The Galileo Affair: Opinions Creating Barriers

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I chose Galileo Galilei and the heliocentric model as my topic. Galileo promoted the theory of heliocentrism, which defines the modern understanding of astronomy and cosmological bodies. His run-in with the Catholic Church shows how overarching world events can sweep up the lives of ordinary people.

To begin, I started by researching about Galileo's life in general. Reading about all of his life accomplishments helped to provide some context before I zeroed in on heliocentrism. I was able to find information about it, but finding a reliable and authoritative source proved to be quite a challenge. I shifted from looking at websites in general to searching for books and academic papers on Google Scholar. I found a book called *When Science and Christianity Meet,* which details the complicated relationship in history between religion and science. This book provided valuable information on exactly why Galileo's ideas were rejected by the Church. A little more searching led me to an independent report titled *The Inquisition's Semicolon.* This report has photos of the original documents from the trial, as well as an in-depth analysis of the effect of his trial. I then found an essay within a book, titled *Science and Religion: A Historical Introduction*. This source gave me information about Galileo's life before the religious inquisition. While websites provide good information, I turned to books in print to provide new perspectives. I've begun looking at a translation of *Sidereus Nuncius,* or *The Starry Messenger.* It details all of Galileo's major findings at the time, and goes in depth into his evidence and support for heliocentrism. Perhaps most exciting is a website, famoustrials.com. This website has a lot of information about the Galileo Affair. Beyond that, it also has links to many important primary sources from major characters in the Galileo Affair.

I chose to write a paper about the Galileo Affair. Considering the sheer amount of information there is, a paper ensures that all the facts will be presented, and nothing will be left up to interpretation, which is possible in other presentation mediums.

The Galileo Affair was not a situation of breaking barriers, but rather creating one. The way the entire situation was perceived created a barrier between religion and science, but that was never the case. The Galileo Affair is generally taken as evidence that religion is an oppressor of science, and that it has historically repressed new scientific advancements. This view is extremely narrow, and ignores a large amount of important evidence, as well as context in terms of world events.

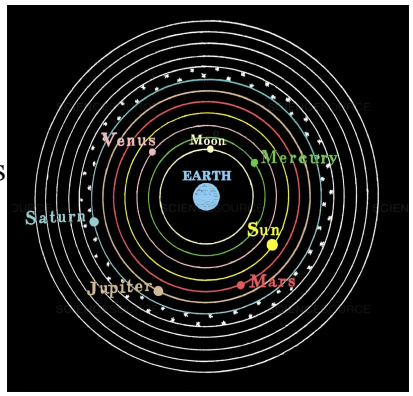
The Galileo Affair: Opinions Creating Barriers

To say that Galileo Galilei was an important scientist is a vast understatement. He made large contributions to astronomy, physics, engineering, mathematics, and overall standardization of certain scientific practices. However, the most widely known thing about Galileo's life is his clash with the Catholic Church. In the 1500s and 1600s, religion played an important role in the political development of the world. Galileo did not willingly rebel against the Church, but was rather caught up in a tide of major world events that forced them to make an example out of Galileo. The idea that Galileo was rebelling against an antiquated and oppressive organization is very narrow, and ignores the larger context of the 16th and 17th centuries.

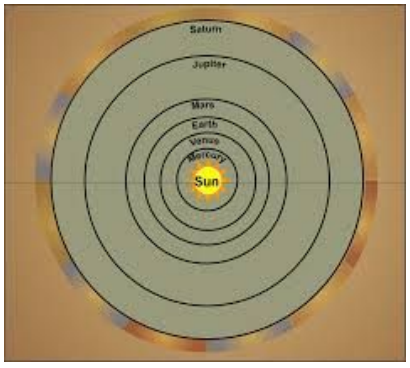
Well before the Galileo Affair, religion had a strong control over the world, and was a major force in all that happened. To understand why the Galileo Affair happened the way it did, it is critical to understand the importance of religion during this time. The Age of Discovery began in the 15th century; it was a time period where European countries attempted to colonize as many countries around the world as possible, as this era was the beginning of globalization being seen as power. The conquering of non-European countries was not strictly limited to governments, seeing as the Roman Catholic Church also sent missionaries in attempts to convert native populations to Christianity. The amount of practicing Christians around the world began to skyrocket, and the role of Christianity and its importance in the world grew as well. However, not everyone agreed with the very strict teachings of the Roman Catholic Church. The Renaissance, with its emphasis on education, brought about an era of widespread literacy. Now that many more people were literate, it is all but expected that the Bible was one of the first to be

