

For Zoey – my thunder & joy

Acknowledgements

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Abstract

Creationism is based on a fundamental belief in the inerrancy of the bible and negatively affects science education because creationist proponents insist on the inclusion of supernatural explanations for the appearance of species, in particular the origin of humans. This detrimental effect on education is particularly relevant in the United States, where almost 70% of the population rejects the idea of naturalistic evolution and the majority of American students struggle to meet the college-readiness benchmarks in science and math. This dissertation provides a comprehensive look at the issue from historical, judicial and educational perspectives. Twenty-four legal cases in the United States regarding anti-evolutionary strategies were analyzed in detail. Strategic trends were identified ranging from the statewide banning of evolution in public schools to the required teaching of Creation Science. The exact effect of creationist political activity was discerned through the analysis of state science standards and textbook adoption processes, which illustrated the creationists' ability to lobby for a diminished coverage of evolution in science standards and textbooks. It was found that despite attempts made by scientific and educational agencies to provide guidelines such as the Next Generation Science Standards, the majority of American state science standards continue to be sub-par and one of the major flaws of these standards is the overall attempt to weaken the coverage of evolution throughout the standards. A similar loss of quality occurs in textbooks

since publishers engage in self-censorship in order to avoid controversial topics such as evolution in order to prevent their books from being rejected. An examination of the free-choice learning materials revealed that creationist proponents are very active and successful in producing books, films and museums for the sole purpose of promoting creationism. Moreover, a brief look at the creationist movement in Germany provided a powerful comparison to the United States and elucidated the key components necessary for a creationist movement to exist and flourish, namely the presence of fundamentalist willing to fight to get anti-evolutionary materials introduced into science classrooms. This study provides new insights into the creationist phenomenon, present not only in the United States but also increasingly present in European countries such as Germany. Understanding the detrimental link between creationism and science education will help the science community realize that this topic needs to be continually readdressed and that it is imperative that these creationist trends are not dismissed as inconsequential.

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Foreword

It may strike some as odd that a biologist would commit herself to writing a doctoral dissertation about the history, development and effects of creationism – a topic that seems much more religious than scientific. And in truth the process of writing this thesis required a lot of research outside of the normal realms of a biological study. No time was spent in a laboratory or observing animals in the wild. Instead, the majority of time was spent on activities very distanced from the realms of biological study such as combing through judicial rulings, analyzing governmental policy descriptions, dissecting biblical passages and watching documentaries. For most, this does not sound like a particularly scientific endeavor and in fact, some of the most useful books on this topic were not found in the library branch for biological sciences but instead in the theological branch in the section on dogmatism. Thus for many, the study of creationism may seem like an irrelevant topic for a scientist to pick up – one possibly left best to the humanities. So why would a biologist want to devote so much time to studying an evangelical ideology – when there are so many more important issues a biologist can address such as endangered species, cancer, climate change, shrinking bee populations, etc.? However, when one truly understands how scientific progress occurs, it becomes apparent that this may be one of the most important topics for a scientist to examine.

It is important to understand that for each successful geneticist, ecologist, microbiologist, zoologist, etc. to be able to make their contribution to society and

human history, they first had to first invest years into the study of biology, of which evolution is one of the most key components. The geneticist of today did not need to discover the concept of genes, chromosomes or heredity – no instead, they were the beneficiaries of decades of knowledge gathered around the world since Mendel's discovery became public in the early 1900s. This passage of knowledge, discovery and understanding of the natural world from one generation to the next occurs through systematic science education that begins before an individual even chooses a major at university.

This foundation of science education is concentrated during the years a student is in high school. While quality science education during this time can provide all students and thus the upcoming general populous with a thorough understanding of how science works and what the most important discoveries have been – possibly even encouraging some students to become a part of the global scientific endeavor – poor science education serves not only to discourage students from pursuing the sciences at university but can also leave students with a complete misunderstanding of what science is and unable to recognize true scientific progress from pseudo-scientific claims. This is particularly true when creationist ideas are presented in the science classrooms as alternative theories to evolution.

Once one understands how all scientific progress and success relies wholeheartedly upon the education of future scientists – it becomes clear why the analysis creationism is completely necessary as it poses a direct threat to the foundation of science education. The inclusion of these ideas in science classrooms, especially when presented as equally valid alternatives to evolution, is the most efficient way to confuse young minds about the true nature of science. Because these concepts fundamentally invoke supernatural powers to describe processes that occur in the natural world, it leads to an immediate loss of science literacy and a diminishment of the overall quality of science education.

This thesis focuses specifically on this topic, science education, without any intention or motivation of discussing the validity of religion in society, the presence or lack of God in the universe or any other metaphysical issue. The main point is to illustrate the history, development and pervasiveness of creationism in all of its forms since the introduction of this type of fundamentalist propaganda could impair science literacy in a radical and long-term manner.

Introduction

In the simplest of terms creationism is the belief that God was responsible for the creation of all life present on the Earth in the basic form that it has at present. Creationists in general oppose the idea that natural processes could be solely responsible for the production of new life forms – though many creationists concede to the notion of microevolution that would lead to minor changes within a species such as different dog breeds. Creationism has been popular among evangelicals in the United States for over one hundred years and continues to gain acceptance and popularity outside of America. This thesis will analyze the creationist movement in order to illustrate how the spread of this fundamental belief system affects not only science education, but also the general science literacy of future generations.

The analysis of creationism in this thesis was approached in a way that could be likened to the manner in which an anthropologist studies another culture. At first, one acquaints oneself with the literature available on the culture, identifying the experts in the field. In terms of creationism, there are many experts who have published great masses on the subject. Some authors such as Scott and Numbers have written books covering the vastness of the development of creationism in the United States, such as *Creationism vs. Evolution* (Scott, 2009), *The Creationists* (Numbers, 1992). Other authors have written books that delve into certain aspects of creationism such as Forrest who focused on Intelligent Design in her book, *Creationism's Trojan Horse: The Wedge of Intelligent Design*, or Larson

who has focused on the historical legal history in books such as, *Trial and Error: The American Controversy over Creationism and Evolution*. Meanwhile European authors such as Kutschera, Hoßfeld, and Levit shed light on creationism beyond the border of America through multiple papers and books, such as *Creationism in Europe* (Blancke ed., 2014). Authors such as Gould, Ruse and Mayr as well as Junker and Hoßfeld have also provided a wealth of materials regarding the history of Darwin, evolution and biology in books such as *Die Entdeckung der Evolution* (Junker & Hoßfeld, 2009), *The Structure of Evolutionary Theory* (Gould, 2002), *What Evolution Is* (Mayr, 2003), *The Evolution Wars* (Ruse, 2002). Many authors who are relatively new to the Darwin arena such as Humes and Shermer also provided valuable insights into the creationist phenomenon with their comprehensive books such as *Why Darwin Matters* (Shermer, 2009). Through the work provided by these authors, it was possible to become acquainted with the overall history and dynamic of the creationist movement. The National Center for Science Education (NCSE), in general, also provides a massive amount material on the subject, which was extremely useful, in particular for keeping up-to-date on current developments and understanding the timeline of legal cases.

