning from our life. But Haught goes on to say that neither of these paths may be suitable for our discovery of Purpose. I find myself in agreement with him and it is through his ideas that I will propose this new path forward.

Haught takes us through the archaeological and the analogical visions in order to set up a third path. Rather than a metaphysics of the past or the eternal present, Haught proposes a *metaphysics of the future* - the anticipatory vision of the universe - characterized

by a *cosmic hope* rather than a cosmic pessimism. This vision is dependent on (and I have hinted at this in preceding chapters) humanity becoming *more*. In his words "cosmic hope is fully aware of the world's perpetual perishing, and it remains abreast to new scientific discoveries, but it rejects the pessimists' claim that perishing is final and the universe is 'pointless' … cosmic hope awaits not the destruction, but the transformation of our minds, hearts and souls along with the whole universe" (Haught 119-120). Rather than pushing us forward from the past, or residing directly above in the present, God in this vision lies ahead, calling us forth into the future, allowing us to change, develop, transform, and evolve, all the while continuing to write the narrative of our existence and that of the universe. And it is this vision that I will use to help me construct my own path towards finding purpose in the face of modern science.

I maintain that life itself has a Purpose; our existence is meaningful, and the fact that we exist at all is astonishing, not to mention unlikely. In a conversation with renowned atheist Daniel Dennett, Richard Dawkins states that "among all animals, we are alone in knowing that we've got to die. But we are also unique in knowing why it was it was worth being born and coming into existence in the first place" (Dawkins). So, unlike the pure scientific naturalist, I maintain that death, while imminent, should not deter us from pursuing our search for Purpose. As a man of science, I recognize that science may at times seem to complicate this search. But taking a deeper look at this science, I believe that we must not let it complicate our search for meaning, but rather fuel it, for if meaning was easy to find this conversation may not be taking place at all. We must let science fuel our search in the sense that it may offer new insights, challenge previously assumed notions of life

and place and meaning; it makes exciting our pursuit, allows us to become things and explore facets of the universe that we never before imagined. Like the naturalist, I will maintain confidence in science's ability to explain natural phenomena, but unlike the naturalist, I cannot claim that science is able to explain every aspect of the universe and the life within. As I have mentioned before, when looking at the stars and into the heavens, my sense of wonder and awe was to a degree lessened by a novel that explained in detail the phenomena throughout the universe. I am a romantic when it comes to life and the universe, and the mysteriousness that lies in its fabric is something that I cherish. I am enthralled with the universe and the wonders it holds, and desperately want to believe that it is more than a giant cosmic accident. If science could explain everything, there would be no sense of mystery, no sense of wonder, and life would be far less interesting to live. My pursuit of Purpose will use science as a guide, but will also recognize its limits.

The religious aspect of my 'custom' path towards Purpose might be considered controversial, but I will propose it nonetheless. I stated previously that I have refrained from believing in a God, and refrained from subscribing to a standardized belief system. For some reason I have always had some discomfort in the idea of a supreme governor of the universe, and never quite liked the idea of living for someone or something else. So when Haught asks us to let God call us forth into the future from ahead, I am slightly hesitant. But perhaps what I have been denying for so long is the conventional idea of God - the Supreme Being, an individual governing our universe, looking down upon his creation. This is the same God that Dawkins and Dennett themselves reject, but it is even true that many theologians and religious believers themselves have strayed away from this

idea in the face of science. For this reason I am confident that I can still maintain a sense of spirituality about life and in the universe that will allow me to live my life with a sense of Purpose that does not necessarily end in the hands of this God, or at least this conventional idea of God. On my path, I can maintain a set of values and live a good life without adhering to an iron, resolute dogma handed down by the conventional 'bearded man in the sky' idea of God. Instead, I will maintain spirituality without this conventional idea of God, and that spirituality and mystique in the universe will call me forth into the future. Unlike the naturalist I will not look towards the past, but do as Haught asks us to do and turn our vision toward the future. Not necessarily toward God, but rather to an unknown, mysterious future - one that is open to new possibilities and developments. It is a recognition that humanity is still coming into being and still developing, and that these developments might currently be outside of the realm of current science that drives my pursuit rather than a God calling me forward. Rather than a cosmic hope that ends with God, it is a cosmic hope that recognizes death, but also recognizes that I have a role to play in the writing of the cosmic drama. It is acknowledging that I do not exist in isolation, but rather I live to continue the story for those that have written it before me, and that I must continue to write it for those that will come after.

Though each individual has but a microsecond to live compared to eons of time that the universe has existed, we exist nonetheless; we are players in the cosmic drama nonetheless, despite our size and finitude. According to theologian Judy Cannato, this vision "is grounded in the Universe Story, with attention to the implication that all life is connected. It is about acknowledging that we all flow from a single source, call it quantum

vacuum or Holy Spirit, and that what each of us does affects all the other wholes of which we are a part and all of the parts that make us whole" (Cannato 22). Humans, again, do not exist in isolation, but rather in conjunction with others, a community in which we discover meaning (a subtle shout out to Dr. Vartabedian). We may be but mere words or even letters in the grand story, but much like any story, without those words and letters the story would not make sense - it would lose meaning. We have a responsibility to our past and to our future to continue the story, setting the stage for whatever may come. The universe is a story, and every person is contributing to its penning; and like any other story, the beginning does not foretell the ending - we cannot know, much less understand, what will come next, much like you, the reader, cannot predict exactly which words and sentences I will use to complete this thesis. So while my time may be fleeting, my legacy, and the legacy of all others, does not have to be. Although we may not understand the future, nor can it be predicted by science, we must have faith that the future will develop and we must allow for that to happen by living our lives and contributing to the story, not only for ourselves, but with others in mind. This is what sets this vision apart from that of the naturalist: a vision toward the future, a comfort in the unknown, a hope in the future, and a mindset focused on community. This is something Cannato refers to as a "Holon". To her, we are simultaneously a whole and a part of something greater.

