MAPPING THE CREATION-EVOLUTION DEBATE IN PUBLIC LIFE

by

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(Under the Direction of Edward Panetta)

ABSTRACT

Evolution versus creation is a divisive issue as religion is pitted against science in public discourse. Despite mounting scientific evidence in favor of evolution and legal decisions against the teaching of creationism in public schools, the number of advocates who still argue for creationist teaching in the science curriculum of public schools remains quite large. Public debates have played a key role in the creationist movement, and this study examines public debates between creationists and evolutionists over thirty years to track trends and analyze differences in arguments and political style in an attempt to better understand why creationism remains salient with many in the American public.

INDEX WORDS: Creation; Evolution; Public Debate; Argumentation; Political Style; Bill Nye

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INTRODUCTION

Introduction to the Controversy

Evolution versus creation is a divisive issue as religion is pitted against science in public discourse. As Gallup polls and National Science Foundation polls have found, as many as half of the United States populous still reports holding creationist views.[1] Dan Kahan writes, "Evolution is a special kind of issue. The position you take on it is an expression of who you are in the world in which there are many diverse sorts of people and in which there is a sad tendency of one sort to ridicule and hold in contempt those of another."[2] Many of these appeals have fomented themselves in public arguments and debates over creationism and evolution. A recent prominent public debate occurred on February 4, 2014 as Bill Nye "The Science Guy" debated Ken Ham, the founder and CEO of the Creation Museum and the Young Earth Creationists, on the merits of evolution and creationism at the Creation Museum in Petersburg, Kentucky. The topic of the debate centered on the question: "Is creation a viable model of origins in today's modern scientific era?" Though there were only 900 seats available at the Creation Museum, the debate was viewed live on the Internet by an estimated 750,000 people at the time. Many more have watched the broadcast since then on YouTube, and perhaps even a few saw the rebroadcast of the debate on C-Span 15 days later.

Despite the decades of evidence in support of evolutionary science, creationist beliefs still hold great sway over the general public. According to a 2012 Gallup Poll on the issue, approximately 46% of Americas believed that God created man in the present form within the

last 10,000 years.[3] Another poll, this one from the Pew Research Center in 2013, found that 60% of Americans believed that humans and other living things have evolved over time," while 33% rejected the idea of evolution, stating that "humans and other living things have existed in their present form since the beginning of time."[4] Perhaps the Nye vs. Ham debate will shift public perception of this important topic, but only time will tell.

Justification for the Study

Despite the scientific evidence in favor of evolution and legal decisions against the teaching of creationism in public schools as part of science curriculum, the number of advocates who still argue for creationist teaching in the science curriculum of public schools remains quite large. This study is looking into the ways that public debates have played a role in maintaining this strong contingent of advocates. Specifically, I examine how creationists have adapted their arguments over time in these public debates and why these arguments remain salient within the general public. In addition to the ways in which creationist arguments have changed, I will be looking to examine how evolutionist arguments have changed as well. By mapping the arguments on both sides of the controversy, I hope to identify the strengths and weaknesses of both creationist and evolutionist forces and to describe the effectiveness of both positions in public debates. In short, this essay is designed to examine the creation/evolution controversy as played out in three public debates and to examine the reasons why creationism continues to maintain a strong hold over many in the general public. In order to address these issues, I will study creation/evolution debates using two different vantage points: argumentation and political style. Given my background within the biological sciences and teaching biology, I am committed to and believe strongly in the teaching of evolutionary science in public schools.

Through this study, I hope to provide a better understanding of the debates and strengthen the case of evolutionist advocates for evolutionary science curriculum in public schools.

This thesis tracks the creation/evolution debates and the argumentative and stylistic changes by comparing three debates. These debates are Duane Gish versus Russell Doolittle (1981), Duane Gish versus Kenneth Saladin (1988), and Ken Ham versus Bill Nye (2014). I focus on the Bill Nye and Ken Ham evolution/creation debate from 2014 to understand how this debate compares to the two debates from the 1980s. The Nye-Ham debate is interesting to study because Bill Nye is not a credentialed scientist but an engineer by trade. Instead of claiming credibility due to a scientific background, Nye is perceived as credible because of his public persona and his brand as "The Science Guy." As a result, Nye is recognized as a voice of science and an entertainer in the media age. Due to the recency of the debate, there has been scant discussion over the Bill Nye and Ken Ham evolution/creation debate within the literature. As a result, this is a largely uninterrogated text that should provide insight to the ongoing controversy.

Creationism and the Creationist Movement

Evolutionary science first rose to prominence in 1859 when Charles Darwin published his book "The Origin of Species." Evolutionary theory is based on a couple of overarching premises. These include the idea that more organisms are produced than can survive, variation in traits will make some offspring better adapted to survive, and these traits will be passed down to future generations.[5] Creationism is often viewed as the counterpoint to evolutionary science and refers to the viewpoint that the literal interpretation of the Biblical account of the origin of the species is the correct explanation for the existence of the earth and the living beings on it.[6] However, it was not until the 1960s that creationism came to refer to a Christian fundamentalist

movement that sought to have a scientific formulation of the biblical account of creation taught in public schools"[7]

Creationism is essentially a religious discourse, though creationists have created a secular branch of their belief in what has been termed creation science. However, creationism is hardly a unified movement. There are several different types of creationism, including Old Earth Creationism, Alternative Gap Creationism, Progressive Creationism, Theistic Creationism, Intelligent Design, and Young Earth Creationism to name a few. However, Young Earth Creationism (YEC) is the focus of this thesis because each of the debates examined include those affiliated with YEC. Young Earth Creationist's believe in the inerrancy of the Bible and believe that the book of Genesis is a literal, historical text of the creation of the universe, life, and energy. Leading creationists argue that creation is the foundation for all Biblical doctrine, and this requires adherence to a literal reading and interpretation of the Bible. This places the discourse firmly within that of Protestant fundamentalism. Within this belief structure, YEC's believe that God created the universe in six days and not more than 10,000 years ago, though most believe that the earth was created closer to 6,000 years ago.[8]

Although there is a general consensus within academic studies of creation science that it is a religious discourse, many of the leading proponents of creation science disagree with this characterization. This version of creationism is distinct from previous creationist discourses because the argument has shifted to claiming that creationism can be seen as a scientific model of origins parallel to model of evolution. The names of the creationist organizations are telling with names such as the "Institute for Creation Research" and "Creation Research Society" because creationists either view themselves as scientists or are posturing to be viewed as scientists by the general public. Many of the most prominent members and advocates of

creation science are not preachers but those who have training and degrees in the sciences, many of whom have Ph. Ds.[9] By positioning themselves as scientists, creationists implicitly seek to be recognized as members of the scientific community, but the mainstream American scientific community has consistently and forcefully rejected and excluded creationist voices.

History of the Movement

Ban on Teaching Evolution and the Scopes Trial

The creationist movement began in earnest in the 1920s as creationists moved to ban the teaching of evolution in public schools. This move began in 1919, as fundamentalists were fresh off of a major success in promoting the ratification of the Eighteenth Amendment banning the sale of alcohol. After this victory, conservative prohibitionists began a new crusade to reform social and moral behavior. Their target this time was teaching evolution because high school years were seen as a critical time in adolescent development, and it was during these years that children were viewed as most impressionable at the time.[10] In addition to the vulnerability of children at that age, more people were attending high schools than ever before, with public schools playing an increasingly important role in U.S. society.[11] Because of the rising importance of public schools and the perceived vulnerability of these students, high school science classes became an attractive target for those who believed that teaching evolution harmed the spiritual and moral development of students.[12] This led to the passage of laws outlawing the teaching of evolution in public schools.

The first and most prominent of these laws was passed in Tennessee in 1925 in what was called the "Butler Act." After the passage of the Butler Act, several states followed suit with Mississippi (1926) and Arkansas (1928) each legally prohibiting the teaching of evolution.[13] It was under the Butler Act that John T. Scopes was prosecuted in 1925 in what would become

known as the "Scopes Monkey Trial."[14] In the *State of Tennessee v. John Thomas Scopes*, Scopes was found guilty under Tennessee state law of teaching evolution in schools and fined $100 for the offense.[15] The decision was appealed to the Tennessee appellate court, which confirmed the constitutionality of the Tennessee antievolution statute but vacated the decision against Scopes because only a jury, not the judge, could assess a fine that high. The Tennessee Court explicitly recognized the law's purpose to promote the Biblical version of creation and upheld the law. After the appeal, prosecutors declined to pursue charges against Scopes again, which prevented Scopes from taking his challenge to the Supreme Court.[16] As a result of the case, the word evolution disappeared from textbooks and would not reappear for decades as new editions refused to include the term and even deleted the word evolution and the name Darwin from their indexes, with some textbooks even adding in religious materials.[17] It would not be until 1968 that these laws would be ruled unconstitutional.[18]

Balanced Treatment

In the post-Scopes era, the antievolution laws remained on the books for more than 40 years, with teaching evolution illegal in several states.[19] It was not until 1957, when the Soviets launched Sputnik that the United States began to focus its attention again on science education in primary and secondary schools.[20] The federal government instituted several reforms, including funding the Biological Sciences Curriculum Study that found that the United States lagged some 20 years behind other nations in biological research and education. This prompted the study scientists to not shy away from controversial subjects such as evolution.[21] Textbooks were revised to include evolutionary science, and this set the stage for another conflict between creationists and evolutionists. This time, the result was a landmark ruling in the Supreme Court

case, *Epperson v. Arkansas (1968)*, in which the prohibitions against teaching evolution in public schools were found in violation of the constitution.[22]

The *Epperson v Arkansas* (1968) Supreme Court case stemmed from a Scopes era law prohibiting the teaching of the theory of evolution that "mankind ascended or descended from a lower order of animals," as well as prohibiting textbooks from promoting the theory.[23] The Court unanimously decided that the law in question was in violation of the First Amendment's establishment clause because it amounted to an impermissible intrusion of religion into public school curriculum.[24] This decision set the standard against which all cases challenging antievolution statutes would be held against.[25]

Instead of ending the religion-in-school controversy, the ruling in *Epperson* prompted creationists to change tactics and to demand their ideas be taught alongside evolution as "creation science."[26] In fact, several fundamentalist organizations were created to promote the idea that the Biblical creation story was supported by scientific principles. This, creationists claimed, meant that creationism should be viewed as a viable alternative to evolution and taught on the same basis as standard science to promote a balanced approach to the teaching of both views.[27] Bolstered by the perceived credibility of the new name of "creation science," antievolutionists renewed efforts to teach creationism by advocating for "balanced treatment" statutes.[28] During the 1980s, bills promoting the teaching of creationism alongside evolution appeared in at least 26 states, with several states, including Louisiana and Arkansas, passing these statutes.[29] The balanced treatment statutes in both Louisiana and Arkansas were challenged in court and deemed unconstitutional.

The Arkansas Legislature passed a statute titled the "Balanced Treatment for Creation-Science and Evolution-Science Act" declaring that creation was a science like evolution, and if

evolution were taught in schools, then creation must be given equal and balanced treatment.[30] The statute, Arkansas Act 590, was intended to appeal to an American sense of fairness and was based on the principle that students should have the right to decide what they believed to be correct between the two opposing theories presented. This defense was based on the idea of "academic freedom."[31] Despite the allure of academic freedom, the Supreme Court applied the precedent from the *Epperson* case claiming that the law violated the establishment clause of the First Amendment in *McLean v Arkansas* (1982). The court decided that the balanced presentation "would constitute the establishment of a religious view because creationism necessarily involved a Creator, understood, at least in the Western world, to be the Judeo-Christian God."[32]

At the same time as the *McLean* case, the Louisiana legislature was considering a very similar bill, and in 1982, Louisiana passed the "Balanced Treatment for Creation-Science and Evolution-Science in Public School Instruction Act." This statute was based upon a model bill that had been circulated by creationists working at the grassroots level, and the law declared that public schools that chose to teach evolution science also had to teach creation science. Just as in the Arkansas case, the law was justified based upon "academic freedom."[33] In the wake of the *McLean* decision, the Louisiana legislature anticipated a similar challenge to the bill and purged the bill's definition of creation science and left only the "the scientific evidences for creation and inferences from those scientific evidences."[34] The statute did not require a school to teach evolution or creation science, but if either was taught, the other was also required. However, this statute was challenged in the courts, and the Supreme Court ruled in *Edwards v. Aguillard* (1987) that despite the tactical vagueness of the law, the statute violated the First Amendment's establishment clause because the act "impermissibly endorses religion by advancing the religious

belief that a supernatural being created humankind."[35] This decision effectively ended the balanced treatment movement but not the antievolution movement as a whole.

"New Justifications"

After the *Edwards* decision in 1987, creationists adapted their tactics once again to include pushes within state legislatures and local education boards to remove evolution from mandatory standardized tests and requiring teachers read disclaimers before teaching evolution saying that evolution is "just a theory."[36] Other moves include having teachers teach evidence against evolution while teaching the theory. Teaching the evidence against evolution, ironically, comes from the dissenting opinion of Justice Scalia in the *Edwards* case. Justice Scalia wrote:

> The people of Louisiana, including those who are Christian fundamental-ists, are quite entitled, as a secular matter, to have whatever scientific evidence there may be against evolution presented in their schools, just as Mr. Scopes was entitled to present whatever scientific evidence there was for it.[37]

It was fairly easy for creationists to repackage creation science as evidence against evolution because a large portion of creation science had always consisted of criticisms of evolutionary science, and it provided creationists with a ready made new strategy.[38]

Within a decade of the *Edwards* case, the U.S. District Court for the Eastern District of Louisiana was confronted with a challenge to the requirement that teachers read a disclaimer saying that evolution is "only a theory."[39] It was in *Freiler v. Tangipahoa Parish Board of Education* (1997) that the court ruled against the disclaimer as well as "intelligent design," claiming that intelligent design was equivalent to creation science and that both promoted religious views that violated the First Amendment. Despite losing every legal challenge since the *Scopes* trial, creationists continue to push for antievolution legislation, choosing to slightly modify the laws to try to conform to the previous rulings. One thing is sure, the creationists are

not going to give up any time soon, and the creationist movement will continue to evolve and push for new statutes against evolution.

Creation-Evolution Debates

Creation/evolution debates are a critical site of study for understanding the creationist movement. Despite the emphatic legal decisions against creationist legislation aimed at public school science curriculum, creationists maintain a strong public presence through their debates with evolutionists. Public debates between creationists and evolutionary scientists have played an important role in the creationist campaign since the 1970s, with more than 300 such events between creationists and evolutionary scientists throughout the 1970s and 1980s all over America.[40] These events help the creationist movement gain publicity and respectability, which helped the creationists change their image from "backwoods ignorance associated with the old anti-evolution crusade to some sort of respectable alternative to evolution."[41]

Creationists began to target university campuses for their campaigns in the early 1970s with lectures and seminars put on by the Institute for Creation Research (ICR), and the first public debate was actually a result of an unscheduled exchange at the end of one of these seminars in 1971. This first debate occurred between Duane Gish of the ICR and G. Ledyard Stebbins and a few of his evolutionist colleagues. After presenting a two-day seminar on creationism, a professor invited Gish to the final class session of his creation-evolution special study course. Gish accepted the offer and showed up to an auditorium that was packed to capacity of nearly 800 seats. At the end of the lecture, an extemporaneous debate broke out between Gish and the evolutionary scientists that lasted over two hours, marking the first ICR campus debate.[42]

The first formally organized debate occurred at the University of Missouri in Kansas City in October of 1972 between Henry Morris (ICR) and Robert Gentile, a professor of geology at UMKC. Despite this being a formally organized debate in which Gentile had the opportunity to prepare, he apparently did not do so, and it did not go well for him. Even the campus newspaper wrote favorably of Morris, and this led to many other invitations by creationists to evolutionists to debate at university campuses.[43] Unfortunately for evolutionist debaters, the UMKC debate was typical of the early public engagements because they did not heed the lessons that should have been learned in the first organized debate, as evolutionist debaters largely ignored creationist beliefs and either did not bother to learn or to prepare for creationists' anti-evolutionary arguments. Instead, these scientists continued to believe that the simple enumeration and the power of the scientific evidence presented would be more than enough to win these debates. Because these scientists were unfamiliar and unprepared for creationist tactics and arguments, creationists did well in these encounters, which helped move the creationist movement forward.[44]

Creationists noticed that these debates were aiding their cause and began to make the campus debates the focus of their program. At first, Henry Morris, the president of the ICR, was skeptical of the value of the events, but he noticed that they were drawing a larger audience and more non-Christians and non-creationists than any of their other methods. Morris noted, "Of all the many types of meetings held by ICR speakers, the campus creation–evolution debates have undoubtedly received the greatest attention" and provided "a tremendous open door for the spread of creationism."[45] As a result, these campus debates quickly became a favorite method of the ICR and other creationists in the promotion of creationism. Creationists would debate prominent scientists at high schools, colleges, and universities. By debating well-known

scientists, creationists were able to generate considerable respect and credibility for their position.[46] Hee-Joo Park argues, "Creationists deliberately chose university campuses, the heart of academia, for their battleground and let their scientist to combat another scientist from the evolution camp in front of a crowd of spectators on the merit of creationism. This image helped establish creationism as an intellectually viable alternative to evolution in the public mind."[47] This was all aided by the poor performance of evolutionists against creationists in the early days of the debates. The development of this tactic by creationists may have come about by accident, but other groups have intentionally adopted the same approach of having on campus debates, such as the People for the Ethical Treatment of Animals because they have seen the effectiveness of such events in providing intellectual legitimacy and generating large audiences. These on campus debates provide these groups with a public and visible outlet for their viewpoints because they provide an academic location and a young audience.

Regardless of the participants' performance in the debate, the fact that the debates were happening at all helped promote creationist causes with the general public. This largely comes down to the form of debates and the way that they are perceived. These creation/evolution engagements operate under the general form of a debate, which involves regular features such as a series of sequenced, timed, and opposed speeches before an audience. For creation/evolution debates, the audience is largely composed of non-specialized individuals.

The form of a debate produces three generic values: democratic choice, equality, and dichotomous confrontation.[48] Each of these values helps promote creationist causes with the public. As Joyce Arthur notes, "Debates are a poor forum for imparting the complexities of science and evolution, and a good forum for delivering the simplistic and often eloquent rhetoric of creation science. Having a debate implies that creation and evolution are on equal terms and

that the question of which one is right is an open issue that can be won or lost, and confidently decided, by a non-scientific audience within one evening."[49]

The first generic value endemic to a public debate is that of democratic choice. The form directs an audience to decide between two options, and the choice is up to the people. One of the important functions of these public engagements was that the audience deciding the debates between creationism and evolutionism was non-specialist. This plays to the strengths of creationists because they had no other place to go with their position because the courts and the scientific community had rejected their arguments. By moving the debate from areas of specialty to the general public, creationists were able to make arguments that have little appeal or persuasiveness in the technical sphere.

The second generic value of a public debate is that of equality. The form of the debate places both sides of the issue on equal footing by its very nature. This creates the perception that there is actually a scientific dispute between evolution and creation over the scientific basis for these positions. This helps creationists overcome the presumptive control of evolutionary science within the technical sphere.[50]

In addition to the structure and form of the debate, media coverage of creation/evolution engagements also contributes to the public perception that creationism is a scientifically viable alternative to evolution and ultimately rewards creationists with more legitimacy than they otherwise would have with the public. As Taylor and Condit note in their study of mass media coverage of the creation/evolution controversy in the *McLean* case, the norm of objectivity in media coverage promotes creationist causes it requires that the media provide equivalent space to both sides of the controversy without regard to judgments about the relative merits of the sides.[51] This means that from the outset both sides are treated as equally valid discourses, even after the

rejection of creationist arguments in the technical sphere. If the reporters covering the creation/evolution engagement lack scientific training, then the press faces the problem of fairly reporting on the debate between scientific and populist discourses to a nonscientifically trained and populist public. [52] Media coverage of scientific issues has a great effect on the public perception of these issues. For non-scientists in the United States, including many policymakers in Washington, their understanding of science and scientific issues comes from what they receive from the mass media.[53] This means that the norm of objectivity helps construct the public perception that creationism is a competing scientific theory of human origins, and the commitment to fair and balanced treatment of the issue helps to rhetorically transform creation and evolution into equivalent discourses.[54]

The third generic value of public debates is that it helps construct a dichotomous opposition between the two sides. This is built around the assumption that the opposing sides in the public debate are discrete and oppositional and that this confrontation is valuable.[55] This value of debate reinforces the construct that there are only two possible options when it comes to human origins: (Biblical) creationism or evolution. This dichotomy also reinforces the suggestion that whichever side wins is not only the "better" option but the only option. When creationists won regularly during the early debates, the debate form instructed the audience about which was the superior position.[56]

Resolution Construction in Creation Evolution Debates

A resolution is the crucial starting point to any debate because it sets the bounds and scope of the debate and lays out the ground from which each side can argue. The way that resolutions are constructed has a significant impact on the structure and quality of the arguments presented because they provide a direction for the debate. For example, if a creation/evolution

debate resolution states, Resolved: The theory of evolution is the best explanation of the scientific evidence related to origins, then the burden is squarely on the evolutionists to prove this claim true. However, creationists would have no such obligation in this case and would occupy the role of a skeptic who has no case to prove but only needs to adequately criticize evolution to fulfill their duties in the debate.

