A Controversy Unlike any Other: A Simple Dispute of Science and Faith, or a Politically-Fueled Power Struggle?

Srijan Sundar

Senior Division

Historical Paper

Paper: 2,495 Words

Process Paper: 494 Words

Process Paper

The importance of the controversies in history that revolved around Science and Religion was tremendous from a socio-political aspect. Even in modern society, we tend to have misconceptions regarding the complex relations between science and faith: two very abstract domains in their own rights. Yet, the question that inspired me to choose this topic was: *how did these domains become this way*? My initial thoughts, prior to selecting this topic, were to either analyze the Galilean Inquisition, or the Newton-Leibniz Controversy among a number of other options. Yet the similarities found within the Galilean Inquisition and the Newton-Leibniz debate were tremendous when critically looking at these from the views described in my paper. As a result, I resolved to take upon the more abstract idea of the relation between Science and Religion throughout history as viewed from a political lens.

The initial stages of research towards this project arose from many primary sources on the Galilean Inquisition. I purchased Finocchiaro's Documentary History in which he includes each of the documents related to the Galileo Affair, with the intent of the documents telling the story of the Inquisition. I borrowed several other books relating to the analysis of the Galilean Inquisition from my local library. The resources available for the Newton-Leibniz Controversy were scarce locally so I started my search online and found numerous secondary sources. I then used the citations within these secondary sources to lead me to the primary sources as well as more secondary sources. In general, throughout the research phase of this project, I let sources lead to other sources and that was very effective for me to conduct my research.

Based on the evidence collected from these sources, I was able to formulate my thesis that the split between science and religion was indeed a political conflict. For the most part, the

dispute stemmed from the various interpretations of the doctrines involved. Furthermore, the communication aspect contributed an additional layer of complexity since it was the fixated minds of the parties involved, and the following miscommunications, that forced the hand of politics to reign over the said controversies. At a first glance, the conflict between science and religion seems natural: after all, one domain seems to strictly concern rationality while the other seems to only be related to spirituality. However, deeper analysis revealed that the split between science and religion emerged as a result of a politically-fueled power struggle coupled with political miscommunications between the numerous parties involved. Hence, to prove this, I set my paper into two main parts: one based on the Galilean Inquisition and the other based on the Newton-Leibniz Controversy. Specifically, the Galilean Inquisition was used to show the perspective of religion over science, and the Newton-Leibniz Controversy was used to show the perspective of science over religion. From each standpoint, the outlook that each domain was in accordance with each other, had it not been for the political miscommunications between the parties involved, was shown.

This page was intentionally left blank.

"Scripture cannot err, nevertheless some of its interpreters and expositers can sometimes err in various ways [...], namely to want to limit oneself always to the literal meaning of the words."

~ Galileo Galilei[1]

The Renaissance and Enlightenment eras featured the emergence of the split between the domains of Science and Faith. Prior to the Galilean Inquisition (1616-1633), the domain of science emerged as an offset of the Catholic Church and was based on the ideas of Thomas Aquinas and the ancient Greeks.[2] In spirit, science emerged as a search for God and the truths of the Universe. Contrary to the popular opinion of a so-called "battle" between these domains of science and religion, most of this perceived conflict stems from a series of political misinterpretations and varying ideologies. Furthermore, these political conflicts created radical reforms within these domains, and set forth new and contesting perspectives on the universe.

The Galilean Inquisition

Arguably, the event that most characterizes this view is what has come to be known as "The Galileo Affair"[3]. The events of "The Galileo Affair" began in 1543 when astronomer Nicolaus Copernicus published his infamous treatise "On the Revolution of the Heavenly Spheres" in which he argued that the Earth revolves around the Sun,[4] contrary to the Ptolemic view that placed the Earth at the center of the Universe.[5] This brought much outcry from the

[1] Galilei, Galileo. "Correspondence." *The Galileo Affair: A Documentary History*, translated by Maurice A Finocchiaro, University of California Press, Berkely, California, 1989.
[2] Feldhay, Rivka. Galileo and the Church: Political Inquisition or Critical Dialogue? Press Syndicate of the University of Cambridge, 1995.
[3] Finocchiaro, Maurice A. "Introduction." The Galileo Affair: A Documentary History, University of California Press, Berkley, California, 1989. And, Feldhay, Rivka. Galileo and the Church: Political Inquisition or Critical Dialogue? Press Syndicate of the University of Cambridge, 1995.
[4] Copernicus, Nicolaus. *On The Revolutions Of The Heavenly Spheres*. Prometheus Books, 1995.
[5] See Appendix A

Protestant Communities but was never really heeded by the Catholic Church.[6] That is, until the Galilean Inquisition.

The Galilean Inquisition began in 1616 when Niccolò Lorini, a Dominican preacher, sent a formal complaint against Galileo Galilei, a celebrated scientist and chief mathematician to the Duke of Tuscany, claiming that Galileo was violating Scripture.[7] Lorini cited a widely circulated letter that Galileo had written to Bendetto Castelli[8] which varied greatly in wording from Galileo's original letter. For instance, Lorini cites that Galileo wrote "in the Holy Scripture, one finds many propositions which are false if one goes by the literal meaning of the words" whereas Galileo states "*looks different from the truth*" instead of "*false*".[9] The consequences of such a subtle error in transcription are profound, for to say *false* is a highly affirmative statement, while *looks different from the truth* neither confirms nor denies the truthfulness of the Scripture. Nevertheless, Lorini's complaint led to the 1616 Inquisition, thus we see how miscommunication is beginning to play a pivotal role in the context of Science and Religion.

