

**Adam & Eve & Evolution  
2017 - Class 1 Manuscript  
The Rev John Roberts**

Video link: <https://youtu.be/zOxHOcnyHBY>

**Class 1**

**History of the Relationship between the Church &  
Science (Early Church through 1900) [2:30]**



**Adam & Eve & Evolution – Class 1 Manuscript**

**5 minutes before start: @slide: Poole quote@**

“There is a principle which is a bar against all information, which is proof against all argument, and which cannot fail to keep a man in everlasting ignorance. This principle is, **contempt prior to examination.**”

-Rev. William H. Poole

**At start: @slide: class logo@**

I’m Father John Roberts and I want to welcome you all to Saint Matthias Anglican Church, where we seek to worship Jesus Christ, to live in his truth, and bless others in his name! We’re glad you’ve joined us this morning.

This morning we begin a five week journey through “Adam & Eve & Evolution”, a course which I hope will provide a fair survey of the variety of Christian perspectives on the origin of human life and a consideration of their implications. In other words, this is not a small topic. We could probably have a thirty week class on this subject, but we’re going to do it in five. So, there might be times where you feel like some of the information is a lot to wade through, but I want to encourage you to stick with me. If you do, I believe that at the end of this five week study you will have a better idea of what you personally believe and why it matters.

I understand this topic can be controversial and even divisive for some. But if you have come here with the intention to argue or be a thorn, I want to encourage you to reconsider. This is an important and sensitive subject and we need to approach it with an open mind and prayerful heart, as well as a respect for those who may hold a perspective different from our own. #

This morning's teaching will be around 90 minutes and we will have two breaks which will provide the opportunity for questions.

But before we dive in, let's open with a word of prayer.

### Prayer

God, as humans we know that we will never know all truth, but this morning we seek to know more of the truth, so we ask for your revelation. I ask that you give all of us understanding minds and discerning hearts. And I pray you will use my teaching this morning for your glory alone. In Jesus' name we pray, Amen.

### INTRO CLASS 1 @class 1 title slide@

Well, this morning we are going to be looking at history from the Early Church up to around 1900. And the reason we're starting with history is because, In order to understand the perspectives on human origins in our contemporary society we need to first begin understand how we got here. We need context. So, we're going to be talking about dates and eras, key figures, some theological ideas, and even some scientific concepts. But I have tried my best to distill it all down to only the most essential facts, to better help us understand our present day and to provide clearer answers to the questions of our origins. ##

There is a general idea in our society that the Church and science are at war, and always have been. This is called "the conflict thesis." This conflict thesis encourages the idea that people must choose between either science or religion and then war against the other.

@slide: conflict images@

And we can certainly see evidence in American culture that many people have bought into it.

Well, this morning, by looking at the actual history, I hope to demonstrate that this conflict thesis about the relationship between the Church and science is not only an oversimplification, but in many ways is just plain *inaccurate*. This morning, we will see that at times in history the Church has *indeed* conflicted with science, in some instances to its shame and in others to its credit, and at other times the Church has been somewhat indifferent to science, but *most* often in history we will see that the Church has encouraged science, and on many occasions even led the charge in propelling science forward. So, rather than using the word "conflict", a better word to characterize the relationship between the Church and science as that it is complex.

## EARLY HISTORY OF SCIENCE AND THE CHURCH

@slide: early history@

Now, beginning in the early Church – the first five hundred years after Christ – we need to understand that at this time

science-as-we-know-it did not exist. Certainly, there were beliefs about the universe, about natural phenomena such as weather and the movement of the stars, about sickness & health,

and even some classification of plants & animals. But all of this fell under the category of “natural philosophy”, probably because it was primarily philosophers who were engaging creation in these ways. But understand, the telescope<sup>1</sup> and microscope<sup>2</sup> would not be invented for another thousand years, so all of this natural philosophy – or “science” – was very rudimentary and generally limited to what could be observed with the naked eye.<sup>3</sup>

Well, when it came to the Church, a few of the Church Fathers dismissed natural philosophy (which I will refer to as “science” from now on) - a few of the Church Fathers dismissed science based upon its connection to pagan Greek philosophy<sup>4</sup> - but most were not opposed to science. @slide: Augustine dates@ And in this Early Church period, our focus should *center* on St. Augustine (354-430 A.D.). Augustine was the Bishop of Hippo, in North Africa, and is “arguably the most significant Christian author outside the new Testament authors.”<sup>5</sup> So he will come up a lot over the next five weeks, but for our purposes of *this morning*, there are three reasons Augustine is significant.

First, Augustine was not opposed to Christians engaging science. Although, he did insist that sound religious knowledge was infinitely *more valuable* than the study of nature because religious knowledge can lead one to the blessed and virtuous life, while science cannot.<sup>6</sup>

The second reason Augustine is significant this morning is that he is one of the earliest examples of a serious theologian wrestling with how early Genesis should be interpreted. For example, Augustine noted that the sun is not created in Genesis 1 until the fourth day even though the sun is necessary to mark the passage of a day. In other words: how could you mark

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<sup>1</sup> 1608 invented

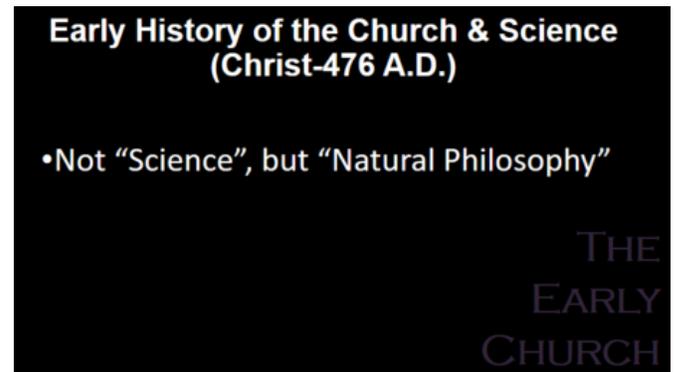
<sup>2</sup> 1625 invented

<sup>3</sup> {Insert citation of quote with “subcategory” in it}

<sup>4</sup> Most notably: Tertullian

<sup>5</sup> PH-EatF208 –

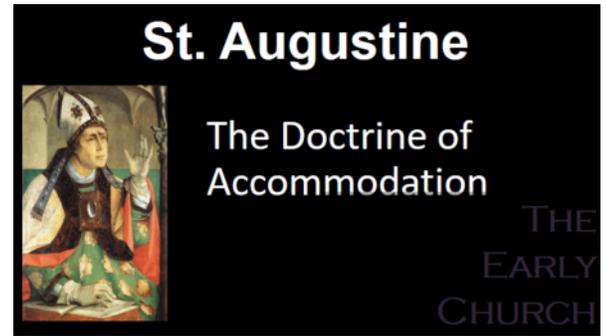
<sup>6</sup> PH-EatF213-5



three days if the sun doesn't even show up until day four? Think about that for a minute :) Therefore, Augustine argued that the Genesis text does not warrant a strict reading of 6 literal days.<sup>7</sup>

@slide: Augustine - doctrine of accommodation@

But the third contribution of Augustine that is pertinent this morning is the most significant. Augustine contended that, in the writing of scripture, God utilized the worldviews of the authors to communicate a greater truth about God and the world. For example, if the original writer of Genesis believed the world was flat – which we can safely assume that he, and his readers, did assume – then the Holy Spirit was not going to correct that scientific misunderstanding in the writing of Genesis, because with the holy scriptures God is not primarily concerned with science, but salvation. This came to be known as the doctrine of Accommodation. And it would serve as a valuable framework for the Church to engage science moving forward.