Creationists understood this crucial point and used it to their advantage. In the early debates, evolutionists often did not pay attention to the resolutions or the terms of the debates before agreeing to the event. This allowed creationists to set the terms of the debate with resolutions worded so only evolution was discussed and criticized in the debate.[57] This put evolutionists in extremely difficult situations and played to creationist strengths because evolutionists were forced to defend whole areas of evolution from a barrage of anti-evolution attacks.[58] Creationists were also quite good at using the major debates within evolutionary science, such as the dispute over the mechanism of evolution, against itself in these debates to create doubt in the validity of evolutionary theory.

Evolutionists began to understand the creationist tactics behind the wording of the resolutions in the early 1980s, and the direction of the resolutions began to shift as evolutionists began to negotiate the wording of the resolutions with creationists.[59] One of the prime examples of this shift came in what became known as the Fezer v. Morris non-debate. In 1982, Karl D. Fezer, a biology professor at Concord College was approached by a creationist to have a debate with Henry Morris. Fezer agreed to meet with Morris to go over the debate topics, and Fezer was given the proposed debate topic of: "The Theory of Evolution is Superior to the Theory of Special Creation as an Explanation for the Scientific Evidence Related to Origins."[60] Fezer wisely declined and suggested that the debate topic should be changed to the ICR's most

consistent claim: "The creation model is at least as scientific as the evolution model, and is at least as nonreligious as the evolution model."[61] This was an attempt to move the debate away from always being about evolution and towards more equal ground. Morris refused to "mix science, religion and philosophy in the debate" without explanation.[62] It became clear that Morris did not want to discuss the possibility of the age of the earth or the Noachian flood. Morris understood that to discuss this aspect of creationism in a public debate would immediately put him on the defensive and force him to provide empirical evidence for accepting these claims, and the debate was eventually called off.[63]

In 1983, evolutionists successfully negotiated the wording of the resolution with creationists that shifted the burden of proof to the creationists in the debate between Frederick Edwords and Duane Gish. After negotiations, Frederick Edwords, the editor of the Creation/Evolution Journal, agreed to debate Duane Gish, the vice-president of the ICR and held a Ph. D in biochemistry from University of California at Berkeley. Gish was the arch-debater for the creationists, and his aggressive and vigorous debating style garnered him the nickname "Morris's Bulldog," echoing Huxley's supposed nickname of "Darwin's Bulldog."[64] This was not the first debate between these two, as he had debated Gish three times already, once in 1978 and twice in 1982.[65] The debate topic initially given to Edwords read "Resolved: The theory of evolution is a better explanation for the scientific evidence related to origins than the theory of special creation."[66] Edwords was ready for creationist tactics about a resolution, and he proposed that the topic be replaced and gave Gish a list of alternative topics designed to defend the unstated premises of the creation model. These included "the age of the earth, historicity of Noah's ark, contemporaneity of dinosaurs and humans, and equal-time policy for creationism in public schools. Edwords argued that these topics were perfectly relevant for a public debate."[67]

Gish rejected this list, and eventually, the two agreed upon the resolution: "Resolved: The theory of special creation offers a better explanation for the fossil record than does the theory of evolution."[68] This slight change in wording helped ensure that the burden of proof would shift to the creation side and illustrates the importance of the way resolutions are worded because of the effect that it has on the structure of the debate and the arguments presented.

Debates Chosen For Study

For this study, I chose to examine three creation/evolution debates. The first is the debate between Duane Gish and Dr. Russell F. Doolittle that occurred in 1981. The second is the debate between Duane Gish and Kenneth Saladin that occurred in 1988. The final one, which is the focus of this study, is the debate between Bill Nye and Ken Ham that occurred in 2014. It is through the lens of the Bill Nye-Ken Ham debate that I came to choose the two other debates for comparison.

Gish-Doolittle (1981)

The first debate chosen for this study occurred between Dr. Duane T. Gish, who had a Ph. D. in biochemistry and represented the ICR, and Russell F. Doolittle, a biochemist and professor from the University of California. This debate was organized by Dr. Jerry Falwell's *Old-Time Gospel Hour* and took place at Liberty Baptist College in Lynchburg, Virginia on October 13, 1981.[69] Surprisingly, I found no formalized resolution for this debate. Instead, the debate was simply described as evolution versus creation. Before this event, evolution-creation debates were local affairs that failed to gather national attention, with more than 15 debates per year throughout the 70s and 80s.[70] However, this debate was the first to receive a national audience.

At the time this debate took place, it was the biggest creation/evolution debate and was planned to be broadcast live to a national audience. According to the spokesperson of the *Old-*

Time Gospel Hour, "We are billing it as the greatest thing since the Scopes trial. It'll make great television; people can turn off the jigglies and the cop shows and turn on…a great debate."[71] Unfortunately, the debate was not aired live due to financial constraints of the *Old-Time Gospel Hour* at the time, but it was later aired from tape on national television in the spring of 1982.[72] Even so, the debate occurred in front of a live audience of approximately 5,000 people. Dr. Falwell was trying to capitalize on the perceived momentum of the creationist movement, since Arkansas and Louisiana had each passed a "Balanced Treatment Act" to allow creationism and evolutionary science have equal time in the classroom.[73]

Due to the media coverage of the event, the size of the audience, and the topic itself, evolutionists took this debate seriously and Dr. Doolittle prepared extensively for the event. He did so beginning in 1980 with a small, informal network of people interested in the debate, including those involved with the *Creation/Evolution Journal*, the Committees of Correspondence, and the Evolution Education Committee of the National Association of Biology Teachers.[74] His preparation was extremely thorough, and he received so much material in support of this preparation for the debate that he joked, "I would need a full-time secretary just to handle correspondence – all the materials flowing into my office for the BIG DEBATE."[75]

This was not the first creation/evolution debate Dr. Doolittle had been involved with. He had experience with both Gish and Henry Morris in these types of events. In 1975, Doolittle had engaged Morris in a print debate in the San Diego Union, the area's largest newspaper. He had also been involved in a public debate with Gish in October 1980 when a creationist student organization arranged a campus debate at Iowa State University.[76] Despite this experience with creationists, Doolittle was urged not to debate because evolutionists worried that the event and the accompanying mass media coverage were providing creationists with publicity and validity.

Doolittle decided to go anyways because he was worried that someone else would do it if he did not, due to the fact that others had been contacted by Falwell's group about debating. However, Doolittle was the only one with any debating experience of those contacted.[77]

Despite this preparation and previous experience against creationists, the results of the debate were shocking to evolutionists as he lost, and lost badly. This loss prompted Doolittle to remark to the Washington Post, "I am devastated. This was so important. How am I going to face my wife after making such a fool of myself."[78] The headline on the front page of The Washington Post even read "Science Loses One to Creationism."[79] Doolittle was reported as saying to his supporters the day after the debate, "The bad news is that television is not my medium. I never expected to 'win' in Lynchburg, but I didn't expect to emerge as a tongue-tied oaf either. As it happened, eighteen minutes flashed by before I ever got to my main message. I didn't even get to show my best slides. Gish had his script memorized perfectly. He didn't say anything new or anything I hadn't heard before. But from a performance point of view he was clearly the better man."[80] Creationists celebrated the debate as a great victory and distributed copies of the videotape to audiences until 1993.[81]

Despite the loss, Doolittle's evolutionist peers did not see the defeat as a complete disaster. Instead, evolutionists used it as a call to arms to coordinate their responses to creationists, and it became a turning point in how evolutionists prepared for debates.[82] After the stunning loss, evolutionists began to try in earnest to understand and study creationist arguments to better respond to them. However, evolutionists were wary of the results and how it would impact those who watched the broadcast. Kenneth Miller noted the importance of the debate on how creationist would be understood after the loss when he stated, "Dr. Gish, in a stunning presentation, made an effective summary of the standard creationist debate arguments. Because

his performance will be so widely viewed, the points he made will become the creationist arguments most familiar to millions of television viewers. We will see them crop up again and again in school board controversies, legislative battles, and court cases."[83] This also prompted meetings amongst scientists in which they decided that debates like the one Doolittle had with Gish should be avoided because creationists do not "exchange on rational grounds."[84] Evolutionists were put on notice for future debates.

There are several reasons why I have chosen this debate for a comparison of argumentation and style with the Ken Ham – Bill Nye debate. The first is that the Gish-Doolittle debate most clearly resembles the Nye-Ham debate in terms of national media coverage and publicity. It was billed as and was the biggest creation/evolution debate of its time. It was broadcast to a nationwide audience, just like the Ham-Nye debate, and received a great deal of media coverage. The second reason is the location and the audience most closely resembles that of the Nye-Ham debate. The Gish-Doolittle debate occurred at a religious institution, just like the Nye-Ham debate, which occurred at the Creation Museum in Petersburg, Kentucky. Both sites are public locations, but the location of the debates at religious institutions affected audience construction. These were ostensibly public audiences, but they were not representative audiences of the public at large because they were primarily religious and conservative audiences. This put evolutionists at a distinct disadvantage with the audience present at these locations, but the national broadcasts of these debates lessened the impact of this problem for the evolutionist debaters.

Unfortunately, the Gish-Doolittle debate was substantially shorter than the Nye-Ham debate, since it was designed to fit in a one-hour timeslot for a national broadcast. The opening statements were only 18 minutes, with rebuttals being only 5 minutes, and the summary only 2

minutes. This certainly affected the amount of arguments as well as the amount of evidence presented. Time limits also affect argument quality and the choice of which arguments to include in the debates. With less time, a debater is often forced to make only what they believe to be their best arguments, but this is not always the case. The time limits for the Gish-Doolittle debate had an effect on Doolittle's presentation because he was unable to get to the evidence for evolution with enough time to even adequately explain his position. Instead, he spent nearly 9 minutes of his opening presentation arguing that Gish was trying to get religious materials into public school science curriculum.

Gish-Saladin II (1988)

The second debate chosen for comparison occurred between Dr. Duane Gish and Dr. Kenneth Saladin, an associate professor of Biology at Georgia College. The debate took place at Auburn University in Auburn, Alabama on May 10, 1988 in front of a live audience of about 800 people.[85] The resolution for the debate was "Resolved: The theory of evolution is superior to the theory of special creation as an explanation for the scientific evidence related to origins."[86] As a result of the Gish-Doolittle debate, Dr. Saladin was very well prepared for the debate. Dr. Saladin stated in reference to his preparation, "Thanks also to Frederick Edwords, the editor of *Creation/Evolution*, Karl Fezer, the editor of *Creation/Evolution Newsletter*, and Eugenie Scott, Executive Director of the National Center for Science Education, for giving me useful materials and advice in the weeks leading up to this debate, and to Ed Friedlander for his compilation, provided to me by Dr. Scott and Mr. Fezer, of Gish's distortions of the scientific literature in his book *Evolution? The Fossils Say No!*"[87] Saladin was also an experienced debater, specifically against Gish, as he had been involved in a public debate 4 years earlier in 1984 against Gish.

Even though this debate did not have the national audience of the Nye-Ham or Gish-Doolittle debates, I chose this debate for analysis and comparison to the Nye-Ham debate for several reasons. First, the transcript was readily available and provided by Dr. Saladin along with annotations and explanations of arguments from both sides. Perhaps more importantly, self-assessments of the debate from both Gish and Saladin were available to understand how each of the debaters felt about the debate and to understand the thought process.

Second, the format of the debate more closely resembles the Nye-Ham debate than the Gish-Doolittle debate, including the components and relative length of time for the presentations. The differences in the format between this debate and the Nye-Ham debate are minor. There was a brief opening statement for each debater in the Nye-Ham debate (5 minutes), the opening arguments are slightly smaller for Nye-Ham (30 minutes – albeit 35 minutes if one includes the opening statement) compared to the Gish-Saladin debate (45 minutes), and the closing arguments section came after the question and answer section for both debaters while Q&A was the final segment in the Nye-Ham debate.

Third, the time frame after the Gish-Doolittle debate also factored into my decision to include this debate. Dr. Saladin makes a compelling case that this debate was long enough after the Gish-Doolittle debate (~8 years) that evolutionist debaters had been able to compile and prepare for the polemics that Gish (as well as the other high value creationist debaters, such as Henry Morris) would use throughout his presentations. He credited this to the establishment of the *Creation/Evolution Journal* by the National Center for Science Education in 1980 for this progress in the debates. Dr. Saladin states,

> Its eight years of rebuttals to the standard polemics of "creation-science" have been an invaluable tool in preparation for debates such as these. Many very accomplished scientists fared poorly in the early debates against creationists because of inexperience with this forum and format of discussion, and because it

> is a daunting task to be prepared against the many bizarre creationist claims that may arise in debates which range from astrophysics to molecular genetics, from paleontology to thermodynamics. Creation/Evolution has made it possible, now, even for those of us of more modest accomplishment to do well against the creationist polemics.[88]

Dr. Duane T. Gish was the most famous and prolific of the creationist debaters, having participated in over 300 debates. Even though his presentation rarely varied, I included two debates with Duane Gish with none by any other creationist debaters for comparison to the Nye-Ham debate. This may give a slightly skewed view with regards to the creationist arguments, but this is unlikely because he set the standard for argument presented by creationists, as Gish was regarded as "the creationist movement's chief intellectual" and the ICR's "top debater."[89] Gish was an experienced and eloquent debater "with a Ph.D in biochemistry and is probably the most influential and visible creationist in North America."[90] Henry Morris, the president of the ICR, noted the effect of Dr. Gish on creation scientists when he stated, "many of today's creation scientists can trace the beginnings of their work back to his ministry and influence."[91] In an interesting turn of phrase, Morris also referred to Dr. Gish as "Creation's Bulldog," which is a play on Thomas Huxley's fabled moniker as "Darwin's Bulldog."[92]

Duane Gish was an exceptional debater, and his presentations were well prepared, polished and very persuasive to a layperson unfamiliar with science.[93] Part of the reason for these presentation and persuasive skills was because Gish's debates were canned, in which he repeated the same stories and arguments against evolution again and again. Because the Gish-Doolittle debate was much shorter than most of the other debates, I wanted to make sure that I had a full understanding and representation of his arguments and style. It also allows me to compare the ways evolutionists responded to Gish with his full repertoire of arguments presented.

Nye-Ham (2014)

On February 4, 2014 Bill Nye "The Science Guy" debated Ken Ham, the founder and CEO of the Creation Museum and the Young Earth Creationists, over the merits of evolution and creationism at the Creation Museum in Petersburg, Kentucky. The topic of the debate centered on the question: "Is creation a viable model of origins in today's modern scientific era?" Though there were only 900 seats available at the Creation Museum, the debate was viewed live on the Internet on an estimated 750,000 computers at the time. It is estimated by A. Larry Ross Communications that nearly 3 million people watched the debate live.[94] Many more have watched the broadcast since then on YouTube, and perhaps even a few saw the rebroadcast of the debate on C-Span 15 days later. The seats in the Creation Museum sold out in a matter of minutes of going on sale, and the huge viewership highlighted the ongoing interest in the creation/evolution subject as polls show that the issue remains deeply divisive.[95] In addition to the number of people watching the debate, there were over 70 media representatives there to cover the debate.[96] As a result of the coverage and size of the audience, this debate is regarded as the most prominent creation/evolution debate to date.[97]

Although it is difficult to assess the long-term impact of the debate on the general public's view on the creation/evolution issue yet, it was fairly clear that the majority opinion of the debate was that Nye was the overwhelming victor. Greg Laden noted that friends on Twitter and Facebook "equated the debate to the Super Bowl with Bill Nye being the Seahawks and Ken Ham being Denver."[98] This was not limited to only Nye supporters. A poll held on Christian Today found that 92% of the voters (with 42,567 responses) thought that Nye won the debate.[99] However, there could be an element of ballot stuffing by Nye supporters because it was an open poll. Even Pat Robertson the famous televangelist, whose presidential campaign in the 1980s

was heavily supported by Young Earth Creationists, agreed that Nye had won. Robertson was quoted as saying, "to say that it all came about in 6000 years is just nonsense.… I think it's time we'd come off of that stuff and say, this isn't possible."[100]

Preview of the Thesis

In an attempt to understand how evolutionary advocates can better debate creationists, I compare the Bill Nye/Ken Ham debate to the Duane Gish/Russell Doolittle and Duane Gish/Kenneth Saladin debates from the 1980s. I use two tools for comparing the debates: argumentation and political style. These are broken down into two separate chapters.

In Chapter 2: Argumentation, I analyze the creation-evolution debates on the basis of the argument schemes deployed by both creationists and evolutionists using the taxonomy proposed by Chaim Perelman and Lucie Olbrechts-Tyteca. I found two main arguments schemes in the debates: Argument by Definition and Argument by Division. In Argument by Definition, I discuss the boundary work between what is and is not science, specifically how evolutionary scientists define science in an attempt to exclude creationism from the scientific community and public science curriculum. This section tracks the choices of what aspects of science to include in the debates by each evolutionist debater. In the next section, I examine two creationist pseudo arguments: "Creation Science" and evolution is a religion. Guy Haarscher argues that a pseudo argument is produced when "one is convinced of the validity of a thesis through a certain path of reasoning, but such a rhetorical line of argument will not persuade a particular audience; then the speaker resorts to other premises than the ones he is most 'attached' to."[101] Creationist pseudo arguments were produced as a result of several court decisions against creationists attempting to ban the teaching of evolution and/or trying to get creationist teachings into public school science classes. This forced creationists to translate their arguments into the language of science, and

creationists began to claim that there was a scientific basis for creationism in what is called creation science. The argument forwarded by creationists is that creation science deserves to be viewed as a viable alternative to evolution and taught in school. The second pseudo argument developed a little later than creation science, but the basic argument goes as follows: If creationism cannot be taught in public schools because it is not a science, then evolution should also be regarded as a religion because evolutionary science entails elements of belief. Creationists are attempting to put evolution and creationism on the same level with either both are sciences or both are religions. The creationists have a scientific basis for their claims, but this is based on the professionally discredited but publicly embraced Baconian worldview. In the final part of the argument by definition, I examine evolutionist's responses to the pseudo arguments. The second argument that I analyze in this chapter is the argument by division. This argument is a creationist tactic that operates under the idea that there are only two possible explanations for life on earth. Either life came about as a result of naturalistic means (evolution) or through supernatural means (creationism). By creating this dichotomy, creationists would then attack evolution and point out the weaknesses or gaps in the theory to argue that since evolution is wrong, creationism must be correct. The resolutions for the debates play a distinct role in creating the conditions for this argument by division. I also analyze the evolutionist responses to this argument within the debates based on the complementary nature of the dichotomy constructed by creationists in an attempt to identify which arguments are most effective.

In Chapter 3: Political Style, I examine the creation/evolution debates using the political style of civic republicanism. The first section of this chapter uses the general civic republican style as proposed by Robert Hariman. The focus of this first section is on the republican style's

call for civility and decorum within public debates. Civility involves avoiding willful deception and being willing to speak and listen with respect. I argue that the creationist debates by Duane Gish lack civility because he is willfully misrepresenting, misquoting and distorting evidence presented. However, the Ham-Nye debate showed a great deal of civility that was absent in the previous debates. I also examine how decorum affects the debates. Within decorum, I look at the debate styles of Duane Gish in what was coined by Eugenie Scott as the "Gish Gallop." This Gish Gallop violates basic rules of legislative address, but Gish was not the only debater who used this debate tactic. Bill Nye also used this within his debate, so I examine the differences between the way Gish and Nye used this debate style. The second part of this chapter looks at the discursive styles of the debaters. In order categorize the different styles, I utilize what Jennifer Mercieca and James Arnt Aune explain as Elite Civic Republicanism versus Vernacular Civic Republicanism. Evolutionary scientists operate within the elite civic republican style that promote elite discourse, while creationists operate within vernacular civic republican style that promotes a plain style of address that rejects elite discourse. The differences in styles are analyzed in order to better understand how evolutionary scientists can better counter the vernacular republican style of creationists. The last section of this chapter examines how Bill Nye's persona as a science educator and "The Science Guy" allows him to operate under a different and more effective style than previous evolutionary debaters.

In Chapter 4: Conclusion, I step back from the specifics of the creation-evolution debates to speculate on what lessons science debaters can take from the analysis of the creation-evolution debates to better argue with others with incommensurate worldviews, such as in the debates over global climate change. The main takeaway from this section is that science debaters need to take

into account the type of audience they are arguing in front of in these public debates and how this affects the way they should approach these debates.

CHAPTER 2

ARGUMENTATION

Argument by Definition/Identity and Definitions in Argumentation

One of the most prominent arguments across all of the debates centers on the question of what is and is not science. It is within this vein that the argument scheme of Identity and Definitions in Argumentation proposed by Chaim Perelman and Lucie Olbrechts-Tyteca comes into play. Perelman and Olbrechts-Tyteca argue that "one of the essential techniques of quasi-logical argumentation is the identifying of various elements which are the object of discourse."[102] They also argue that "the most characteristic method of complete identification consists in using *definitions*."[103] These definitions in and of themselves are arguments. It is the division between science and not science and the exclusion of creation science from the scientific community that is at play in these debates, and this section looks at the ways in which creationists and evolutionists argue over the definition of science within the debates and the inclusion/exclusion of creation science and evolution. First, I analyze the ways in which evolution advocates attempt to define science to exclude creationism and the direct creationist responses in the debates. Second, I look at how creationists have adopted what Chaim Perelman calls a pseudo argument in response to this boundary work by evolutionists. There are two pseudo arguments found within the debates, and these are creation science and the claim that evolution is a religion. Third, I discuss how evolutionists responded to these pseudo arguments in the debates.