Yet, while all of the information from these creationists experts was very useful, it was all written by individuals outside of the creationist movement, making observations about the creationists, providing a wealth of facts about the existence of creationists and different creationist groups, their goals, their leaders, their books, their strategies to oppose evolution, but almost always from the perspective of a scientist. In order to take the study of creationism one step further, much effort was given to understand the creationist movement from the inside-out by learning about creationism from the creationist themselves and thus after a general orientation using literature from scientist about creationism, the second step of research was a complete immersion in the creationist culture. This immersion meant reading books about creationism from leading creationists such as Johnson, Morris, Behe, Meyer, Dembski, Wells, etc. It meant scouring creationist websites such as Institute for Creation Research, Answers in Genesis, Discovery Institute, etc. and then reading and rereading Genesis and other Scriptures and books by bible experts such as Bart Ehrman. It meant listening to podcasts produced by the Discovery Institute and watching creationist movies to hear about their beliefs from their mouth.

This immersion allowed an insight into the creationist phenomenon, that would not have otherwise been possible. Instead of just reading about them from authors such as Dawkins, who immediately dismiss all creationists as imbeciles or are baffled by the existence of creationism, the immersion in the creationist culture allowed insight into why they have these beliefs and why they oppose evolution and what is it exactly that they want to accomplish.

Once this general understanding of the creationism was established, it became clearer what parts of creationism are truly noxious. Thus, the second approach of the study developed into an examination that could be compared to the analysis of a mutating infectious organism or a super bug. This comparison is made not to vilify a belief in special creation but to make the clear distinction of what aspects of this movement are dangerous. It would be wrong to say that all bacteria are bad, just as it would be wrong to say that all religious belief is dangerous. Thus, creationism can be thought of as a super bug in that a certain belief in special creation or God may serve certain emotional and psychological needs for an individual or even provide whole populations with a sense of purpose, yet it becomes very harmful when it mutates to an extreme form of fundamentalist belief that is entirely resistant to scientific discovery and is aimed at degrading the standards of science education.

So in order to limit the amount of harm that this mutated species could cause to an organism, one would want to study an infectious species or super bugs to understand where it came from, how it develops, how it reproduces, what it feeds upon, what type of conditions it needs to survive, what kind of damage it causes, what can be done to limit damage, in the same way, this thesis aims to provide a thorough overview of the origins, developments and specific dangers of this movement in terms of science education and will accomplish this by examining the movement from multiple perspectives.

The first chapter of the thesis is devoted to looking at the origin of creationist beliefs, the conditions in the United States that provided an environment for these beliefs to flourish and a look at the theory of evolution, which became the focus of creationist attacks. The first chapter provides background necessary to understand all subsequent chapters. The subchapters on religion and American history aim to (1) highlight how creationism is not a general phenomenon of religious belief or Christianity but is a fundamentalist idea centered within the evangelical sect of Protestantism (Ruse, 2001), (2) explain how and why this evangelical belief system is so popular within the United States, and (3) have evangelical Protestantism gained its political influence in the US. The subchapter on science and evolution provides a brief overview of the nature of science and the theory of evolution in order to (1) explain the nature science in order to explain how creationism, creation science and intelligent cannot be considered scientific pursuits, (2) highlight the strength and importance of the theory of evolution to show that many of the later described creationists claims that the theory of evolution is weak and flawed are without merit, and (3) explain how the theory of evolution became associated with moral degradation.

The next chapter is devoted to looking at the development of creationism. The chapter provides an overview of the various strains of creationists and creationist beliefs, whenever possible based on works written by creationists themselves. The chapter also chronicles the mutation of creationists, who began as fundamentalists

who opposed evolution outright but accepted the antiquity of the Earth (Numbers, 2014) and became a movement towards Creation Science, which attempted to find scientific data to support the Genesis account of creation and simultaneously popularized the proposition that the Earth was relatively young and that there was data to support this idea (Blancke, 2014) and finally moved on to Intelligent Design. The final part of the chapter is devoted to a special look at Intelligent Design, which takes a subtler approach to the idea of creation by emphasizing the necessity of a higher being without harking upon the details of the Genesis account. The purpose of the chapter is to (1) provide contextual information about creationism, (2) to illustrate the stark mutations of the movement throughout the 1900s, (3) to highlight the fact that the creationist movement is not only still present and very active in the United States but is in fact stronger and more powerful than ever before (Forrest, 2007), (4) thus providing the reasons why it is important to study this phenomenon.

The ensuing chapter focuses on the legal aspect of the creationist movement and describes not only the cases but also the laws and measures that are in place in the United States to protect students against the introduction of religious doctrine into public science classes. While almost all publications, only focus on only the most prominent cases such as Scopes, Kitzmiller, Epperson, and Edwards, this thesis provides a detailed overview of every single case heard in the US involving creationism from 1925 to 2005. In order to illustrate the weight and influence of each case, a particular effort was made to explain how the American legal system works since many publications about these cases presuppose that the author is familiar with the American judicial system. Again, instead of just reading about these cases from experts such as Larson or central organization such as the NCSE, importance was placed on the reading primary sources such as the actual court rulings, prohibition legislation, etc. This chapter specifically describes (1) the laws that prevent creationism from being taught in public schools, (2) the legal battles that have been fought in the 80 years between the most publicized cases: Scopes and Kitzmiller, (3) the effects that these cases had on education and the creationist movement, (4) the temporal and geographical presence of these types of cases in the United States. All cases are presented using a uniform layout that included the year, location, court level, plaintiffs, defendants, charges, ruling, summary and the cases specific effect on education. This sleek design provides the reader with a thorough overview of the cases in a simplified and organized manner allowing the reader to (1) quickly understand how many of the cases are built upon one another, (2) see how the results of these cases caused creationists to change strategies in order to avoid further legal problems, (3) glimpse at the complexity of the problem for parents, students and teachers, (4) understand why certain cases have larger impacts due to the precedence set by their ruling.

The subsequent chapter focuses specifically on how creationism affects education in the United States. Although many publications talk about the danger of

creationism in terms of science education, many authors, with the exception of Miller, do not go into any specific details about these effects. This thesis thus aims to clearly define what parts of the American education system are effected most through creationist lobbying and grassroots actions in order to provide clear examples of the detrimental effects of this political pressure. Again, a firsthand approach was taken by reviewing the state education board publications and not only publications about the state education board activities. This chapter first describes the structure of the American school system, and the systems of control at the local, state and national level. Once establishing a general knowledge about the American education system, the chapter then (1) describes how curriculum and textbooks are chosen in the United States, (2) clearly explains the detrimental effects that creationists can have on science standards and textbook content through lobbying actions at the state level (Watts et al., 2016), (3) highlights how these deranged science standards and mutilated textbooks lead to a loss of science literacy among students and (4) discusses the various other ways in which creationists attempt to introduce creationism into American schools below the state level.