Before we proceed, it is best to take note of the official mechanics of the Inquisition. By Papal Decree, the Inquisition gave three degrees of punishment for *holding*, or *suspected of holding*, heretical thoughts. The first of these was the *monitum* in which the defendant was *suspected of holding* an idea declared heretical and was notified that they may not hold nor defend, but may discuss and teach the aforementioned idea. The *praeceptum* was the next stage: the defendant would be called once more to the Inquisition if they were still *suspected of*

---

[6] Feldhay, Rivka. Galileo and the Church: Political Inquisition or Critical Dialogue? Press Syndicate of the University of Cambridge, 1995.
[7] Galilei, Galileo. "The Earlier Inquisition Proceedings (1615 - 1616)" *The Galileo Affair: A Documentary History*, translated by Maurice A Finocchiaro, University of California Press, Berkely, California, 1989.
[8] Ibid.
[9] Lorini, Niccolò. "Lorini's Complaint (7, February 1615)". *The Galileo Affair: A Documentary History*, translated by Maurice A. Finocchiaro, University of California Press, Berkeley, California, 1989. And Galilei, Galileo. "Galileo to Castelli (21 December 1613)". *The Galileo Affair: A Documentary History*, translated by Maurice A. Finocchiaro, University of California Press, 1989.

holding, and they were told to not hold, discuss, teach, nor defend the subject. Finally, with enough evidence, the Inquisition could impose *carcere* in which the defendant was convicted of *holding* the heretical subject, and would be physically silenced by arrest.[10]

The 1616 Galilean Inquisition showcases the power struggle within the Catholic Church. There were two main orders within the Church during this time: the Dominicans and the Jesuits.[11] The 1616 Inquisition took place at the residence of Jesuit Cardinal Bellarmine,[12] albeit most of the Inquisitors were from the Dominican Order.[13] The Dominicans were very offended at Galileo's writings, for they adhere closely to the literal Scripture. Thus they gave both the *monitum* as well as the *praeceptum* to Galileo.[14] While that was not the Jesuit opinion, they were obliged to obey as the Dominicans constituted the majority. However, in 1619, when Galileo approached Jesuit Cardinal Bellarmine regarding reports that he was "slandered or alleged to have abjured [to the Inquisition]"[15], Bellarmine issued the infamous certificate, without the knowledge of either Order, that conveyed that Galileo had received the *monitum*.[16] Here, the two Orders are playing a political game: each is trying to realize *their own interests*. Hence, the Galilean Inquisition may be viewed as a medium through which each order is trying to achieve supremacy.

---

[10] Feldhay, Rivka. Galileo and the Church: Political Inquisition or Critical Dialogue? Press Syndicate of the University of Cambridge, 1995.
[11] Ibid.
[12] "Special Injunction (26 February 1616)". *The Galileo Affair: A Documentary History*, translated by Maurice A Finocchiaro, University of California Press, Berkely, California, 1989.
[13] Feldhay, Rivka. Galileo and the Church: Political Inquisition or Critical Dialogue? Press Syndicate of the University of Cambridge, 1995.
[14] "Inquisition Minutes (3 March 1616)". *The Galileo Affair: A Documentary History*, translated by Maurice A Finocchiaro, University of California Press, Berkely, California, 1989. And "Special Injunction (26 February 1616)". *The Galileo Affair: A Documentary History*, translated by Maurice A Finocchiaro, University of California Press, Berkely, California, 1989.
[15] Bellarmine, Robert Cardinal. "Cardinal Bellarmine's Certificate (26 May 1616)". *The Galileo Affair: A Documentary History*, translated by Maurice A Finocchiaro, University of California Press, Berkely, California, 1989.
[16] Ibid.

Note the grave miscommunication that characterizes the earlier Inquisition Proceedings: the Inquisition, inclusive of Dominicans and Jesuits, believes that Galileo was given the *praeceptum*, yet they have no proper proof of such a claim as it was contrary to Papal Decree and even their written report of giving the *praeceptum* bore no signature.[17] Whereas Galileo, albeit hearing the Inquisition's statement, firmly believed that he is not allowed to hold, but may discuss and teach, the view of the Heliocentric Universe. Particularly, Galileo has firm evidence, namely Bellarmine's Certificate, to support his version of the 1616 Inquisition.

At this point, the stage has been set for the political schemes of 1633. In 1632, Galileo had published his *Dialogues Concerning the Two Chief World Systems*, or *The Dialogues*, which were to argue for the Heliocentric Theory from a *hypothetical* standpoint, as per the Decree of the Index from the 1616 Inquisition.[18] Yet, the Inquisition found that *The Dialogues* is plagued with "a lack and deviation from hypothesis, either by asserting absolutely the earth's motion [...] or by characterizing the supporting arguments as demonstrative"[19].

Thus, the Inquisition summoned Galileo to answer for his "crimes" against the Church.[20] And it is here that both of the Orders found the hot water that they were embroiled in: for the existence of Bellarmine's certificate came as quite a surprise to both Orders. Firstly, this certificate muddled the 1616 events and raised the question: which *version* of the 1616 Inquisition is true. It's not hard to see that the certificate signed by Cardinal Bellarmine trumps the unsigned report of the Inquisition. This would incriminate the Dominicans for they were the

---

[17] "Special Injunction (26 February 1616)". *The Galileo Affair: A Documentary History*, translated by Maurice A Finocchiaro, University of California Press, Berkely, California, 1989.
[18] "Decree of the Index (5 March 1616)". *The Galileo Affair: A Documentary History*, translated by Maurice A Finocchiaro, University of California Press, Berkely, California, 1989.
[19] "Special Commision Report on *the Dialogues* (September 1632)". *The Galileo Affair: A Documentary History*, translated by Maurice A Finocchiaro, University of California Press, Berkely, California, 1989.
[20] "The Later Inquisition Proceedings". *The Galileo Affair: A Documentary History*, translated by Maurice A Finocchiaro, University of California Press, Berkely, California, 1989.

Order in power in 1616.[21] Furthermore, it was the Dominican-controlled *Imprimatur* that allowed for *The Dialogues* to be printed in the first place.[22] This places the Dominicans in a dilemma for why did they even allow this book, now deemed heretical, to be published.

The Jesuits were also incriminated by Bellarmine's certificate: for in 1633, it was the Jesuits who dominated the Inquisition. From the Jesuit Perspective, Bellarmine's certificate shows a mass discrepancy in their own policies since they were bound to honor the 1616 Inquisitorial verdict. Even worse, the appearance of Jesuit Cardinal Bellarmine's certificate justifies Galileo's position for it *enabled* him to publish the said book[23]. Thus, it was of common interest to both Orders to incriminate Galileo Galilei, for if they fail, this would inevitably constitute the political downfalls of these Orders.