## NATURAL SCIENCE IN THE EARLY MIDDLE AGES (500-1000 A.D.)

@slide: fall of rome @

Well, the Early Church period ends in 476 A.D. with the fall of the Roman Empire, which marks the beginning of the Middle Ages. This period is also known as the Dark Ages, because the instability resulting from the fall of Rome caused intellectual advance, including science, to stagnate and even regress.<sup>8</sup> However, if anyone should be credited for keeping the light on during these Dark Ages, it's the Church, who – particularly through its monasteries – preserved scholarly knowledge about nature, and even made a few *modest* advances in science.<sup>9</sup>



## NATURAL SCIENCE IN THE SCHOLASTIC PERIOD - LATER MIDDLE AGES (1000-1400 A.D.)

<sup>7</sup> PH-EatF210-11 But in nature Augustine also observed what he saw as an ongoing creative process where new things are always coming to be and passing away. For this reason he contended that God had implanted the seeds of everything that was to unfold in the future in one single creative act. This unfolding view of creation has even led some to suggest that Augustine was a sort of evolutionist, even though evolutionary theory wouldn't appear for another 1200 years.

<sup>8</sup> Ancient Greek texts and the ability to read them was largely lost

<sup>9</sup> {insert citation}

@slide: anselm of bec@

But in the latter half of the Middle ages, the dark times begin to pass and scientific advance begins to pick up some speed again. During this time we have the Scholastic Period when scholars and thinkers of the time begin to apply human reasoning to both theology and science.<sup>10</sup> For example, Anselm of Bec and Canterbury (1033–1109) is notable during this period for attempting to prove the existence of God without any reliance on the Bible at all.<sup>11</sup> Additionally, those who studied nature began to focus on secondary causes for scientific phenomena.<sup>12</sup>

@slide: lightning @

Let's take lightning for example. What causes lightning? Well, before this period, the answer would have simply been that God causes lightning. But now, people are starting to think, "Yeah, God causes the lightning, but how does it work? In other words, what are the natural processes and laws that God uses to cause the lightning." Spoiler Alert: it's a buildup of an electrical charge in a cloud.

So during this period, people are increasingly interested in natural explanations for why things occur, but still very much within the context of faith and for the glory of God. There is a shift, but there is not conflict between the Church and science.

### The Late Middle Ages (476-1000 AD)

Anselm of Bec & Canterbury  
(1033-1109)



### The Scholastic Period

## PROTESTANT REFORMATION (1517+)

@slide: protestant reformation @

Well, in many ways this new way of questioning how things work leads directly to the Protestant Reformation in the early 1500s. In a parallel way to asking scientifically HOW lightning works, Martin Luther asks theologically HOW salvation and grace work. When Martin Luther read the Bible, he believed he found a different concept of salvation than what the Church was teaching at the time. Now

### The Protestant Reformation

- Martin Luther - 1517  
Wittenberg, Germany
- English Reformation - 1533



<sup>10</sup> This was partly because many ancient natural philosophy (or scientific) texts began to be recovered or re-discovered.

<sup>11</sup> Loc1234 frengren

<sup>12</sup> Ferngren p63

remember, until this time there had only been one church in the Western world: the Roman Catholic Church. But when Martin Luther nails his 95 theses to the door of his Church in Wittenberg Germany, objecting to the doctrine being taught – he sparks a shift that eventually leads to the forming of a new church. And, every western Church in America that isn't Roman Catholic can trace its origins to Martin Luther in 1517. Even the Anglican church, our tradition here, would have never broken from the Roman Church in 1533 if it weren't for what Martin Luther did.

Well, for our purposes this morning, the Martin Luther and the Protestant Reformation are significant because we will see that Christianity would no longer have a unified response to scientific development. It was no longer “the Church” engaging science, but “churches” engaging science, each with their own biases and foundations.

## SCIENTIFIC REVOLUTION (1543-1750)

@slide: geocentrism @

Okay, so we've gone from Augustine and this time of philosophical thinking and observation about creation to a good long "dark" time of not much happening to a surge in human reason within the church. Asking HOW God does what He does: how the world works; how grace works.

And now we're at a big moment in history – the Scientific Revolution. And yet, the most significant development during this period was the discovery of something that we all now take for granted: that the sun does not revolve around us, the Earth, but actually we revolve around the sun. You see, up until the 1500s, everyone believed that the earth was the center of the universe; that the sun revolved around us. This view is known as geocentrism. And people had little reason to question it because from a human perspective the sun appears to rise and set- to go around the earth. @slide: Copernicus (heliocentrism) @

It was a Polish astronomer named Nicholas Copernicus who discovered that we - the earth - actually revolves around the sun.

# Geocentrism

- Accepted view before 1543: the sun revolves around the earth

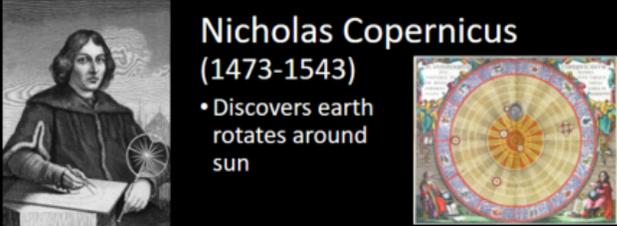


THE SCIENTIFIC REVOLUTION (1543-1750)

# Heliocentrism

Nicholas Copernicus  
(1473-1543)

- Discovers earth rotates around sun



THE SCIENTIFIC REVOLUTION (1543-1750)

Our solar system is not geocentric, but heliocentric.

Now, put yourself in the position of a person at this time. You are suddenly told that you, the world, are actually not the center of the universe. Like a 3 year old learning how to share, that can be hard to digest. Add to the personal shock, the Bible, Scriptures indicate a geocentric solar system – a solar system that revolves around the Earth. @slide: psalm 104 @ Psalm 104:5, states that the earth doesn't move,

*(The Lord) set the earth on its foundations, so that it should never be moved.*

- Psalm 104:5 ESV

@slide: Joshua @

...And in Joshua 10:12-14, Joshua commands the sun – not the earth – to stand still to prolong the battle at Gibeon.<sup>13</sup>

<sup>12</sup> *At that time Joshua spoke to the LORD in the day when the LORD gave the Amorites over to the sons of Israel, and he said in the sight of Israel,*

*“Sun, stand still at Gibeon,  
and moon, in the Valley of Aijalon.”*

<sup>13</sup> *And the sun stood still, and the moon stopped,  
until the nation took vengeance on their enemies.*

*Is this not written in the Book of Jashar? The sun stopped in the midst of heaven and did not hurry to set for about a whole day.<sup>14</sup> There has been no day like it before or since, when the LORD heeded the voice of a man, for the LORD fought for Israel.*  
- Joshua 10:12-14 ESV

So Copernicus knew his scientific discovery that the world revolves around the sun and not the other way around would be hugely controversial. It contradicted the pride of humanity, the common sense of sunrise and sunset, and most importantly it contradicted the straightforward reading of the Bible. @slide: de revolutionibus @

Copernicus was a faithful Roman Catholic and did not know what to do. In fact, he did not publish his findings until just before his death in 1543.<sup>14 15</sup>

### **The Roman Catholic Response to Heliocentrism**

While maybe not his most courageous decision, Copernicus' anxiety about publishing his findings might have been well founded because after his death the Roman Catholic Church

<sup>13</sup> GINGERICH 1867

<sup>14</sup> Ferngren page 97 *Narattio Prima (First Narrative)*

<sup>15</sup> *De revolutionibus* (Ferngren)

does indeed place his book on the Index, which was a list of banned books for the Roman Catholic Church. Now before we judge the Roman Church of the 1500s too harshly, we need to remember the Catholic Church is just coming off of the Protestant Reformation. So they already feel threatened and therefore are eager to squelch any ideas or movements that might further undermine their authority.