Evolutionists Defining Science

Russell Doolittle provides no robust definition of what is or is not science within his debate. Instead, he operated under the assumption that the differences between religion and science would be readily apparent to the audience. Doolittle argues, "Now this seems alien to me, that is evolution is part of science whereas creation, and so-called creation science, is a religion."[104] While the argument of what is and is not science is not a major component of the Doolittle debate, this boundary work is a prominent component of Saladin's opening statement. He provides a robust defense of what is and is not science and applies the qualities of what he defines science to creationism specifically. In doing so, Saladin provides five main properties that make up science, and they are the qualities of naturalism (versus supernaturalism), empiricism (versus revelation), falsifiability (versus unfalsifiability), predictive power, and open-mindedness (versus dogmatism and biblical literalism).[105]

Rather than focusing on many different aspects of what defines science from not science (or religion in this matter), Nye offers only two critical characteristics of science that distinguishes evolutionary science from Biblical creationism: the ability to make predictions and the contingent nature of scientific knowledge.[106] These two characteristics operate as a demarcation of what is and is not science because the demarcation comes from "attributions of selected characteristics to the institution of science for purposes of constructing a social boundary that distinguishes 'non-scientific' intellectual or professional activities."[107] The first characteristic is the predictive nature of scientific practices. Nye argues, "what we want in science, science as practiced on the outside, is an ability to predict. We want to have natural law that is so obvious and clear, and so well understood that we can make predictions about what will happen."[108] Perhaps the most compelling argument distinguishing evolutionary science from

Biblical creationism that Nye presents is the contingent nature of scientific knowledge. Nye highlights the process by which scientific knowledge is produced and the contingent nature of this knowledge by arguing, "[f]or us in the scientific community, I remind you that when we find an idea that's not tenable, that doesn't work, that doesn't fly, that doesn't hold water, whatever idiom you'd like to embrace, we'd throw it away."[109] Scientific knowledge is never complete and is consistently modified with new evidence. Nye argues that just one piece of evidence contradicting scientific theories would be enough to change his mind, and Nye provides his best example of this when asked, "What if anything would ever change your mind?" Nye argued:

> We would need just one piece of evidence, we would need the fossil that swam from one layer to another; we would need evidence that the universe is not expanding; we need evidence that the stars appear to be far away, but they're not. We would need evidence that rock layers can somehow form in just four thousand years instead of the extraordinary number. We need evidence that somehow you can reset the atomic clock and keep neutrons from becoming protons. Bring out any of those things, and you would change me immediately.[110]

It is the willingness of scientists to modify their theories when provided with new evidence that is critical to distinguishing science from religion.

Ken Ham, on the other hand, shows no such willingness to modify his beliefs when confronted with contradictory evidence. When Ham responded to the same question of what, if anything could change his mind, he responded that nothing would be able to change his mind. He argued that the creation story and the Bible where he gets all of his information is the word of God and that "as far as the word of God is concerned, no one's ever going to convince me that the word of God is not true." [111] Ham also argued that his information is infallible when he stated, "I claim there is only one infallible data method, the witness who was there and knows everything, and He told us. And that's from the Word of God."[112] Because of this lack of

contingency of knowledge, Ken Ham's claim that Biblical creationism and "creation science" are sciences fails the test set by Nye.

Creationists' "Pseudo Argument"

Creationist responses to this definitional exclusion of creation science can be described as what Chaim Perelman calls a pseudo argument. Perelman defines the pseudo argument as, ''It is actually possible that one seeks to obtain approval while basing the argument on premises that one does not accept oneself as valid. This does not involve hypocrisy, since we can be convinced by arguments others than the ones used to convince the persons we are talking to.'' [113] This is the case when a judge, who may be personally convinced of a given position for moral reasons, is still obligated to issue a ruling based upon valid legal premises. As Guy Haarscher explains, "The premises [the judge] will begin with are perhaps not the ones he personally finds totally adequate, but he is a judge, not a legislator, or a tyrant who would be entitled to dictate his moral views to all his subjects."[114] To put it simply, Perelman's conception of a pseudo argument can be understood as "an argument made by someone who is not really convinced by the premises he uses before a given audience."[115] This form of a pseudo argument appears legitimate and does not necessarily imply any level of hypocrisy.

However, it is often the case that a pseudo argument entails hypocrisy, especially in debates. Haarscher argues that this hypocrisy occurs when the person arguing "will lie about his true position, and try to deceive the audience by pretending to begin the argument with some premises the latter accepts. In that case, the speaker does not believe in the premises he uses; he resorts to them for other, hidden reasons."[116] The intent of such a move is to manipulate the audience, and this occurs when the rhetor understands that the audience would not accept the arguments to which one is really attached. In this case, Haarscher argues that the rhetor "will

abandon the frontal attack, and replace it with a more devious − but rhetorically more efficient − strategy."[117]

Regardless of the intent of the rhetor in making a pseudo argument, it is the process of translation of an argument, moving from one particular audience to another and from a frontal attack on the system to operating within the system, that produces a pseudo argument. Perelman notes that when speaking in front of a particular audience, the rhetor must start the reasoning with shared premises. Otherwise, the argumentative process cannot begin. If a rhetor wishes to continue to argue the same thesis, it is necessary to modify the premises of the argument or to translate it into the language and presuppositions of the new particular audience. [118] This process is inevitable because a rhetor must defend the thesis before various audiences, but it is also dangerous because of the potential for the new premises-thesis relationship to be partially or completely artificial.

It can be extremely difficult to determine if a speaker is actually convinced of the arguments and premises presented. As such, I am not defending the idea that creationists are not convinced of their pseudo arguments, though there may be evidence for this claim. Instead, I am using a broader understanding of Perelman's pseudo argument based on the process of translation. As Haarscher explains, a pseudo argument can be broadly understood as when "one has been convinced of the validity of a thesis through a certain path of reasoning, but such a rhetorical line of argument will not persuade a particular audience; then the speaker resorts to other premises than the ones he is most 'attached' to."[119] In doing so, I examine the way an orator challenges adhesion to a system of values, and there are two fundamentally different ways in which one can do that. The first challenge is one of a frontal attack on the system in which one attempts to directly challenge the system. In the case of creationists, this was outlawing the

teaching of evolution in public schools. The second challenge is one in which the advocate will "pretend to argue *from within* the system by saying that you accept some of its basic premises, while subtly distorting the process of reasoning in order to get to your conclusions. If the audience is naïve or poorly informed, you will be able to defend positions that are fundamentally at odds with [the values one is challenging] while seeming to argue from inside the system."[120] When examining the creation/evolution debates, I found two arguments made by creationists that can be considered pseudo-arguments: Creation science and evolution is a religion.

The Genesis of the Pseudo Arguments by Creationists

In order to understand why these two arguments made by creationists operate as pseudo-arguments, it is necessary to understand the history of arguments made by creationists, beginning with the frontal attack on evolution and then how creationists translated their arguments to the language of science. Creationists are convinced that creationism should be taught in schools and that evolution should not be. However, creationists have found that this line of reasoning is no longer persuasive to the courts and with some members of the general public. In order to attempt to persuade these audiences, creationists resorted to arguing that creationism is actually a science and/or evolution is a religion.

Creationists Frontal Attack on Evolution

The frontal assault on evolution was highly effective for creationists for a long time, as statutes outlawing the teaching of evolution in public schools passed in many states and remained in place for over a century after Darwin first proposed his theory. The Butler Act outlawed the teaching of anti-religious doctrines because they were opposed to the Law of God. The first challenge to this doctrine came with the *Scopes Trial* of 1925. The end result of this case was that anti-evolution statutes were allowed to be enforced and outlawed the teaching of

evolution in public schools. In 1968, the Supreme Court issued the first ruling in favor of evolutionary science in the case of *Epperson v. Arkansas*, which found that prohibitions against teaching evolution were in violation of the First Amendment's establishment clause.[121] This would be the standard that all future cases involving teaching creationism in public schools would be held against.[122] This decision effectively outlawed the frontal attack on evolution by creationists. However, instead of ending the religion-in-school controversy, the ruling in *Epperson* prompted creationists to change tactics and to demand their ideas be taught alongside evolution as "creation science" in what would be termed "balanced treatment." In fact, several fundamentalist organizations were created to promote the idea that the Biblical creation story was supported by scientific principles. This, creationists claimed, meant that creationism should be viewed as a viable alternative to evolution and taught on the same basis as standard science to promote a balanced approach to the teaching of both views.[123] Bolstered by the perceived credibility of the new name of "creation science," creationists renewed efforts to teach creationism by advocating for "balanced treatment" statutes. It was this decision in *Epperson* that forced the creationist movement to modify its strategy for attacking evolution and to begin the process of translating its arguments.

First Pseudo Argument: Creation Science

With the frontal attack on evolution outlawed by the courts, creationists resorted to Perelmenian pseudo arguments. Instead of advocating for the banishment of evolution from public school science curriculum, creationists began translating their arguments into the language of liberal-democratic values, such as "freedom of scientific research and teaching, tolerance, openness, acceptance of controversies, discussions about epistemology, etc."[124] In order to justify the teaching of their creationist views in public schools, creationists began claiming that

creationism is actually a science and called it "creation science." This move attempted to position creationism as a viable scientific alternative to the explanation of origins that should be taught alongside evolution in schools. Guy Haarscher notes, "now the process of argumentation began with liberal-democratic premises instead of the absolute and literal Truth of the Bible: equilibrium, impartiality, fairness, different scientific approaches, etc."[125] Essentially, the pseudo-argument made by creationists operates in the following way. The creationist position taken in the 1920s of banning the teaching of evolution in schools is replaced with a translation of the problem into the language of free scientific debate in which students would be able to choose between the two sciences.[126] This made the opponents of this proposal appear dogmatic, but the Supreme Court did not accept this pseudo argument and has consistently ruled against creationists based upon the establishment clause. However, this did not prevent creationists from deploying this argument in the public debates, where it may have persuasive appeal with many in the general public.

Creation Science in the Debates

The first form of a pseudo argument that appears in the debates is that of creation science. This pseudo argument appears in all of the debates in the set, as each creationist debater, Gish and Ham, appeals to creation science as an explanation for the evidence of origins. However, there are dramatic differences between the debates by Gish and Ham in the type of creation science being argued and the effect this has on the debate.

In order to make his argument that creationism actually has a scientific basis, Gish strips all references to the Bible in an attempt to make his position appear as scientific as possible. As David H. Milne explains, "One strategy not employed by creationists is reference to Scripture (at least in debates). The debater wishes to seem as "scientific" as possible, and to

use Biblical quotes would tend to weaken this image."[127] Gish makes this move explicit in both of the debates examined. In his debate against Doolittle, Gish argues "creation scientist[s] are asking that excluding the use of the Bible or religious literature of any kind, only the scientific evidence that can be adduced in favor creation and evolution be presented."[128] Gish later states, "the material that we have prepared for public schools had been very carefully edited to remove any references to the Bible or any religious literature of any kind."[129] Gish's arguments also involve a secondary translation, which is the movement from his personal beliefs in the Young Earth Creation model of origins to arguing for creation in general with no reference to the Bible.

Ken Ham also argues that creationism has a scientific basis, but instead of following the argument from general creation that Gish made, Ham argues from the basis of Biblical creationism. Despite providing the basis for his claims of creationism being scientific because of biblical creationism, it still operates as a pseudo argument because this argument translates Ham's argument into the language of science to make it appear that the model has a scientific basis.

Second Pseudo Argument: Evolution is a Religion

The second pseudo-argument presented by creationists was that both creationism and evolution are religions. The basic argument goes as follows: If creationism cannot be taught in public schools, because it is not a science, then evolution should also be regarded as a religion. Creationists began calling evolution the "religion of secularism." This was a reversal of the argument that creationism was actually a science. Guy Haarscher notes the reasoning behind these seemingly contradictory pseudo arguments when he writes, "if it is so difficult to present Creationism as a science, it will perhaps be easier and more convincing to affirm that Darwinism is based on a metaphysical materialist 'belief.' So the conclusion will be: both are religions and

should not be taught in public schools."[130] Simply put, this argument links the fates of evolution and creation, since the argument supposes that either both should be taught in the classroom, or both should be excluded.[131] Once again, even though the courts had rejected this argument in their decision, this argument is present in all of the debates.

"Evolution is a Religion" in the Debates

The argument that evolution is a religion is a common refrain amongst all the debates in the set, and there is not a great amount of difference between these debates. Gish makes the argument that evolution operates outside the bounds of empirical science because humans were not there to observe the creation of life on earth. Instead, it is only through inferences that we can begin to understand how the universe and life began. In his debate against Doolittle, Gish argues:

> Let us now dispense once and for all with the notion that this is a debate between science and religion. Each concept origins is equally scientific and each is equally religious. In fact neither qualifies as a scientific theory. The first requirement of science is observation. Obviously there were no human observers to the origin of the universe, the origin of life, or as a matter of fact to the origin over single living thing. These events were unique, unrepeatable, historical events of the past.[132]

Eight years later in his debate against Dr. Saladin, Gish repeats a remarkably similar argument when he states:

> The evolutionist goes beyond that. He steps outside the limits of empirical science. He says, we must also use those very same natural laws to explain the origin of the universe, and the origin of life, and the origin of man and all other living organisms. Now he's beyond empirical science. He's not dealing with the here and now, he's not dealing with the empirically observable, testable theories. But he's trying to infer what may have happened in the unobservable past, and that's what the creation-scientist is doing. And they have equal scientific validity and certainly evolution is just as religious as creation.[133]

Ken Ham also makes similar arguments as Gish, but he uses a slightly different terminology to describe what he is talking about. In his debate, Ham argues that "[t]he word

science has been hijacked by secularists" to specifically reject the supernatural.[134] In order to reclaim "science" from secularists, Ham divides science into two distinct categories that he would repeat continuously throughout the debate: observational science and historical science. Observational science is strictly what can be observed in the present, such as observing microevolution of bacteria in a lab setting or noticing changes in character traits within species. However, historical science, or origins, is what cannot be observed in the present but what has happened in the past that is a function of the starting point for interpreting observational science. By distinguishing between these two types of science, Ham intends to put evolutionary science on the same level as Biblical creationism, in that both are a belief system. Ham argues that we were not there to see God create the world, just as we were not there to observe bacteria turning into more complex organisms and eventually humans. We can observe that we can see that the Earth is not flat, but we cannot observe the age of the earth. This distinction allows Ham to dismiss all of the conflicting evidence provided by Nye about the age of the earth because scientists were not there to see the earth being created. Therefore evolutionary science works as a belief system the same as creationism. For Ham, the distinction between creationism and evolutionary science is not a matter of science but a matter of philosophical orientation for interpreting the shared evidence from observational science.

The only place that I find a pseudo-argument in the debates is from the creationist side and not with the evolutionists. This comes from the fact that creationists have been forced to look for a new foundation for their arguments against evolution in the wake of the court decisions against their position. When one loses in the courts but wishes to continue to advocate the same thesis, it is necessary for one to find new ways to justify the thesis or to translate the argument. Because evolutionists are speaking from the argumentative high ground and have

consistently won decisions over creationists, there is no need to produce a pseudo-argument. Rather, evolutionists are arguing from a position of power and do not need to translate their arguments. This occurs because evolutionists are able to argue from a fixed or permanent position of mainstream science. However, the creationists have to deal with moving or changing grounds for their position as the courts rule against their moves to exclude evolution and/or include creationism in public school curriculum.

Evolutionist Responses

Instead of dismissing this leveling of evolution and creationism argument merely as obscurantism, the way that evolutionists often have against creationists in debates, evolutionists need to understand that this creationist view of science actually does have a theoretical basis, albeit one that is professionally discredited. Modern creationists try to appear scientific by using the professionally discredited but publicly accepted Baconian view of science that operates as inductive empiricism. By using a Baconian scientific basis, Randy Moore argues that "creationists claim that the 'unempirical' nature of evolution makes creationism and evolutionism scientific equals."[135] Charles Alan Taylor also argues, "creationists argue that true science abandons metaphysical flights of fancy in favor of close empirical observation and strict processes of induction from those observations."[136]

While the dismissal of this creationist view of science as obscurantism may be reasonable in the technical sphere, it is unwise to do so in public debates because, as Taylor argues, "it misunderstands the epistemological heritage of creationism and implicitly distances scientific decision-making from the broader social contexts in which it must necessarily remain embedded."[137] This means that evolutionists must have a well thought out response to this argument in public debates.

Bill Nye provides one such response in his debate against Ken Ham. He explicitly contests the construction of creationism as creation science and the Baconian leveling of evolution and creation as religions by disputing the historical/observational science distinction. Nye uses the popular television show *Crime Scene Investigation* as an example in his refutation, and he argues, "on CSI, there is no distinction made between historical science and observational science. These are constructs unique to Mr. Ham. We don't normally have these anywhere in the world except here…Although CSI is a fictional show, it's based absolutely on real people doing real work, going to a crime scene, where you have evidence and you get clues about the past, and you trust those clues and you embrace them, and go forward to convict somebody"[138] Even though those investigating the crimes were not present to see it occur, they can still correctly deduce what transpired from the evidence collected. The CSI example illustrates how decisions can be confidently made without directly observing the phenomenon and shows how modern science operates using evidence. If we can convict someone based upon deductions made from forensic evidence without an eyewitness, then we should be willing to accept other conclusions using the same scientific technique, such as the validity of evolutionary science or the age of the earth.

Argument by Division

The argument by division is a technique explained by Perelman and Olbrechts-Tyteca in which a speaker proposes that there are only two potential explanations for a phenomenon. After limiting the options to only two outcomes, the speaker then simply points out the problems with the opponent's thesis, leaving the speaker's thesis as the only remaining possibility. Perelman and Olbrechts-Tyteca provide a more nuanced definition of the argument by division, stating:

> Since the argument by division presupposes that the sum of the parts equals the whole and that the situations which are being considered exhaust the possibilities,

> when the parts or the possibilities are limited to two, the argument becomes an application of the exclusion of a third party. This form of division is used in debate when the solutions are limited to two: that of the adversary and that of the speaker himself. After pointing out the absurdity of the adversary's thesis – which is sometimes completely fabricated to suit the argument – a speaker then proposes his own thesis as the only remaining possibility.[139]

In this respect, one side merely needs to negate the other side in order to prove that their model is correct, and this requires that the division is exhaustive.

However, Perelman and Olbrechts-Tyteca also note that the two parts forming the whole can be complementary, and this complementariness can be used to respond to this argument by division. Perelman and Olbrechts-Tyteca state, "An affirmation and its negative are in a sense always complementary, but, in putting the emphasis on this quality, one eliminates the idea of opposition and of unavoidable choice, ending instead that the choice is indifferent."[140]

In this section, I examine how the argument by division and the emphasis on complementariness are deployed in the debates. The argument by division was a popular tactic of Gish, as he used this technique in both of his debates and operated from the role of a skeptic. However, creationists did not universally adopt this strategy, as Ham did not utilize this tactic in his debate against Nye. This difference in the debate techniques stems from what each debater defended as a result of the resolutions (or lack thereof) chosen for the debates. Complementariness was an evolutionist tactic, and each debater argued from the same position of complementariness by highlighting the compatibility of religious and scientific beliefs in an attempt to respond to this argument by division.

Creationist Tactic

One of the more important creationist tactics in the debates was to argue that there are only two possible explanations for life existing on earth: Creation or evolution. By setting up the debate under this framework, creationists are then free to attack the model of evolution and to

point out the shortcomings of that theory. In doing so, creationists are able to claim that because evolution has problems and must be wrong, creationism must be true. Gish makes this argumentative set up explicit in his opening statement against Doolittle, arguing, "There are two fundamentally different explanations for the origin of the universe and the living things it contains."[141] From there, it was relatively easy for creationists to win the early debates because they were able to occupy the position of a skeptic with no case to prove, and this was a tactic that creationists understood well.

In the debates by Gish, he was able to set the terms of the debate so that only evolution was ever discussed and criticized, which left evolutionary advocates in a poor position.[142] In the Gish-Doolittle debate, I found no formal resolution, only the general topic of evolution versus creation, which meant there were no constraints on what Gish could do in the debate. He simply did what he had done in his previous debates and levied various arguments against evolution while providing no specific model of creationism to defend. In the Gish-Saladin debate, the resolution read "Resolved: The theory of evolution is superior to the theory of special creation as an explanation for the scientific evidence related to origins."[143] This resolution placed the burden of proof on evolutionists because they were obligated to prove the superiority of evolution, and this leaves the creationists free to simply discredit evolution. This made it much easier for creationists to win the debates in front of the general public. As Robert Shapiro, a biochemist at New York University, noted, "As critics of conventional science, with no body of experimental work of their own to defend, the Creationists occupy an admirable position in a debate. A scientist who opposes them faces the same situation as a boxer battling a pair of remote-controlled boxing gloves. He can try to defend himself from punishment, but he lacks a target at which to strike back."[144] To this end, Duane Gish proposed no model for his view of creationism;

instead, opting to defend the general idea of creationism. Gish never says when the creation event occurred nor does he say whether the plants and animals were created in their present forms or at the same time or at different times and different forms in his debate against Doolittle.[145] This leaves evolutionists with no target to attack in the debates.