This is evident by the extent to which these Orders attempted to resolve the issue "extrajudicially"[24]. To cover-up their mistakes, the Dominicans and the Jesuits conjointly attempted to convince Galileo of the "error" in *The Dialogues*.[25] Evidently, this attempt succeeded as Galileo "confessed" the next day that "it dawned on" him to read his book after three years of not seeing it, and he "found" that his book gave the appearance of absolutely believing in the Copernican Theory and not hypothetically.[26] He attributed this to his own "ignorance," and "vain ambition".[27] Consequently, Galileo was given *carcere* and his *Dialogues* were banned.[28] Hence, we see the recurring theme of communication play a key role throughout

---

[21] Feldhay, Rivka. Galileo and the Church: Political Inquisition or Critical Dialogue? Press Syndicate of the University of Cambridge, 1995.
[22] Ibid.
[23] Ibid.
[24] Firenzuola, Vincenzo da. "Commissary General to Cardinal Barberini (28 April 1633)". *The Galileo Affair: A Documentary History*, translated by Maurice A Finocchiaro, University of California Press, Berkely, California, 1989.
[25] Ibid.
[26] Galilei, Galileo. "Galileo's Second Deposition (30 April 1633)". *The Galileo Affair: A Documentary History*, translated by Maurice A Finocchiaro, University of California Press, Berkely, California, 1989.
[27] Ibid.
[28] Borgia, Gasparo, et al. "Sentence (22 June 1633)". *The Galileo Affair: A Documentary History*, translated by Maurice A Finocchiaro, University of California Press, Berkely, California, 1989.

this issue, as it was the miscommunication between the Inquisition and Bellarmine's certificate that blurred the boundary between the hypothetical and absolute position of the Copernican theory. And it was the mutual political understandings of the Dominicans and the Jesuits that forced them to sentence *carcere* upon Galileo.[29]

Thus, this Inquisition may have helped the Church gain a stronger footing in such an area, but the effects of the Reformation were felt strongly during this time so perhaps the church incriminated Galileo to prevent the split between science and religion from occurring. Ironically, this event led scientists to break from the Church, since the relation of the once intertwined domains of science and religion is thus fractured. Ergo, we conclude that this politically-fueled power struggle rendered science and theology as both incompatible with each other, therefore we see the split between science and religion has been seeded in the minds of both the Church and scientists.

Newton-Leibniz Controversy

Sir Issac Newton and Gottfried Wilhelm Leibniz were the two leading minds of the 17th - 18th century. Yet, their infamous clash would leave a deep impression on the relation between Faith and Science. Specifically, this conflict shows the perspective of *science* concerning religion, while the Galileo Affair showed the perspective of *religion* concerning science.

The initial controversy took the form of a priority dispute: both Newton and Leibniz claimed to be the founders of Calculus.[30] The resulting tensions between the English and Continental mathematicians soon expanded into a flurry of debates ranging between Newtonian

[29] Ibid.
[30] Appendix B

and Leibnizian views on the universe and the theological implications of such views.[31] While this controversy appears to stretch between Newton, Leibniz, and we shall soon see Dr. Samuel Clarke, the extent of this controversy reached all the way to their respective societies. Because Newton was highly revered in the English mainland,[32] it was considered 'disloyal' to Newton and England if one studied the Continental methods and approaches.[33] Thus most English academia solely prescribed to Newton's beliefs.[34] In a sense, English academics was monopolized by Newton's ideas. On the other hand, in Continental Europe, much of the English ideas were considered not as contradictory, but rather incompatible with the Leibnizian views.[35] Thus, the English views were "translated", or altered, to suit the Continental notions.[36] It was this extreme loyalty on both sides that led to radically different views of the Universe. This dispute rendered England not only as separate from the rest of Europe geographically but also intellectually.

Arguably, it was the belief of English scientists that there existed an "interventionist God",[37] a God that would regularly intervene in the Universe, that led to an intellectual split between England and Continental Europe. In his replies to Leibniz, Samuel Clarke, a reputed Newtonian who acted as a proxy for Newton throughout this correspondence,[38] builds his

---

[31] Clarke, Samuel and Leibniz, Gottfried W. *Correspondence*. Edited by Roger Ariew. Hackett Publishing Company, Inc., 2000, https://personal.lse.ac.uk/ROBERT49/teaching/ph103/pdf/Ariew_1715LeibnizClarkeCorrespondence.pdf.
[32] Schrader, Dorothy V. "The Newton-Leibniz Controversy Concerning the Discovery of the Calculus." *The Mathematics Teacher*, vol. 55, no. 5, 1962, pp. 385–396. *JSTOR*, www.jstor.org/stable/27956626.
[33] Appendix B
[34] Iltis, Carolyn. "The Leibnizian-Newtonian Debates: Natural Philosophy And Social Psychology". *The British Journal For The History Of Science*, vol 6, no. 4, Cambridge University Press, 1973. *JSTOR*, http://www.jstor.org/stable/4025501.
[35] Ibid.
[36] Ibid.
[37] Perl, Margula R. "Physics and Metaphysics in Newton, Leibniz, and Clarke." *Journal of the History of Ideas*, vol. 30, no. 4, 1969, pp. 507–526. *JSTOR*, www.jstor.org/stable/2708608. Ariew, Roger. "Introduction". *Correspondence*. Hackett Publishing Company, Inc., 2000, https://personal.lse.ac.uk/ROBERT49/teaching/ph103/pdf/Ariew_1715LeibnizClarkeCorrespondence.pdf.
[38] Shapin, Steven. "Of Gods and Kings: Natural Philosophy and Politics in the Leibniz-Clarke Disputes." *Isis*, vol. 72, no. 2, 1981, pp. 187–215. *JSTOR*, www.jstor.org/stable/230969. Accessed 28 Jan. 2021.

arguments from this viewpoint, stating that "If a king had a kingdom in which all things would continually go on without his government or interposition [...] he [would not] deserve at all the title of king or governor."[39] Similarly, if God were not to intervene in the Universe, His existence would be forgotten and He would not deserve to be honored. Clarke then proceeds to argue from this viewpoint the existence of a vacuum and the construction of the Universe.[40] Nonetheless, Leibniz refuted this outlook from the sense that if God was all-knowing, why did he have to "wind-up his watch from time-to-time" to control the events of the cosmos.[41] Ergo, even if the Newtonian beliefs were scientifically sound, they were utterly rejected by the Leibnizian philosophy since they opposed the Continental Scientists' beliefs.[42] Hence, each side of this debate "amended" their religious beliefs to justify their scientific principles.[43] Accordingly, 18th century scientists viewed faith both as an accompaniment and a motive for their work. Therefore, the multifaceted nature of this debate resulted in differing perspectives on the said issue and the incomprehensibility of the opposing ideas.