@slide: galileo slide@

Well, following Copernicus, in the 1600s an astronomer you've probably all heard of, Galileo Galilei, makes it his aim to convince the world that heliocentrism is correct. Consequently, the Catholic Church calls Galileo before the Roman Inquisition to try him for heresy, and they formally declare heliocentrism "philosophically absurd and false, and formally heretical." Galileo's book is banned, he is forced to recant, and he is sentenced to lifelong house-arrest.<sup>16</sup>

So, clearly this is not a good moment in history for the relationship between the Church and science. And certainly many modern day opponents of the Church like to bring up Galileo as an example of how the Church *is* anti-science. But history shows that, beyond the responses of those in power in the Church and the official Roman Catholic declarations, there were actually many in the Roman Church who found heliocentrism convincing and not inherently opposed to faith or biblical authority, but who just lacked the power to do anything about it. However, it will not be until the mid-1700s that the Roman Catholic Church reversed its stance against heliocentrism and lifts the ban on Galileo's book.

### **The Protestant Response to Heliocentrism**@slide: kepler slide@

Now, in contrast to the Roman Church, the Protestants were much quicker to accept heliocentrism. And one reason was a German astronomer named Johannes Kepler. Kepler was a Lutheran and thoroughly convinced heliocentrism was true. So Kepler employed Augustine's doctrine of Accommodation, arguing that Scripture utilized the common worldviews of its writers while still communicating a greater and universal understanding of God. In other words, while the writer of Psalm 104 understandably assumed the sun rotated around the earth when he wrote, "(The Lord) set the earth on its foundations, so that it should never be moved", God was not going appear the psalmist and say, "Hang on buddy. Actually, this won't be discovered for a few thousand years, but I wanted to let you know that the earth actually *does* move (around the sun)." That's not the way God works! Our scientific correctness is not God's highest priority. @slide: psalm 104 @ We may not like it, but scientific information is not essential for Psalm 104 to accomplish its goal. When we hear the psalmists words, "(The Lord) set the earth on its foundations, so that it should never be moved," we are correct to assert the Earth actually moves, but (the Doctrine of) Accommodation argues we are also correct to hear the greater truth in the psalmists words- that God is sovereign over the earth.

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<sup>16</sup> Ferngren 4564

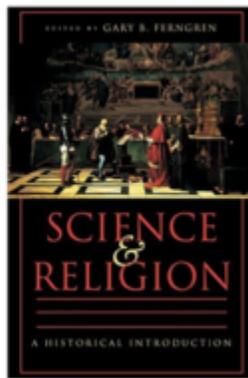
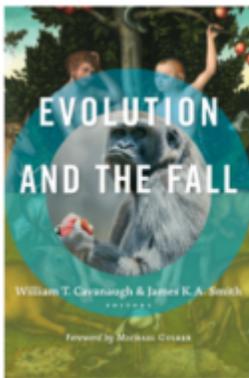
So overall the Protestant Church was pretty friendly to Copernicus and Galileo's ideas. In fact, there is actually a strong argument that the Protestant emphasis on human sinfulness is what ironically what drove scientists to push for carefully designed experiments done with painstaking precision and repeated trials. In many ways it is the Protestants' lack of trust in humanity that led to the development of the scientific method which was so crucial for scientific advance in the years that followed.<sup>17</sup> #

@slide: summary slide@

So as we can see the history between Church and science to this point in history had been complex: not entirely clean and peaceful, but undeniably intertwined and perhaps more supportive than we would have thought. We're going to take a 5 minute break and come back to talk about another historical curve ball for the church and science and human origins- Columbus and the New World!



@slide: white sources slide@



### The Dating of Creation

@slide: dating of creation blank slide@

Already, we've begun to see that the relationship between the Church and science is more complex than the conflict thesis would have the world believe. In truth, Augustine set the church up quite well for engaging science; even the condemnation of Galileo didn't reflect the majority view of the Roman Church at the time, and the Scientific Revolution might have

<sup>17</sup>"instruments such as the microscope and telescope were also necessary to augment senses that had been weakened by the fall." 221

never occurred (or at least it would've been delayed) if it not for the influence of the Protestant Reformation.

So, now, I want to turn our attention to another subject that was of great interest to the Church around the same time that all of this drama with Copernicus and Galileo and heliocentrism was going on. And that subject is the dating of Creation: how long ago did God create the cosmos?

Well, long before this time, artifacts had been discovered that indicated Egyptian & Chinese civilizations went back tens of thousands of years, and these were known even to the Early Church. However, the historical validity of these documents had long since been rejected on the grounds that they appeared to contradict the Bible, which they believed 1) presents Adam and Eve as the first people from whom all humans derived, 2) presents Hebrew as the first language, *and* which they believed 3) presents all people, other than Noah's family, as being subsequently wiped out by a worldwide flood. Augustine himself dismissed the validity of these documents from other cultures, calling them "full of fabulous and fictitious antiquities."

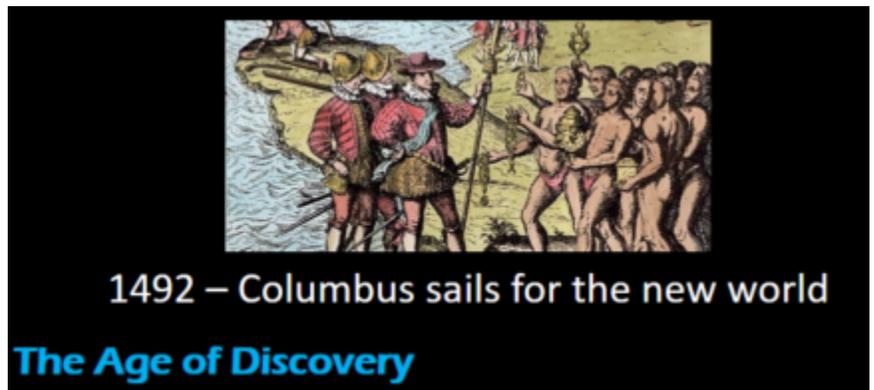
@slide: columbus@

But after 1492, and Columbus' discovery of America, some people began to reconsider their assumptions. As we know, Columbus did not find an empty land. He found a whole lot of people, both the American Indians and peoples like the Mayans further south. Well, this raised a question: if all humans had descended from

Adam & Eve, not to mention Noah, how did all of these people end up over in America? Across an ocean? So, Columbus' discovery of a new land with its own people immediately challenged the conventional thoughts of the time about how and when humans were created.

However, this didn't stop many in the Church from trying to reconcile this with the biblical record. Some speculated that perhaps Noah's maritime skills were sufficient for him to reach America by sea in ancient times; others were convinced that the Native Americans were the ten lost tribes of Israel. The Spanish Jesuit José de Acosta even clung to the idea the New World could be entered via northeast Asia, though this solution had already been proven unrealistic.