widely copied and produced in many languages, considering the importance Christianity had in that time period. This mass distribution of The Bible is what caught the attention of Martin Luther, a German monk. He thought that the church had become an organization that sought to hold power above all else, even more so than actually spreading the message of Christianity. It is commonly believed that Luther initiated what is known as the Protestant Reformation when he published his *95 Theses*, a collection of his thoughts on the Catholic Church and their abuse of power in a quest to stay important. To quote the work of undergraduate Nickie Cranz, "The vast system of confession, pardons, absolution, indulgences, sacred relics, and ceremonies gave the male clerical hierarchy immense power over its largely illiterate flock" (*Martin Luther Stands in History*...). These practices are the exact things that Luther believed was wrong with the Catholic Church, and as such, took measures to protest them. He was largely ignored at first– the Church had no idea that Luther's ideas would be so pervasive. Their first attempt to curb Luther and his beliefs came at the Diet of Worms in 1521. He was formally asked to recant his statements against the Church, and when he refused, was excommunicated. He believed that "he could not submit [his] faith either to the pope[sic] or to the council, because it is as clear as noonday that they have fallen into error and even into glaring inconsistency with themselves" (Luther's defense at the Diet of Worms, 1521). Luther's fervid dissension from and disrespect of the Church and their authority is seen as the impetus that began the Protestant Reformation. From there, his ideas quickly spread throughout Europe, with strongholds of the Protestant belief forming in locations far away from Rome, where the headquarters of the Catholic Church was located. In a bid to preserve power and shut down the Protestants, the Church enacted the Counter-Reformation. As is evidenced by the name, it was a movement that went against the

ideas of reforming the Catholic Church. The Counter-Reformation began with the 1545 convening of the Council of Trent, a group of high level church officials, designed to find a solution to the ever-growing threat that was the Protestants. For example, the Council of Trent decided that "[r]egulars, of whatsoever order they may be, may not preach even in the churches of their own orders, unless they have been examined and approved of as regards their life, manners, and knowledge, by their own superiors, and with his license" (Council of Trent, Fifth Session). Establishing that only certified and approved officials in the Catholic Church were allowed to interpret the Bible severely limited the ability of the Protestants to spread their ideas, considering that it was now considered a crime to do so. This, despite being a setback for the Protestant Reformation, only served to slow the growth of those beliefs down, not to curb them entirely. It may seem that the Church was making a much larger deal out of this than necessary, but during this time, the Scientific Revolution was replacing religious doctrine as the common source of understanding the universe. Prior to this, scripture was the public's main source of understanding for the way the universe worked, and science was seen as complementary to this. The church was historically an avid supporter of science, because cutting-edge scientific discoveries simply aided in supporting the Bible. However, this began to diverge at the dawn of the Scientific Revolution. Now, new ideas were coming into play that worked on their own as ideas, and even contrasted scripture at times– for example, the new discoveries in the diversities of species on Earth began to go against the biblical idea of Creationism, where God created the Earth.



Ptolemaic Geocentrism



Copernican Heliocentrism

There were also new debates on the orbits of the planets– Ptolemaic Geocentrism, the biblical cosmological model, was under attack by Copernican Heliocentrism, the belief that the Sun was the center of the universe, not the Earth. Beyond these two examples, there are many other ideas of the Church that science began to move away from. However, the scientific community was relatively small, and even within the community, many scientists still held their beliefs in geocentrism. Needless to say, this means that heliocentrism did not take a very strong hold at first, between the scientific resistance and the public conviction in geocentrism. One scientist who believed very strongly in heliocentrism was Nicolaus Copernicus. Copernicus had a distinguished career in science, specifically astronomy. Throughout his life, he believed in heliocentrism based on rigorous examination of all the available facts. However, he held these beliefs in secret, for fear that his beliefs would upset the Church. In 1543, he published a work known as *De Revolutionibus,* or *On The Revolutions.* In it, he details all his support and evidence that suggested that the geocentric model was wrong. To placate the pope (Pope Paul III at this time,) he dedicated the foreword to him. Perhaps more important, however, is that Copernicus specifically treated heliocentrism as a hypothetical system, rather than assuming it to be true. Whether the Church intended any ill will towards Copernicus is unknowable, as he died later in 1543, the year of *De Revolutionibus'* publication. Copernicus' relative lack of notoriety meant that the Church had less to worry about when he published what they saw as subversive ideas. This exact idea is what makes Galileo's encounter with the Church so much different.