But was it really the *religious motivation* that drove this debate, or was religion a mask for the underlying politics? The answer to this lies within the political situation; both Newton and Leibniz wished to hold their seats of power amongst the academia, but more importantly, they both wanted to extend their influence upon their societies. Thus, the resulting power

---

[39] Clarke, Samuel and Leibniz, Gottfried W. "Clarke's First Reply". *Correspondence*. Edited by Roger Ariew. Hackett Publishing Company, Inc., 2000, https://personal.lse.ac.uk/ROBERT49/teaching/ph103/pdf/Ariew_1715LeibnizClarkeCorrespondence.pdf.
[40] Ibid.
[41] Clarke, Samuel and Leibniz, Gottfried W. "Leibniz's First Letter, Being an Extract of a Letter Written in November, 1715". *Correspondence*. Edited by Roger Ariew. Hackett Publishing Company, Inc., 2000, https://personal.lse.ac.uk/ROBERT49/teaching/ph103/pdf/Ariew_1715LeibnizClarkeCorrespondence.pdf.
[42] Clarke, Samuel and Leibniz, Gottfried W. *Correspondence*. Edited by Roger Ariew. Hackett Publishing Company, Inc., 2000, https://personal.lse.ac.uk/ROBERT49/teaching/ph103/pdf/Ariew_1715LeibnizClarkeCorrespondence.pdf.
And Iltis, Carolyn. "The Leibnizian-Newtonian Debates: Natural Philosophy And Social Psychology". *The British Journal For The History Of Science*, vol 6, no. 4, Cambridge University Press, 1973. *JSTOR*, http://www.jstor.org/stable/4025501.
[43] Ibid.

struggle between the English and Continental Academia delved into religion as a way to justify their outlook to society, thus revealing the underlying political motives. Indeed, the Hanoverian Succession, the succession of German Georg Ⅰ, elector of Hanover, to the English throne characterizes this view as it was not Georg Ⅰ, but Caroline Brunswick, Princess of Wales, who was directly involved in these debates.[44] Leibniz's first letter in the Clarke-Leibniz correspondence was actually addressed to Princess Caroline who was Leibniz's closest supporter in England.[45] Thus, Newton's supporters viewed her with enmity and sought to convince her of Newton's superiority;[46] the Clarke-Leibniz Correspondence presented such an opportunity to the Newtonians. Furthermore, the notion of a German royal family ruling England didn't bode well with the English public.[47] Consequently, this debate was also a method through which the English-Hanoverian political conflict was expressed, as Leibniz was the official librarian to Hanover.

Therefore, the extent to which political factors influenced this debate within the scientific domain clearly has strong nationalistic ties. Even a close confidant to Leibniz once remarked "[most] see this battle not as a debate between Newton and [Leibniz], but as a battle between England and Germany."[48] Thus, the communication between both sides of this debate must be viewed from the perspective of two respective parties, similar to the perspective of the Galilean

---

[44] Ariew, Roger. "Introduction". *Correspondence*. Hackett Publishing Company, Inc., 2000, https://personal.lse.ac.uk/ROBERT49/teaching/ph103/pdf/Ariew_1715LeibnizClarkeCorrespondence.pdf.
[45] Clarke, Samuel and Leibniz, Gottfried W. *Correspondence*. Edited by Roger Ariew. Hackett Publishing Company, Inc., 2000, https://personal.lse.ac.uk/ROBERT49/teaching/ph103/pdf/Ariew_1715LeibnizClarkeCorrespondence.pdf.
[46] Ibid.
[47] Thompson, Andrew C. "The Hanoverian Succession In British And European Politics, C.1700–1720". *Oxford Dictionary Of National Biography*, 2014, https://www.oxforddnb.com/view/10.1093/ref:odnb/9780198614128.001.0001/odnb-9780198614128-e-106970. Accessed 4 Jan 2021.
[48] Shapin, Steven. "Of Gods And Kings: Natural Philosophy And Politics In The Leibniz-Clarke Disputes". *Isis*, vol 72, no. 2, University of Chicago Press, 1981. *JSTOR*, https://www.jstor.org/stable/230969, pp. 191.

Inquisition. As a result, both sides of this quarrel were blinded by their own political ties and failed to understand the point that the opposing side attempted to communicate.

Due to this conflict, English mathematics and sciences remained behind that of Continental Europe for over a century.[49] Again, this effect can be attributed to the stubbornness of both sides of this controversy to the respective ideas of Newton and Leibniz as well as the political enmity between England and Germany.

Conclusion

Thus, largely political factors were behind the development of these issues. We may conclude that the domains of Science and Religion truly are intertwined as, in essence, they are both interdependent upon each other even if we view these domains as polar opposites; each domain truly supports the other, as is evident from both the Galilean Inquisition and the Newton-Leibniz controversy. Thus, if it were not for the political meddling within these issues, perhaps we would see the relationship of these two domains in a more positive light.