However, a minority of folks began to argue that maybe Adam wasn't the first person of



the entire human race. And they cited discrepancies in the Genesis narrative itself. For example, Cain (Adam's son) is banished from Eden and goes to build a city in the land of Nod. Building a city in an existing land implies the presence of other people. Not to mention the unanswered question of where did Cain's wife come from?<sup>18 19</sup>

But, without a doubt, the most disturbing and politically self-serving way people reconciled Columbus' finding of a new land and a new people with the Biblical account of Genesis was to assert that the native people of America couldn't have descended from Adam & Eve, and therefore were not really humans and did not bear the image of God.<sup>20</sup> These arguments were motivated by hatred and greed, because if the natives weren't really humans, then they could justify treating them like animals and enslaving them.<sup>21</sup> So here is a great example of when what people believed about the origins of humanity and the universe really made a difference/ it mattered!

The point here is that Columbus inadvertently made the church wrestle with its interpretation of Genesis and to begin considering when human life was first created. And it is safe to say that most people in the church - Catholic and Protestant - landed on a traditional reading of Genesis and a "young" birth year for the earth and humankind.

During the 15 and 1600s there were over 140 estimates for the earth's birth year! And all of them ranged from between 3,000 and 7,000 year. **@slide: ussher@** But it is the date set forth in 1654 by James Ussher, the Anglican archbishop of Ireland, that becomes the most widely accept. Based on his research of Hebrew genealogy, as well as other ancient texts, and astronomical occurrences, Ussher calculated that the date of the Creation was nightfall on 22 October 4004 B.C.!!!<sup>22</sup> That's pretty specific!! ☺

**The Dating of Creation**

James Ussher  
(1581-1656)

- Anglican Archbishop of Ireland
- Calculated creation to nightfall October 22, 4004 B.C.

The Age of Discovery

**The Dating of Creation**

- Ussher's 4004 B.C. date for creation in the King James Bible from 1701-1885

The Age of Discovery

<sup>18</sup> {cite}  
<sup>19</sup> 474 livingstone

<sup>20</sup> [footnote this](#)

<sup>21</sup> Well, in 1512 (so five years before the Protestant Reformation, when the church still had a single voice), Pope Julius II tried to nip this in the bud by decreeing that the Native Americans were descended from Adam. But these arguments persisted. In fact, in 1550 there was a debate at the papal junta at Valladolid, Spain, where Juan Ginés de Sepúlveda, who had become a Bishop in Central America, argued that the natives were “bereft of rationality, practiced human sacrifice and other barbarous customs, and engaged in degraded idol worship.” Therefore, “Sepúlveda felt entirely justified in (concluding) that such peoples were destined by nature to be the slaves of superior masters.”

<sup>22</sup> Livingstone page 5

But Ussher's date sticks because, beginning in 1701, it began to be published in the King James Bible, @KJV@ in the margins right at the beginning of Genesis (pictured). In those days, the King James Bible was often printed with editor's notes in the margins and while it should have been clarified to readers that these notes were not part of the sacred text itself, understandably, many assumed they were indeed sacred, true, infallible. So even though this date set by Ussher, October 22, 4004 BC, had never been formally authorized by the church, it remained in the margins of the King James Bible until 1885! So for almost 200 years - 200 years(!) - Ussher's date for the creation of the world was subtly listed in the margins of Genesis 1, but was powerfully indoctrinating the masses to believe that early Genesis was definitively saying the Earth and the human race were a fairly recent creation. Well, this would leave the majority of Christians ill-prepared for some scientific discoveries about creation that were still to come.<sup>23</sup>

## OLD EARTH FINDINGS IN COSMOGONY, GEOLOGY AND PALEONTOLOGY

### COSMOGONY/ASTRONOMY

@slide: age of the earth@

So, out of the advancements of the Scientific Revolution and Columbus' discovery of a new world and a new people, we now move into the 1700s to a period known as the "Age of Reason" or the Enlightenment. Recent inventions like the microscope, telescope, & barometer had become readily available, the scientific method had been refined to its modern form, and confidence in human reason is at its peak. Whereas 500 years before we gave the example that scientists might have wanted to understand how lightning worked, but they would have still agreed God is ultimately responsible for everything that happens in nature... Well, now some scientists begin to push the notion of God aside altogether and argue that natural phenomenon are just that: natural; not supernatural. In other words, to these scientists the natural causes of lightning is all that would've interested them. Well, many scientists during the Enlightenment began to think this way about even the creation of the earth(!) and began to consider whether that *also* could be explained by naturalistic causes.<sup>24</sup>

@slide: laplace@

Well, this all culminates in 1796, when astronomer Simon LaPlace published his Nebular Hypothesis. The Nebular Hypothesis states that the planets were created from the atmosphere of the sun. It proposed that the sun's atmosphere had at one time been MUCH larger (like, as large as our solar system is now), but as its atmosphere condensed and got smaller over time it left a trail of atmospheric rings that eventually formed into the various planets we know today. This is heady stuff, but 200 years later and with all of the scientific

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<sup>23</sup> {cite Ussher stuff}

<sup>24</sup> <https://explorable.com/science-and-enlightenment>

advance that has taken place, the Nebular Hypothesis still holds up for almost all scientists (!), as it is still widely thought that the Earth was indeed created out of the atmosphere of the Sun.

Now, what may surprise you is that, unlike Copernicus' heliocentrism, the Nebular Hypothesis did not rock the worldviews of those in the Church.

**@slide: whewell@** Those within the Church who did respond, such as William Whewell (1794-1866), an Anglican priest and scientist argued there was no problem with the Nebular Hypothesis from a faith perspective, since it by no means proved that the solar system was formed without the intervention of intelligence and design. The Nebular Hypothesis- the idea that the

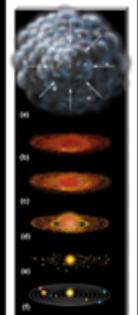
Earth formed out of the sun- was not a conflict moment for the Church and science. And, that's significant, because it sets the stage for many Christians to accept other natural processes that scientists later propose- such as evolution- as part of the way God created the world and life as we know it.

### Age of the Earth - Astronomy



**Simon LaPlace**  
(1749-1806)

- 1796: Nebular Hypothesis



Age of Enlightenment (1715-1789)

### Age of the Earth - Astronomy



**William Whewell**  
(1794-1866)

Age of Enlightenment (1715-1789)

## GEOLOGY & PALEONTOLOGY

**@slide: grand canyon@**

By the 1700s and 1800s the traditional understanding of Genesis was not only being challenged by astronomers but also by geologists and paleontologists. Up to this time, many had believed that some of the earth's most unique features - such as the Grand Canyon - had been formed as a result of the flood recorded in Genesis that was endured by Noah. But in 1826, Presbyterian Geologist John Fleming argued persuasively that even a massive flood would have been inadequate to form landmarks like the Grand Canyon, demonstrating that a river flowing over a *very long* period of time was a far better explanation.<sup>25</sup>

**@slide: paleontology@**

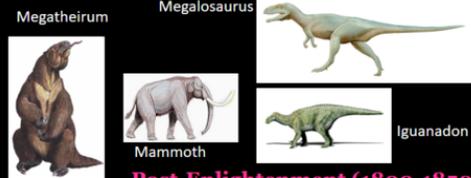
Also during this time, Paleontologists were literally unearthing other-worldly seeming creatures like the Megatherium, the Mammoth, and dinosaur bones such as the Megalosaurus and the Iguanodon. Fossil findings were suggesting that history of the earth extended long

### Age of the Earth - Geology



Post-Enlightenment (1800-1850)

### Age of the Earth - Paleontology



Post-Enlightenment (1800-1850)

<sup>25</sup> DFD13-14

before the appearance of mankind; even that there were successive "worlds" before the one we know, each with its own distinctive vegetation.<sup>26 27 28</sup>

So, this is all new information that the Church is being forced to grapple with in the early 1800s. After all, there are no dinosaurs mentioned in Genesis and Genesis 6 through 9 doesn't describe Noah's ark as merely floating down a river. But even more significantly, this all points toward an earth that is quite old, not young, and the Church has to figure out how to respond.