The last chapter aims to illustrate the immensity of the creationist movement by demonstrating that it is not limited temporally or physically. This chapter thus focuses on legal cases post-2005, free-choice learning materials used to influence public opinion outside of the classroom and creationism outside the United States. Almost all publications that mention the legal aspect of the creationism-evolution conflict only focus on legal battles fought before *Kitzmiller* giving the impression that all legal conflict ended in 2005. The first subchapter therefore discusses all of the court cases that have occurred since *Kitzmiller* in order (1) to illustrate that despite the apparent blow to Intelligent Design through the *Kitzmiller* ruling that the topic of creationism continues to appear in courtrooms around the United States, (2) to show the strategy changes caused by the *Kitzmiller* ruling and (3) to illustrate the fact that creationism is still very present problem in the United States that needs to be continually addressed. The second subchapter focuses on free-choice learning materials such as books and museums in order (1) to show that the fight for the American minds is not limited to the school classroom, (2) to illustrate the success that the creationist have had in the production of free-choice learning materials and (3) to discuss the potential that such materials have in convincing the general public about the legitimacy of creationist claims about the inadequacy of the theory of evolution. The last subchapter describes the presence of creationism in Germany in order (1) to show how creationist ideas have been exported from the United States to other countries, (2) to provide a comparison between creationist movements in different countries, while highlighting the similarities the necessity of certain elements within a society for a creationist movement to exist such as the presence of evangelical sects.

By the conclusion of this thesis, the reader should be very familiar with the origin, development, and detrimental effects of creationist activities on science education. It should be clear to the reader that (1) creationism is a fundamentalist belief that is localized in evangelical Protestantism, (2) the creationist movement originated in the United States and has since been exported to countries around the world (Watts, et al., in press), (3) creationism did not die in the 1900s but is in fact a very current issue, (4) it is necessary to understand the movement and the potential effects of this movement, (5) despite laws prohibiting the teaching of creationism in public schools that creationist continue to find ways to introduce their ideas into the classroom, (6) the inclusion of creationist beliefs is detrimental to science education, (7) if left unabated, the creationist could cause a major loss of science literacy, and (8) a general loss of scientific literacy could lead to a major societal shift towards fundamentalism. More specifically, by the end of the thesis, the goal is to have provided proof for the following thesis: There is currently an active battle surrounding science education in the United States that is particularly focused on the theory of evolution and specifically aimed at determining the manner in which human origins is taught to American students at public high schools. This battle has been active in the United States since the beginning of the 1900s and has evolved over the last 100 years in response to domestic politics, judicial rulings or social shifts within the country. This creationist movement is a well-organized movement that through generous financial backing and central organizations is well-equipped and prepared to pursue its aim of weakening the teaching and authority of evolutionary theory through grassroots action aimed at school boards, state curriculum standards, textbook adoption as well as the production of and marketing of free-choice educational material and venues and have thus been able to respond and adapt to new social, political and legal situations presented to them as well as flourish in the free market. This trend is an endangerment to science education and if left unabated could lead to a rapid drop in the overall science literacy. A list of sub-theses can be found in the list of appendices.

Understanding the Conflict: science, religion and the United States

This chapter will focus on providing background information regarding science, religion and American history in order to provide the context needed to understand the current conflict regarding the teaching of creationism in public schools in the United States. This chapter will accomplish this by answering the following questions: Is it natural and logical that a conflict would occur organically between religion and science? What causes a person to become an advocate of creationism and supporter of anti-evolution legislation? How and why did fundamentalism and evangelicalism develop in the United States? What is science and why is it important for students to be educated in the sciences and to understand the theory of evolution?

The first section will look at religion and Christianity and how these differ from fundamentalism. The second section will look at American history with a focus on how evangelical Christianity developed in the United States, where an equally passionate part of the population battles for the separation between church and state. Finally, the last section will address the nature of science, the development of the theory of evolution and the importance of educating students about these subjects.

Understanding the difference between religion and fundamentalism

One might question why a chapter about religion and religious text is necessary for a dissertation about science education and evolution. However, once the topic of creationism or intelligent design arises the question of religion, Christianity and the Bible appears almost simultaneously. It is thus important to discern whether this is an organic conflict that logically occurs between religion and science. In other words – is it possible for someone to believe in God and accept the theory of evolution or are they mutually exclusive? The question has already been addressed and answered by science philosophy expert, Michael Ruse who has explicitly stated that this struggle is more legend than truth (2001). Stephen Jay Gould has also vehemently proclaimed that there is an absolute lack of conflict due to the two very different realms of religions and science (1997). Even Pope Benedict XVI and his predecessor Pope John-Paul II have both praised the role of science in the evolution of humanity and acknowledged the strength of the theory of evolution allowing Catholics to avoid any conflict between their belief system and scientific progress (Numbers, 1998).

Yet, despite all of the proclamations and explanations for why there does not need to be a conflict between science and religion, creationists continue to fight against the teaching of evolution claiming that it contradicts the biblical account of special creation and thus leads to a loss of faith (Ham, 2012; Humes, 2007; Morris, 2008). The reasoning behind this fear lies therein, that, if evolution tells a different story than what is in the Bible and if evolution were true then the Bible would be false or allegorical at best. If the Bible is no longer seen as the word of God, then doubt arises to whether or not there is a God, which leads according to creationists' claims could cause moral demise through the loss of faith or Christian values (Ham, 2012; Morris, 2008; Numbers, 1992; Numbers, 2006).

The purpose of this section is to take a detailed look at when religious beliefs lead to antievolution tendencies. In order to address creationist claims about evolution being incompatible with the Bible, Christianity and faith in God in general, this section will take a detailed look at the Bible, its content and how the Bible came into being as well as the traditional stance of religion in terms of science by looking at the historical relationships between the church and science as well as modern statements made by church leaders. Finally, the section will take a specific look at Christian fundamentalism to illustrate how it emerged and how fundamentalism and evangelicalism differ from mainline Protestantism and traditional Christianity in their views on evolution.

Bible Content and History of Bible Translations

The driving force behind the opposition to evolution is that it contradicts the biblical accounts of creation in Genesis (Ham, 2013; Hemminger, 2009, Morris, 1961). This section will look at what is actually contained in the Bible and how the Bible texts have been accumulated, edited and translated over time. Subsequently, the chapter will also illuminate how Bible interpretation has historically caused strife between scientists and the church in the past.

The easiest place to begin is in the beginning, i.e. Genesis. Creationists in general and Young Earth Creationists (YEC) place a great amount of importance on the 7 days of creation, referring to Genesis 1–2:4a, but often do not mention the second creation story from Genesis 2:4b–24 (Ham, 2013). Eugenie Scott, an expert on creationism and former executive director of the National Center for Science Education, laid out the differences between the two stories of creation from Genesis 1–2:4a and Genesis 2:4b–24 in her comprehensive book *Evolution vs. Creationism* (2009, p 273):

Tab. 1: Comparison of Creation Stories in Genesis 1 & 2 (Scott, 2009)

| Genesis 1–2:4a | Genesis 2:4b–24 |
|------------------------------|---------------------------------|
| (Water and formless Earth) | (Heavens and Earth presupposed) |
| Light (day 1) | Water (mist) |
| Firmament (day 2) | Adam |
| Earth and vegetation (day 3) | Vegetation |
| Sun, moon and stars (day 4) | Rivers |
| Fish and birds (day 5) | Land animals, birds (no fish) |
| Land animals, humans (day 6) | Eve |

Scott continues in her book to describe the symbolism of the Genesis story. She quotes theologian, Conrad Hyers, as she describes the differences between the ancient Hebrews and their surrounding tribes. The main difference between the Hebrews and Egyptians or the Babylonians is that they were monotheistic while the other groups were polytheistic. According to Scott and Hyers Genesis was largely meant as a religious statement that their God of Abraham was the one and only true God. As Hyers states, “Each day [of creation] dismisses an additional cluster of deities, arranged in a cosmological and symmetrical order”. Scott summarized spe-

cifically which deities were dismissed on each of the given days of creation, which is shown in the following table (2009, p 61):