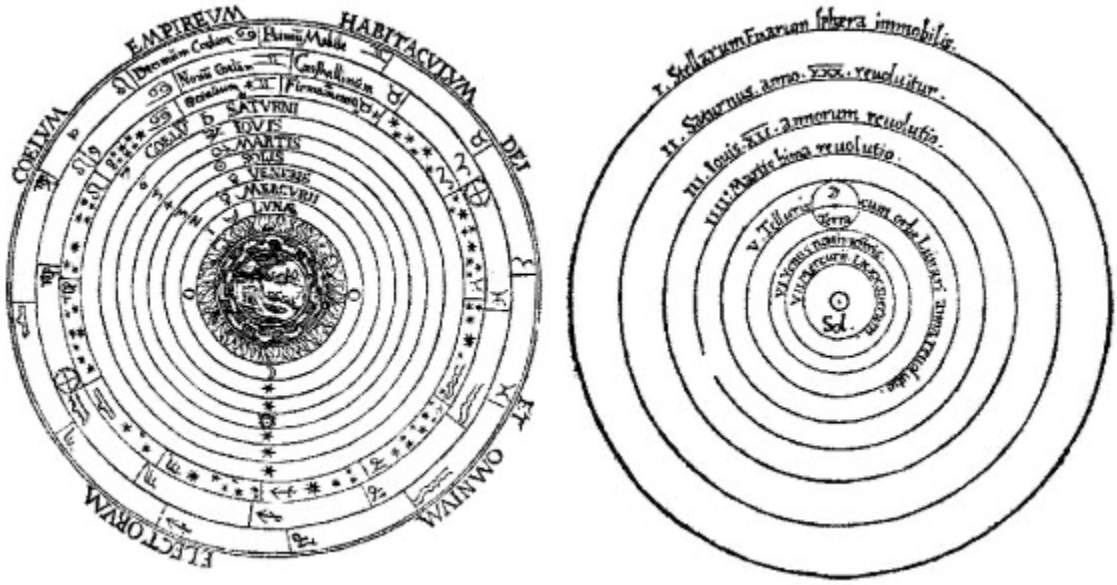
From a modern perspective, many view science and religion as mutually incompatible. However, while these events in history appear to corroborate this view, we conclude that this is merely the tip of the iceberg. Namely, this "war between science and religion"[50] is virtually nonexistent and is the result of political miscommunications and a mere twisting of words in history. Hence, this popular view which has its roots as early as the Galilean Inquisition is founded upon, not a conflict of science and religion, but rather upon pure politics in history. Today, we find religion to deal with spiritual matters and science to be a rigorous and rational

[49] Schrader, Dorothy V. "The Newton-Leibniz Controversy Concerning the Discovery of the Calculus." *The Mathematics Teacher*, vol. 55, no. 5, 1962, pp. 385–396. *JSTOR*, www.jstor.org/stable/27956626.
[50] Hall, Norman F., and Lucia K. B. Hall. "Is The War Between Science And Religion Finally Over?". The Humanist, 1986, p. 26., Accessed 9 Jan 2021.

discipline. From an abstract view, perhaps we will find these two disciplines as one and the same, just as they were viewed before the 16th century. And this view on the relation of science and religion is reconciled by the words of Albert Einstein: "*Science without religion is lame, religion without science is blind*."[51]

[51] Einstein, Albert. "Science And Religion". *Nature*, vol 146, no. 3706, 1940, pp. 605-607.

Appendix A

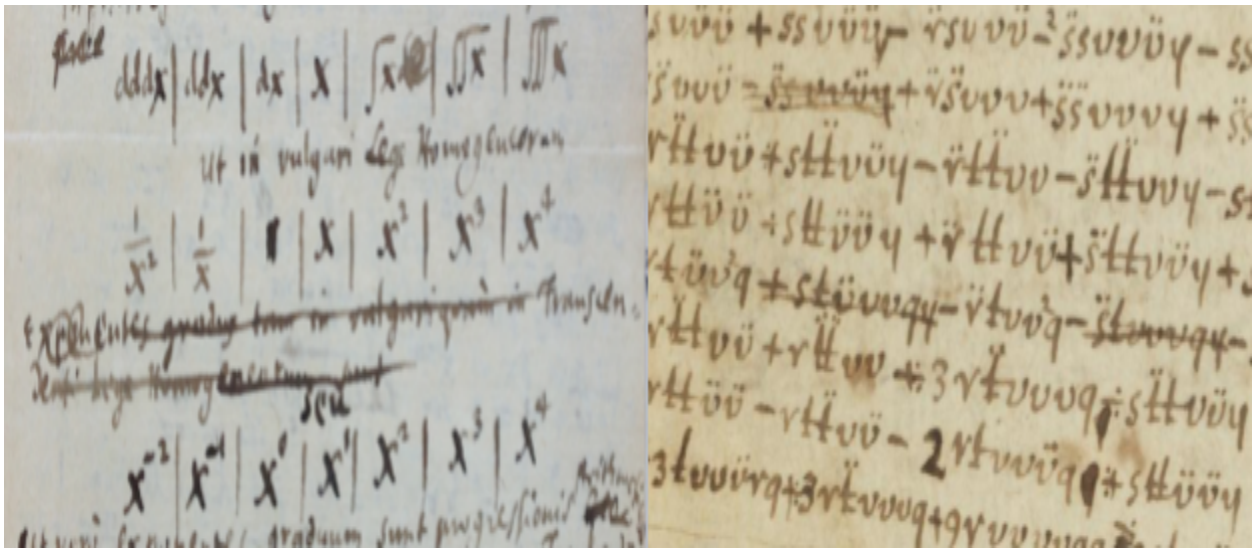


The illustration on the left shows the Geocentric (or Ptolemaic) model of the Universe which depicts the Earth placed at the center of the Universe. The Moon, Mercury, Venus, Sun, Mars, Jupiter, and finally Saturn are shown as revolving around the Earth, in that order.

The illustration on the right shows the Heliocentric (or Copernican) model of the Universe, which depicts the Sun at the center. Mercury, Venus, Earth, Mars, Jupiter, and Saturn are depicted revolving around the Sun in that order. The rest of the Universe is depicted as stationary in this model.

Source: Williams, Matt. A Comparison of the Geocentric and Heliocentric Models. 5 Jan. 2016, phys.org/news/2016-01-heliocentric-universe.html.

Appendix B



This illustration shows a difference between the Newtonian and Leibnizian notations in Calculus. This is the most easily seen result of the Newton-Leibniz Controversy when it comes to the mathematics and sciences. The illustration on the left shows the Leibnizian or Continental notation of Calculus, while the image on the right shows an example of the Newtonian or English notation of Calculus. The differences in the notations shown demonstrates one of the examples of the long term differences between the Continental and English Scientists, as it was the stubbornness and extreme loyalties on either side of the controversy that prevented them from understanding and adopting the different notations.