This same type of argument is also found in Gish's debate against Saladin. He argues this explicitly in his opening statement against Saladin; "I want to make it clear, first of all, what we are not debating about here this evening. We are not debating about the age of the earth… We are not discussing the Biblical record of creation…We're not here to talk about anybody's theology."[146] Instead of offering a model for his creationist argument, Gish relies on just the general idea of creation. In both of these debates, Gish purports to argue for creationism from the perspective of science, and Gish is arguing for general creation science, in which he hides the basis of his claims, the bible. Instead, the concept of general creation comes from the idea that the universe and all of the life on earth were created by an intelligent creator. Gish takes no stance on any specific version of creationism, unlike the way that the ICR and Young Earth Creationism specifically propose that the book of Genesis is a literal historical text of the creation of the earth. As a Young Earth Creationist, this is the model he truly believes explains the creation of life on earth. By refusing to talk about the biblical nature of his claims, Gish is proposing that it is a scientific debate and not a religious or theological one. Creationists assumed in their debate proposals that the scientific aspect of creationism could be separated from the biblical aspect in order to limit the debate to only the scientific aspects of the issue.[147] This is a strategic choice by Gish to avoid discussing difficult topics to defend and prevent evolutionists from levying the best arguments against creationism, such as the age of the earth and the Noachian flood as the basis for the creation of major strata.[148]

Instead of offering a model of creation that can be interrogated and discussed, Gish opts to attack evolution. This is present in both of the debates by Gish. He used various attacks on evolution to point out the holes in the theory of evolution, and several of these attacks are common across both debates. These include the use of arguments from the Second Law of Thermodynamics, complexity and mathematical probability, and gaps in the fossil record and the lack of transition fossils. Gish also adds a couple of other attacks on evolution in his debate against Saladin, including attacks on the fossil record for human evolution and the inability of evolutionary scientists to explain how species metamorphosis came to be. To an unscientific audience or one that is pro-creation, this type of argument can be very persuasive because it appears that there are only two possible options and there are problems with the theory of evolution.

Despite the effectiveness of Gish's argument by division in his debates, creationist's understood that negative arguments alone will not persuade a critical audience, as creationists themselves acknowledged the limitation of a heavily negative stance in debates. As a result, creationists began to try to find positive evidence for their position by searching for Noah's Ark and promoting the contemporaneous footprints of dinosaurs and humans in the Paluxy River basin.[149] The Paluxy River argument is the one argument that Gish does use in the debates that could be classified as positive evidence for the creationist side.

Although this argument by division produced by creationists may have been an excellent debate strategy because it kept the evolutionists on the defensive throughout the debate, evolutionists did not let this argument by division go without a challenge. Ken Saladin called out Gish for his purely negative argumentation in his debate when he stated:

> But what did [Gish] do? All he did was present negative evidence and try to convince you that that proves his point, just by disproving the other point.

> [Applause] Dr. Gish hasn't come anywhere near establishing what he writes in his book: that all basic forms of life were created all at one time, in the Creation Week, maybe ten, maybe twenty thousand years ago, and that no new basic forms of life have come into existence since then.[150]

Outside of the debates, evolutionists were also willing to point out the problems in the arguments presented by Gish. Kenneth Miller argued, "If we were to declare that Dr. Gish had 'won' the debate, we would only be saying that evolution had been questioned, not that a case had been made for creation."[151] But because creationism was widely accepted in the status quo at the time of the debate, Gish had no need to offer an alternative. Instead, he was able to rely on the presumption of many of those in the audience that creationism was simply the best explanation.

The difference between the argument styles of Gish and Ken Ham is readily apparent when it comes to the argument by division because Ham does not utilize this argument structure in his debate against Bill Nye. There are very few arguments against evolution in this debate outside of the arguments about the age of the earth. Instead, Ham spends a great deal of time laying out the evidence for the Young Earth Creation model of the origins of life on earth. This is a major departure from the Gish debates in the 1980s. This can be explained as a function of the difference in the types of resolutions that were debated in the past and the one for the Nye-Ham debate. Earlier debate resolutions were phrased in terms of evolution, but the Nye-Ham debate centered on the question of creationism's viability. Because the Nye-Ham resolution focuses on solely on creationism, Ham is forced to prove that creationism is a viable model of origins in today's scientific era instead of being able to attack evolution.

In fact, the script for the debate is largely flipped. Nye spends a great deal of time enumerating the arguments against creationism. However, Nye does not rely solely on negative argumentation to make his point, and he does not argue that by disproving creation that evolution must be true. In this instance, Nye's arguments do not truly operate as an argument by division.

Evolutionists' Responses

Perelman and Olbrechts-Tyteca note that the two parts forming the whole can be complementary, and this complementariness can be used to respond to this argument by division. Perelman states, "An affirmation and its negative are in a sense always complementary, but, in putting the emphasis on this quality, one eliminates the idea of opposition and of unavoidable choice, ending instead that the choice is indifferent."[152] This structure of argument is present in each of the debates by evolutionists when Doolittle, Saladin, and Nye all highlight the compatibility of religion and science. Surprisingly, Dr. Jerry Falwell actually makes this argument in his opening statement as the moderator for the Gish-Doolittle debate, stating:

> Some religious people have felt that science is the enemy of religion. Some scientists believe that religion is the enemy of science. Both camps have erected a high wall between them. I believe both sides have been wrong. Religion and science, rightly understood, are not enemies. In fact, rightly understood, they complement each other. The purpose of tonight's debate is to begin to tear down that wall.[153]

Evolutionist debaters also highlighted the argument that religion and science are compatible with each other in each debate by Doolittle, Saladin, and Nye. Doolittle argues that evolution and religion are compatible in his debate by arguing, "Now, I'd like to reiterate that evolution is a scientific concept. It is completely secular. It has nothing to do with a religion. It doesn't say anything about what you want to believe in that regard."[154] Like much of his debate, this argument was not very well developed or nuanced or made repeatedly, but he does attempt to argue that religion and evolution are compatible.

Ken Saladin makes a more nuanced and well-developed argument for compatibility. However, much like Doolittle, this argument is only made during one speech within the debate, and it only comes in his concluding arguments. Saladin argued, "Science by its very nature does not deal with supernatural questions. It does not mean that science asserts that God does not

exist. It just means that that issue is outside the domain of science."[155] He went on to argue later in his concluding remarks, "So I submit to you, that it is by no means necessary to reject one's religious belief to fully accept the truth of evolution. I think that any modern and intelligent Christianity would find little or no conflict with the empirical findings of science."[156]

Nye makes this argument regularly throughout the debate, and it is fairly well developed in the debate. He argues that evolutionary science and religion are not necessarily at odds with each other. Nye argues that science should not be confused with atheism. To support this claim he states:

> There are billions of people in the world who are deeply religious, and I respect that. People get tremendous community and comfort and nurture and support from their religious fellows, and their communities, in their faiths, and churches, and yet they don't accept your point of view. There are Christians who don't accept that the Earth could somehow be this extraordinarily young age. Because of all the evidence around them.[157]

Nye provides perhaps his best argument for the compatibility of science and religion during the question and answer section when asked the question, "Is there room for God in science?" Nye explicitly refutes the common claim that science is inherently atheistic. To this end, Nye argues that science is:

> Not really that connected with your belief in a spiritual being or a higher power. If you reconcile those two, scientists, the head of the Nationals Institutes of Health, is a devout Christian. There are billions of people in the world who are devoutly religious; they have to be compatible because they're the same people who embrace science.[158]

Perhaps Nye and Saladin should have highlighted the compatibility of evolutionary science and religious beliefs within their debates explicitly instead of highlighting the religion and science compatibility, but this effort to show that religion and science are compatible does go a long way towards showing that there is no forced choice between the positions.

CHAPTER 3

POLITICAL STYLE

There are three main sections to this chapter. The first focuses on the civic republican ideals of civility and decorum within the debates. Civility involves honest and candid discourse amongst the rhetors, and this operates mainly as a willingness to treat each other with respect within the debates. Decorum involves following the rules and conventions of public debates. The second examines discursive differences between creationists and evolutionists in the debates and how these have changed over time. I contend that both sides utilize a republican style, but evolutionist debaters work within an elite civic republican style with appeals designed to persuade a scientifically literate and intelligent audience while creationists operate under a vernacular republican style with appeals designed to persuade average citizens. The difference is a question of which audience the debaters choose to try to persuade. The third analyzes Bill Nye's persona as a public voice of science and an entertainer. This is perhaps the most important section for evolution advocates because Nye provides a model of how to approach these types of debates by popularizing scientific evidence and engaging the audience as a science educator and entertainer.

Civic Republican Style

The republican style is one that emerges with the persona of a public citizen. As such, it is a discursive practice that has its own rhetorical norms that is able to incorporate a wide range of ideological positions. This style requires both verbal competence and an appreciation for the art of public address.[159] As Robert Hariman notes, "The beauty of the republican style is evident

all around us, usually in the ordinary practices of self-governance that characterize the thousands of school boards, church boards, unions, party organizations, and other political groups that make up the fabric of a modern democratic society."[160] To put it succinctly, Marcus Llangue argues, "Republican rhetoric means political deliberation in self-governing institutions."[161]

Public debates are a site where civic republican style should be at its purest with rhetors donning the persona of public citizens and performing the ideals of the art of oratory in maintenance of the republic. As Hariman notes, "Civic republicanism also is a manner of thinking animated by the social practice of public debate and the performative ideals of the art of oratory."[162] This places a priority on public debates, and this often comes from what Iseult Honohan argues, the "republican emphasis on publicity means that deliberation gives priority to public debate as a means of deliberation."[163] Hariman notes, "politics comes to be understood within the republican style as a form of oral argument – of making ideas stand the test of public debate."[164] Civic republican style in public debates should not be limited to only those operating within the state or legislatures, Honohan argues, "The republican conception of the public is not so closely tied to the central state and its authoritative decision-making…The republican public may be seen in plural terms, as it is disengaged from total identification with the legislature and coercive state."[165] Even though the creation/evolution debates examined may occur outside of the legislative arenas and the state, these debates still operate within the republican style of public debate.

There are several components that comprise the republican style. These include placing a priority on consensus and agreement, taking joy in public address and pride in rhetorical skill, maintaining civility and decorum in public address, eschewing secrecy, and demonstrating a concern for the republic. While each of these represents an important component of republican

style, this first section only focuses on the civility and decorum found within the creation/evolution debates and whether these debates and individual debaters meet the ideals of civility and decorum. When examining the transcripts of the debates, I found that Duane Gish failed to meet the standards of civility established by the civic republican style as he consistently employed deceptive tactics. However, evolution advocates embodied the ideal of civility despite Gish's tactics. The Nye-Ham debate offered a distinct shift in the debates, as both debaters showed a great deal of civility towards each other with honest and candid arguments. The issue of decorum in these debates involves what has come to be known as the "Gish Gallop" in which Gish would quickly jump from "fact" to "fact" in an attempt to make it impossible for the opposition to effectively answer each. However, this tactic is not limited to only the creationist side of the debate. Instead, it is a question of the wording of the resolution, which is why Nye was able to employ this technique in his debate with some small but important differences.

Civility

Civility is one of the defining features of the republican style. As Robert Hariman notes, "The republican style instead relies on a specific sense of decorum to regulate the political actor: the code of civility. This code requires one to speak publicly with one's opponents as if one respected them."[166] Civility can be conceptualized as something as simple as "the persistence of such formalities as referring to 'the senator' from wherever, or in the day-to-day arguments and drafting legislation."[167] But civility is a much richer concept than simply politeness in language. Hariman notes that civility also "includes the manners of legislative address, seating, and the like, and it is defined at all points by refraining from violence, recognizing social status, observing parliamentary customs, and acting as if oneself and one's opponents always were motivated at least in part by civic virtue and the duties of public office."[168] Broadening the

notion of civility beyond simply that within the public office or civic virtue, Susan Herbst argues, "Civility demands arguing, listening, and respect for the deliberative process."[169] Along the same lines, Mary E. Stuckey and Sean Patrick O'Rourke argue that civility "involves the avoidance of willful deception and the readiness to speak and to listen with respect."[170] In essence, honest and candid discourse that shows respect amongst rhetors and for the republic and the deliberative process is critical for civil discourse in the republican style. It is within this frame of civility that I examine the creation-evolution debates.

Creationists and Civility

Under this definition of civility, the creationist debater Duane Gish fails to rise to the level of civility in his debates. There is ample evidence that Gish does not avoid willful deception within his debates because he intentionally misrepresents arguments and misquotes scientists. John W. Patterson notes that Gish's "presentations were invariably couched in scientific-sounding words and phrases, often incorrectly applied, then supplemented with numerous out-of-context quotes deliberately fashioned to misrepresent the scientific authorities being quoted. With all this in place, the entire community of evolutionary scientists would be ridiculed as a group."[171] While there are numerous examples of this occurring within the debates, I wish to point out only a few of the most glaring examples of this occurring. While debating Ken Saladin, Gish cites a scientist Derek Ager to make it sound as if evolution has been debunked wholesale. Saladin points out within his speech that the quote that Gish has been using in his presentations only speaks to a question about a specific relationship between two bivalves rather than evolution as a whole. The interesting aspect of this misrepresentation of scientific evidence comes from the fact that Saladin contacted Dr. Ager about this to which Ager responded, "I get rather tired of these things.... It is true I have been clasped to the

fundamentalists' Californian bosoms because of things which I have written about evolution and about the stratigraphical record. Of course they have misunderstood and misrepresented me (and in some cases taken my perhaps overfacetious nature too seriously)."[172] Perhaps this misrepresentation of the nature of one scientist's words could be forgiven, but there is a clear pattern of this occurring.

Another prime example of Gish intentionally misquoting scientists to make it seem as if they are saying something they are not comes from Gish quoting Dr. Oxnard on the locomotion of australopithecines in his book *Evolution? The Fossils Say No!*. Saladin notes that Gish argues that Dr. Charles Oxnard contends that australopithecines "had a mode of locomotion similar to that of the orang-," when the actual quote from Dr. Oxnard reads, "it is clear that the actual overall mode of locomotion of the orangutan today is **not** the model for these creatures."[173] What Gish did within this misquotation was to completely reverse the author's statement. While this quote does not come directly from Gish within the debates, the argument stemming from his misquotation in his book is used in both of his debates. In his debate against Saladi, Gish stated in reference to Dr. Oxnard's work, "According to their researches, these creatures did not walk upright, they are not intermediate between ape and man, and they are certainly not our ancestors."[174] Saladin uses this misquotation to attack Gish who tried to use Dr. Oxnard's work as reluctant testimony to make his point stronger.

Gish also misquotes mainstream scientists within his debate against Doolittle. He quotes Dr. Corner, a Cambridge botanist, as stating, "Much evidence can be adduced in favor of evolution, but I still think that to the unprejudiced the fossil record of plants is in favor of creation."[175] This is an impressive sounding case that utilizes authorities to support his claim. However, the quote that Dr. Corner actually stated was, "... the fossil record of *higher* plants is in

favor of *special* creation."[176] While the exclusion of the word higher may not seem to mean much, it actually has quite a bit of significance within the argument. What it means is that the major form of higher plants, such as angiosperms or flowering plants, appeared on earth about 135 million years ago, and there was no good fossil evidence as to what forms they evolved from and not plants in general, which is what Gish is attempting to state.[177] Saladin explicitly argues this in his debate against Gish when he points out the places where Gish has misquoted mainstream scientists in his debates and in his books. Perhaps any one of these could be excused as being unintentional, but the pattern of misquotation creates a solid basis for arguing that this is an intentional and willful attempt at deception, which makes his debating uncivil.

Evolutionists and Civility

Evolutionary debaters such as Doolittle, Saladin, and Nye maintained a high level of civility within their presentations. Jim Lippard highlights the reason for maintaining such a high level of civility in response to a pair of debates by evolutionists in which they were highly uncivil towards Gish. These debates were by Dr. Ian Plimer and Dr. Barry Price. In both of those debates, the evolutionary debaters did exactly what Gish has done within his debates, misrepresent arguments and misquote in order to make their positions seem stronger. While those two debates were not included in my study, the comparison Lippard makes is telling. Lippard wrote:

> Why not just ridicule and abuse such a person? Because sincere people are watching. Ridicule and abuse simply confirm their suspicions about evil conspiratorial evolutionists who are out to suppress the creationist viewpoint. (This does not require us to forego humor or sarcasm which are not abusive and counterproductive.) It is possible to deal with creationists effectively yet politely--Philip Kitcher's 1985 debate and Ken Saladin's 1988 debate, each with Gish, are prime examples. Presentations like these are probably more likely to persuade people than those like Plimer's. Price and Plimer have engaged in the same sort of tactics we complain about creationists using. The only result of such tactics can be the loss of credibility. The creation versus evolution debate is already one

> which tends to generate more heat than light. To attempt to gain converts by means other than reasoned argument supported by evidence is to engage in a war of propaganda, in which the first casualty is truth. It is my hope that this criticism will serve to discourage such counterproductive battles in the future.[178]

As Lippard notes, the Saladin debate is an example of the type of presentation that maintains civility and should be emulated by other evolutionist debaters. This is the same case with the Doolittle debate. Certainly, there were moments where things got fairly heated between the two sides in both debates, but it is a contentious issue being debated between the two sides. Doolittle spends a great deal of time in his debate arguing that Gish is trying to bring religion into the science classroom and using quotes from Gish and his books to make this point, but he does not misquote or misrepresent anything that Saladin has written or said. Saladin does accuse Gish of misquoting and misrepresenting arguments within his presentation, but these accusations were not without merit. Both Doolittle and Saladin were honest and candid in their representation of their arguments and evidence. While the Saladin-Gish debate was more contentious than the Doolittle-Gish debate, each of the debates met the requirements for their sides of the debates to be considered civil. Saladin and Doolittle each took the debate seriously and prepared for the debate, which showed that there was a level of respect for Gish as a debater and provides further evidence for civility within the debate.

The Nye-Ham Debate and Civility

The debate between Ken Ham and Bill Nye was different from previous debates between creationists and evolutionists largely because of the civility shown between both of the opposing sides. Although the form of the civic engagement between the two was a "debate," both sides agreed independently that the debate itself was more of a form of entertainment than an academic debate. Neither of the debaters could be called experts in the field of evolution or professional debaters. Both Nye and Ham are best (self)described as science educators.

However, both sides have some experience with entertainment and/or some minor debate experience. Ken Ham has slightly more debate experience than Bill Nye, since he had participated in formal debates on evolution in the 1990s. However, Nye had much greater experience as an entertainer and educator on television as "The Science Guy" on PBS. Ken Ham summed up the orientation for both of the debaters when he stated, "He's like me. He's a communicator. We're not really used to doing formal debates."[179]

Despite the agreement on the form of the debate as more entertainment than an academic debate, each side took the event seriously, both doing extensive research and preparation for the debate. Bill Nye stated, "I consulted the world's foremost authorities on arguing or debating with creationists."[180] In doing so, Nye met with several prominent evolutionary scientists and scientific organizations, including Genie Scott, Josh Roseneau, Michael Shermer, and the staff of the National Center for Science Education to prepare his arguments in favor of evolutionary science. Nye then met with Don Prothero to discuss how he should phrase things with a focus not so much on *what to* say, but rather on *what not to* say. The consultation with Don Prothero is certainly noteworthy because Prothero had debated Duane Gish, a professional debater for the creationist side, in the 1980s.[181] Like Nye, Ham also prepared extensively with experts in the field. Ham consulted with creationists with Ph.Ds, such as molecular biologist Georgia Purdum and geologist Andrew Snelling. This preparation from both sides showed a level of respect for the other sides position that was often lacking in previous debates.

Since the debate was seen as a form of entertainment instead of an academic debate, the way the debaters approached the debate itself changed from previous debates between creationists and evolutionists. Instead of preferring to go first, as those who had professional debate experience with creationists had advised Nye to do because of the perception that those

who go second in an academic debate feel the onus to respond to what the first presenter stated, Nye argued:

> If this were a debate in an academic session, where there are thoughtful judges from the history department or tort instructors from the law school, who have the ability to determine who said what better than who or to whom, per se, et cetera. But this debate was a television show. And my audience was on the worldwide web not in the auditorium. If I get the chance, I go second. I just don't see it any other way. Whatever Ken Ham talked about, I pretty much planned to talk about what I wanted to talk about.[182]

Ham, likewise, viewed the debate as a form of entertainment and not an academic debate with a strict winner and loser decided by a group of judges. Noting that the debate was a form of entertainment trying to reach the next generation, Nye stated:

> Perhaps there was no winner, as this was not a scored debate. Nevertheless by all, or a strong majority of, accounts, I bested him. The fundamental idea that I hope all of us embrace is, simply put, performance counts as much or more than the specifics of the arguments in a situation like this.[183]

Both of the debaters agreed that the debate was about trying to reach the next generation, the audience viewing the broadcast on the Internet.[184] Instead of trying to win over the 900 people in the physical seats at the Creation Museum, the debaters focused on the "next generation," many who were watching online because those viewers were more likely to not have fixed views on the issue and also comprise the largest generation since Baby Boomers.[185] Beliefs formed in early adulthood tend to have lasting power, so appealing to this younger next generation before beliefs have hardened provided the best opportunity to change minds.[186]. These individuals, who could also be called "the *net* generation," are tech savvy and tend to be visual learners, so entertainment education, or "edutainment," resonates with these students when other, more traditional educational techniques fail. These traditional efforts tend to fail because the net generation is accustomed to having instant access to information and are able to absorb information quickly, so these students quickly get bored with traditional techniques. However,

edutainment efforts, especially those on the Internet, have been effective in reaching these students. These individuals of the net generation are "digital natives" who depend upon technology and use the Internet constantly for acquiring information[187] In order to effectively train and teach the net generation, they must be entertained while educated.[188] The net generation also tends to be more civic minded, open to social issues, and value manners and respect; and with over a quarter of a century between the debates being compared, there are new cultural norms forming that appear to value civility more now than in the 1980s. So, the civil nature of the debate likely played well to this group.[189] By focusing on providing the net generation edutainment broadcast over the Internet, Nye and Ham set themselves up to reach the biggest generation since the Baby Boomers on their preferred medium and through the way they learn best._ With over a quarter of a century between the debates being compared, there are new cultural norms that now value civility, or at least those in the net generation are more aware of civility, more than in the 1980s. This means that the difference in civility may be a result of differences of the times in which the debates occurred. The nature of the times makes it more likely that the debaters would be more civil to each other now in order to cater to the more civilly inclined net generation.