Tab. 2: The Allegorical Interpretation of the Genesis Story (Scott, 2009)

| Days of Creation: Genesis Chapter 1 | Dismissed deity |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| Day 1: "And God said 'Let there be light'...And God called the light Day, and the darkness He called Night. " | God vanquishes the pagan gods of light and darkness |
| Day 2: " 'Let there be firmament in the midst of water...'God made the firmament, and divided the waters...And God called the firmament Heaven. " | God displaces the gods of the sky and the seas |
| Day 3: "And God said: 'Let the waters under the heaven be gathered together unto one place, and let the dry land appear. ... Let the Earth put forth grass, herb yielding seed, and fruit-tree bearing fruit after its kind'... " | God vanquishes Earth gods and the gods which govern the vegetation |
| Day 4: "And God made the two great lights: the greater light to rule the day, and the lesser light to rule the night; and the stars " | God establishes superiority over sun, moon and stars |
| Day 5:"And God created the great sea-monsters, and every living creature that creepeth, wherewith the waters swarmed, after its kind, and every winged fowl after its kind; and God saw that it was good." | God removes divinity of the animal kingdom |
| Day 6: "And God created man in His own image, in the image of God created He him; male and female created He them." | God removes divinity of kings and pharaohs |

The importance of discussing whether the Bible was written in order to be interpreted literally is important because this question has been the major claim made by creationists against the teaching of evolution. According to leading YEC and founder of the Creation Museum, Ken Ham, the Genesis story forms the foundation of Christianity – if Genesis were to be lost – Christianity would tumble (2012). While YEC place a tremendous amount of importance on the literal interpretation of Genesis, historically, the Catholic Church also placed an interest in defending a more literal interpretation of the biblical reference to a stationary Earth with a sun

that moved through the heavens in the Bible¹, which was in obvious conflict with the discoveries made by Copernicus in the 17th century. Copernicus' discovery led Galileo to write a letter of support of Copernicunism in 1609 and later provided further support for heliocentrism for which he was put on trial in 1633 for heresy (Finocchiaro, 2009). During this time, Galileo also wrote another letter in 1615 dealing with natural and revealed knowledge and the principle of accommodation (Dixon, 2008). The principle of accommodation was a view also perpetuated by St. Augustine² more than 1000 years before Galileo's birth. St. Augustine in his time, argued against the literal interpretation of biblical texts explaining that the Bible was written in a language that should be understood by relatively uneducated people since this was the characteristic of the mass population at the time that the Bible was revealed to human kind (Dixon, 2008).

According to the principle of accommodation, Genesis does not need to be read as a literal account of the creation of the Earth for it to provide a foundation of the Judeo-Christian belief system that revolves around the concept of a single, almighty, omniscient God. When Genesis is read in this manner, it poses no problems with evolutionary biology, as can be seen by the theistic evolution individuals who are able to maintain their faith while simultaneously able to embrace science (Scott, 2009).

Yet, although Christian men from the 4th and 17th century were able to understand the allegorical value of biblical texts, current believers in a literal interpretation of Genesis and the Bible in general purport that these texts should be interpreted as a description of God's exact actions in the creation of the universe (Ham, 2012; Ham, 2013; Morris, 1961; Morris, 1974). This insistence on a literal interpretation of biblical accounts is the root of the strife between religious and scientific communities (Ham, 2012; Hemminger, 2009). According to Hemminger, once an individual or society has decided that the Genesis story must be understood literally, there will be a conflict with science because science shows that the Genesis story cannot be interpreted as a literal account, which threatens a literalist believer who then sees that the rest of the Bible can also be seen allegorically instead of literally, ultimately leading a person of faith to question the overall existence of a personal God (2009). As Ruse states, the story of Genesis and the Pentateuch are very relevant for Christians, since the first five books of the Old Testament provide the context to explain the importance of Jesus' crucifixion (2005).

¹ These beliefs were based not only on the Genesis account of creation but also upon verses in the Book of Samuel, Psalms and 1 Chronicles that all make reference to an earth that does not move. Again in each of these books the reference to the stationary earth can be understood metaphorically for the mightiness of God. Example: 1 Chronicles 16:30. Fear before him, all the earth: the world also shall be stable, that it be not moved.

² St. Augustine lived from 354 to 430. Other supporters of the principle of accommodation include John Calvin (1509–1564), John Wesley (1703–1791). Not to be confused with St. Thomas Aquinas (1225–1274) who believed that God did not create things in their final state, but rather created them with a potential to develop as he had intended.

The account of Adam and Eve in the Garden of Eden provides the basis for the sinful nature of humans, and as Jesus was crucified, he became the redeemer of all humans, not for their sinful actions, but their sinful nature as described in the Old Testament (Ruse, 2005). This idea of all Scripture being reliant upon the rest has also been described on the creationist website, Creation Expeditions:

Tab. 3: Reasons for a literal reading of the Scripture

| All Scripture Stands or Falls Together |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| All scripture is inspired by God . . ." (2 Tim. 3:16). God does not lie (Titus 1:2, Rom. 3:4). Because God speaks only truth, and all of Scripture is God's Word, (inspired by Him) all of scripture must be true. This belief is the presupposition upon which a Christian reads the Bible. The Bible is authoritative because it is the Word of God and because God's Word is true. It is therefore a most serious matter to suspect the accuracy of the Genesis creation account. If God is not always truthful, it is impossible to be sure when the Bible is telling the truth, and when it is not (or if it is ever accurate at all). If one part is false, then the rest is likewise called into question. Allowing for the possibility that some passage in Scripture could be inaccurate opens the door for an endless barrage of questions as to the legitimacy of every other passage. Finally, the reader will simply jettison any Scripture he finds inconvenient. |

So obviously for bible literalists, questioning Genesis is like pulling on a loose thread that could unravel the entire belief in the Bible and thereby cause the entire tower of Christianity to tumble (Ham, 2012; Ham, 2013). Yet, although these believers in a literalist interpretation of the Bible are concerned with teaching scientific theories that contradict their Bible, they do not seem to be aware of the fact that the Bible contradicts itself – and not in a small way (Ehrman, 2005). Moreover, those who are so inclined to believe that the Bible is the direct word of God, given to Moses upon the top of Mount Sinai, or written from personal accounts by the apostles, have forgotten that even if this were true, we are not reading the original texts. Supporters of a literalist interpretation of the Bible seem to be unaware of the process which took place in order to produce the Bibles now available in local bookstores or online.

Bart Ehrman is a distinguished professor of Religious Studies at the University of North Carolina at Chapel Hill and has published a number of books that outline how the New Testament came into being and about the contradictions contained within the New Testament. In his book, *Misquoting Jesus*, he describes how the modern Bible was shaped by mistakes and intentional alterations by those who performed the early copies of the texts (2005). He discusses some of the unintentional changes that occurred simply in the copies made by hand in the early Roman Empire where the illiteracy rate was approximately 90% and how the mistakes were compounded as copies were made of flawed copies. He also de-

scribes that fact that the first copy of Mark is from 200 A.D, 150 years after Mark wrote it, meaning that neither the original nor the early copies are available. Moreover, he points out that all 27 books of the New Testament suffered the same fate, compounded by the problem that even if a scribe found a mistake and tried to correct it, that is still not reproducing the original (Ehrman, 2005).