### CHRISTIAN RESPONSE TO OLD EARTH SCIENTIFIC FINDINGS

Well, instead of all-out rejecting these scientific "Old Earth" findings - instead of warring against them - geologists in the Church begin developing theories to harmonize Genesis with these Old Earth findings. @slide: Gap Theory@ One of these theories is called the Gap Theory, which suggested there was a gap of an indeterminate length of time between the first verse of Genesis chapter 1 - which says, "in the beginning God created the heavens and the earth - and the six days of creation (or really seven days) that follow. According to proponents of this theory in the 1800s, the gap of time between Genesis 1 verse 1 and Genesis 1 verse 2 makes space for all of the "other worlds" of an Old Earth. In other words, the fossils and artifacts come from this mysterious gap in time.<sup>29</sup>

@slide: day age theory@

A more popular "harmonizing theory"- in fact, some of you have probably heard this one before or might even subscribe to it yourself- is the "Day Age Theory" (which, I wish I had an illustration for. This view states that the "days" of Genesis 1 represent vast geological ages. In other words, they're not the 24 hour day as we know it.<sup>30</sup> For example, one proponent of this theory, Swiss-American geographer Arnold Guyot (1807–84), believed the nebular development of the solar system (which we discussed earlier) occurred during the first three of these epochs or "days" in the Genesis account.<sup>31</sup>



<sup>26</sup> 3294

<sup>27</sup> 3294

<sup>28</sup> 4079

<sup>29</sup> 4469 and 2183

<sup>30</sup> 4469

<sup>31</sup> "The formless "waters" mentioned by Moses symbolized gaseous matter. The light of the first "day" was generated by chemical action as this gas concentrated into nebulae. The dividing of the waters on the second "day" corresponded to the breaking up of the nebulae into various planetary systems, of which ours was only one. On the third "day," the earth condensed to form a solid globe; on the fourth, the nebulous vapors surrounding our globe dispersed to allow the light of the sun to shine on the earth." 4473

The significance of these harmonizing theories is that they demonstrate that Christianity was anything but at war with science. In fact, to the contrary they show there was a desire the Church to figure out how these new scientific findings and Scripture could fit together. So, this is the attitude leading up to Darwin: faith and reason working together.<sup>32</sup>

## EVOLUTION

@slide: pre-darwinian slide@

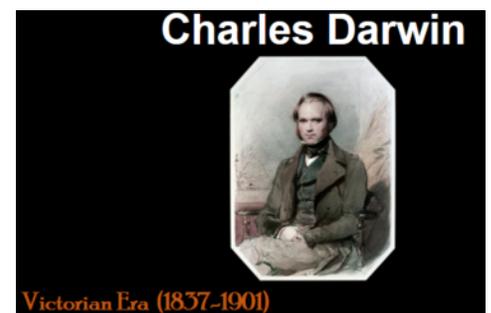
### Pre-Darwinian Evolution

So, now we've arrived at Evolution! Well, during the Age of Reason - or the Enlightenment - you'll recall that scientists were beginning to wonder what natural processes had led to the creation of the earth. Remember the Nebular Hypothesis? Well, during this time scientists had also begun considering what natural processes could have led the emergence of life, and particularly human life, on earth. So, more than a half century BEFORE Darwin's book, *On the Origin of Species*, would be published in 1859, some radical scientists were beginning to suggest the possibility that species might change in response to natural forces, in other words: evolution.<sup>33</sup> Indeed, Darwin was not the first evolutionist. However, Darwin was responsible for bringing the idea of evolution into the mainstream and obviously his writing has hugely impacted our current conversations around human origins. And his work has had such a tremendous impact on the conversations about human origins that we're going to take a few moments to look at his life, to get to know him a little better.<sup>34</sup>

@slide: young Darwin slide@

### Charles Darwin

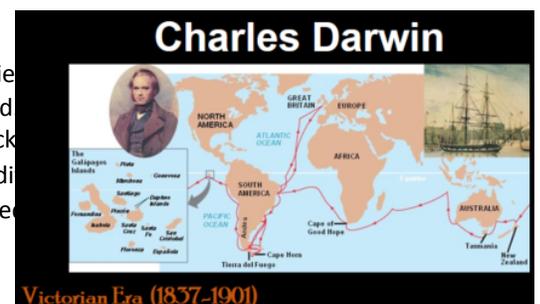
Charles Darwin (1809-1882) was born in Shrewsbury, England, the second son of a doctor. His mother died when he was just a boy, and though she was a Unitarian, but Darwin was christened in the Anglican Church. That's right, he was an Anglican. At his father's encouragement, when Darwin came of age, he went to university seeking to become a doctor. However, he couldn't stomach medicine, so he dropped out and began to pursue ordination in the Anglican Church, again at the behest of his father. He began attending Christ's College in 1828. And it was there that his interest in botany and geology was sparked. @slide: map beagle@ And in a key turning point for Darwin,



<sup>32</sup> 1951 marsden

<sup>33</sup> However, prior to Darwin, evolutionary views were primarily being embraced by scientists. The traditional structure of society undergirded by the Christian belief in a static, designed world. The most prominent and credible was put forth by Jean Baptiste de Monet de Lamarck (his theory of species to their environment was explained by supposing that individual animals modified themselves in response to environmental change and any resulting changes in their body structure were inherited characteristics). BowPage221

<sup>34</sup> 4083



in 1831 his botany professor invited Darwin to join him as a captain's companion aboard the H.M.S. Beagle on a 5-year journey around the globe. "For five years, Darwin collected specimens, kept a diary, and made countless notes."<sup>35</sup> It is after this voyage that Darwin becomes a closet evolutionist. Remember, evolutionary thought existed already but it was on the fringes. But privately Darwin had been persuaded and his commitment to orthodox Christianity also begins to erode. @slide: Darwin marries@

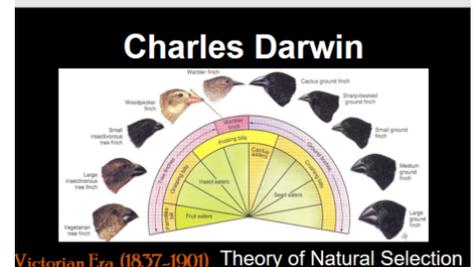
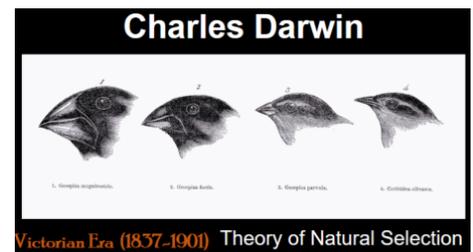
But Darwin's life continues. He marries and has ten children.<sup>36</sup>

But professionally, he continues to focus on evolution. His goal is to explain the origins of plants and animals (including humans) by identifying natural laws. And his work eventually develops into his theory of natural selection. @slide: finches @

Darwin's theory of natural selection is directly based on the patterns he had observed on his five year voyage around the world. The most famous pattern that got Darwin's attention and that played a significant role in the development of his theory of natural selection concerned some finches he observed on the Galapagos Islands.