While science may appear at first glance to complicate our idea of humanity, it does not have to do so. Like Haught and Cannato acknowledge, humanity is still coming into being. To be human is to become more, to develop, and to progress. Modern genetics and the use of CrisprCas9 allow us to do just that. The new cosmology allows us to do just that.

Modern science simply proves that humanity is in the process of evolving and becoming more than we presently are and that we can continue to write the story of human existence. If modern science strips us of meaning, then all science throughout history must have already stripped that meaning away, for all science was once itself new. It is a privilege to understand all we do about ourselves and the universe in which we live, and it is our duty to use that knowledge and continue to advance rather than let it halt our pursuit. Our existence as humans in this universe, with God or without, is meaningful for we, against all odds, do exist and get to contribute to the story that is ours. Athiest and philosopher Daniel Dennett himself puts it very succinctly: “the way to thank the human beings that created all this, is to create a little bit more and add to the goodness in the world” (Dennett).

But it is now that I am realizing that I, ironically, have more or less come to a religious conclusion. The fact that I stand resolute in my commitment in science and its capabilities (and boundaries), and the fact that I hold that there exists something mysterious, something unexplainable in the universe, may seem contradictory. If science can explain everything, how can I maintain a belief in something else beyond science? Well, I believe I must return to Polkinghorne, who says that there is no single epistemology. Many theologians and religious thinkers themselves stand behind the capabilities and boundaries of science. So I suppose where I believe that I remain hesitant is the use of the word “God”. Reflecting on my writing, the God that thinkers like Dennett and Dawkins deny is exactly the God that I myself have been denying - the conventional supreme governor. This idea of God, however, is not the idea of God that many theologians and Catholic thinkers accept.

While some might say that a Godless universe is an inherently meaningless one because there is nothing calling us forward to become more, I now wonder if this is true. Perhaps my perspective of the universe is not Godless, but instead it is my vocabulary that is Godless. Still I yearn for something, and a feeling deep inside me craves something more - an existence after death brought about by a force calling me into becoming more. But calling this force "God" is something I am hesitant to do, perhaps out of principle. In Dawkins' and Dennett's finite, naturalistic universe, with their perception of what "God" is (or isn't), perhaps the universe does in fact hold no meaning beyond our biological purpose and the meaning which we prescribe and create ourselves. In their universe, this force, this unexplainable something in the fabric of the universe does not exist - any meaning beyond that which we create is non-existent. But if I am to maintain belief in something more, beyond science, beyond comprehension, and that the universe and life itself possesses an inherent purpose, my perception of God must change. This might mean straying away from Dawkins' God and evolving to Haught's God that is simply being itself.

I have then found myself in a perspective based in 'panentheism' - in the words of theologian David Ray Griffin:

> "for many science-oriented religious thinkers, panentheism provides an appealing doctrine, because it allows us to accept scientific naturalism in this fundamental sense without being forced into accepting atheism . . . panentheism says that God is the soul of the world, and it allows us to think in terms of a divine center of consciousness, purpose, and agency that is seeking to bring the world into line with normative values based on loving concern for all of its creatures" (Griffin 2).

I have arrived at a conclusion that is a combination of Haught's progressive idea of a metaphysics of the future and this idea of panentheism but I, and presumably many others, remain hung up on using the word "God" and prescribing that word to this mysterious force. A force that penetrates the whole of the universe - even Pope Francis urges us to recognize this mystery in his encyclical, *Laudato Si*. In quoting Saint Francis of Assisi, Frances states "It is our humble conviction that the divine and the human meet in the slightest detail in the seamless garment of God's creation, in the last speck of dust of our planet" (Francis 18). This idea is the essence of the Jesuit value of 'finding God in all things,' and shows that modern theology is itself adapting its visions. But does my perception of the universe lack meaning because of my reluctance to use the word "God"? I do not have an answer to this question, but I would hope not. I recognize that calling this force "God" may take time, but I have accepted that this will be the challenge and struggle I endure as I continue this search for meaning.

I understand that it may be controversial to customize my own path toward Purpose. But if we had one definition for Purpose, set in stone for all humans, would it really be meaningful? I am convinced that it would not be. Instead, each individual pursuit is different, and it is our unique ability to both create and discover meaning in our own individual fashion that may make it meaningful in the first place. In his novel *Man's Search for Meaning*, Viktor Frankl states that "it is this spiritual freedom - which cannot be taken away - that makes life meaningful and purposeful" (Frankl 67). And I do believe he is correct. Each individual has an ability … an ability that no one can take from us to make and discover meaning his or her own individual life - to discover Purpose. And that

individual Purpose contributes to the overall meaning and Purpose of our human existence in the overall cosmic story. I cannot avoid my or our existence, and it is my responsibility, for myself and others, to find Purpose and make it meaningful.

Perhaps Annie Dillard says it best, for I would be remiss not to turn to Dillard as an Honors Student: “the work is not yours to finish … but neither are you free to take no part in it” (Dillard 202). My life is not finished, and the life on this planet is not finished. This universe is not finished either, nor will it be in my lifetime; but it is my duty to contribute anything I can to allow for its continuation and the bringing about of its Purpose, for myself and for others despite the science that so often tempts us to think otherwise.

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