The focus on edutainment changed the way arguments were presented within the debate. Nye specifically argues, "I did not choose, as I was advised, to attack, attack, attack. My actor's preparation helped me keep things civil and be respectful of Mr. Ham despite what struck me as his thoughtless point of view."[190] Because the debate was not seen as an academic debate and instead mostly as a form of entertainment, the debate maintained a level of civility that many of the previous debates between creationists and evolutionists did not. A telling moment about the civility of the debate came right after Ken Ham's long presentation and as Bill Nye began his

long presentation. Nye stated, "Thank you very much, Mr. Ham. I learned something. Thank you."[191] Eric Bangeman, summed up the civility of the debate in terms of respect for each other when he wrote:

> The debate ended as it began, with the two adversaries shaking hands and then walking off the dais. Were hearts touched and minds changed? Probably not. But two men with starkly different beliefs and viewpoints made their case stridently and respectfully before a rapt, well-behaved audience. Today, that counts for something.[192]

The civility of the debate was not constructed solely by Nye. Ham's approach to the debate, informed by the view of the debate as a form of entertainment, also promoted the civility of the debate. John W. Patterson, who has followed the creationist/evolutionist debates since the late 1970s and participated in six or more himself, argues that the Nye-Ham debate was completely different from previous debates. Patterson argues, "Ham's honesty and candor sets him markedly apart from any of the creationist debaters I have listened to or debated in the past."[193] Previous debates had seen the professional debaters from the creationist side insist that no mention or reference to the Bible or Religion be made in the debate. The creationists would then "deliver unsettling barrages of thinly veiled apologetics, polemics, and code phrases that, to the delight of creationists in the audience, provided indisputable 'scientific' support for ideas that even Pat Robertson calls nonsense."[194] Instead, the Nye-Ham debate was different from those previous debates Patterson references. Patterson notes that Ham was the first creationist to be honest about the Biblical basis for his young-earth creationist claims. Ham openly admits this multiple times within the debates, stating, "I am only too ready to admit that my historical science is based on the Bible."[195] Instead of misquoting mainstream scientists, Ham quotes well-qualified creationist scientists. Because Ham was candid about the source of his claims, Patterson argues that this "spared Nye the burden of having to refute the kinds of obfuscations

and distortions that debaters like Morris, Gish, Brown, and others typically used in the effort to direct attention away from the biblical basis for creationism." [196] As a result, some may claim that Nye should have done more in to attack and Ham in the debate, but Patterson applauds the civility within the debate and argues, "I think Nye deserves the benefit of the doubt here; in my opinion he chose to be much more gentlemanly than a lesser man might have been under the circumstances."[197] The change in strategies by Ken Ham from previous debates may have caused some divisions and rancor within the traditional creationist ministries "because their less candid polemical debate strategy which tried to obscure the biblical roots of their assertions and pretend to have a scientific basis had been successful for so long."[198] However, this change in strategies produced a much more civil debate between the two, and likely helps reduce public confusion about the distinction between evidence-based science and the faith-based biblical science from previous debates.[199]

Decorum: "Gish Gallop"

The republican style is also greatly invested in the rules of decorum for society as a whole and the legislative institutions in particular.[200] Accordingly, public debates must follow the rules of the assembly, but these rules are also negotiated within the process of the debate.[201] As such, one area where the rules of decorum come into play within these debates is when examining the debate style of Duane Gish, which came to be called the "Gish Gallop." The term "Gish Gallop" was first coined by Eugenie Scott, the executive director of the National Center for Science Education, in which she described the debate style of Gish as "where the creationist is allowed to run on for 45 minutes or an hour, spewing forth torrents of error that the evolutionist hasn't a prayer of refuting in the format of a debate."[202] The Gish Gallop operated as follows. Gish would insist that his opponents go first. Once the opponent would finish their

opening presentation, Gish would then speak quickly and reeling off half-truths, lies, misrepresentations, misquotations and the like in order to drown his opponent in arguments. His opponent had no opportunity to note all of the facts presented, let alone work out whether they were accurate or not in the time frame of the debate and the presentations. In the rebuttal, Gish's opponent could either ignore Gish's presentation altogether, which would appear as if the rhetor was trying to dodge the issue, or attempt to answer as many of the points made by Gish in the time allotted, which would give the appearance that the speaker were floundering.[203] If the debater tried to respond to the Gish Gallop, it would take an extremely long time to adequately respond to each of the arguments. As Eugenie Scott explains:

> How long does it take to straighten out your audience on this matter? The creationist has made a simple declarative sentence, and you have to deal with not an easily-grasped factual error, but a logical error and a methodological error, which will take you far longer to explain… Creationist debaters (at least the nationally-prominent ones) are masters at presenting these half-truth non-sequiturs that the audience misunderstands as relevant points. These can be very difficult to counter in a debate situation, unless you have a lot of time. And you never have enough time to deal with even a fraction of the half-truths or plain erroneous statements that creationists can come out with. Even if you deal with a handful of the unscientific nonsense spewed out by your opponent, your audience is left with the , "Yeah, but..." syndrome: well, maybe there are intermediate forms and the creationist was wrong about radiometric dating, YEAH, BUT why didn't that evolutionist answer the question about polonium halos?" (or some other argument.[204]

When not all of his arguments were answered, Gish would proclaim victory. This strategy was clearly evident in both the Doolittle and Saladin debates, as he would jump from "fact" to "fact" in his presentations while misrepresenting and misquoting as he went.

The resolutions (or lack thereof) for the 1980s creation/evolution debates were essential for him to use his titular Gish Gallop because he was able to set the terms of the debate so that only evolution was ever discussed and criticized. If the resolutions for the debates were written such that he was forced to defend creationism in the debates, he would not be able to employ the

same tactics because he could not simply levy a plethora of arguments against evolution. In the Doolittle-Gish debate, there was no formalized resolution, only the general topic of evolution versus creationism. Without a resolution to provide constraints or to define the bounds of the debate, Gish was able to do what he wanted in the debate and what he had done in his previous debates. This meant that he was free to simply attack evolution without having to really defend his model of creationism. In the Saladin-Gish debate, the resolution was "Resolved: The theory of evolution is superior to the theory of special creation as an explanation for the scientific evidence related to origins."[205] The wording of this resolution is slanted towards creationists because it puts the onus on evolutionists to prove that evolution is superior, while creationists were able to occupy the position of skeptics with no need to defend their position. All that was necessary for creationists to win was to simply attack evolution, and this made the Gish Gallop a highly effective tactic.

The only way to get agents to constrain themselves in these debates is to have a resolutional wording that forces them to defend something. This is one of the main reasons why the Ham-Nye debate was so different from those during the 1980s. Ham had voluntarily set the debate topic to the following question: "Is creation a viable model of origins in today's modern scientific era?" [206] The resolution is only about creationism and does not even mention evolution. This puts the onus on Ham to defend the scientific validity of creationism, which meant that Nye did not have to operate under the usual dilemma of having to defend and explain the complex topic of evolution to the audience.[207] Nye would not have to be on the defensive throughout the debate and could instead attack the scientific basis of creationism.

Although creationists are famous for using the Gish Gallop in the creation-evolution debates, it was Bill Nye and not Ken Ham who used this debate style in the debate, though there

are qualitative differences between the way Gish and Ham deployed this tactic. Many scientists feared that Ham would deploy the Gish Gallop in the debate, and this was one of the main arguments against Nye participating in the debate because it was believed that Nye would have to try, as Don Prothero explains, to "undo the "mistaken ideas and lies the creationist has just said, and replace it with a more complex explanation."[208] However, it was Nye and not Ham who would use the Gish Gallop. At the behest of NCSE staffers and others helping him prepare for the debate, Nye chose to utilize a "reverse Gish Gallop" and to pile example on example in an attempt to prevent Ham from being able to adequately respond to each of them. Nye confirmed this when he explicitly said that he was planning on using this debate tactic in his statements following the debate. Nye stated:

> A scientist debating Gish often got bogged down in details and, by all accounts, came across looking like the loser. It quickly occurred to me that I could do the same thing. If you make the time to watch the debate (let's say for free at http://billnye.com—wink, wink), I hope you'll pick up on this idea. I did my best to slam Ken Ham with a great many scientific and common sense arguments. I believed he wouldn't have the time or the focus to address many of them.[209]

The qualitative difference between the Gish Gallop utilized by Gish and the "reverse Gish Gallop" used by Nye comes down to the fact that Nye did not intentionally misrepresent, misquote, or distort the arguments or evidence that he was presenting. This is an important distinction because it means that even if Nye violated some level of civility or decorum, it was still less of a violation than what Gish did during his debates.

Elite Civic Republicanism Versus Vernacular Civic Republicanism

Although the creation-evolution debates examined operated out of a general republican style, there are substantial stylistic differences between the two sides based upon their differing conceptions of the audience. For evolutionists, the audience constructed is scientifically literate and intelligent. For creationists, the audience constructed is comprised of average citizens.

Because of this difference in how creationists and evolutionists construct the rational audience, each side chooses a different version of civic republican style: "Elite Civic Republican Style" for evolutionists and "Vernacular Civic Republican Style" for creationists.

The essential difference between elite civic republican style and vernacular civic republican style comes down to a difference in discursive style: elite discourse or plain speech. Elite republicanism values the type of communication that is decorous, oratorical, and elitist. To put it succinctly, Jennifer Mercieca and James Arnt Aune explain that elite republicanism discourse is in the "realm of elite discourse, or 'artistry,' over plain speech."[210] Vernacular republican style on the other hand, Mercieca and Aune explain, "contains a more populist, even democratic, strand of political theory and an attendant rhetorical style. The vernacular republican style privileges plain speech over trickery (not necessarily eloquence) because everyone can use and understand plain speech."[211] Vernacular republicanism is a "rejection of decorous oratory as a privileged mode of public communication and [a] rejection of 'top-down' republican oratory in favor of information circulating freely among the citizenry and public leaders."[212] Vernacular discourse also puts an "emphasis on quotidian-everyday-colloquial discourses."[213] The stylist demands that there be action to "rectify the discrepancy between the promise of republicanism that serves the interests of the many and the reality of republicanism that serves the interests of the few. In other words, elite republicanism is characterized by its satisfaction with the status quo, while vernacular republicanism extends the locus of critique to all forms of oppression, whether the oppression is based upon economic, class, power, or (eventually) race and gender injustices."[214] Despite the difference in discourse, both forms of republican style are united in the concern for the common good and the republic.

Vernacular civic republican style is characterized by four main components: rhetoric of critique, transparency and openness, rejection of elite leadership, and a concern for the public good. It is this common thread of a concern for the public good and the republic that unites the two forms of republican style. The main difference is that vernacular republicanism views the elites as a threat to the republic. Merceica and Aune explain that vernacular civic republicanism "is based on the fear of corruption and is motivated by the common good just like elite republicanism."[215] Those who are operating within vernacular civic republicanism fight against what is perceived as being relegated to the margins of political debate, just like the way creationists view creation science being relegated to the margins of the scientific community. It is an anti-elitist discourse arguing "that the proper authorities are not in power and seeks reform."[216]

Discourse (Elite vs. Vernacular)

Although Duane Gish failed to meet the general republican ideal of civility because of his deceptive tactics, it is important to note that the orientation to these debates of elite republicanism and vernacular republicanism have a great effect on the style of discourse presented in the debates. Creationists inhabit the vernacular republican style, while evolutionists occupy the elite republican style. This occurs because evolutionary advocates view the audience as intelligent and scientifically literate, but creationists view the audience as comprised of average citizens. Mainstream scientific discourse has come to occupy the elite position within public decision making with regards to what is and is not allowed in the scientific curriculum as a result of the court decisions, which is the position that evolutionists operate from within the debates. However, the creationists operate on the margins of science and argue

against the elites who control science curriculum. As Celeste Condit and Charles Alan Taylor argue:

> The inclusion of creationist discourse in the schools would be a public validation of a populist way of life, which can be characterized as a small town, working class, most prominent in the South and Midwest, suspicious of the encroachment of 'big science,' and rooted in religious faith, local authority, and dramatized morality. In contrast, the teaching of evolution can be read as supporting the traditional elite program of scientific knowledge, international economy, and technical performance.[217]

Condit and Taylor later explain, "whereas evolutionist claims appeared to be targeted to the scientifically literate and efficiency minded, creationist advocacy reflected a concern with 'the average citizen.'"[218]

Creationist's Vernacular Civic Republican Style

Creationists have focused on persuading and influencing ordinary or average citizens within their debates. In doing so, Randy Moore notes, "Creationists have won many of their public debates by sacrificing sophisticated arguments for simplicity, ignorance, religious zeal, and populist appeal."[219] Rather than use complex arguments, creationists recognized the importance of using simplified accounts of natural phenomena that will speak to the general public who may lack scientific knowledge. This includes simplistic explanations of what evolution means and the Second Law of Thermodynamics.[220] Creationist discourse in the debates exemplifies each of the four categories of vernacular civic republican style: the rhetoric of critique, appeals to transparency and openness, rejection of elite leadership, and a concern for the common good.

Creationists like Duane Gish and Ken Ham utilize discourse that speaks to average citizens by using popularized understandings of scientific processes and using the general public (mis)understanding of science within the debates. Both Duane Gish and Ken Ham have similar

catchphrases to simplify the process of evolution in ways that make the theory of evolution seem as implausible as possible. For instance, Gish argues in his debate against Doolittle, "This theory may be called the general theory of evolution; the particles to people theory, or as I sometimes call it the "Fish to Gish theory" of evolution."[221] Gish uses similar phrasing in his debate against Saladin, arguing that hydrogen becomes people through the theory of evolution. Gish stated, "According to this theory. Someone has said that if that's true then we could say that hydrogen is an odorless, tasteless, invisible gas, which if given sufficient time, becomes people. And of course this is precisely what evolutionists believe, because there was nothing but hydrogen then, now we have people, obviously the only place we could have come from is from this hydrogen gas."[222] In a similar way of phrasing evolution, Ham uses the phrase "molecules-to-man" consistently throughout his debate in order to describe evolution.[223] These are vastly oversimplified and misleading constructions of what the theory of evolution actually states, but they are persuasive to many in the audience.

In addition to the glib catchphrases creationists use in debates against evolutionists, creationists also use popularized definitions of evolution instead of scientific ones. Gish uses a philosophical definition from Julian Huxley in his debates. Huxley drew a number of philosophical extrapolations from evolution, and the definition Gish cites is philosophical rather than scientific, which is that "Evolution in the extended sense can be defined as a directional and essentially irreversible process, occurring in time, which in its course gives rise to an increase of variety, and an increasingly high level of organization in its progress. Our present knowledge indeed forces us to the view that the whole of reality **is** evolution, a single process of self-transformation."[224] By using a philosophical instead of scientific definition of evolution, Gish is

able to use the audience's misunderstandings of evolution and science to make it easier to defeat the evolutionists in this arena.

Another prime example of the way creationists use popularized and misleading definitions within debates that play to the average citizen comes from the definition and understanding of the Second Law of Thermodynamics within these debates. Gish uses two ways to describe the Second Law of Thermodynamics in the debate, both of which are simplified and popularized. The first is his description of the Second Law of Thermodynamics in which he states:

> The Second Law says that such a system can never, **ever** become more complex, more highly structured, more highly organized, but it will **inevitably** run down and deteriorate to become **less** organized and more random. And yet the evolutionists insist on believing that the universe started with some explosive Big Bang, with all that chaos and disorder and the simplicity of hydrogen gas, and all we had was **hydrogen** gas, and it was hydrogen gas than **transformed** itself into the universe today including you. Clear violation of the Second Law of Thermodynamics.[225]

The second way that Gish explains the Second Law of Thermodynamics comes from a popularized definition from Isaac Asimov, whom Gish describes accurately as being staunchly anti-creationist. He uses Asimov's definition:

> Another way of stating the Second Law, then, is, the universe is constantly getting more disorderly. Viewed that way we can see the Second Law all about us. We have to work hard to straighten a room. If left to itself it becomes a mess again, very quickly and very easily. Even if we don't enter it, it becomes dusty and musty. How difficult to maintain houses and machinery, and our own bodies in perfect working order. How easy to let them deteriorate. In fact, all we have to do is nothing, and everything deteriorates, collapses, breaks down, wears out, all by itself. And that is what the Second Law of Thermodynamics is all about.[226]

The problem for evolutionists comes from the fact that even if the evolutionist has anticipated the popularized version of the Second Law, David H. Milne explains that "a definitive counter-argument is likely to go 'over the heads' of the audience. To a person in the

crowd, neither of the scientists on stage who are arguing about entropy can make a completely convincing case; but the observer will tend to favor the one whose argument is simplest and in accord with his/her religious beliefs."[227] However, Saladin counters this popularized view of the Second Law effectively by pointing out the simplified version of the Second Law in the debate. He uses Dr. Asimov's response to the way that Gish explains the Second Law to point this out. Saladin quotes Asimov as saying that Gish's treatment of the Second Law being "on a kindergarten level."[228] The second aspect of Saladin's response to Gish is to point out that:

> As he typically does, Gish has simply erected a straw man --- something that no scientist believes anyway. In fact the creationists have a history of concocting their own Second Law. Not being satisfied with the one in the physics books, they call theirs the "New Generalized Second Law.[229]

These types of responses to the popularized explanation of scientific processes do not fall into the trap that Milne explains in which the scientist tries to explain the process in the "correct" scientific way. This is not to say that Saladin does not do this in his debate because he does counter Gish's explanation with a more accurate scientific definition and explanation, but the use of the arguments explained above are a fairly effective way to counter creationist ploys in the same style they employ.

After using simplified accounts of scientific processes designed to appeal to the average citizen in the audience, creationists then demand that creationism be taught in public schools alongside evolution because students need to be exposed to both sides of the issue and be able to make the decision themselves as to what makes the most sense to them. This is a public idiom that is rooted in fairness and participation, and Randy Moore explains that "This strategy has been remarkably successful at the local level because it squares with the public's belief in hearing all sides of a story. Creationists invoke 'fairness'… Biologists who protest are labeled 'censors.'"[230] As Taylor and Condit explain, the majority of "the public views science

curriculum choices as a matter of political participation because it is partially through the school system that communal values and presumptions are shaped."[231] These creationist appeals for equality have a "visceral and populist appeal, especially when evolutionists are portrayed as elite pompous authoritarians who are violating the rights."[232] As Charles Alan Taylor explains:

> The visceral appeal of the creationists' implicit epistemology (if not their research program) is accentuated by its consistency with the public skepticism of detached technical expertise. The traditional scientific community which defends evolution as situated in the same ivory tower popularly thought to harbor such miscreants as the absent-minded professor engaged in abstruse philosophizing and tenured radicals engaged in politically correct proselytizing.[233]

Each creationist debater makes appeals that play upon public skepticism of scientific elitism and the way that these elites use their position to exclude creationism from the scientific community and public science curriculum. To this end, creationists accuse evolutionists, and the mainstream scientific community, of censorship. Perhaps the most notable use of this discourse comes from Gish's closing statement from his debate against Saladin. Gish makes a stunning appeal to the audience's sense of fair play in his closing statement by comparing the creationist movement and creation science to that of Galileo and Louis Pasteur as they faced the stifling dogma of the ruling elite. Gish stated:

> Ladies and gentlemen, 3 or 4 centuries ago, the notion that the sun and other planets revolved around the earth was a dogma of the scientific establishment. Galileo faced determined opposition from fellow astronomers when he suggested otherwise. Louis Pasteur and others about a century ago overturned the established dogma of centuries when they showed that living things never arise spontaneously from dead matter. Today even though thousands of scientists are creationists and the number is growing rapidly, the notion of evolution remains a stifling dogma. Evolutionists seek to smother all challenges from within or without the scientific and educational establishments, concealing the fallacies and weaknesses of the theory and adamantly opposing a hearing for the scientific case for creation. Why is this so? Certainly not because the notion of evolution, the science and the concept of creation, is religion. I can think of possibilities. First it may be that evolutionists consider that our students are too ignorant, too illiterate to be exposed to these competing ideas of origins. They must be protected from error and carefully indoctrinated in correct ideas by those who

> consider themselves to be intellectual elite, the sole possessors of truth. Secondly, having engendered this fragile tower of hypotheses piled on hypotheses for fact and fiction intermingle in an inextricable confusion, it may be that evolutionists are aware of the fact that the notion of evolution will fare badly if exposed to an open and determined challenge from creation scientists. And that if this is done, the majority of our students will accept creation as a better of the two concepts of origins. [234]

In continuing the theme of the mainstream scientific elites maintaining dominant control of the scientific community that excludes and denigrates anyone who dare challenge evolution from a creationist point of view, Ham quotes Dr. Burgess in his opening argument as stating, "I find that many of my colleagues in academia ascribe to the creationist viewpoint, including biologists. However they are often afraid to speak out because of the criticism they might receive from the media and their atheist colleagues."[235] Ham's analysis of the situation is telling, as he stated, "I agree that's a real problem today. You need to have freedom to be allowed to speak on these topics."[236]