What Darwin observed was that on different isolated islands, there were finches with that were almost identical, except that the species of finches had slight variations in their beaks from island to island to island that were reflective of their environment. @slide: finches2 @ For example, on one finches tended to eat bugs and therefore had beaks shaped more ideally for eating bugs than the finches on other islands. On another island, seeds were more plentiful and the finches there had beaks shaped better for that. In other words, the finches appeared to be adapted to better survive the specific conditions of the particular island they inhabited. Pretty interesting stuff!<sup>37 38 39</sup>

So, as Darwin is analyzing evidence like this, he has two assumptions. First, Darwin assumes that ALL organisms have variations, which I'm sure we can affirm: no two of us are exactly the same. Second, Darwin also assumes a principle made popular by another scientist, Thomas Malthus, who said organisms (including human beings) collectively produce more offspring than can possibly survive, but that the factor that ultimately *restrains* populations (including human populations) is the limits of the food supply. From this, Darwin deduced there must be a "struggle for existence" where any slight advantage counts. But, in animals, this is not a literal violent struggle between two animals where the strongest prevails, but rather it is a competition of sorts, where the one who is fittest to obtain food in their environment, the most correctly



<sup>35</sup> 3869 moore

<sup>36</sup> [https://en.wikipedia.org/wiki/Emma\\_Darwin](https://en.wikipedia.org/wiki/Emma_Darwin)

<sup>37</sup> Bow loc4116

<sup>38</sup> DFD36-7

<sup>39</sup> Bow loc 4116

adapted, is the one most likely to survive and propagate. So, for example, if on one island there are a lot of bugs but not many seeds, the finches whose beaks vary slightly in the direction of being better at retrieving bugs will eat better, survive longer, and thus leave more offspring than the finches with beaks shaped slightly better for retrieving seeds, and over multiple generations the finches with the bug-beaked traits will be the ones that reproduce and the species in that location will evolve in the direction of that favorable adaptation. It is important to note here that Darwin's theory of natural selection never spoke of entirely new species suddenly appearing. Though the changes Darwin suggested were caused by natural selection were significant, in the big picture they were only slight. In other words, the finches were still finches. They were just becoming better adapted to succeed in their particular environment with each generation.<sup>40</sup>

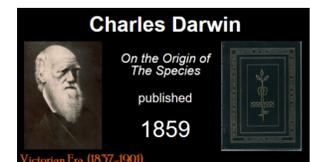
Now, I imagine a lot of this is review for many of you or at least familiar. But what I want to highlight is what made Darwin distinct - and distinctly *concerning* to the Church. While evolutionary thought - the idea that species evolve - was already present before Darwin, it was natural selection, which proposed a *mechanism* for HOW this evolution occurs, that was new. And, the process of natural selection specifically concerned the Church because it implied a *randomness* to it all. With natural selection, the evolution of species seemed to lack any ultimate direction or purpose other beyond survival. This, therefore, conflicted with the Christian idea of an overarching intelligent design to creation or, for that matter, an intelligent designer in God.<sup>41 42</sup>

And we know from Darwin's journals that he recognized the potential conflict with the Church and traditional Christian thought, so he chose to wait on publishing his theories and he also prepared arguments to protect himself from his opponents.<sup>43</sup>

Well, a few years later, by the 1850s, the influence of science is only increasing in British society. @slide: darwin's daughter@ Add to this, that Darwin completely loses his faith at this time in large part correlating with the deaths of his father and his 10 year old daughter, Anne. So, in 1856 Darwin begins preparing his theory for publication, in a book that would be titled *On the Origin of the Species*.<sup>4445</sup>

@slide: origin of the species@

Now, Darwin may have lost his faith, but he was no fool! In the book, he couched his entire argument in the context of a divine creator. He was careful not even to use the word "evolution"; that word doesn't appear in the book until its sixth edition (!). However, there was no way of masking that his theory of natural



<sup>40</sup> Dfd page 39

<sup>41</sup> DFD 39

<sup>42</sup> DFD48

<sup>43</sup> Bowlpage 223 +?

<sup>44</sup> BOWPage222

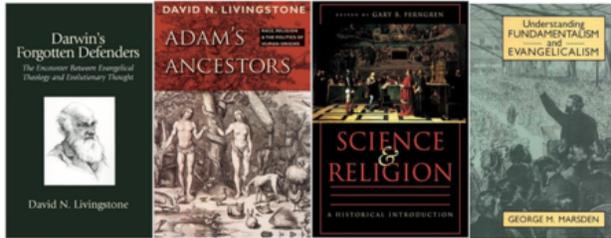
<sup>45</sup> [3996](#)

selection clearly undermined the traditional belief about origins. <sup>46 47</sup>

Y'all are doing great! So, let's take one last break and then we'll come back and finish up by looking at the different responses to Darwinism.

@slide: break slide@

## Technical Support



@slide: response 1859 slide@

### The Response to Darwinism

So, in 1859, Darwin published *On the Origin of the Species* and, in doing so, brought evolution and natural selection to the mainstream, and controversy followed.

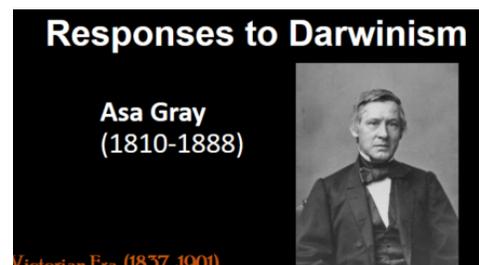
As you might have expected, the first challenge that conservative Bible-believing Christians had was reconciling biological evolution with Genesis' Adam & Eve. This course you're attending was not yet available.<sup>48</sup> ;)

Secondly, many, from both inside and outside of the faith, found the inference that humans descended from animals to be offensive to the *dignity* of man. Understand: Darwinism emerged during the Victorian period, a time where dignity was just about the highest virtue. So it should be no surprise that the monkey-to-man concept was shocking to some people in every camp: liberal, moderate, and conservative.

But a third reason Darwinism hit the Church hard was because the Church, specifically Protestant Evangelicalism, had staked *a lot* on science. Remember the Church had accepted the Nebular hypothesis with little protest and it had worked hard to figure out how to accommodate the interpretation of scripture to old earth findings, as that science emerged. But again, Darwinism was different because natural selection evolution is not governed by an almighty God, but simply by *chance*. As one writer put it, "a sequence of accidental changes."<sup>49</sup>

@slide: asa Gray@

So, initially churchmen argued against evolution as legitimate science. But more and more of the scientists who are Christians are getting on board. In fact, across the



<sup>46</sup> DFD49

<sup>47</sup> moore

<sup>48</sup> 1967

<sup>49</sup> 4130

pond in America, Darwin's biggest promoter was a Harvard botanist named Asa Gray, who was a thoroughly evangelical Presbyterian. Gray noted that in *The Origin of the Species* Darwin had suggested "that animals have descended from at most only four or five (species)... into which life was first breathed."<sup>50</sup> This led Gray to suggest that Darwin had accepted "a supernatural beginning to life on earth", which should make him willing to allow another "special origination" in connection with the appearance of humans.

@slide: descent of man@

Well, this would cause Darwin to regret writing *Origin of the Species* in a way that catered to Christianity. So, in 1871, he wrote *The Descent of Man*, in which he wrote, "Man is descended from a hairy quadruped, furnished with a tail and pointed ears, probably arboreal in its habits, and an inhabitant of the Old World."<sup>51</sup> @slide: cartoons@ With this, he again provoked the ire of many, leading some cartoonists to parody this idea with cartoons depicting Darwin as a monkey.