According to Ehrman, John Mill spent 30 years in the 1700s studying the differences between many copies of the Greek New Testament (100 manuscripts) and that in his printed copy of the New Testament he noted 30,000 places where the manuscripts differed and he only sited the places that he found significant (2005). Currently there are 5700 copies, complete or portions, of the New Testament in Greek (the original language of the New Testament) and it is estimated that there are more differences in the manuscripts than there are words in the New Testament. Ehrman also discusses the intentional mistakes, which do not look like a slip of the pen such as in Mathew 24:36 when Jesus states that no one knows the day or the hour which the end will come “not even the angels of the heaven, nor the Son, but the Father alone” – this phrase could have caused problems about the omniscient character of Jesus and was therefore omitted from future versions (Ehrman, 2005).

In *Jesus, Interrupted*, Ehrman outlines the contradictions that are apparent in the New Testament. One of the clearest examples he gives is the difference in the dates that Jesus is crucified. The Gospel of Mark tells states that Jesus eats Passover dinner with his disciples and is then arrested; he spends the night in jail and is crucified the next morning at nine. The Gospel of John (written 30 years after the Gospel of Mark) also gives an exact time at which Jesus was killed – it states that Jesus is killed on the afternoon before the Passover meal during preparations. Ehrman believes that this is an important difference since John is the only gospel that states that Jesus is the son of God or the “lamb of God” who takes away the sins of the world and that John specifically chose the afternoon during preparations for the Passover meal to be the time of Jesus’ crucifixion since that is precisely when the Passover lambs is sacrificed. Thus, it is obvious that John has changed the historical data in order to make a theological point (Ehrman, 2009)³.

Ehrman suggests that the best way to recognize the discrepancies in the New Testament is to read it horizontally – for instance, by looking at the different accounts of the resurrection from various gospels. Who goes to the tomb? Whom do they see? What does this person tell the women to do? Do they do what they are told to do? If so what do the disciples do? Each gospel has different answers to these questions. Below is a horizontal comparison of the resurrection according to gospels of Mark, Luke, John and Matthew.

³ For more information about Ehrman’s publications, credentials or speaking appointments see <http://www.bartdehrman.com>

Tab. 4: Horizontal comparison of the New Testament (New International Version)

| Different accounts of the resurrection of Jesus Christ in the New Testament | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mark 16 | Luke 24 | John 20 | Matthew 28 |
| <p>Jesus Has Risen 16 When the Sabbath was over, Mary Magdalene, Mary the mother of James, and Salome bought spices so that they might go to anoint Jesus' body. 2 Very early on the first day of the week, just after sunrise, they were on their way to the tomb 3 and they asked each other, "Who will roll the stone away from the entrance of the tomb?" 4 But when they looked up, they saw that the stone, which was very large, had been rolled away. 5 As they entered the tomb, they saw a young man dressed in a white robe sitting on the right side, and they were alarmed. 6 "Don't be alarmed," he said. "You are looking for Jesus the Nazarene, who was crucified. He has</p> | <p>Jesus Has Risen 24 On the first day of the week, very early in the morning, the women took the spices they had prepared and went to the tomb. 2 They found the stone rolled away from the tomb, 3 but when they entered, they did not find the body of the Lord Jesus. 4 While they were wondering about this, suddenly two men in clothes that gleamed like lightning stood beside them. 5 In their fright the women bowed down with their faces to the ground, but the men said to them, "Why do you look for the living among the dead? 6 He is not here; he has risen! Remember how he told you, while he was still with you in Galilee: 7 'The Son of Man must be delivered over</p> | <p>The Empty Tomb 20 Early on the first day of the week, while it was still dark, Mary Magdalene went to the tomb and saw that the stone had been removed from the entrance. 2 So she came running to Simon Peter and the other disciple, the one Jesus loved, and said, "They have taken the Lord out of the tomb, and we don't know where they have put him!" 3 So Peter and the other disciple started for the tomb. 4 Both were running, but the other disciple outran Peter and reached the tomb first. 5 He bent over and looked in at the strips of linen lying there but did not go in. 6 Then Simon Peter came along behind him and went straight into the tomb. He saw the</p> | <p>Jesus Has Risen 28 After the Sabbath, at dawn on the first day of the week, Mary Magdalene and the other Mary went to look at the tomb. 2 There was a violent earthquake, for an angel of the Lord came down from heaven and, going to the tomb, rolled back the stone and sat on it. 3 His appearance was like lightning, and his clothes were white as snow. 4 The guards were so afraid of him that they shook and became like dead men. 5 The angel said to the women, "Do not be afraid, for I know that you are looking for Jesus, who was crucified. 6 He is not here; he has risen, just as he said. Come and see the place where he lay. 7 Then go quickly and tell his disci-</p> |

| | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>risen! He is not here. See the place where they laid him. 7 But go, tell his disciples and Peter, 'He is going ahead of you into Galilee. There you will see him, just as he told you.'"</p> <p>8 Trembling and bewildered, the women went out and fled from the tomb. They said nothing to anyone, because they were afraid.</p> <p>Alternate ending: Then they quickly reported all these instructions to those around Peter. After this, Jesus himself also sent out through them from east to west the sacred and imperishable proclamation of eternal salvation. Amen.</p> <p>Mark 16</p> | <p>to the hands of sinners, be crucified and on the third day be raised again.' " 8 Then they remembered his words.</p> <p>9 When they came back from the tomb, they told all these things to the Eleven and to all the others. 10 It was Mary Magdalene, Joanna, Mary the mother of James, and the others with them who told this to the apostles. 11 But they did not believe the women, because their words seemed to them like nonsense. 12 Peter, however, got up and ran to the tomb. Bending over, he saw the strips of linen lying by themselves, and he went away, wondering to himself what had happened.</p> <p>Luke 24</p> | <p>strips of linen lying there, 7 as well as the cloth that had been wrapped around Jesus' head. The cloth was still lying in its place, separate from the linen. 8 Finally the other disciple, who had reached the tomb first, also went inside. He saw and believed. 9 (They still did not understand from Scripture that Jesus had to rise from the dead.) 10 Then the disciples went back to where they were staying.</p> <p>John 20</p> | <p>ples: 'He has risen from the dead and is going ahead of you into Galilee. There you will see him.' Now I have told you."</p> <p>8 So the women hurried away from the tomb, afraid yet filled with joy, and ran to tell his disciples. 9 Suddenly Jesus met them. "Greetings," he said. They came to him, clasped his feet and worshiped him. 10 Then Jesus said to them, "Do not be afraid. Go and tell my brothers to go to Galilee; there they will see me."</p> <p>Matthew 28</p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

It becomes obvious by comparing these four different account of arguably the most important incidence in Christian belief that there are very large discrepancies within the Bible. This may be not be very surprising for those who do not believe in the literal truth of the Bible – yet it is a main point that could unravel some of the main

accusations made by fundamentalist who are worried that evolution is in contradiction of the Bible, when the Bible severely contradicts itself.