Galileo, unlike Copernicus, had a long and very productive career that catapulted him into the public eye. Early in his scientific career, he was already making huge advancements in science; for example, discovering the moons of Jupiter, or the motion of pendulums. He also

worked towards the standardization of scientific practices, and could be considered one of the first "experimental" scientists, as evidenced by his methodical procedures in experimentation. His vast contributions to science as a whole led to him gaining a certain degree of notoriety with the public. This "fame," for lack of a better term, meant that anything he did was broadcast far more than anything Copernicus had ever done. This is exactly what complicated Galileo's situation with the Church. He first came into conflict with the Church in 1616, over his 1610 book, *Sidereus Nuncius.* In this book, Galileo detailed his findings based on observations he made through a telescope. He talked of the moons of Jupiter, and the shape of the Earth's moon. He firmly believed that based on what he had seen, a geocentric system was inconsistent. *Sidereus Nuncius* caught the attention of the Church almost immediately. Between the raging Protestant Reformation, and the growth of the Scientific Revolution, any threat, even one as relatively insignificant as Galileo, represented a threat to their declining power. Thus, the Church made a clear order to Galileo:

> "It is set forth that the doctrine attributed to Copernicus, that the Earth moves around the Sun, and that the Sun is stationary in the centre of the world and does not move from east to west, is contrary to the Holy Scriptures and therefore cannot be defended or held" (Letter from Cardinal Bellarmine to Galileo, 05/26/1616).

Galileo, fearing the might and retribution of the Catholic Church, ceased his work in heliocentrism for nearly a decade. However, things changed when Pope Urban VIII was elected to the papal throne in 1623. Galileo had developed a friendship with him years prior, which paid off in allowing Galileo to continue his work on heliocentrism. There was one stipulation–

Galileo was required to treat the Copernican system as purely hypothetical, so as not to anger many important members of the Church. *Dialogue Concerning the Two Chief World Systems* was the book Galileo eventually released with his newfound permission from the head of the Church. However, the book was hardly up to the standards Urban specified. It not only treated Copernican heliocentrism as a fact, it presented the arguments for geocentrism through the character Simplicio, meaning "Simple One." At one point, Simplicio wonders; "Is it not there first proved that there are no more than three dimensions, since Three is everything, and everywhere?" (Dialogue Concerning The Two Chief World Systems, Galileo). This argument is somewhat nonsensical and not based in any scientific facts. To have the character defending geocentrism be so dumb not only seems to be an indirect criticism of those who believe in geocentrism, but comes off as a challenge against God, seeing as God put the Earth stationary in the center of the universe according to the Bible. Once he read Galileo's work, Pope Urban was infuriated. Urban called Galileo to Rome to defend what he had written. Galileo had not only lost a friend through his work, but his largest and most important supporter. At the mercy of the Roman Inquisition, an organization designed to punish those who commit crimes of heretical nature, Galileo was declared "vehemently suspected of heresy:" this meant that the Inquisition could imprison him at their leisure. And they did, sentencing him to house arrest until his death on January 8th, 1642.

Galileo's life was certainly complicated, and while painting him as a hero who rebelled against the anti-progressive ideals of the Church makes for an interesting story, that perspective severely oversimplifies the larger religio-political context of the time. If the Church actually had issues with the idea of heliocentrism, then surely they would have punished Copernicus as well.

This shows that the false hero narrative creates a barrier between religion and science that did not exist prior to the Galileo Affair. Additionally, Galileo's hero narrative may overshadow his numerous achievements he made throughout the course of his life, painting him as a martyr of scientific beliefs rather than the contributor to science that he was.

Annotated Bibliography

Primary Sources

Bellarmine, Robert. Letter to Galileo Galilei. 26 May 1616. *Famous Trials*, Douglas O. Linder, www.famous-trials.com/galileotrial/1022-bellarminestatement. Accessed 7 Jan. 2020. This is a transcript of a letter sent from Cardinal Robert Bellarmine to Galileo regarding his newly formed system of heliocentrism. What this letter provides is a quote that specifically defines the Church's version of the cosmological model, as well as stating why Galileo was in the wrong. It also sets up the later conflict of the Galileo Affair by formally banning Galileo from supporting heliocentrism.

---. "Letter on Galileo's Theories." 12 Apr. 1615, Paul Halsall, sourcebooks.fordham.edu/mod/1615bellarmine-letter.asp. Accessed 27 Oct. 2019. This letter from Cardinal Bellarmine, a promient figure in the Galileo Affair, was sent to a supporter of Galileo. The purpose of the letter was to effectively affirm the authority of the Church. This letter provides context for the events of the Galileo Affair from an earlier standpoint.