Another way that Gish accuses the scientific establishment of excluding creationism comes from the fact that creationists almost never get an article published in scientific journals. He accuses the journals of censorship, and this appeal holds a great deal of sway in the general public who view the scientific establishment with skepticism. Gish accuses the scientific establishment of refusing to publish his articles in scientific journals because his research suggests that evolution is false. Gish stated:

> Well no wonder they don't publish in their journals! They won't publish it. If you submit an article to one of these leading journals, if you suggest that evolution is false, that creation is a more reasonable and credible explanation, I will guarantee you, you won't get it published. In almost all of these journals. They won't do it. That's why we don't publish---- They asked Fred Hoyle, "Why didn't you publish this material in one of the standard journals?" He said, "Because they wouldn't publish it. That's why I had to put it in a book. That's the only way I could get it published, is put it in a book." That's why. And that's censorship, young people. That's book-burning. We want all the evidence on both sides to be freely and

> objectively evaluated on the basis of its merits, not on the basis of censorship. And it's dogma that dominates our educational-scientific establishment today.[237]

Creationists also argue for the common good of the republic. The basic thrust of this discourse is that there is still a belief in the need to maintain the republic, but the focus is on the people instead of the leading elite. In doing so, creationists appeal to academic freedom in the debates in that students should be allowed to choose for themselves which scientific version of origins they believe the evidence supports best. In his debate against Doolittle, Gish stated that evolution:

> Is a basic dogma of agnosticism, humanism, and atheism in general. The one-sided indoctrination of our students in this materialistic philosophy in the tax-supported public schools in our pluralistic, democratic society is a violation of academic and religious freedoms. Furthermore, it is poor science and poor education. To remedy this intolerable situation, creation scientist are asking that excluding the use of the Bible or religious literature of any kind, only the scientific evidence that can be adduced in favor creation and evolution be presented thoroughly and fairly in our public schools. After students have had an opportunity to examine all the data, consider each alternative, and to weigh the implications and consequences of each position, then they should be challenge to decide for themselves, which is more credible or reasonable. Now that is good education in the finest traditions of academic freedom.[238]

In his closing statement in the debate against Saladin, Gish repeats his explicit call for academic freedom to teach both evolution and creation in public schools and to allow the students to choose for themselves what they believe is the more likely scientific explanation for the origins of life. This time, Gish also makes explicit appeals to public opinion as for a reason for allowing creation to be taught alongside evolution. To this end, Gish stated:

> I am pleading for academic and religious freedom ladies and gentlemen, I am pleading for your academic freedom. You may not like it, you may not agree with me, but you have every right to hear the scientific evidence for creation. You have every right to know the failings, the fallacies, the weaknesses, what we believe to be the insuperable barriers to an evolutionary origin of life, an evolutionary origin of cells. Why shouldn't you hear? What's wrong with that? What's wrong with hearing what Sir Fred Hoyle had to say? What's wrong with hearing what Hubert Yockey has published in the Journal of Theoretical Biology? What's wrong with

> hearing with Keosian, John Keosian, has to say about the scientific evidence on both sides of this question? Are we a democracy? Or are we not? In a survey, national survey, in 1981, 76 percent of the American people said teach both creation and evolution in the public schools. Another ten percent said teach creation only. Eight percent said teach evolution only, six percent had no opinion. Eighty-six percent to eight percent want's creation in our public schools. What do we have today? The eight percent. And I say that in order to insure academic freedom, good science, good education, we should have both, evolution---- Only scientific evidence, not the Bible, not the Book of Genesis, not the Navajo Indian, not the Hindu story, but strictly the scientific evidence taught in our schools, so you students can decide for yourselves, what you think is more reasonable and credible?[239]

Although the explicit appeals to academic freedom are largely confined to Gish's statements, likely because the Courts were grappling with the balanced treatment statutes at the time, Ham also made statements that indicate the need for academic freedom in the schools. Ham accuses the scientific elite, specifically evolutionary scientists, of indoctrinating students with their "religion of naturalism" and that the word "science" has been hijacked by secularists in teaching evolution, to force the religion of naturalism on generations of kids."[240] All of these appeals to freedom and indoctrination work on the public ideal of choice and fairness. This makes these types of appeals very persuasive to a general audience.

In addition to the appeals for fairness and freedom, creationists also make appeals to the maintenance of the republic specifically. Gish argues that to exclude creationism from public school science curriculum would be to throw out the Declaration of Independence. Gish argued:

> To absolutely, totally exclude the possibility of Creation. We've got to throw out the Declaration of Independence {3}. In that we read, "We take this to be self-evident, that all men were created equal, and they are endowed by their Creator with certain inalienable rights." We've got to substitute the Creator, we've got to put hydrogen gas in there, and take that out, if God's unconstitutional in our public schools.[241]

Evolutionists Elite Discourse

It is difficult for scientists to explain the nature of their work in "lay" terms that speak to the average citizen. Instead, scientists arguing in public debates in front of average citizens often present in a style that conforms to the scientific community. Taylor and Condit argue that this largely occurs because "Science is a more highly restricted enterprise, and, as such, the nature of the information commodity is constrained by the insular nature of the scientific establishment."[242] Evolutionists specifically are hampered by their reliance on a style of articulation and argumentation that conforms to the narrow scholarly concerns of the scientific community.[243] While this narrow form of argument and style works well within the scientific community, it is limited in its effectiveness with a general audience.[244] As such, Moore argues that "Scientists have been far less successful in manipulating the public discussion than have creationists."[245]

In following the elite civic republican style, both Doolittle and Saladin operate within the elite scientific discourse that works well within the technical sphere of the scientific community but not in the public sphere. This style operates within the norms of mainstream scientific community, and this often results with presentations that appear as dry, scientific presentations that do not speak to the audience in public debates. Doolittle and Saladin both fall prey to this problem in the debates. For instance, Doolittle uses scientific notation for the age of the earth. Doolittle stated, "4.6x10^9, the exact same age as meteorites, the same age that all scientists that were seriously involved in this thought the earth was."[246] This also makes a call to scientific elitism because it is what all serious scientists believe. This rhetorically excludes anyone who thinks that the earth is younger from being a serious scientist. Saladin also makes appeals to

scientific elitism when he argues that Gish lacks the scientific credentials to make claims about paleontology. He stated:

> Now Dr. Gish pretends he's an expert on fossils, but he's never contributed a thing to any professional journal of paleontology and I doubt he's ever done any original research on the subject or even tried to publish. Yet he acts as if he knows more about it than Simpson, Dobzhansky, Gould, and Darwin all rolled into one![247]

These appeals to scientific expertise fail to take into account the way that the vernacular civic republicanism rejects elite discourse and plays upon the average citizen's skeptical view of mainstream science. In fact, this style plays directly into the hands of the creationists when arguing in front of the general public. Instead, Doolittle and Saladin appear, as Taylor and Condit argue, "as a detached elite bent on maintaining the hegemony of the scientific establishment."[248]

Doolittle and Saladin also offer very little popularization of the evidence presented in their debates. Saladin's presentation was very informative and full of well-crafted and well-reasoned arguments with scientific evidence for his position, but it reads like a scientific presentation. For someone who is interested in science this presentation is excellent. It comports to the detached and impersonal style used in the scientific community by which one relays the facts that support the theory. This applies to the attempt to definitionally exclude creation science from mainstream science as well as the way evidence is presented in the debate. For example, Saladin argues, "The basic building blocks like amino acids and nucleotides polymerize spontaneously to form short peptides, proteins, and nucleic acids."[249] There is little to no explanation designed to make this understandable for a general audience.

This is not to say that Doolittle and Saladin do not popularize their scientific evidence occasionally. Doolittle does make some attempts to make his presentation more relatable to the

audience by calling the process of gene replication a "biochemical Xerox" and uses the example of the closeness of relatives for organ transplants to discuss the molecular fossil record.[250] Saladin also provides an anecdote within his presentation while discussing the closeness of dogs and bears when he stated:

> Now we have a town character in Milledgeville who likes to keep wild animals penned up in tiny little cages in front of his roller rink. One day a colleague of mine visited town with his young son. As I was driving them around we went by the roller rink [SLIDE 58: Grizzly bear], and the owner was out walking his bear down the side of the road on a chain. (Not that bear!) The little boy gazed at this sight as he went by, and continued gazing at the man and his bear through the rear window until they were out of sight. Then he turned around to us and said, "Daddy, that man's dog looked just like a bear!" [Audience laughter] But that as a perspicacious observation, because bears and dogs are closely related and have a lot of similarity between them. I had a friend with a dog named Bear, and that dog lived up to it.[251]

However, these anecdotes and popularization of scientific evidence are far and few between in these debates. Instead, Saladin and Doolittle largely relied on enumerating the evidence for their position without popularizing or translating their arguments to meet the needs of average citizens.

The enumeration of evidence in favor of evolution through the elite scientific discourse is not enough to persuade the general public. Randy Moore argues, "Although scientists would like to think otherwise, the public does not passively accept the knowledge presented by scientific experts. Moreover, different intellectual communities use different criteria for determining what is reasonable or 'scientific;' this is why creationism is considered differently by the public than many scientists."[252] The problem is that evolutionary scientists debating creationists often naively believe that what is convincing in the laboratory will be equally convincing in the national forum without any attempt at popularization.

In all of the debates, evolutionists make appeals that show a concern for the republic. Although there is no specific appeal to the republic in his debate, Saladin does highlight the damage that not learning about the theory of evolution has on science students once they reach the collegiate level. While his appeals are not specifically tailored to the maintenance of the republic, Saladin's appeals do show a concern for the common good of the student.

On the other hand, both Doolittle and Nye make explicit appeals to the maintenance of the republic. Doolittle reiterates his plea for the exclusion of creation science from the classroom because he sees it as a threat to education and the republic. He stated:

> I find creation science is a pseudo science. It distorts, it misrepresents, we've seen it tonight, it ignores facts, its based on a narrow religious dogmatism. To put it in the science classroom is to handicap America. It is to cheat our children. For only by an understanding of the logic of evolution are we going to understand the problems that we face as a civilization today. Mankind, if he doesn't understand evolution, cannot understand ecology. He cannot understand how we are drowning in this earth from an overpopulation and an over exploitation of resources. To ignore these facts, I would contend, is to live a life of pretense and will certainly lead us on the road down to a dinosaur like extinction.[253]

For Nye, what is at stake in this debate is that we as a nation should reject teaching students creationism in public schools as science because of the effect that it would have on the ability of the United States to compete in the globalized economy. He stated:

> What keeps the United States ahead, what makes the United States a world leader is our technology, innovation, our new ideas. If we continue to eschew science, eschew the process, and try to divide our science into observational science and historical science, we won't move forward and embrace natural laws, we will not make discoveries, we will not invent and innovate and stay ahead.[254]

The end result of allowing creationism to be taught in schools would be to lose the lead the United States currently holds in the globalized economy. The stakes of the debate become much greater when tied to this, and this is designed to move the rhetorical appeals beyond just that of a

scientific/factual claim to looking at the potential consequences of allowing creationists teachings in public school science curriculum.

In maintaining the republican style, both Doolittle and Nye also appeal to their position as citizens within the debate and not simply as scientists. In his opening statement, Dr. Doolittle references his reason for being at the debate as a "concerned citizen", and he states, "the reason I'm here tonight is that I really am a concerned citizen, and I'm worried about the future of education in America. I'm very much worried about what has happened this last year in Arkansas and Louisiana where in fact the state legislatures have seen fit to award equal time teaching of creation and creation science in the science curriculum."[255] Saladin makes little to no reference to this position as a rhetor. However, Nye makes an appeal to his being a patriot in his debate. He stated:

> And I just want to close by reminding everybody what's at stake here. If we abandon all that we've learned, our ancestors, what they've learned about nature and our place in it, if we abandon the process by which we know it, if we is eschew, if we let go of everything that people have learned before us, if we've stopped driving forward, stopped looking for the next answer to the next question, we in the United States will be outcompeted by other countries, other economies. Now that would be okay, I guess but I was born here, I'm a patriot. So we have to embrace science education. To the voters and taxpayers that are watching, please keep that in mind. We have to keep science education in science. Science classes.[256]

These references to being a concerned citizen or a patriot place both Nye and Doolittle firmly within the republican style. Nye's specific reference to being a patriot is designed to make him seem more credible as a speaker because he has the best interests of the audience and the nation in mind. By making this argument about being a patriot couched within the argument about science being necessary for the health of the United States moving forward, Nye is arguing that Ken Ham is not a patriot and that he does not have the best interests of the audience and the nation in mind. The patriotic maneuver also allows Nye to challenge the conception some

members of the audience might have that a belief in certain religions were necessary to also be supportive of the republic.

Bill Nye Style and Persona

A new approach to the creation-evolution debates is necessary to counter the creationist movement. As Taylor notes, "The unique public character of the creationism debate calls for different approaches than those which currently hold sway in the professional domain."[257] This is why Bill Nye's discourse as a science educator and entertainer and his persona as "The Science Guy" is so important. Nye's style in the debate is distinctly different from the previous evolutionist debaters. Instead of fulfilling the norms of the scientific community, Nye presented as a science educator who knows how to speak to average citizens. He was able to translate the scientific basis for his arguments into discourse any member of the audience could understand. Part of the reason for this ability to translate complex scientific concepts into terms that the general public can understand and to popularize scientific evidence comes from his experience as a science educator and the fact that he is not a scientists by trade. Rather, Bill Nye is an engineer. It was through his show, *Bill Nye the Science Guy*, that he came to be an experienced entertainer and science educator. Nye is able to parlay this experience to his debate against Ham. Nye explicitly refers to this in his take on the debate after the fact. Nye stated:

> I am by no means an expert on most of this. Unlike my beloved uncle, I am not a geologist. Unlike my academic colleague and acquaintance Richard Dawkins, I am not an evolutionary biologist. Unlike my old professor Carl Sagan or my fellow Planetary Society Board member and dear friend Neil deGrasse Tyson, I am not an expert on astrophysics. I am, however, a science educator. In this situation, our skeptical arguments are not the stuff of PhDs. It's elementary science and common sense. That's what I planned to rely on. That's what gave me confidence. With my experience as a science educator, I like to divide elementary science into three categories: life science (biology), physical science (physics and chemistry), and planetary science (geology and astronomy). And so with the remarkable help of the NCSE and skeptics, I chose arguments from each of these three disciplines.[258]

This exceptional ability to make science entertaining and popular was also recognized by several scientists, who by chance also believed that scientists should stay away from debates against creationists. Ann Reid and Glenn Branch noted, "Nye is a brilliant and admired science communicator, with a professional entertainer's stage presence and the ability to connect with a general audience. Debates are performances, and Nye is a splendid performer."[259] Greg Laden also noted that Nye played to the gallery and charmed the audience. It was his ability to present science to the audience, even the evangelical audience, in an entertaining fashion that Laden notes when he wrote:

> Bill Nye also did well in this debate, objectively speaking. He presented science, science, science and more science. He presented the science clearly, convincingly, chose his examples well, personalized the discussion wherever possible even to the point of doing a Lewis Black moment (pulling out a fossil he had picked up earlier in the week!). During the few moments when we were allowed to see the evangelical audience during Bill Nye's presentation they looked, frankly, charmed. And how could they not be, Bill Nye is a charming guy![260]

The Nye persona as "The Science Guy" also played a role in the way the audience received his debate against Ken Ham. Hariman notes that the persona of a person presenting in a public debate plays into the republican style. He argues, "Fame, like other elements of the republican style, is both a means for personal influence and a context for audience participation, the pursuit and acquisition of glory can even be a resource for political conciliation, something that not only motivates extraordinary action but also binds competing interests together."[261] He also notes that "Ethos plays a particularly important role in republican discourse" and that one "can offer one's persona as a political resource."[262] This persona that a person has also affects the way in which the arguments are received. Michael Overington argues, "Finally, one may need to consider 'non-technical' arguments, those pieces of evidence that are excluded from the formal rhetorical argument. Thus, the prestige of the speaker's institutional affiliation, the

speaker's reputation, the kind of foundation or granting agency that funded the research, whether or not the paper has been read previously, and the like, may all affect the plausibility of the argument."[263] The difference between Nye and scientists like Saladin and Doolittle is best explained by Don Prothero, who had also participated in debates against creationists. He argues in favor of Nye as an evolutionist debater:

> As Olson said and the NCSE people coached him, what really counts is to be likable, friendly, positive, upbeat, non-threatening, while explaining the science in a clear simple fashion at fifth-grade level, and not bullying or being condescending to the opponent or looking arrogant or smug as a scientist (These things are very hard for me to do, since I take the creationist's attacks as a personal attack on my profession and my integrity. Another reason I won't debate them any more). Bill didn't attack Ham directly or belittle his idiocy and stupidity (most of us wanted to throttle Ham each time he spouted another lie). Instead, Bill was a gentleman, talking up the absurdity of his position and saying how it "troubled him," how Ham's ideas were against evidence and common sense, and generally letting the audience fill in the blanks when they too realized how silly YEC is. Bill has been a TV entertainer and science educator for 30 years, and he (along with Neil DeGrasse Tyson and the late Carl Sagan) are among the few scientists who are good popularizers that we need so badly. Even as the debate was winding up, most people no longer remembered any of the details or who scored points on whom, or who failed to reply to whose challenge. What they DO remember is that they liked Bill and he made science sound fun and interesting and important, while Ham came off as a dogmatic religious extremist who wouldn't change his mind despite any evidence, and fell back on the Bible rather than scientific evidence each time he was challenged. Bill beat Ham on this issue, hands down![264]

Don Prothero was not the only one to compare Nye to other well-known science popularizers like Carl Sagan. Randy Olson also argues that Bill Nye has even surpassed Carl Sagan in the mass support for him as a science educator and presenter. Olson notes:

> Carl Sagan in his prime never had this sort of mass support and wild enthusiasm. Bill Nye, like him or not, is creating the "trusted and liked" broad voice that the science world has lacked. On Saturday I saw the phenomenon live and in person at the University of Missouri's "Decoding Science" event that I took part in (which was excellent!). He filled the 2000 seat auditorium on Saturday morning where I literally arrived 10 minutes late, could not find a seat, so had to watch most of it on the TV monitor in the lobby. The audience went bonkers — cheering him for the Ken Ham debate, roaring with laughter at the corniest of

> jokes, then in the Q&A students asked him for Hi-fives, selfies and other hero-worship gestures. I guarantee you this is the result, more than anything else, of his having done the Ken Ham debate. I'm coming to the conclusion, goofball or not, he is perhaps more media savvy than anyone else in the ENTIRE world of science, and certainly far more than the scientists (with virtually no media experience) who have been taking potshots at him in magazines and blogs. Go Science Guy![265]

Nye took great pains to make the audience like him, and it showed in the way it was received. One telling moment from an interview with Nye after the debate comes when he states, "From the beginning, I told Genie et al., that at some level, this thing has to be fun. Otherwise, it's hard to be passionate and have the audience like you. Put another way, what is it that you or each of us loved about your favorite teacher or professor? I believe it's his or her passion."[266] It was his passion and excitement that helped make his presentation different from previous creation-evolution debates because it showed in his presentation style and resonated with the audience. In addition to this passion that Nye was trying to cultivate, Nye notes that he did something that scientists would not do to endear themselves to the audience. He talks about how he made a joke about his signature bowtie in his opening statement. To this end, Nye stated, "In keeping with the idea of getting the audience to like me, I spent my first minute and a half on a joke about bow ties. I'm not sure how many of my academic colleagues would have made that choice, but I stand by it.[267]

In addition to the Nye persona, the inclusion of personal anecdotes and personal experiences also is a great change from previous evolutionist debaters that makes his presentation less detached scientific elitism and more down to earth science educator. Nye included a personal anecdote of his family being master ship builders to challenge Nye on the ability of Noah's Ark to contain all the forms and its ability to float at such a great size. By making these types of arguments, Nye is able to appeal to and relate to the average American

citizen in ways that previous scientists were unable or unwilling to do in their debates against creationists.

CHAPTER 4

CONCLUSIONS

Simply looking at the evolution-creation debates from either argumentative techniques or political style alone presents an incomplete understanding of the debates and why worldviews counter to mainstream scientific knowledge persists. By looking at both the style and form of the debates, I hope to be able to provide evolutionary advocates with a better understanding of both how creationists arguments resonate with the general public and how to better debate in front of the general audience. Perhaps these two vantage points also provide an incomplete understanding of this, but it does provide a robust explanation of this phenomenon and provides several lessons for how evolutionary advocates should argue with creationists in public debates. The overarching lesson for scientists who engage in public debates is to take into account the audience when engaging in a public debate. This understanding can also be broadened to understand how to debate with others who have incommensurate worldviews, such as the global climate change controversy.

Bill Nye provides a great model for science debaters to follow. It is his mixture of arguments and style that makes Nye so much different from other evolutionary debaters. Nye may be the voice of science within the debate, but he does not speak as a scientist in the style of the norms of the scientific community. Instead, Nye was able to present mainstream scientific knowledge to the audience in the Creation Museum and those watching online in ways that spoke to them and not over them.