The importance of these differences of course will not directly improve science education in the United States, but in order to increase scientific literacy, one must be able to show that the Bible is not a science textbook. The New Testament was written much more recently than the Old Testament and seeing the discrepancies and contradictions in the New Testament should allow students who believe in the literal meaning of the Bible to begin understand the allegorical nature of the Bible and allow not only students, but teachers and parents to see the danger in such attempts and the illogical claim that scientific education should be based on a creation story from the Old Testament.

Moreover, it should be stressed that an allegorical interpretation does not cause a loss of faith, as many religious leaders and researchers have already discussed the compatibility of religion, faith and science (Gould, 1997; Numbers, 1998; Ruse, 2001; Scott, 2009). And Pope John Paul II clearly stated that the essence of the biblical account of creation lies not in the details of the literal interpretation of the creation of the universe but instead in the understanding of the relationship between man, God and the universe as he said, “The Bible itself speaks to us of the origin of the universe and its makeup, not in order to provide us with a scientific treatise but in order to state the correct relationships of man with God and with the universe. Sacred Scripture wishes simply to declare that the world was created by God, and in order to reach this truth it expresses itself in the terms of the cosmology in use at the time of the writer⁴”.

Historical stances of the church to science and literal reading of the scriptures

As soon as one begins to speak about the conflict between science and religion, many are most aware of the legendary conflicts of the past and the most current debates involving creationism. The most well known historical conflict is the Catholic Church’s condemnation of Galileo Galilei in the 17th century for his support of the heretical Copernican view of heliocentrism (Numbers, 2010). Yet despite accusations of heresy, Galileo still belonged to a category of believers who sought to find harmony between the Bible and knowledge of nature and upheld the importance of the Scripture (Dixon, 2008; Numbers, 2010; Finocchiaro, 2009). In the time since Galileo’s plight almost 400 years ago, the Catholic Church’s view on the matter has changed as Pope John Paul II stated in 1992, “The error of the theologians of the time, when they maintained the centrality of the Earth, was to think that our understanding of the physical world’s structure was, in some way, imposed by the literal

⁴ Scripture and Science: The Path of Scientific Discovery. An Address to the Pontifical Academy of Science, by Pope John Paul II (1981)

sense of Sacred Scripture...⁵”. Yet while the former Pope was able to see the necessity of moving away from a literal interpretation of the Bible and towards an acceptance of scientific discovery, the same questions and issues which were at hand in 1633 in Rome are still on the table today in the United States, namely: how should the bible be interpreted and who is authorized to produce and disseminate knowledge (Dixon, 2008).

What has changed since 1633 is that the battle in Rome was between the Catholic Church and Galileo and current conflict regarding creationism vs. science is perpetuated by conservative Protestants, more specifically evangelical Protestants (Ruse, 2006; Watts, et al., in press). Why this shift has happened, has its roots in the Protestant Reformation, which placed an enormous importance on the scripture and the right for every individual to read the Bible in their own language (Dixon, 2008).

The Ontario Consultants on Religious Tolerance⁶ has provided an overview of the different views taken by the various Christian denominations. Here is a brief summary of that overview:

“Most conservative Protestants believe in the literal truth of the stories of creation found in the book of Genesis in the Hebrew Scriptures (Old Testament). They interpret the Hebrew word ‘Yom’ as implying that creation took six actual 24-hour days. This implies an earth that is less than ten thousand years old. A minority of conservative Protestants, most liberal Protestants, the Roman Catholic Church, and most scientists accept either theistic evolution or naturalistic evolution. Both accept that evolution of the species has happened and that the earth is over 4 billion years of age – some 500,000 times older than young-earth creationists believe. Supporters of theistic evolution believe that God used evolution as a tool to guide the development of the species; supporters of naturalistic evolution believe that evolution was caused by unguided natural processes⁷.”

While the Protestant Reformation placed the importance on the ability of every individual to read the scripture for himself, the Counter-Reformation by the Catholic Church deemed that “no one, relying on his own judgment and distorting the Sacred Scriptures according to his own conceptions, shall dare to interpret them contrary to that sense which Holy Mother Church, to whom it belongs to judge their true sense and meaning, has held and does hold, or even contrary to the unanimous agreement of the Fathers” (Dixon, 2008).

While this statement may seem oppressive, this stance from the Catholic Church may have possibly averted the conflict between the Church and evolution since the stance from the Holy Mother Church has been fairly responsive to evolution within the past decades as largely thanks to Pope John Paul II who stated,

⁵ Faith Can Never Conflict with Reason. An Address to the Pontifical Academy of Sciences, by Pope John Paul II (1992)

⁶ www.religioustolerance.org (Accessed 14 April 2013)

⁷ http://www.religioustolerance.org/ev_school.htm (Accessed 7 April 2013)

“Today, almost half a century after publication of the encyclical, new knowledge has led to the recognition of the theory of evolution as more than a hypothesis. It is indeed remarkable that this theory has been progressively accepted by researchers, following a series of discoveries in various fields of knowledge. The convergence, neither sought nor fabricated, of the results of work that was conducted independently is in itself a significant argument in favor of the theory” (Swanson, 1996). In addition, as H.L. Mencken stated “[The advantage of Catholics] lies in the simple fact that they do not have to decide either for Evolution or against it. Authority has spoken on the subject; hence it puts no burden upon conscience, and may be discussed realistically and without prejudice” (Mencken, 1925).

As will be discussed in the chapter on Creationism and Intelligent Design, many of the motivations behind creationist strategies is to preserve religious belief and the integrity of the Genesis story (Morris, 1974). Yet ironically, it has already been enumerated multiple times that there is no necessary conflict between religious belief and science. As Stephen Jay Gould repeatedly stated, “The lack of conflict between science and religion arises from a lack of overlap between their respective domains of professional expertise – science in the empirical constitution of the universe, and religion in the search for proper ethical values and the spiritual meaning of our lives” (1997, p. 18). Moreover, religious leaders have also specifically said that there does not need to a conflict between religious convictions and the acceptance of scientific discovery, such as Pope Benedict XVI and his predecessor Pope John-Paul II, who have both praised the role of science in the evolution of humanity and acknowledged the strength of the theory of evolution. In fact, Pope Benedict XVI made a very similar statement to Gould when he went so far to declare that evolution a “reality” that is complementary to the Genesis account as he stated, “The story of the dust of the earth and the breath of God, which we just heard, does not in fact explain how human persons come to be but rather what they are. ... And vice versa, the theory of evolution seeks to understand and describe biological developments. ... To that extent we are faced here with two complementary – rather than mutually exclusive – realities” (Ratzinger, 1995).

Now clergymen across America have also banded together to help spread this pro-science message. The result of this national cooperation is an open letter (sometimes referred to as the Clergy Letter), which has already been signed by over 10,000 clergymen from different Christian denominations across America affirming the compatibility of Christian faith and the teaching of evolution (Dixon, 2008). Currently (6 May 2016) there are 13,162 signatures on the Christian clergy letter⁸, which states:

⁸ For more information regarding the Clergy Letter Project, or to find the current status of signatures see <http://www.theclergyletterproject.org/>

**The Clergy Letter – from American Christian Clergy
An Open Letter Concerning Religion and Science**

Within the community of Christian believers there are areas of dispute and disagreement, including the proper way to interpret Holy Scripture. While virtually all Christians take the Bible seriously and hold it to be authoritative in matters of faith and practice, the overwhelming majority do not read the Bible literally, as they would a science textbook. Many of the beloved stories found in the Bible – the Creation, Adam and Eve, Noah and the ark – convey timeless truths about God, human beings, and the proper relationship between Creator and creation expressed in the only form capable of transmitting these truths from generation to generation. Religious truth is of a different order from scientific truth. Its purpose is not to convey scientific information but to transform hearts.