Copernicus, Nicolaus. *Six Books on The Revolutions of The Heavenly Spheres*. 1543. *University of Texas* , www.geo.utexas.edu/courses/302d/Fall_2011/Full%20text%20-%20Nicholas%20Copernicus,%20_De%20Revolutionibus%20(On%20the%20Revolutions),_%201.pdf. Accessed 14 Jan. 2020. Copernicus' book *On The Revolutions* details his model for the universe, heliocentrism. There are many good sections of this book, giving me an insight into what he was thinking and how he came to his belief that the common cosmological model was wrong. It also provides context for the world situation at the time, as he writes about world happenings a little too.

"Decree Concerning Original Sin." Council of Trent, 17 June 1546, Province of Trento, Italy. *Papal Encyclicals Online*, www.papalencyclicals.net/. Accessed 12 Jan. 2020. The fifth session of the Council of Trent harbors much importance compared to the other 26 sessions. This was the session where the Council formally decreed that private interpretation of the Bible was disallowed, among other things that aimed to take away any power the Protestant Reformation had.

"Decree Touching the Manner of Living, and Other Matters to be Observed, During the Council." *Papal Encyclicals Online*, www.papalencyclicals.net/councils/trent/second-session.htm. Accessed 15 Jan. 2020. The Second General Council of Trent was also a relatively important meeting– it established the goals of the council, and set them up to further establish the laws that they did regarding heresy.

Galilei, Galileo. *Dialogue Concerning the Two Chief World Systems*. *Semantic Scholar*, pdfs.semanticscholar.org/b1b4/2bf806e69e465cdbccff4e26822c35b07b82.pdf. Accessed 14 Jan. 2020. This is Galileo's second book about heliocentrism. This one was written with explicit permission from the pope, so when Galileo dropped the ball and wrote something the pope deemed heretical, he faced the consequences. Reading what Galileo wrote helps to develop my argument by letting me understand the thought process of the Church when they punished Galileo.

---. Letter to Benedetto Castelli. 21 Dec. 1613. *Interdisciplinary Encyclopedia of Religion & Science*, inters.org/Galilei-Benedetto-Castelli. Accessed 25 Nov. 2019. This letter was written from Galileo to Benedetto Castelli to offer him supporting arguments on heliocentrism. Castelli was a fellow mathematician who supported Galileo and his endeavors. When Castelli was approached by the Grand Duchess Christina of Florence, who brought forth biblical arguments against the Copernican system, he needed support. Thus, Galileo sent this letter, which contains the idea that The Bible was a governing force for morality, not science.

---. "Letter from Galileo to Diodati ." Received by Diotati, 24 July 1634. *Famous Trials*, www.famous-trials.com/galileotrial/1031-galileolettertodiodati. Accessed 15 Jan. 2020. Letter. This letter from Galileo to one of his supporters is a perfect close to the Galileo Affair. It summarizes what happened to him, and what he thought about the entire situation. It provides a scope for what the Church did to him, and gives some context for the rest of Galileo's life.

Luther, Martin. "Martin Luther's Speech at the Imperial Diet in Worms." 18 Apr. 1521. *San Jose State University*, www.sjsu.edu/people/james.lindahl/courses/Hum1B/s3/Luther-Speech-Worms-1521.pdf. Accessed 9 Jan. 2020. Working paper. This is a translation/transcript of Martin Luther's defense of his religious beliefs, specifically that of Protestantism. The transcript allows me to see what he was thinking from a first hand perspective.

Papal Condemnation of Galileo. UMKC School of Law. *Famous Trials*, UMKC School of Law, www.famous-trials.com/galileotrial/1012-condemnation. Accessed 14 Jan. 2020. This formal condemnation of Galileo's actions was written and signed by the Inquisition, the group that put Galileo on trial within the Church. To see what they actually said provides a much clearer perspective on their perspectives and what they were thinking when they forced Galileo to give up his beliefs.

Secondary Sources

Allchin, Douglas. "Galileo Trial II 1616 Documents." *Galileo Trial II 1616 Documents*, douglasallchin.net/galileo/library/1616docs.htm. Accessed 25 Nov. 2019. Douglas Allchin has credibility with a well written book on the nature of science. His website contains documents from 1616, when the Roman Inquisition formally ordered Galileo to

stop holding the belief of heliocentrism. These documents will provide me quotes to use and analyze in the paper.