What evolutionary scientists, and scientists in general, should takeaway from this analysis of the debates is that science debaters need to understand that they are not arguing within the professional scientific community. They are arguing in front of the general public that is comprised of ordinary citizens who may or may not have a strong scientific background. Instead of simply enumerating the evidence for the position and making claims to a scientific consensus, which is persuasive in the professional domain of mainstream science, science debaters need to take a cue from Nye's argument and style choices. Nye infused his arguments with personal anecdotes and popularized scientific evidence that makes the arguments presented understandable to all of those in the audience. It is the translation of the arguments from the discourse scientific community to the public domain that makes a great deal of difference. Simplifying scientific concepts is often the best way to reach an audience. Some scientists were upset with Nye's presentation because he did not represent evolutionary science with technical precision. However, this criticism of Nye in a public debate misses the mark and is symptomatic of large portions of the reason why scientists have difficulty translating their arguments to the public sphere because he is not arguing in front of a scientific audience. Instead, he is arguing in front of a public audience, comprised of non-experts in the field, so his choices of what arguments to present and how were likely the correct choice for the debate.

Science debaters also must be aware that there is a great deal of skepticism towards mainstream science within the general public. This is another reason why simply enumerating evidence for one's position or making claims of a scientific consensus are at best unpersuasive to many in the audience and potentially counterproductive because these types of claims are seen as scientific elitism. Scientists should refrain from trying to make claims that the opposition is not real scientists or to openly ridicule the position. Instead, arguing from the position of civility is

an essential component for making persuasion possible. As Jim Lippard notes about creation-evolution debates, "We must not lose sight of the fact that no matter how silly creationism looks from an informed perspective, those who adhere to it are human beings.. Most creationists are sincere believers, even if some of the leaders of creationist organizations are not…Ridicule and abuse simply confirm their suspicions about evil conspiratorial evolutionists who are out to suppress the creationist viewpoint."[268] This lesson applies to all science debates, not just those with creationists. Because the audience is skeptical of mainstream science, resorting to ridicule or abuse may simply confirm the audience's suspicions that mainstream science is simply out to suppress any view counter to their control. This does not mean that science debaters need to simply avoid any sort of contentious arguments, but it does mean that they need to be aware of how they interact with the other debater has an effect on how the audience perceives the arguments.

One also must understand the basis for the incommensurate worldview being presented. In the instance of the creation-evolution debates, many of those who hold creationist beliefs believe that evolution science, and mainstream science in general, represent a direct challenge to their religious identity. One must tailor the arguments in the debate to take into account this belief, and Nye is able to do so in his debate when he argues regularly within his debate that science and religion are compatible with one another. There is often at least some semblance of a scientific basis for the beliefs that the opposition holds, and understanding what this is allows the debater to choose arguments that best counter or addresses this belief. In the instance of the creation-evolution debates, creationists do have a basis for their view of science in a Baconian worldview. The choice of what elements of science to include in the debate to exclude creationism as a science has a real impact on how creationists view the debate.

Science debaters should also be aware that the persona of the debater has a great effect on the persuasive appeal of the arguments presented. Simply being a well-credentialed scientist does not automatically make one persuasive. Instead, Nye, like Carl Sagan and Neil deGrasse Tyson, is a well-liked and beloved voice of science. Not every scientist will be able to have a persona like "The Science Guy," but these scientists can speak with passion, energy, and be entertaining. One of the things that Nye figured out in his time as "The Science Guy" is how to make science entertaining. It is the fusion of entertainment and education that makes Bill Nye who he is as his persona, and this is a critical component for science debaters to reach their intended audience.

These lessons can illuminate how to engage others who have incommensurate worldviews, such as what is happening in the global climate change "controversy." Many of those who do not believe that global climate change is occurring or is not a big deal often hold skeptical views of mainstream science and believe that their everyday observations of what is occurring is more believable than what mainstream science tells them. Making claims of scientific consensus or simply enumerating the evidence is just not persuasive because of this. Instead, one should simplify complex scientific concepts about climate change into terms that anyone can understand and also popularize the scientific evidence. Instead of showing frustration with those with whom they are arguing, they should maintain civility and try to understand what the basis of their beliefs are. Simply dismissing or ridiculing what one sees as a silly or illogical argument like "How can there be global warming when there is snow in March?" is counterproductive. Instead, calmly and clearly explaining the scientific basis for why that misunderstands climate science using popularized and simplified explanations is the best way to counter these misunderstandings.

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APPENDIX A

TRANSCRIPT: RUSSELL DOOLITTLE VS. DUANE GISH DEBATE (1981)

Dr. Jerry Falwell:
Good evening. Since mankind came into existence, he has asked such questions as who am I, why am I here, and where am I going. The origin of species, where did I come from, has been another question that man has debated for nearly as long as he has been asking those philosophical questions. In fact, the answers to those questions determine not only how men and women view themselves but how they view others as well. Some religious people have felt that science is the enemy of religion. Some scientists believe that religion is the enemy of science. Both camps have erected a high wall between them. I believe both sides have been wrong. Religion and science, rightly understood, are not enemies. In fact, rightly understood, they complement each other. The purpose of tonight's debate is to begin to tear down that wall. Anyone who knows anything about me is aware of my belief that the issue of special creation versus evolution is the foundational premise for all truth. I hold to the view of biblical creation because I believe in the inerrancy of scripture, and I accept totally the Genesis account of creation. Millions of persons hold to that position. However, there are millions of persons who do not believe in scientific creation. They accept various theories of evolution, and tonight we have one scientist who holds to the evolution view of man. Those who believe in special creation have been greatly disturbed that in many public schools evolution has been taught as fact. To compound the problem many educators and some media personalities have maintained publicly that there is no scientific evidence to support the concept of special creation. They have maintained that special creation is merely a religious philosophy and is not supportable in the arena of science. Therefore, the Old Time Gospel Hour proposed earlier this year that a nationally televised debate should be conducted between to eminent scientists who hold opposite viewpoints on the Origin of Species.

Let me now introduce the participants and tonight's debate. First, from the Department of Chemistry at the University of California, San Diego, Dr. Russell F. Doolittle. Dr. Doolittle will argue the evolution theory. Next, from the Institute for Creation Research, also in San Diego, Dr. Duane Gish. Gentlemen, welcome to Liberty Mountain and to Lynchburg, Virginia.

The ground rules for tonight's debate are as follows. Each gentleman will have 18 minutes to make a position statement. Then, 5 minutes for rebuttal, and then 2 minutes for summary. We request that all applause be held until each speaker concludes his remarks. By the toss of a coin, it has been determined that Dr. Doolittle will speak first. Dr. Doolittle.

Dr. Russell Doolittle: Opening Statement (18 Minutes)
I'm here this evening against the advice of many of my colleagues. They have pointed out to me that this is a no-win situation. That in fact, how can you come into the home of the Old Time Gospel Hour and really hope to convince anyone of the factual nature of evolution. They point out also that it is impossible for anyone in 15 minutes to outline the tremendous amount of data and information that leads to the concept of evolution. They point out that this is a very different

debate than the kind of debate that I may have had with Dr. Gish on other occasions. It's not the same as going over to the student cafeteria and exchanging a few words here and there, skirmishing a bit about this or that, and in fact, this is an enormous media event, witnessed by millions of people perhaps. And that what it will amount to is that really publicity for a special cause. They point out that I'm really a stage prop here to sort of a necessary fixture and that there's no way that I could convince anybody to change their mind about this particular view.

Now of course, they're right and the question comes up why in the world am I here tonight, and I'll tell you that the reason I'm here tonight is that I really am a concerned citizen and I'm worried about the future of education in America. I'm very much worried about what has happened during this last year in Arkansas and Louisiana, where in fact the state legislatures have seen fit to award equal time teaching of creation and creation science in the science curriculum. To me, this is a travesty. Even though, of course, being way out there on the frontier in California, I perhaps might not have been moved to be some sort of carpetbagger and come all the way out here to Lynchburg and do it. If it hadn't been that in fact various things happening in the state of California, also have moved me to my concern.

There was a poll that appeared last May showing that in fact half the people in California wouldn't mind if in fact equal time were given to the teaching of creation alongside of evolution. Now this seems so alien to me. That is evolution is part of science whereas creation, and so-called creation science, is a religion and our country was founded on this principle of keeping the two separate. It just seems so strange that I felt I must come here and speak out. Now, in California, something else happened last year. The events of which move me very much to come here and try to be a spokesman and speaking in opposition to people who call themselves creation scientists. These events occurred in Livermore, CA. About a year ago, parents found that their children were coming home from the fifth and sixth grade of a particular school and were telling their parents stories about science class that smack very much of fundamentalist religion. And, in fact after it went through a period where various committees were faced with the traditional dilemma of teacher freedom versus what's going on in the classroom, it was found that a teacher had taken it upon himself to introduce creation science teaching in the classroom in Livermore, CA without any mandate from the people who live in that community. In fact, when this committee went in and inspected, they found that it was a virtual propaganda campaign that was nothing short of indoctrination. They found that there were eight different filmstrips with accompanying cassette audio. They had eight different audiocassettes besides 6 hardbound books, 24 paperback books, 8 pamphlets, 40 copies of eight different newspapers, all bearing the creationist stamp. The overwhelming majority of these materials emanated from the creation press. I've got the name here someplace and got it wrong, but it's Dr. Gish's institution. It is the Creation Life Publishers that are an arm of Christian Heritage College, the home base of the Institute of Creation Research. Some of these materials contain such statements, as "evolution is the best tool Satan has to destroy the minds of young people." There were many of them, and in fact, I thought about this debate tonight. I thought the best way for me to make my point, not necessarily with the people here in Lynchburg, but with the heart of America that I hope will have some sense about this, is to read from these materials to show what you're getting into if you want to follow Mr. Falwell's advice about putting creation science into the curriculum. By most of these materials were authored by Drs. Gish, Dr. Morrow, Mr. Parker, and I'd like to use them now to just tell you what it was that so upset me. I'm going to start with one particular one

called “Dry Bones,” probably familiar to many of you in the audience. “Dry Bones” is purportedly an article or book about fossils and what it’s supposed to do is show in fact how the fossil record can be interpreted in terms of creations, special creation. This book is in the form of a dialogue between a father and his two young children, David and Diane, and its message is to explain how the fossils are just a natural result of the great Noah Flood, Noah and his Ark, all about 3,000 years ago, or several thousand years ago. Let me just read you a few passages. Diane has just inquired about a fossil snail that David had found and their father has just explained that it was drowned when Noah’s flood covered the earth. I’m going to start with the father talking here he says, “Here is another picture of another extinct creature, Diane. Do you know what it is?” She says, “Of course, it’s a dinosaur. The dinosaurs lived when Noah lived, Dad.” “And that’s what I think,” he says, “The way it looks, dinosaurs were drowned in the flood too. Besides, what did we see on our camping trip last summer? Do you remember the Paluxy River near Glen Rose, TX?” “Oh yes, we saw footprints of man and dinosaur together. I guess man and dinosaur had to live together if they could make footprints at the same time.” Now, in fact folks, so I have to just tell you that the Paluxy “human footprints” with “dinosaur footprints” ranks among the greatest frauds of our time. The locals down in TX simply carved them in amongst the dinosaur tracks to sell to the tourists. Now, the thing that is most astounding to me is that in fact the creationists well know this, and then on occasion, they will even admit it, even in print once or twice. But, there is “Dry Bones” still out there in the classroom, and it even recommends the film down in the bottom here “Footprints in Stone” that follows the same line, available from the Films for Christ. Let me continue, I want to go on with the dinosaur business here. “By the way, Dad, if dinosaurs were alive when the flood came, did Noah have to take them on the Ark?” “He surely did. God told Noah to take at least one pair of all the dry land animals.” So, here we have now dinosaurs, which of course were extinct long before mankind appeared on the earth, going off in Noah’s Ark in this particular book being used in the fifth and sixth class grades at a Livermore public school last year. He went on, “They confirm that the reason that Noah had to have this flood was because they had to make these animals extinct because our sins made the world so bad.” And, so it goes on in this little book, I like to continue one more because now we want to get into the case of what does that have to do with science and evolution. It says, “Now, Dad, you were telling me that the fossils were probably things drowned in the flood, right.” “Yes, Dave,” he is talking to Dave now, “and so the fossils were alive at Noah’s time, and are probably only a few thousand years old, right?” “Right.” “Well, my friend who told me about evolution showed me a book. It said the fossils are millions of years old. He said you could prove it with uranium dating.” “If you use uranium to date fossil rocks,” father said, “Sometimes [bold print] you do get ages in millions of years, but did your friend also tell you about scientists at Oak Ridge National Lab?” “No, what about them, dad?” “They used uranium dating on wood [on wood] in rocks in the dinosaur group and only got thousands of years.”

Now, quite apart from the fact that there’s no uranium in wood, I’d like to know what those Oak Ridge Scientists had in mind, like you Oak Ridge people to write in and tell me, come clean now, how is it that in fact you think those dinosaur prints are only a few thousand years old? That’s hokum. I think that the only thing that we can ever say is that any implication the dinosaurs lived a few thousands years ago, is sheer gobbledygook.

Now, going on to read one last passage here, since that I think it really makes my case. "I guess uranium isn't proof after all is it?" "I don't think it is," Dad says, "but don't take my word for it David. You read what the Bible says, study science yourself when you get older. I want to know what you think, that you think for your own good reasons." "You know dad, I was just thinking, if there isn't really any proof of evolution, why do people believe in it?" [like that Dr. Doolittle fella] "Not because of the fossils, that's for sure," Dad says, "the fossils go along with creation, but I can tell you why I once believed in evolution. "YOU BELIEVED IN EVOLUTION, Dad?" Yes I did, David (this is like the confession of Saint Augustine here) I even taught it in college for seven years." "Why did you believe in evolution?" "I thought [bold print] I believed that because of all the evidence. I really believed it because I didn't believe in God."

I'd like to read that passage again, because as far as I'm concerned, that's why we're here tonight and that's what this debate is all about. "I thought I believed that because of all the evidence. I really believed that because I didn't believe in God."

And, as I interpret that, it says that if you only consider the evidence, then you'll accept evolution. But its only when you go to the mystical and the supernatural, you find yourself forced to deny it. Of course, I could be accused of some vivid reading here and taking things out of context. After all, you all know where I come from, so let me read you a letter from a citizen in Livermore that happens to be an open letter. Its from Dr. Edward Teller, Dr. Edward Teller is a famous atomic physicist, a father of the you know what and not usually known as a reflex liberal, and I'd like to read a few lines he wrote about "Dry Bones" after he saw it, and said, "'Dry Bones' whose use in the public schools in Livermore, etcetera, dinosaurs are seen lying restfully in Noah's Ark." He says, "As a fantasy, it is charming and many a child will love to see it, but it is not presented as a fairy tale. The book advocates the strict, literal interpretation of biblical creation. It misrepresents science, Darwinism, and the modern method of establishing dates of past events using radioactive substances, though this method has been proven beyond a shadow of a doubt."

That is an open letter from Dr. Edward Teller.

Now, there were many, many other things in this science classroom that were extraordinary. There was one about learning about the Sun. One is a filmstrip; I have the strip that goes with the filmstrip with me. It says, "I am the sun, 93 million miles away from you folks down there. My intelligent creator designed me to make a lot of different things happen from way up here."

This is in the fifth and sixth grade classroom in Livermore, CA, fall 1980.

Another one down here, "Did you notice your earth is tilted at 23 and 1/2 degrees? Our creator did this on purpose." It goes on. This mentions creator over and over and over again during this and sets the whole solar system, as though an intelligent creator system had just gone out and done it in one day. All right, there were many, many more. There's the hand dandy evolution refuter. I have a checkout list showing that many children were taking that one out. "Dry Bones" and others going on "Dinosaurs, Those Terrible Lizards," by Dr. Gish…many others.

Now, that I have told you why I'm here, now I'm going to move into what I consider to be the strong evidence for evolution. But, all of that was to say that I'm concerned when materials of that sort are introduced in a classroom, and with nothing short of a blitzkrieg to put one narrow point of view before people.

With that, I'd like to start my own little slideshow here, and quickly go through some of the evidence that I feel most favors natural evolution of all life on this earth. Now, if I may see the first slide, I think it's going to go (oh, it's over here on my left) It says, it shows, that there are many, many different fields that contribute to evolution. I'm only going to stress a few this evening, but they cover every aspect that science can be brought to bear. And, it's all self-consistent, that's where its major strength comes from, that everything adds up for everything else. And, furthermore, it not only has to do with life on this earth, we could bring in astronomy to this picture, and on my second slide, I'll show you a picture of the galaxy Andromeda. This galaxy is in fact 2000, err 2 million light years away. We ourselves are in a similar galaxy, the Milky Way, stretching so far across it takes light almost a hundred thousand years to get from one side of our galaxy to another. Well, anyplace, I would contend that a life occurs in either of those galaxies or any other one, it's going to evolve in the same way that we've seen it evolved here on this earth. The next slide is just going to hurriedly introduce a little roughage for the talk to show you that, in fact, there are a lot of molecules that occur out there in interstellar space besides the stars. I'd like to especially emphasize that many molecules made up of the small atoms, carbon, hydrogen, nitrogen, oxygen, the kind of which living things are made, occur out there in open space, including thinks like ammonia and water. There's one up there on the list in particular, HCn, that's hydrogen cyanide, a very key molecule for life, and I'm going to come back to that in a few minutes. But it's on the next slide, now, that I want to stay and dote for a while. This gives some ages, and I think that here is one of the two fundamental things I am going to try to emphasize during the course of my short talk here. One is how old the universe is and the earth. This has a very big distinction between people who accept evolution and those who want to go with a biblical, special creation account. That's one, and secondly, after that, I'm going to switch to the man-apelike ancestry business, taking the two most important ones here and cutting out all the in between stuff, even though that is an enormous amount.

Well, according to the principles that I accept, our universe is something of the order of 15 billion years old. There are a number of ways of estimating this age, having to do with how bug the universe is and how fast it is expanding and so on, but I want to go strictly, quickly now to the earth. The earth should be in here on this list something of the order of 4.6x10^9, that is to say 4.6 billion years old. I think that almost all scientists agree that that's its age, and I want to tell you how they know that. They got it first by dating, radio dating, meteorites. They used three different methods, not just one. They used uranium decay series to lead as one principle way that can be used. They used another one using the elements of potassium and argon. They use another when using rubidium and strontium. And all three of these gave the same age. Now, what they were dating here were meteorites, and the assumption at that time was that meteorites, which are formed out in the outer reaches of our solar system, or presumably at the time the solar system was formed, are an example of what the earth might have been like in terms of its age when it was formed. Now, clearly the surface of the earth is weathered during all this time, and it is very hard to find rocks that are still in that pristine condition to give those old ages. The oldest rocks are only something on the order of three or four billion years old. On the other

hand, the big confirmation of all this came when our astronauts went to the moon, and they brought back those moon rocks. And they brought those moon rocks back, and they were dated in the laboratory. And zingo, right on 4.6x10^9, the exact same age as meteorites, the same age that all scientists that were seriously involved in this thought the earth was. Now, at this point, I have to ask, because I feel this is so important I'm going to try and pin Dr. Gish down tonight to tell me how old he thinks the earth is. He doesn't like to come up with hard numbers on this in my previous experience, but I'm hoping America will be watching to see if he'll give us a number. And, the reason is, that creationists like to be a little slippery about this. There are some of them that like a very small number. A few will stretch it a little bit. For example, I have here a quote from Jerry Falwell, his famous Penthouse magazine interview, Penthouse March 1981, no applause, page 151. Falwell said, "In the beginning, God created the heaven and the earth. If you read the first three chapters of Genesis carefully, there's a very clear unlimited time span there. It could have been millions of years, could have been hundreds of millions of years." Now, that's Jerry Falwell's view about all this. I want to hear Dr. Gish say tonight how old he thinks… Ooh, 30 seconds, I'm running out of time, its incredible. All right, well, I have to real quickly go here. May I in fact quickly now just go through my slides. I just thought what I think is a 30 second flash here. These have been the fastest 18 minutes of my life. And, if I'm now on my last slide… I've been squeezed out; my last slide just went by. I'm out of gas, and I think that…

Dr. Jerry Falwell:
I'm sorry to interrupt Dr. Doolittle, but your time is up and thank you. And now with his initial statement from the Institute of Creation Research, Dr. Duane Gish.

Dr. Duane Gish: Opening Statement (18 minutes)
Thank you Dr. Falwell, Dr. Doolittle, ladies and gentlemen.

There are two fundamentally different explanations for the origin of the universe and the living things it contains. According to the theory of evolution, or as we should more properly call it the evolution model, everything in our universe has come into being through mechanistic processes, which are ascribed to properties inherent in matter. No supernatural intervention any kind was involved. In fact, by definition, God is excluded. Thus, while not all evolutionists are atheist, the theory of evolution is an atheistic theory. According to this theory all living things have arisen from a single one celled organism, which in turn had arisen from a dead inanimate world. This theory may be called the general theory of evolution; the particles to people theory, or as I sometimes call it the "Fish to Gish theory" of evolution.

On the other hand, after 120 years of Darwinism, a rapidly growing number of scientists have become convinced that natural laws and processes absolutely exclude the possibility that the universe could have created itself and that the best available evidence demonstrates that living things could not, and in fact, did not arise from lower forms. These scientist have become convinced that the concept of creation is a much more credible explanation of the evidence related to origins. According to the concept of creation, or as it may be called the creation model, the origin of the universe and all living forms came into being through the design purpose and deliberate acts of a supernatural creator. The creator using special processes not operating today created the stars, our solar system, and all basic types of plants and animals. Although there

were no human witnesses to any of these events, creation can be inferred by the normal methods of science: observation and logic. Just as surely as we can all tell the difference between a pebble formed by natural processes and in Arrowhead created with plan and purpose.