Sources: Wolfram, Stephen. “Dropping In On Gottfried Leibniz”. *Stephen Wolfram|Writings.* https://writings.stephenwolfram.com/2013/05/dropping-in-on-gottfried-leibniz/. And Newton, Isaac. Cambridge University Library, cudl.lib.cam.ac.uk/view/MS-ADD-03958/2.

Annotated Bibliography

Primary Sources

Books

Clarke, Samuel and Leibniz, Gottfried W. *Correspondence*. Edited by Roger Ariew. Hackett Publishing Company, Inc., 2000, https://personal.lse.ac.uk/ROBERT49/teaching/ph103/pdf/Ariew_1715LeibnizClarkeCorrespondence.pdf.

This book provided all of the letters of correspondence between G.W. Leibniz and Dr. Samuel Clarke during the Clarke-Leibniz Correspondence. These letters were very important throughout this paper, given that my analysis of the issues described in these sources was central to the claims discussed throughout the Newton-Leibniz section.

Copernicus, Nicolaus. *On The Revolutions Of The Heavenly Spheres*. Prometheus Books, 1995.

This book was quite influential when trying to understand the fundamental Copernican ideas and notions that would be the subject of the Galilean Inquisition. Formally, Copernicus discusses the heliocentric view of the universe, where the sun is at the center, and argues, mathematically, why this theory is quite sound, contrary to the Ptolemic view of the universe.

Finocchiaro, Maurice A., and Galileo Galilei. *The Galileo Affair: A Documentary History*. University Of California Press, 1989.

By far, this was the most important source for the Galilean Inquisition part of this paper. This book was a compilation of all of the primary sources that could aid to truly

understand the Galilean Inquisition, hence the name “A Documentary History”. All of the primary sources regarding the Galilean Inquisition can be found in this particular book, and it contained letters, manuscripts, and the actual Inquisition Proceedings, all of which were translated from their original Latin or Italian by Finocchiaro. Only by critically analyzing the relevant documents was the argument in this paper developed. While each Inquisition Document from this book was analyzed, the documents that were directly referenced in the paper above are cited, along with their annotations, below in the section titled “Galilean Inquisition Documents”.

Galilei, Galileo. *Dialogue Concerning The Two Chief World Systems - Ptolemaic And Copernican*, translated by Stillman Drake, 2nd ed., University Of California Press, 1967.

The *Dialogues* were a very important source to understand the arguments that Galileo brought forth in his book. It was vital to understand these arguments in order to comprehend the perspectives that the Catholic Church took in order to refute this book.

Leibniz, Gottfried Wilhelm and Farrer, Austin (ed.). *Theodicy*. Translated by E.M. Huggard. 4th ed., Open Court Publishing, 2005, https://homepages.uc.edu/~martinj/History_of_Logic/Leibniz/Leibniz%20-%20Theodicy.pdf.

The *Theodicy* was Leibniz’s last work before his death. This work closely preceded the Clarke-Leibniz Correspondence. Thus, this work was very useful because it conveyed Leibniz’s notions and his view on the Universe. Notably, many of these views resurface in his correspondence with Clarke. Thus, this book was able to show, to a much

greater extent, the full scheme of Leibniz's philosophy. This proved quite influential because it offered the clear Leibnizian perspective of the world.

Galilean Inquisition Documents

Bellarmine, Robert Cardinal. "Cardinal Bellarmine's Certificate (26 May 1616)". *The Galileo Affair: A Documentary History*, translated by Maurice A. Finocchiaro, University of California Press, Berkely, California, 1989.

This was the infamous certificate that Robert Bellarmine issued to Galileo. In it Bellarmine conveys that only the conditions of a *monitum* need to be met. This document was critical to understanding the viewpoints of either Order as well as Galileo's own belief regarding the verdict of the 1616 Inquisition.

Borgia, Gasparo, et al. "Sentence (22 June 1633)". *The Galileo Affair: A Documentary History*, translated by Maurice A. Finocchiaro, University of California Press, Berkely, California, 1989.

This document contained the final verdict of the Galilean Inquisition. It shows the penultimate decision of both Orders involved due to the events of the Galileo Affair. Hence, this document was useful to confirm and to understand the end result of the Galilean Inquisition.

"Decree of the Index (5 March 1616)". *The Galileo Affair: A Documentary History*, translated by Maurice A. Finocchiaro, University of California Press, Berkely, California, 1989.

The Decree of the Index was the document which detailed the final outcome of the 1616 Inquisition which had banned the absolute position of Copernicanism.

Specifically, this Decree banned or held several books subject to "revision" due to their absolute Copernican perspectives. This was the document that clearly stated the end result and the final say of the Church regarding the topic of the Heliocentric universe. Galileo was notified of this decision and that the Copernincan belief was heretical.

Firenzuola, Vincenzo da. "Commissary General to Cardinal Barberini (28 April 1633)". *The Galileo Affair: A Documentary History*, translated by Maurice A. Finocchiaro, University of California Press, Berkely, California, 1989.

This letter between da Firenzuola, the Commissary General, and Cardinal Barberini dictates the instructions that da Firenzuola received to proceed with the Galilean Inquisition "extrajudicially". Within this letter, da Firenzuola conveys that he would speak to Galileo on the 29th April 1633, a day before Galileo would deliver his "confession". It may be speculated that some sort of a bargain was made or arranged between the Catholic Church and Galileo through da Firenzuola. This document shows that both the Dominicans and the Jesuits were united in this cause since both Orders voted unanimously to send da Firenzuola to speak with Galileo.

Galilei, Galileo. "Galileo to Castelli (21 December 1613)". *The Galileo Affair: A Documentary History,* translated by Maurice A. Finocchiaro, University of California Press, 1989.

This was the original letter the Galileo had written to Bendetto Castelli. Within this letter, Galileo justifies and defends the topic of Heliocentricity to his disciple Bendetto Castelli. However, within this document, Galileo utilizes non-suggestive diction to argue for Copernicanism hypothetically, contrary to Lorini's version of this same letter.