We the undersigned, Christian clergy from many different traditions, believe that the timeless truths of the Bible and the discoveries of modern science may comfortably coexist. We believe that the theory of evolution is a foundational scientific truth, one that has stood up to rigorous scrutiny and upon which much of human knowledge and achievement rests. To reject this truth or to treat it as “one theory among others” is to deliberately embrace scientific ignorance and transmit such ignorance to our children. We believe that among God’s good gifts are human minds capable of critical thought and that the failure to fully employ this gift is a rejection of the will of our Creator. To argue that God’s loving plan of salvation for humanity precludes the full employment of the God-given faculty of reason is to attempt to limit God, an act of hubris. We urge school board members to preserve the integrity of the science curriculum by affirming the teaching of the theory of evolution as a core component of human knowledge. We ask that science remain science and that religion remain religion, two very different, but complementary, forms of truth.

Fig. 1: Clergy Letter – from American Christian Clergy

The clergy letter project (<http://www.theclergyletterproject.org>) now also includes a Rabbi letter, which has been signed by 516 Rabbis as of today (6 May 2016). The Rabbi letter reads as follows:

**The Clergy Letter – from American Rabbis
An Open Letter Concerning Religion and Science**

As rabbis from various branches of Judaism, we the undersigned, urge public school boards to affirm their commitment to the teaching of the science of evolution. Fundamentalists of various traditions, who perceive the science of evolution to be in conflict with their personal religious beliefs, are seeking to influence public school boards to authorize the teaching of creationism. We see this as a breach in the separation of church and state. Those who believe in a literal interpretation of the Biblical account of creation are free to teach their perspective in their homes, religious institutions and parochial schools. To teach it in the public schools would be to assert a particular religious perspective in an environment which is supposed to be free of such indoctrination.

The Bible is the primary source of spiritual inspiration and of values for us and for many others, though not everyone, in our society. It is, however, open to interpretation, with some taking the creation account and other content literally and some preferring a figurative understanding. It is possible to be inspired by the religious teachings of the Bible while not taking a

literalist approach and while accepting the validity of science including the foundational concept of evolution. It is not the role of public schools to indoctrinate students with specific religious beliefs but rather to educate them in the established principles of science and in other subjects of general knowledge.

Fig. 2: The Clergy Letter – from American Rabbis

In reading the letters from both the Christian clergy and the Jewish rabbis, it is obvious that scientists are not the only ones who are concerned about the creationist/intelligent design movement. It is not the Pope or the clergy or the rabbis that are leading the fight against evolution – but instead making an active attempt to support science education free of creationism⁹. Furthermore, the clergy letters in themselves and the fact that they have been willingly signed by so many priests and rabbis highlight the fact that this problem is not a broad problem between religion and science. It is clear that the main goal of the religious leaders is to teach their followers about the nature of their chosen God, while the primary goal of scientist is to understand the natural world around them.

So where did the impetus for battles originate if it has not been instigated by the church or the clergy? Why is there so much motivation to have a science class be taught according to principles found in a book, which was so clearly not meant to be read in such a manner? As mentioned above, the Bible was meant to teach fairly illiterate individuals about the character of the Judeo-Christian God. It was copied several thousand times by hand and is wrought with mistakes through transcription and translation. The various scriptures contain conflicting descriptions of one of the most crucial points in Christianity, i.e. Jesus' crucifixion and resurrection. So why, if the Bible was obviously not meant to be read literally are there individuals in the 20th and 21st century in one of the most industrialized nations in the world claiming that it should be used as the basis for an alternative theory to evolution in science classrooms?

The answer can be found in the second line of the Clergy Letter by the American Rabbis, as they state, "Fundamentalists of various traditions, who perceive the science of evolution to be in conflict with their personal religious beliefs, are seeking to influence public school boards to authorize the teaching of creationism". Here the rabbis make the clear distinction that this is not a general religious pursuit or a Christian or a Protestant pursuit, but instead, a goal clearly perpetuated by a group of fundamentalist. So what are fundamentalists exactly? And how do they differ from those who are very pious or have strong religious beliefs?

⁹ For more information about the clergy letter project, please visit their website at <http://www.theclergyletterproject.org>

Fundamentalism

By understanding the difference between religion and fundamentalism it is possible to understand how the creationist movement began and gained momentum. As will be discussed in the chapter, Creationism and Intelligent Design, these movements have been phenomena of the 20th and 21st century.

There was not an immediate reaction to the theory of evolution, which would have been expected if it were a universal and organic conflict between religion and science or Christianity and evolution (Scott, 2009). Yet the thinking in the 50 years after Darwin's publication was marked with much more flexibility than what is seen today (Hemminger, 2009; Ruse, 2003). Over 100 years ago, in 1893, the evangelical theologian, Henry Drummond, showed an enormous amount of flexibility of thought when he addressed the question of the proper Christian attitude towards evolution and stated that a miracle was not necessarily something that happened quickly, but rather God's miraculous work could be seen in the slow process of evolution and that the final result of evolution was Love" (Dixon, 2008).

So to begin, it is important to establish a working definition of the difference between religion and fundamentalism. The terms religion, faith and fundamentalism, are defined by the Oxford dictionary as follows

Religion: (noun) 1. The belief in and worship of a superhuman controlling power, especially a personal God or gods. 2. A particular system of faith and worship. 3. A pursuit or interest followed with great devotion.

Faith: (noun) 1. Complete trust or confidence in someone or something. 2. Strong belief in the doctrines of a religion, based on spiritual conviction rather than proof.

Fundamentalism: (noun) 1. A form of a religion, especially Islam or Protestant Christianity, that upholds belief in the strict, literal interpretation of scripture: Modern Christian fundamentalism arose from American millenarian sects of the 19th century, and has become associated with reaction against social and political liberalism and rejection of the theory of evolution.

From these definitions, it is obvious that religion and faith alone could not cause a "war" against science or evolution. In fact, Ronald Numbers has stated that the greatest myth is that science and religion have been in a constant state of struggle (2009). The struggle can, therefore, not be understood as a conflict between science and religion but instead caused by a specific belief in the strict and literal interpretation of the Bible that causes the conflict with evolution (Ruse, 2000; Ruse, 2006). As Eugenie Scott described it, fundamentalism¹⁰ "formed the basis in the United States for the antievolutionism of the 1920s Scopes era as well as the present day" (2009).

¹⁰ Scott also uses the definition fundamentalism to be "a Protestant view that stresses the inerrancy of the Bible." page 94

So where did this concept of Bible literalism originate? Trawling the internet and skimming through stacks of books, one will come across multiple theories and explanations of the origin of Christian fundamentalism. Here is a brief overview in reverse chronological order.