@slide: aggasiz@

Interestingly, the biggest opponent of evolution was a colleague of Asa Gray's at Harvard named Louis Agassiz, who was a paleontologist. But Agassiz's opposition to Darwin had nothing to do with the Bible. In fact, he was a Unitarian! He disagreed with Darwin because he believed that God created every human *race* for specific geographical zones. Therefore evolution of humankind as an entire species doesn't work. But much like some people had used the debate over human origins during the time of Columbus to justify slavery, Agassiz was committed to his beliefs because he used them to justify slavery and oppose interracial marriage. On the other hand, his colleague at Harvard, the Presbyterian Asa Gray, who vehemently opposed slavery on account of his evangelical faith, used Darwinism and evolution to argue that the slave master and slave were ultimately "blood relations".

@slide: response blank@

Well, by the mid-1870s the idea of organic evolution, had won allegiance of American biologists and geologists, primarily as a result of the overwhelming amount of empirical

### Responses to Darwinism



*Descent of Man* (1871)

"Man is descended from a hairy quadruped, furnished with a tail and pointed ears, probably arboreal in its habits, and an inhabitant of the Old World."  
-Charles Darwin

Victorian Era (1837-1901)

### Responses to Darwinism



Victorian Era (1837-1901)

### Responses to Darwinism

Louis Agassiz  
(1807-1873)

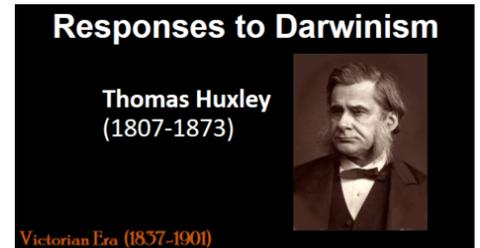


Victorian Era (1837-1901)

<sup>50</sup> NC16

<sup>51</sup> NC17

evidence Darwin and others had produced. In fact, get this, after Louis Aggasiz died in 1873, there were only two professional scientists in North America who were known to be creationists (!!), and **both** of them believe in an old earth, rejected that Noah's flood explained the fossil record, and read Genesis figuratively. So, the majority of professional scientists in America had embraced the evolutionary origin of the species. However, many scientists – perhaps most- remained skeptical that natural selection was the primary or only mechanism.<sup>52</sup> And that had been the Christian's real concern. But it wasn't just Christians who were uncomfortable with the science of natural selection. @slide: response huxley@ For example, in England, Thomas Huxley was an agnostic scientist who was known by the nickname "Darwin's bulldog", both because he looked sorta like a bulldog and because of his ferocious support of Darwin's cause. But Huxley *never could* accept natural selection as the primary mechanism for evolution.



But if Huxley was having trouble with natural selection, you may wonder how could he provide such fervent support to Darwin? Well, Huxley was the ringleader of a group of scientists who were radically opposed to the influence of religion upon science. Huxley himself believed that religion "would eventually evolve itself out of existence."<sup>53</sup> But since long before Darwin published the goal of these scientists had been to remove science "from any connection with religion." But the institutional *link* between science and the church, particularly in America and England, had always remained too strong for them to make any headway. However, once Darwin came along, they see his views as perfectly suited to their campaign. They believed "Darwin's massive array of evidence was aimed directly at the concept of (intelligent) design, (which had been) the link between Christianity and science that had been hardest to dissolve."<sup>54</sup> So, even though Huxley didn't even personally accept Darwin's theory of natural selection, he and others promoted Darwin vigorously and enthusiastically!<sup>55</sup>

Well, remarkably, "a number of recent historians (who are experts on) the reception of Darwinism seem largely agreed that, in the early decades after *Origin of the Species*, (the) "warfare" framework for understanding the relationship of Christianity to Darwinism was developed and promoted primarily by ardent opponents of Christianity," by scientists who opposed the Church's influence on science!<sup>56</sup>

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<sup>52</sup> NC17

<sup>53</sup> 205

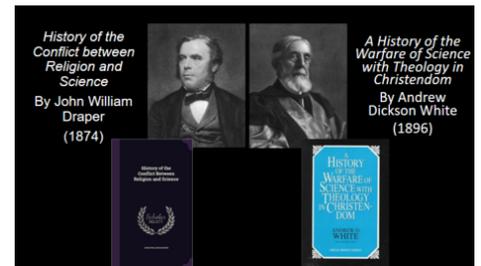
<sup>54</sup> 2032

<sup>55</sup> 2032

<sup>56</sup> 2006

@slide: draper.white@

And in the 1870s, John Draper and Andrew White published books suggesting that the relationship between religion and science has primarily been a relationship of warfare and conflict. John Draper wrote *History of the Conflict between Religion and Science* in 1874, while Andrew White wrote *A History of the Warfare of Science with Theology in Christendom* in 1896, but he wrote a less-famous book on the same theme that came out around the same time as Draper's. But these two books were instrumental in cementing the conflict thesis – that the relationship between religion and science has primarily been a relationship of conflict – these two books cemented this into the minds of western society at large, and their influence looms large to this day. And yet, it turns out that Draper and White, were each motivated by scores they wanted to settle against the Church. In the case of Draper, his agenda was against the Roman Catholic Church, which in the 1870s was really pushing the doctrine of papal infallibility, a dogma that Draper resented and feared. In White's case, he had been president at Cornell University, which was a school that was intentionally founded without any affiliation to religion, which put White on the receiving end of "withering criticism and innuendo directed at him personally by some religious figures."<sup>57</sup> So both of these men were extremely motivated to enhance the public appreciation of science and had huge axes to grind against the Church, and so they each wrote books that had the appearance of sound history, but that no one respects as historically accurate any longer. And yet, they were effective in establishing this myth that science and the Church were at war in the minds of the public. And, as we will see next week, when we turn to the 1900s, much of the church would come to believe this and proceed to *actually go to war* with science! And, in doing so, they would play right into the Draper and White's plans. ##



@slide: vatican @

Now, some of you might be wondering a bit about what the Roman Catholic Church's reaction was to Darwinism. But, there really *wasn't* much official response until 1941. A year after Darwin published (in 1860) some German bishops came out with a statement against evolution, but that's pretty small potatoes. In the most significant Roman Catholic event of that era: the First Vatican Council of 1868, there was notably no mention of evolution.<sup>58</sup> #

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So, by the 1870s the dust has begun to settle in response to Darwinism. The scientists

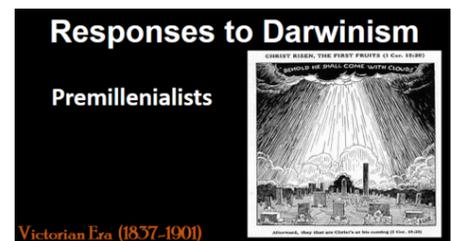
<sup>57</sup> 384 and [RUSSELLconflict285](#)

<sup>58</sup> [https://en.wikipedia.org/wiki/Catholic\\_Church\\_and\\_evolution](https://en.wikipedia.org/wiki/Catholic_Church_and_evolution)

in the Church had overwhelmingly accepted evolution, but remained dubious about the natural selection being the singular mechanism. But the theologians and ministers lagged a bit behind. However, until 1875, when churchmen opposed evolution, they typically criticized it on scientific grounds, calling it an unscientific theory. But “after 1875, when it became clear that the majority of American scientists had embraced organic evolution, protestant leaders (who opposed the theory) sought to prove (it) invalid by stressing its inconsistency with the biblical Christian message.” However, none of them “insisted on compressing the history of life on earth into a mere six thousand years” – they either held to the day age or the gap theory – and none of them “invoked (Noah’s flood) to explain the fossil record.”<sup>59</sup>