This document was primarily used in the paper above in contrast with Lorini's version of this Letter.

Galilei, Galileo. "Galileo's Second Deposition (30 April 1633)". *The Galileo Affair: A Documentary History*, translated by Maurice A. Finocchiaro, University of California Press, Berkely, California, 1989.

This was the famous "confession" that Galileo was, arguably, forced to give. In this he stated that he may have accidentally transgressed the boundary of the precedents set by the 1616 Inquisition. He gave this verbal speech to the Inquisition exactly one day after his correspondence with da Firenzuola. This document was used to analyze the outcomes of the Galilean Inquisition as well the effects that the underlying political struggle had on this controversy.

"Inquisition Minutes (3 March 1616)". *The Galileo Affair: A Documentary History*, translated by Maurice A. Finocchiaro, University of California Press, Berkely, California, 1989.

This was a document which conveyed that Galileo had received the *praeceptum* and was written just days after the Special Injunction was given. Furthermore, according to this document, Galileo was aware of the decision the Inquisition took regarding the stance of Heliocentricity as he was shown the Decree of the Index.

Lorini, Niccolò. "Lorini's Complaint (7, February 1615)". *The Galileo Affair: A Documentary History*, translated by Maurice A. Finocchiaro, University of California Press, Berkeley, California, 1989.

"Lorini's Complaint" was the accusation filed by Niccolò Lorini to the Inquisition. In his defence, Lorini cited the letter from Galileo to Castelli that was written two years before he filed his complaint. Hence, it had numerous transcription errors. This particular letter was compared with Galileo's original letter in the paper above to analyze the validity of Lorini's accusation, and to assess the consequences of the said accusation.

"Special Injunction (26 February 1616)". T*he Galileo Affair: A Documentary History*, translated by Maurice A Finocchiaro, University of California Press, Berkely, California, 1989.

This is the very unsigned document of the Inquisition that reported that Galileo promised to obey the *praeceptum* imposed upon him. This document was very important throughout this paper as it showed the Inquisition's version of the 1616 Inquisition.

"Special Commision Report on the Dialogues (September 1632)". *The Galileo Affair: A Documentary History*, translated by Maurice A. Finocchiaro, University of California Press, Berkely, California, 1989.

This commission report by the Inquisition clearly found the *Dialogues* to be contrary to the decision of the 1616 Inquisition. It was this particular document that initiated the Galilean Inquisition of 1633. Hence this document was particularly useful in determining the initial causes of inquiry into the *Dialogues* which eventually led to the penultimate *carcere* imposed upon Galileo.

Journals

Einstein, Albert. "Science And Religion". *Nature*, vol 146, no. 3706, 1940, pp. 605-607.

This journal article by Albert Einstein helped captivate the overarching view on Science and Religion. It also gave the 20th century perspective on this issue, which was helpful when helpful in determining the impact of the Science-Religion Controversy in the long term. Furthermore, the concluding quote in this paper was taken from this article.

Websites

"Act Of Settlement, 1701". *The Jacobite Heritage*, http://www.jacobite.ca/documents/1701settlement.htm.

This primary source detailed the Act of Settlement from 1701 which was the Act that allowed for the Hanoverian Succession. This source aided in finding the legal precedents that surrounded the Hanoverian Succession. Furthermore, this allowed for a clearer understanding surrounding the political situation of the Hanoverian Succession which was key to understanding the Clarke-Leibniz Correspondence.

"Galileo". *Bortz Library*, https://libguides.hsc.edu/c.php?g=795010&p=5695337.

This page contained many primary sources relating to the Galileo Affair, albeit most were also included in Finocchiaro's Documentary History. Nevertheless, this source provided select primary sources that are more important to understand when holistically looking at the Galilean Inquisition.

Newton, Isaac. Cambridge University Library, cudl.lib.cam.ac.uk/view/MS-ADD-03958/2.

This primary source contained actual manuscripts written by Sir Isaac Newton. As described in Appendix B, this was used to show the Newtonian notation in Calculus and the differences between the Newtonian and Leibnizian notations. This was one of the consequences of the extreme loyalty of the English Academia to Newton's notation since they were not willing to accept the Leibnizian notation of Calculus.

Secondary Sources

Books

Ariew, Roger. "Introduction." *Correspondence*. Hackett Publishing Company, Inc., 2000, https://personal.lse.ac.uk/ROBERT49/teaching/ph103/pdf/Ariew_1715LeibnizClarkeCorrespondence.pdf.

The introduction to this book gave a very detailed outlook regarding the Correspondence Letters between Leibniz and Clarke. It also gave perspective regarding the content of the letters as well as the historical situation surrounding these letters. Thus, this gave insight into the underlying political situation found within the Clarke-Leibniz Correspondence as well as both the perspectives of the Newtonians and the Continental Mathematicians or Scientists.

Einstein, Albert. "Foreword." *Dialogue Concerning The Two Chief World Systems - Ptolemaic And Copernican*. 2nd ed., University Of California Press, 1967.

This foreword by Albert Einstein was extremely helpful as it provided the perspective on the context of Galileo's *Dialogues* as well as on the controversy between Galileo and the Catholic Church. Notably, this Forward also featured many ideas similar

to another one of Einstein's works titled "Science and Religion" (see above). Ultimately, this was very helpful in understanding the *Dialogues* and its significance in the 1633 Inquisition.

Feldhay, Rivka. *Galileo And The Church: Political Inquisition Or Critical Dialogue?*. Press Syndicate Of The University Of Cambridge, 1995.

This book narrates the events of the Galilean Inquisition in great detail. The author frequently cites many primary source documents to further prove their point throughout this book. This book is very insightful to understand the historical situation surrounding the Inquisition and the numerous political factors at play, especially with the underlying power struggle between the Dominicans and the Jesuits. Furthermore, this book is very critical about the events that occurred during the Galilean Inquisition, and was very influential in providing numerous different sources as well as the different points of view that this conflict may be looked upon. Overall, this book provided key insights that served as starting points to develop the historical argument in this paper.

Finocchiaro, Maurice A. "Introduction." *The Galileo Affair: A Documentary History, University of California Press*, Berkley, California, 1989.