Let us now dispense once and for all with the notion that this is a debate between science and religion. Each concept of origins is equally scientific and each is equally religious. In fact neither qualifies as a scientific theory. The first requirement of science is observation. Obviously there were no human observers to the origin of the universe, the origin of life, or as a matter of fact, to the origin of a single living thing. These events were unique, unrepeatable, historical events of the past. Furthermore, even if evolution were occurring at the present time, it would require hundreds of thousands of years to produce the kind of change needed to document evolution. Ultimately then, no theory of origins can be considered a scientific theory in a strict sense. Creation and evolution are inferences based on circumstantial evidence and predictions based on each model can be contested and compared with that circumstantial evidence. Among creationists are found those of almost all religious persuasions except atheist. And, among evolutionists are found those are almost all persuasions, including atheist. However, since evolution is a mechanistic, atheistic theory, it is a basic dogma of agnosticism, humanism, and atheism in general. The one-sided indoctrination of our students in this materialistic philosophy in the tax-supported public schools in our pluralistic, democratic society is a violation academic and religious freedoms. Furthermore, it is poor science and poor education. To remedy this intolerable situation, creation scientist are asking that excluding the use of the Bible or religious literature of any kind, only the scientific evidence that can be adduced in favor of creation and evolution be presented thoroughly and fairly in our public schools. After students have had an opportunity to examine all the data, consider each alternative, and to weigh the implications and consequences of each position, then they should be challenged to decide for themselves, which is more credible or reasonable. Now, that is good education in the finest traditions of academic freedom.

Now let us consider the available scientific evidence. According to The Big Bang Theory of the origins of the universe about ten to twenty billion years ago, all the energy and matter of this entire universe were crammed into a cosmic egg of sub-atomic particles and radiation. Of course, no one has to the foggiest notion of where this cosmic egg came from or how it got there. Zap, there it was. Then for some equally inexplicable reason this cosmic egg exploded and out of this initial chaos our marvelously complex universe somehow created itself. A relatively short time after this explosion, we are told, the universe consisted of an expanding crowd of hydrogen with a minor amount of helium. The late Professor Harlow Shapley of Harvard University stated that "some people piously proclaim in the beginning God, I say in the beginning hydrogen." He went on to say that "starting with hydrogen natural laws and time, one could explain the origin of the universe." Of course he could do no such thing, but the idea was consistent with his philosophy. This reminds me that someone has said that hydrogen is an odorless, tasteless, invisible gas ,which if given enough time becomes people. And of course, that is exactly what evolutionists do believe. According to evolution theory then, disorder spontaneously generated order; complexity arose from simplicity; chaos created the cosmos - all by a process of self-transformation. According to this theory, the universe is an isolated system, which began in a state of disorder and spontaneously transformed itself into the present highly ordered and complex universe.

Now, ladies and gentlemen, that idea, that notion, is directly contradicted by the Second Law of Thermodynamics. According to this law of science, an isolated system, that is a system on which no work is being performed by an outside agency, and a system into which no energy is being brought in from the outside can only become more disordered with time, never more ordered. Such a system will constantly become more random, more disorderly. That is a natural law of this universe. Flying directly in the face of this natural law, evolutionists persist in believing that this universe is an isolated system, which started in a state of disorder and transformed itself into a highly ordered and complex state. Creation scientists reject this totally anti-scientific notion.

Furthermore, they ask by what means of tortured logic can one assume that the very same processes and principles, which are now leading towards destruction of this universe, could also have been responsible for its origin in the first place? To believe that this universe created itself naturally is irrational and unscientific. And, if it could not have created itself naturally, then it had to be created supernaturally. If evolution is really believed in science, they would abandon their faith in the god of evolution.

Now, let us consider the laws of probabilities, also a fundamental law of science. Every living cell on this earth, whether bacterial or human is indescribably complex, marvelously coordinated in time and space, and exhibits purposefulness in every detail of its structure and function. The human body has about 30 trillion cells of over 200 varieties, 12 billion of which are found in a 3-pound human brain. In the brain, there are at least 120 trillion connections, the most incredibly complex arrangement of matter in the universe. The evolutionists would have us believe that this marvelously designed and unbelievably complex human body and millions of other equally complex plants and animals were produced through millions of random chance mistakes or mutations. Evolutionist Lauren Eisley, for example, declared that "man is a long chain of DNA accidents, taking place over billions of years." Carl Sagan was quoted in Time Magazine in saying that "only through the deaths of an immense number of slightly maladapted organisms are we, brains and all, here today." Creation scientists point out that when this notion is examined in light of information theory and the laws of probability, that notion is simply preposterous. And, we are finding an increasing number of scientists and mathematicians, who although they are evolutionists, are saying the same thing. You just cannot generate even a single bacterial cell by such chance processes in 5 billion years, or 500 billion years, as far as that's concerned, let alone the millions of complex species that now exist. Even at the molecular level, evolution is impossible. Most proteins consist of several hundred amino acids, each arranged in precise sequence. And DNA and RNA usually consist of thousands of nucleotides, also arranged in precise order. The number of different possible ways these subunits can be arranged is so incredibly astronomical that it is literally impossible for a single molecule of protein or DNA to have been generated by chance in 5 billion years. For example, calculations by Dr. Hubert P. Yocky, based on information theory demonstrated that the most one could get by chance in a billion years is one single gene sufficient to code for a protein of only 49 amino acids. Of course, that's light years short of what would be required for the most primitive cell imaginable. For even to have the remotest chance of getting life started, we would have to have billions of tons each of hundreds of different protein molecules and billions of tons each of hundreds, if not thousands, of different DNA and RNA molecules. Here in my hand, I have a newspaper article,

published August 14, 1981 in the Daily Express of London. The headlines say, "When two skeptical scientists put their heads together and reach an amazing conclusion, there must be a God."

Who are these two atheists, or I should say ex-atheists? None other than the famous British astronomer Sir Fred Hoyle and Dr. Chandra Wickramasinghe, a mathematician and an astronomer. These two scientists working independently calculated the mathematical probability of life starting spontaneously by some evolutionary process, taking the entire universe into account, they were astounded. They couldn't believe their results. The probability turned out to be zero. Nil. They each then concluded life had to be created, therefore, there must be a God. Now, how could anyone ignore these conclusions, reached no less than by these two hard-nosed atheists, or I should say again ex-atheists. Ladies and gentlemen, based on the proved principles of chemical thermodynamics and kinetics, information theory, and the laws of probability, we can say that a mechanistic evolutionary theory of life is simply impossible. Earlier, I referred to evolution as the "Fish to Gish Theory." Now in this context, I think we should call it the "Too Little to Doolittle Theory of Evolution."

What about the fossil record? In that record, do we find gradual change from simple to complex demanded by evolution? Are our museums overflowing with vast numbers of the transitional form that should have been found if evolution is true? Well, our museums do contain millions of fossils, including those of other 250,000 different species. The available fossil record is much more than adequate to document evolution if true. However, what we find in the fossil record is not what is predicted based on evolution. We have not found what we were told to look for, ever since Darwin. The missing links are still missing. What we do find is a sudden explosive appearance of a great variety of highly complex forms of life for which we have never found ancestors. Furthermore, we find that each basic type of plant and animal has appeared fully formed with no evidence of gradual change; no evidence of intermediate or transitional forms are found. This is precisely the evidence predicted on the basis of creation. Let us hear what some evolutionists have admitted about the fossil record. Dr. Corner, a Cambridge botanist, stated in a book published in in 1961 that "Much evidence can be adduced in favor of evolution, but I still think that to the unprejudiced the fossil record of plants is in favor of creation." In an article published in the journal *Evolution* in 1974, Dr. David Kitts, of the University of Oklahoma said, "Despite the bright promise of paleontology [that is the fossil record], provides the means of seeing evolution, it has presented some nasty difficulties for evolutionists, the most notorious of which is the presence of gaps in the fossil record. Evolution requires intermediate forms between species and paleontology does not provide them."

But what about Lucy, an ape, the Donald Johanson claims walked upright just like man. And therefore he said, "should be placed at the base of the human family. An intermediate between ape and man." Since Johanson describes this creature as totally ape from the neck up, the only basis for the idea that this creature was the link between man and ape is the notion that it did walk upright. But did it really walk upright like you and I? Johanson says that his Lucy is the earliest and most primitive of a group of creatures whose scientific name is *Australopithicus*. But studies on supposed more recent forms of *Australopithicus* by Lord Zuckerman, a famous British anatomist, and by Dr. Charles Oxnard, a professor at the University of Southern California, convinced him that these creatures did not walk upright like man and that they were

not intermediate between ape and man. In fact, in his book *Beyond the Ivory Tower* published in 1970, Lord Zuckerman states that "If man evolved from an ape-like creature, he did not leave a trace of that evolution in the fossil record." While we're on this subject, we should remind ourselves of the famous "Piltdown Man" that stood for nearly 50 years as the human ancestor until shown to be a hoax constructed from a modern ape jaw and a modern human skull. And, "Nebraska Man," another creature hailed as an evolutionary ancestor of man that turned out to be nothing more than a pigs tooth. Finally, evolutionists believe that some hairy, four-legged mammal that may have resembled a pig, cow, or buffalo evolved into whales, dolphins, and other marine mammals. One of our creation scientists, Luther Sunderland, has attempted to visualize what these intermediates may have looked like. We see that on the screen. Now, my challenge to Dr. Doolittle and all other evolutionists is this: If you don't like these suggestions, what are yours? When we come right down to any concrete case like this example, we see that the whole idea of evolution is absurd. Special creation is far more credible, far more reasonable.

Dr. Shably gave us two choices: In the beginning God, or in the beginning hydrogen? I say the overwhelming mass of the scientific evidence demands "In the beginning God."

Dr. Jerry Falwell

Thank you, Dr. Gish. And now, with his rebuttal, Dr. Doolittle.

Dr. Russell Doolittle: Rebuttal

Dr. Gish continues with more of his illogical logic. If it can't be explained right now, then obviously, by any, if it can't be explained by natural causes, it must be supernatural. I have two rebuts to this to start with.

The first place, if it has to be supernatural, why only the Christian one? Why not all these non-Christian explanations that have been with us for centuries? It always seems to be that it always has to be his supernatural one.

Secondly, just because we can't explain something now, doesn't mean we won't be able to explain it in the future. Look at the last 100 years. We have discovered the world of the very small, the world of the very large. We've discovered viruses, bacteria, all these things. A whole notion of DNA and how it gets together and its self-assembly process is something we've only been onto for about 30 years now. So, I think there is no doubt we will explain all this and any of the questions he's raised to everyone's satisfaction eventually. The question is whether we have to put everything on hold and go through a lot of mumbo-jumbo in the interim. Let me take some specifics. His thermodynamic one. Now, Dr. Gish raises this thermodynamic argument no matter where he goes. I'd like to take a page from his book and read from his own fellows. I'm reading now from Dr. JA Kramer, professor of physics at Wheaton Illinois College, an acknowledged creationists. This isn't an evolutionist now; this is one of you, a creationist. He says, "If we are to believe that general evolution contradicts the second law, we must also conclude that all living organisms continually violate the law." He suggests creationists stick to things they are more competent in.

Now, with regard to this fellow Yockey and his paper. Dr. Gish raised this last year in a debate with me. I hadn't read the paper before; this time I've read it. It is shot through with errors and misassumptions. In fact, as I've explained to Dr. Gish many times, the earliest proteins were

undoubtedly very simple and small; they weren't the size of the ones that they always take for their examples. They got bigger by a process of gene duplication, biochemical Xerox I usually refer to it as. They were inefficient at the beginning. They got better. There has been plenty of time. That's why the age of the earth is so important to the evolutionary argument. I'm still waiting to hear this evening when Dr. Gish tells us how old, in his view, the earth is. Now besides these things that I've… when it comes to this business about thermodynamics, probability and so on, I have to say that either Dr. Gish understands, he refuses to understand, or he can't understand. And, it's not for me to decide which tonight. Now, the thing that I'm most concerned about here in this business about what view should pertain if you in fact find that evolution is offensive to your religion. To me that is a problem. I understand that you could have something very near and dear to you. I mean after all, who wants to tell a child that Santa Claus doesn't exist or something of that sort. I can understand that it would be very sensitive if you believe this certain thing, and you find your daughter or son being taught something differently in school. Now, I'd reiterate that evolution is a scientific concept. It is completely secular. It has nothing to do with a religion. It doesn't say anything about what you want to believe in that regard. Now, the analogy I would make is, should we not teach for example in the public schools hygiene, suppose we should not say as we know that germs cause disease viruses, bacteria, etc. is because some religions don't accept that. Should we therefore say we have give equal time to people who don't believe that? It would be absurd. Should we teach or not teach that the earth is a globe? There are people, mostly on religious grounds, more fundamental than these people here I would tell you, that believe the earth is flat. There are still flat earthers, and they find it in their rendering of the bible that the four corners of the earth are referred to there. You don't find four-corners when you have a sphere. Should we not teach that just because some religions don't? Now, I say keep religion separate. Now, I'd like to get onto the business that I missed I main rendition about the ape-like ancestor and man because this is in fact because this is what gets people most aroused. Jerry Falwell, for example, in that quote I started to read earlier, said he wouldn't mind in fact if the earth were a hundred million years old as long as nobody starts to claim man came from an ancestor that resembles apes. Now, of course, man did come from an ancestor that resembled apes. We can prove this in several different ways. There are no gaps in the molecular fossil record. There's a complete set of transitional forms. And, I can make this point, I think, very clearly to you. If you were going to have a transplant, kidney for example, you go to the doctor if you are a person these days who has any sort of current and care about your health and had to have a transplant, you would certainly prefer to have that from an identical twin. If you don't have an identical twin, the doctor would say, "Do you have a fraternal twin?" The reason is that your molecules, your molecular constitution, is more similar when you are in fact coming from an egg fertilized in the same womb. Or, if you cant have that, a sibling of any sort would do or a parent. Then, after that then maybe a first cousin. Everybody appreciates that as you get further, further away in ancestry, the molecules become more different. Now, this same picture emerges when you compare all the molecules…

Dr. Jerry Falwell
Sorry Dr. Doolittle, but your time is up.

And now, with his rebuttal, Dr. Duane Gish.

Dr. Duane Gish: First Rebuttal

Now, unfortunately, Dr. Doolittle wasted much of his time talking about the situation in Livermore school district. What that teacher did, he used books that included references to the bible and material like that which we have no intention of putting in the public schools. As a matter of fact, the material that we have prepared for public schools had been very carefully edited to remove any references to the Bible or religious literature of any kind. So all of that discussion had nothing to do with the discussion this evening. As a matter of fact, this is supposed to be a debate on the scientific evidence related to origins, you see, creation and evolution, not what some teacher may have done in Livermore, CA.

Now I am surprised that Dr. Doolittle doesn't know the difference between living organisms and a dead, inanimate world or our universe. You see, of course we can exist, living things can exist, because are living organisms. We have marvelous machinery. We can take in food, and we can use that food you see. But our universe was an isolated system. You didn't bring anything into the universe, you see. You didn't have any means like that. Let me give you another example. You know that automobiles don't usually run up hill. They usually run down hill, but you can get an automobile to go up hill. But you don't just bring in a can of gasoline and pour the gasoline over the car and light a match. That won't make it go up hill. It just goes up in smoke. What do you do if you want to get that car to go uphill? You have to take the gasoline, which is chemical energy, put it into your gas tank, which is fed into the motor. What does a motor do? It converts that chemical energy into mechanical energy. Now the car will go uphill. So, you have to have an energy conversion machine. And, of course, you have to have somebody driving the automobile. If you don't have anybody driving the automobile, it doesn't go uphill. It runs off into the ditch. You see, you have to satisfy certain conditions. You have to have an energy conversion machine and a proper control. On the hypothetical primordial earth, you did not have an energy conversion machine. You had no control system. And the idea that life could have spontaneously generated itself contrary to the Second Law of Thermodynamics is not science, ladies and gentlemen, that is blind faith. Now, Dr. Doolittle, has mentioned the age of the earth. Now concerning the age of the earth, evolutionists have no choice. They must believe in a very old earth, since evolution demands an immensity of time. This debate is not about the time of origins, however, but about the how of origins. These are separate questions. In fact, some creationists agree with Dr. Doolittle. The thing seems quite old, while other creationists cite a large number of physical time clocks that indicate that the solar system and the universe must be quite young. Yet, both groups of scientists agree that the scientific data demands creation. Dr. Doolittle has referred to the ____ wood. How could you date wood with uranium? The uranium is an intrusion into the _____ wood. The uranium is there, no problem. He mentions these Paluxy River tracks. Ladies and gentlemen, there were a few tracks carved during the depression when they ran out of tracks, didn't have any more to sell, they carved a few. But that doesn't mean the tracks that have been uncovered in recent years in under a bank and so forth, they can't be carved. These aren't carved. These are genuine tracks. And so, they are valid evidences. They are for the at least the coexistence for man tracks with dinosaur tracks. And, he referred to a statement by Dr. Parker. I know Dr. Parker personally; he's my colleague. Dr. Parker, for a while after he became a Christian, was an evolutionist. It wasn't that but his pursuit of the scientific evidence convinced him as a scientist that evolution cannot be true and that creation is a better explanation. Now, Dr. Doolittle has referred to meteorites and the moon, and you always get the right age. He didn't mention the fact that when they dated the moon rock, they got ages of all kinds, from almost a few thousands to a many multiplied billions of years. They

simply selected the date that had to be right, which had to be 4.6 you see, 4.6 billion. The trouble with these dating systems is there's too much picking and choosing. That's what I say about it, it's simply not a scientific method. But again, I reiterate that is not the question here tonight. How did things come about, creation or evolution? I say the scientific evidence is overwhelmingly in favor of creation. Thank You.

Dr. Jerry Falwell
And now, with his summary, Dr. Doolittle.

Dr. Russell Doolittle: Summary
Still no age of the earth in numbers there. I think that ____ NASA's been lying to the President. Maybe the president should call up NASA and ask how old are those moon rocks?

Summation, all living things as we know them today, I would contend, are related through an enormous family tree. You through your parents, your grandparents, your great parents, and as reprehensible as it may seem to you, all the way back to back to bacteria. You have enzymes floating around your system that can be shown unequivocally to have amino acid sequences that resemble those that occur in bacteria. They could not possibly come about by chance in any possible way. In contrast, I find creation science is a pseudo science. It distorts, it misrepresents, we've seen it tonight, it ignores facts, its based on a narrow religious dogmatism. To put it in the science classroom, I believe, is to handicap America. It is to cheat our children. For only by an understanding of the logic of evolution are we going to understand the problems that we face as a civilization today. Mankind, if he doesn't understand evolution, cannot understand ecology. He cannot understand how we are drowning in this earth from an overpopulation and an over exploitation of resources. To ignore these facts, I would contend, is to live a life of pretense and will certainly lead us on the road down to a dinosaur like extinction. Therefore, I naturally favor the view of evolution. I know it is the only explanation for our being here tonight.

Dr. Jerry Falwell:
Thank you. Now, Dr. Gish with his summary.

Dr. Duane Gish
Ladies and gentlemen, 3 or 4 centuries ago, the notion that the sun and other planets revolved around the earth was a dogma of the scientific establishment. Galileo faced determined opposition from fellow astronomers when he suggested otherwise. Louis Pasteur and others about a century ago overturned the established dogma of centuries when they showed that living things never arise spontaneously from dead matter. Today, even though thousands of scientists are creationists and the number is growing rapidly, the notion of evolution remains a stifling dogma. Evolutionists seek to smother all challenges from within or without the scientific and educational establishments, concealing the fallacies and weaknesses of the theory and adamantly opposing a hearing for the scientific case for creation. Why is this so? Certainly not because the notion of evolution, the science and the concept of creation, is religion. I can think of two possibilities. First it may be that evolutionists consider that our students are too ignorant, too illiterate to be exposed to these competing ideas of origins. They must be protected from error and carefully indoctrinated in correct ideas by those who consider themselves to be intellectual

elite, the sole possessors of truth. Secondly, having engendered this fragile tower of hypotheses piled on hypotheses for fact and fiction intermingle in an inextricable confusion, it may be that evolutionists are aware of the fact that the notion of evolution will fare badly if exposed to an open and determined challenge from creation scientists. And that if this is done, the majority of our students will accept creation as a better of the two concepts of origins. Whatever may be the case, it is urgent that our students be exposed to all of the evidence, all of the arguments on each side of this question so that these two alternative concepts of origins: creation or evolution can compete freely in the marketplace of ideas. Thank you.

Dr. Jerry Falwell:
I am sorry, Dr. Gish, your time is up thank you.

Thank you very much Dr. Russell Doolittle, of the University of California, San Diego, and Dr. Duane Gish of the Institute for Creation Research, San Diego, for being with us tonight for this most important debate. You have just witnessed a one hour nationally televised debate on one of the most important controversies of our time: Scientific creation versus evolution. No one-hour debate on such an important and involved topic could be complete. Our purpose is to whet your appetite, to encourage you to investigate the subject at greater length for yourself, in your personal reading, in your research, in school at the library. And to help you do that and to assist you in remembering what you've heard in this debate, I would like to offer you a full transcript between Dr. Doolittle and Dr. Gish. We will mail it to you free, if you will dial the toll free number now on your screen. Please include your name, address, and proper zip code. Thank you for joining us tonight. I hope this debate has proved beneficial to you; it certainly has to me. I'm Jerry Falwell. Thank you for watching, and goodnight.