@slide: premills @

Perhaps the most outspoken critics of evolution among the churchmen were Pre-millennialists. Pre-millennialists (e.g. the Advent Christian Church) were Christians who predicted Christ’s return was imminent, sometimes even predicting specific dates, based on very literal readings of scripture. Well, their commitment to this belief painted them in a corner when it came to accommodating scripture to accept evolution, because if they accepted that the creation account in Genesis was a myth, which seemed like the only other option in those days, that would undermine the literal interpretations that support their beliefs about the second coming they were so committed to.<sup>60</sup> #



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But by 1880, an article in a weekly religious magazine reported that (quote:) “perhaps a quarter, perhaps a half of the educated ministers in leading denominations believed that the story of creation and the fall of man, told in Genesis, (to be) no more a record of actual occurrences than is the parable of the prodigal son.” In other words, only twenty-one years after Darwin published, perhaps as many as half of seminary educated ministers had come to believe Adam and Eve weren’t real people. Now, whether you think that’s good or bad or goes too far, this is certainly different from the impression we get from those who pedal the conflict thesis.<sup>61</sup>

But until this time, most lay Christians were pretty unaware of and disengaged from the debate over Darwin. It was only in the 1880s and 90s that the debate really began to spill over into popular culture. And on the lay front, “the majority of (Americans in this era) remained

<sup>59</sup> NC25-6

<sup>60</sup> NC26-7

<sup>61</sup> Numbers 15

true to a traditional reading of Genesis.”<sup>62</sup> And yet, of the small number of those laypeople who wrote on the subject very few believed in a young earth, and even less attributed the fossil record to Noah’s flood.

So there was an interesting dynamic in the late 1800s where...

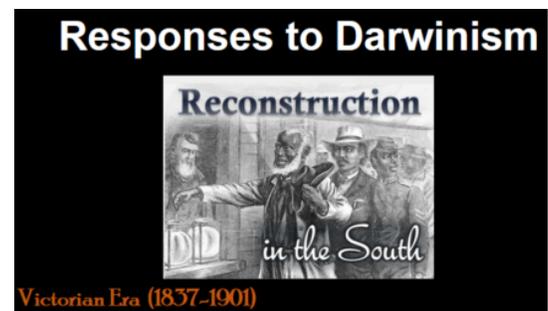
- the scientists had accepted evolution,
- the ministers were only halfway there,
- and the laypeople were even further behind.

But what is remarkable is that “this surprising amount of diversity did not degenerate into factionalism. Rather, the channels of communication between individuals in different camps remained quite open!” In fact, what we *can* say with some certainty is that, in the Protestantism of the late 1800s, opposition to evolution was “seldom made a test of evangelical faith.” *No one* believed that accepting organic evolution disqualified someone from being a Christian. That is, except for in one particular region of America: the South. <sup>63</sup>

### The American South

@slide: reconstruction @

For the third time this morning we see a significant connection between the debate on origins and racism. Remember, the American Civil War began just two years after Darwin’s book was released (1861) and ended in 1865. After the war was over, Christians in the South were particularly resistant toward evolution, first of all because they associated it with the Northern Liberal attitudes. But also because for a Christian to accept evolution required accepting an interpretation of scripture other than the straightforward, literal reading. And for Southern Christians any non-literal interpretation of Scripture was a direct threat to the institution of slavery. For generations, southerners had utilized a strict and straightforward reading of Scripture to justify slavery- Ephesians 6:5-8 "Slaves obey your earthly masters with fear and trembling" and other such cherry picked New Testament verses are examples. To accept evolution was to accept a nuanced reading of scripture which consequently (and may I add correctly) undermined a scriptural case for slavery. So in the late 1800s, Christian opposition to Darwin and evolution found a safe haven in the American South. This is important because we will see that this opposition bubbles up in a big way later on and greatly shapes the polarized



<sup>62</sup> NumbersSRloc 5108

<sup>63</sup> DFD145

atmosphere around evolution for much of the 1900s in America.<sup>64</sup>

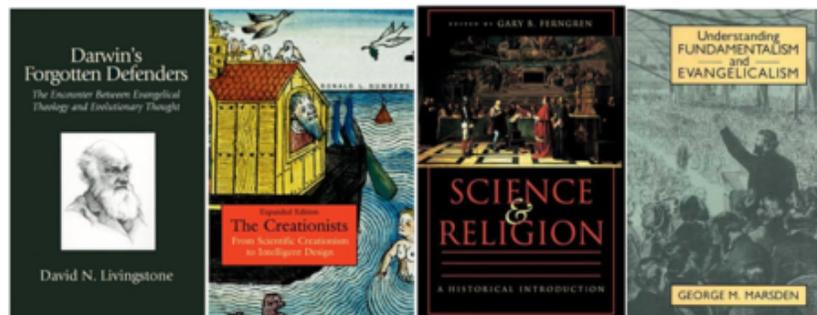
@slide: class logo @

So by the closing years of the 19th century (the 1800s), evolution had begun infiltrating even the ranks of the evangelicals, and most assumed that creationism “seemed destined to go the way of the dinosaur.”<sup>65</sup> Almost every professional scientist in America had accepted some form of organic evolution, all but the most conservative theologians and pastors were trending in that direction (including an increasing number of evangelicals), and even the creationists overwhelmingly believed in an old earth. So, how would it come to be that by 1991 47% of Americans believed that “God created man pretty much in his present form at one time within the last 10,000 years” and in 2005, two-thirds of Americans polled said ‘creationism’ is either definitely or probably true, and in 2004 87 percent of American evangelicals would believe that the entire world was created in six literal days and that there really was a flood that covered the whole globe?<sup>66</sup>

Well, I want to invite you to come back next week and find out.

@slide: technical sources @

## Technical Support



<sup>64</sup> This marsden quote is actually DFD124

<sup>65</sup> [5102](#)

<sup>66</sup> Lameroux loc 700





# Adam & Eve & EVOLUTION

A 5-week survey of the spectrum of Christian perspectives  
on scientific findings and interpreting Genesis 1-3

## Class 1

**History of the Relationship between the Church & Science**  
(Early Church through 1900) [2:30]

## Class 2

**History of the Rise of Creationism in America** (1900 to the  
Present) [1:00]

**Introduction of Six Models for Interpreting the Scientific  
Findings on Origins** [43:15]

**Examining the differences between Scientific Terms:  
Hypothesis, Theory,  
Law, & Model** [1:00:55]

**Scientific Findings on the Origin of the Universe** [1:08:10]

## Class 3

**Scientific Findings on the Origin of Life** [2:40]

**Interpreting Genesis 1** [33:55]

Barrick (Young-Earth Creationism) [45:10]

Collins (Old-Earth Creationism) [53:07]

Lameroux (Planned Evolution) [1:00:42]

Walton (Directed Evolution) [1:08:21]

## Class 4

**Scientific Findings on the Origin of Species** [1:20]

**Interpreting Genesis 2-3** [32:09]

Barrick (Young-Earth Creationism) [42:33]

Collins (Old-Earth Creationism) [47:56]

Lameroux (Planned Evolution) [52:35]

Walton (Directed Evolution) [1:00:03]

## Class 5

**Scientific Findings on the Origin of Humans** [1:02]

**Why what we believe about Human Origins matters** [34:55]

**A Fifth Perspective on Genesis 2-3**

Beyond Galileo to Chalcedon – Smith & Cavanagh  
[39:39]

What stands on the Fall? – Smith [47:42]

Reading Genesis 3 Attentive to Evolution –  
Middleton [1:03:26]

“Adam, what have you done?” – Green [1:32:19]

**Conclusion** [1:41:00]