This 40 page introduction to the Galilean Inquisition Documents presented numerous perspectives regarding the Galilean Inquisition. It provided a thorough summary of the events in the Galileo Affair as a prelude to the actual Inquisition Documents. Hence, Finocchiaro's Introduction offered different outlooks to view the

events of the Galileo Affair upon. It also shared many of the same ideas and opinions as Feldhay described in *Galileo and the Church*.

van Fraassen, Bas C. An Introduction To The Philosophy Of Time And Space. 3rd ed., Columbia University Press, 2013, https://www.princeton.edu/~fraassen/BvF%20-%20IPTS.pdf.

This secondary source was very helpful in understanding the arguments of Newton and Leibniz with regards to the point made by Clarke (regarding the vacuum in Space), on the behalf of Newton, in his *Correspondence* with Leibniz. This source helped provide additional details and clarification while in the initial stages of research.

Journals

Ballard, Kaith Emerson. “Leibniz's Theory of Space and Time.” *Journal of the History of Ideas*, vol. 21, no. 1, 1960, pp. 49–65. *JSTOR*, www.jstor.org/stable/2707998. Accessed 9 Jan. 2021.

This journal article was very important because it gave the view of Leibniz regarding the Newtonian Principles. This viewpoint was needed in order to accurately characterize both of the opposing viewpoints of Newton and Leibniz. The viewpoint of Newton was already found to a much larger degree in (Iltis) and (Shapin).

Hall, Norman F., and Lucia K. B. Hall. "Is The War Between Science And Religion Finally Over?". *The Humanist*, 1986, p. 26., Accessed 9 Jan 2021.

This journal article gave the modern perspective regarding Science and Religion. It accurately characterized many of the modern misconceptions in the article. Thus, this article helped establish the modern connection in the conclusion of this essay.

Iltis, Carolyn. "The Leibnizian-Newtonian Debates: Natural Philosophy And Social Psychology". *The British Journal For The History Of Science*, vol 6, no. 4, 1973. *JSTOR*, http://www.jstor.org/stable/4025501.

This journal article, coupled with the one below, was very important in realizing the political schema surrounding the Newton-Leibniz controversy. This article gave numerous key ideas specifically relating to the separation of ideas between the English and Continental Mathematicians. Specifically, this journal article concerned the social and psychological implications of this controversy within Newtonian and Leibnizian groups. A major point discussed in this journal article was regarding the pre-set psychological mindsets of Leibnizians and Newtonians that led to the communication issues on either side of the debate. Hence, this article was very influential in providing insight into the complex nature of the Newton-Leibniz debates.

Shapin, Steven. "Of Gods And Kings: Natural Philosophy And Politics In The Leibniz-Clarke Disputes". *Isis*, vol 72, no. 2, 1981. *JSTOR*, https://www.jstor.org/stable/230969.

This journal article was very helpful during the research phase regarding the Clarke-Leibniz Correspondence. It gave a very detailed account of the underlying political ambitions found within the time period of the Clarke-Leibniz Correspondence.

Ultimately, this article provided many insights that were key to the development of this paper.

Websites

"Galileo Galilei". *Stanford Encyclopedia Of Philosophy*, 2005, https://plato.stanford.edu/entries/galileo/.

This secondary source provided a very thorough narrative of the Galileo Affair. It outlined major key points that took place during the Inquisition as well as throughout Galileo's life. Thus, this document was very beneficial in understanding the character of Galileo as well as his accomplishments. Furthermore, this document was very helpful as it provided a solid review of the events that surrounded the issue between Galileo and the Church. Thus, this article was very helpful in clarifying more details, as well as bringing up strong key points that could be used as a starting point in my paper.

Guicciardini, Niccolò. "The Newton–Leibniz Calculus Controversy, 1708–1730". *Oxford Handbooks Online*, 2017, https://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780199930418.001.0001/oxfordhb-9780199930418-e-9.

This source helped serve as a starting point to discover the schema surrounding the Newton-Leibniz Controversy. It detailed many key points regarding the political aspects of the Newton-Leibniz Calculus controversy and thus aided in realizing the different viewpoints of the aforementioned controversy.

Helden, Albert Van, and Elizabeth Burr. "The Galileo Project". *The Galileo Project*, 1995, http://galileo.rice.edu.

This website provided a brief summary of Galileo's life, contributions, as well as the Inquisition. Thus, this article was helpful when initially researching details regarding the Galilean Inquisition.

"History". Public Broadcasting Service, https://www.pbs.org/faithandreason/intro/histo-frame.html.

This article provided very basic information regarding the relation of Faith and Science. This article gave important references to different issues that characterize the dispute of Religion and Science. This was a good starting base for research.

Thompson, Andrew C. "The Hanoverian Succession In British And European Politics, C.1700–1720". *Oxford Dictionary Of National Biography*, 2014, https://www.oxforddnb.com/view/10.1093/ref:odnb/9780198614128.001.0001/odnb-9780198614128-e-106970. Accessed 4 Jan 2021.

This article gave a lot of key information regarding the Hanoverian succession. The Hanoverian Succession was important to analyze for the Newton-Leibniz Controversy because it gave a very detailed look on the historical situation surrounding the controversy itself. Thus, the perspective of The Hanoverian Succession gave important insight to help develop the political aspect of the Clarke-Leibniz Correspondence.

Williams, Matt. A Comparison of the Geocentric and Heliocentric Models. 5 Jan. 2016, phys.org/news/2016-01-heliocentric-universe.html.

This source was used to show the differences between the Heliocentric and Geocentric theories of the structure of the Universe. An image from this source was used in Appendix A to show the differences between the two contrasting models of the Universe at the time of the Galilean Inquisition.

Wolfram, Stephen. "Dropping In On Gottfried Leibniz". *Stephen Wolfram|Writings*. https://writings.stephenwolfram.com/2013/05/dropping-in-on-gottfried-leibniz/.

As explained in Appendix B, an image from this source was used to show the Continental or Leibnizian Calculus Notations. The differences between the Newtonian and Leibnizian notations demonstrated one of the long term impacts of the varying ideologies on either side of this conflict.