Origins of Christian Fundamentalism

Eugenie Scott marks the beginning of fundamentalism within American Protestantism with the organized movement in the early 1900s, which was responsible for the publication of a series of small series of booklets called (very fittingly) *The Fundamentals* (Scott, 2009). Christian Fundamentalism can thus be said to have begun as a systematic theology by the 1920s within the Protestant churches. As Scott states, the Fundamentalists stressed: (1) the inerrancy of Scripture (2) the Virgin Birth of Christ (3) Christ's atonement for our sins on the cross (4) his bodily resurrection and (5) the objective reality of his miracles¹¹ (2009). But if one looks at an essay from these booklets, like the one entitled *A Testimony to the Truth*, it is aimed at defending Protestant orthodoxy while attacking such topics as higher criticism, liberal theology, socialism, modern philosophy, atheism, Catholicism and evolutionism, which means that although the American Protestant fundamentalism had its official beginning in the early 20th century the roots go much farther back in time, often as a reaction to progress. It is important to look at how and why this American Protestant fundamentalism developed because its enlargement is fueled mostly in a reaction-based manner against intellectual progress. Thus, by understanding what fundamentalism is trying to defend against, it is possible to see the implications of what would occur if the fundamentals were ever successful in reaching their goals.

In the chapter, *American History*, much of the conditions in the United States are explained that would allow or encourage the growth of a fundamentalist movement. This section will look more generally at the movements and concepts that caused the fundamentalist reaction, namely enlightenment, higher criticism and liberal theology.

The Age of Enlightenment is said to have started at around 1650, sparked by publications from intellectuals like Rene Descartes, John Locke, Isaac Newton, Voltaire and Baruch Spinoza. The purpose of this cultural movement was to renovate the fabric of society using reason and to increase knowledge using the scientific method. It was a time where skepticism was supported and superstition and beliefs based on tradition or faith alone were confronted (Ruse, 2015). It was also a time in which the abuses by the state and the church were to be overturned. For this reason, the Age of Enlightenment is often held in high esteem and seen as a positive trend in human history. Yet for the religious right, the Age of Enlighten-

¹¹ Eugenie Scott used this as part of a quote from Armstrong, Karen. 2000. *The battle for God: A history of fundamentalism*. New York: Ballantine Books. Page 171

ment threatened to sink the Christian faith as it spawned ideas such as higher criticism and liberal theology (Orr, 1910).

Higher criticism is a branch of literary criticism which analyzes ancient texts in order to understand “the world behind the text” (Ehrman, 2009; Soulen, 2001) and it is based on the idea of rationalism – a belief or theory that opinions and actions should be based on reason and knowledge rather than on religious belief or emotional response. Modern rationalism was brought about by the some of the same men who drove the Age of Enlightenment, namely Descartes and Spinoza. Spinoza himself is credited with being one of the first to apply this type of rational literary criticism to the Bible (Durant, 1926). Yet, the term higher criticism is most often linked to the German scholars like Schleiermacher and Feuerbach, who in the mid-19th century analyzed the historical records of the Middle East from Christian and Old Testament eras in an attempt to find independent confirmation of events stated in the Bible (Everett, 1988). The fact that higher criticism was associated with German scholars helped fuel the fundamentalist movement in America in the 1920s since the Germans had become equated with evil (Wacker, 2000) . As Grant Wacker describes it:

Social changes of the early twentieth century also fed the flames of protest. Drawn primarily from ranks of “old stock whites”, Fundamentalists felt displaced by the waves of non-Protestant immigrants from southern and eastern Europe flooding America’s cities. They believed they had been betrayed by American statesmen who led the nation into an unresolved war with Germany, the cradle of destructive biblical criticism. They deplored the teaching of evolution in public schools, which they paid for with their taxes, and resented the elitism of professional educators who seemed often to scorn the values of traditional Christian families (Wacker, 2000).

Higher criticism in itself probably would not have been a problem for fundamentalists or provided fuel for their movement if the scholars had found data that had in fact corroborated the events described in the Bible. Yet, they instead found data that threatened the inerrancy of the biblical accounts and for that reason higher criticism is seen as an attack on Christian faith as described by creationism.org:

In keeping with this skeptical view, secular and liberal Bible scholars have developed a highly inferential, analytic approach to the biblical text that is called “higher criticism”. Among the fruits of this line of inquiry is a long list of textual difficulties and alleged discrepancies along with suggestions as to the motives, lack of information, education etc. which led the writer to err. Often the above analysis is followed by plausible hypotheses as to what really occurred historically. Many a Christian believer has been troubled by such analyses, and not a few have abandoned their faith commitment to the inerrancy of Scripture as a result thereof. (Ackerman, 1983)

Higher criticism is strongly linked to liberal theology in that it begins to look at the Bible as a historical document and not a direct message from an almighty God. Friedrich Schleiermacher, for instance, was one of the German scholars responsible for developing higher criticism and he is also seen as the “Father of Modern Liberal Theology”. Liberal theology or sometimes known as liberal¹² Christianity is an important and interesting concept. Liberal theology, like higher criticism, was another by-product of enlightenment, meaning “liberalism” embraced the methodologies of enlightenment science as the basis for interpreting the Bible, life, faith and theology, which leads liberal interpretation of the Bible to see Jesus’ miracles as metaphorical narratives (Brandom, 2000). The Catholic Encyclopedia describes liberalism as such:

“Since the end of the eighteenth century, however, [liberalism] has been applied more and more to certain tendencies in the intellectual, religious, political, and economical life, which implied a partial or total emancipation of man from the supernatural, moral, and Divine order. Usually, the principles of 1789, that is of the French Revolution, are considered as the Magna Charta of this new form of Liberalism. The most fundamental principle asserts an absolute and unrestrained freedom of thought, religion, conscience, creed, speech, press, and politics. The necessary consequences of this are, on the one hand, the abolition of the Divine right and of every kind of authority derived from God...” (Gruber, 1910)

The Catholic Encyclopedia goes on to state that the danger of liberalism lies therein that: “By proclaiming man’s absolute autonomy in the intellectual, moral and social order, Liberalism denies, at least practically, God and supernatural religion. If carried out logically, it leads even to a theoretical denial of God, by putting deified mankind in place of” (Gruber, 1910). According to historian John Buescher, liberalism is what truly initiated the fundamentalist movement in the United States. As he states:

Fundamentalism, in the narrowest meaning of the term, was a movement that began in the late 19th- and early 20th-century within American Protestant circles to defend the “fundamentals of belief” against the corrosive effects of liberalism that had grown within the ranks of Protestantism itself. Liberalism, manifested in critical approaches to the Bible that relied on purely natural assumptions, or that framed Christianity as a purely natural or human phenomenon that could be explained scientifically, presented a challenge to traditional belief...A multi-volume group of essays edited by Reuben Torrey, and published in 1910 under the title, *The Fundamentals*, was financed and distributed by Presbyterian laymen Lyman and Milton Stewart and was an attempt to arrest the drift of Protestant belief¹³.

¹² Liberal here is not to be confused with “Progressive Christianity” or any particular political direction.

¹³ Buescher, John. “A History of Fundamentalism”. *Teaching History* <http://teachinghistory.org/history-content/ask-a-historian/24092> (Accessed 22 July 2014).