Blackwell, Richard J. "Galileo Galilei." *Science and Religion: A Historical Introduction*, edited by Gary B. Ferngren, JHU Press, books.google.com/books?hl=en&lr=&id=4mFwdYxrjBMC&oi=fnd&pg=PA105&dq=galileo+heliocentrism+&ots=F860B5KZdj&sig=dpoieK4HjABQ6i9tDJ7_va5yKfQ#v=onepage&q=galileo%20heliocentrism&f=false. Accessed 22 Sept. 2019. Richard J. Blackwell has a PhD from Saint Louis University, where he is Professor Emeritus of philosophy. He has written many essays on 17th century science and philosophy, not unlike this one. The essay mentions Protestantism, and cites it as a reason that heliocentrism was rejected by the church. It also provides extremely detailed information about Galileo's life and his process of spreading heliocentrism, all of which may be difficult to find elsewhere. Specifically, this source explains the significance of Galileo's relationships with figures within the Church, and how these relationships played into the religious condemnation of the heliocentric model.

"Dawn." *NASA Science Solar System Exploration*, solarsystem.nasa.gov/missions/dawn/overview/. Accessed 14 Jan. 2020. This site gave me an image of the heliocentric model. I put it in my paper to help my readers understand what the heliocentric model looks like.

Dolling, Lisa M., et al., editors. *The Tests of Time: Readings in the Development of Physical Theory*. Princeton UP, 2003. Lisa M. Dolling, Arthur F. Gianelli, and Glenn N. Statile were all professors that taught history and philosophy of science at St John's University. Their book covers a broad scope of scientific discoveries throughout history. The first part of the book is called "The Heliocentric Theory," which describes the history of Heliocentrism. The section about Galileo and his contributions provides two transcripts of articles Galileo himself wrote. These articles provide insight into Galileo's thinking, and help show why exactly Galileo thought his theory was enough to go against the will of the church. Galileo's articles also provide a healthy amount of scientific evidence in support of Heliocentrism.

Finocchiaro, Maurice A. "Science, Religion, and the Historiography of the Galileo Affair: On the Undesirability of Oversimplication." *JSTOR*, pp. 1-19, www.jstor.org/stable/301982. Accessed 6 Oct. 2019. Maurice Finocchiaro has a B.S. from MIT and a Ph.D. from U.C. Berkeley, and is a distinguished author about the history of science and political theory. His report, "Science, Religion, and the Historiography of the Galileo Affair: On the Undesirability of Oversimplication," provides many interesting perspectives. For example, Finocchiaro believes that the Galileo Affair isn't necessarily representative of the overarching conflict between religion and science. He cites that many religious individuals supported Galileo, and that many scientists were very critical of him. Overall, the article provides a lot of technical information about Galileo's life. Despite the very

informative nature of the article, the plethora of information provides context for the events of the Galileo Affair.

Fowler, Michael. "Johannes Kepler." *Uva Physics*, galileo.phys.virginia.edu/classes/109N/1995/lectures/kepler.html. Accessed 29 Nov. 2019. Michael Fowler is professor emeritus of physics at UVa. He has websites published which contain a lecture series on Tycho Brahe and Johannes Kepler. He provides information on both of their lives, as well as their discoveries and the critical reception to those discoveries.

Graney, Christopher M. *The Inquisition's Semicolon: Punctuation, Translation, and Science in the 1616 Condemnation of the Copernican System*. arxiv.org/ftp/arxiv/papers/1402/1402.6168.pdf. Accessed 22 Sept. 2019. *The Inquisition's Semicolon* is an independent report written by Christopher M. Graney. Graney is a professor of astronomy and physics at Jefferson Community and Technical College. He also researches the history of astronomy. This report is primarily about the original documents from Galileo's trial, and how different interpretations of the handwriting alter the meaning of the document. Graney also provides his own opinion on the lasting significance of the trial, such as how the suppression of Galileo's heliocentric model, which was based in fact, helps modern science-denial groups. The report also contains images of the original trial document, and transcripts, because the documents are hard to read.

Kranz, Nickie. *Martin Luther Stands in History as a Leader of the Protestant Reformation*. MSU. *Cornerstone*, cornerstone.lib.mnsu.edu/cgi/viewcontent.cgi?article=1142&context=jur. Accessed 9 Jan. 2020. This paper is one of many put forth by an organization run through Minnesota State University. The page is full of papers written by students doing undergraduate research on the subject. While that may seem suspect, the fact that a college supports the work gives it an air of credibility. This specific paper delves into Martin Luther and the Protestant Reformation, and basically functions as a broad context source about those topics.

Levinson, Martin H. "Science versus Religion: A False Dichotomy?" *ETC: A Review of General Semantics*, vol. 63, no. 4, Oct. 2006, pp. 422-29, www.jstor.org/stable/42578676. Levinson's journal article is about the conflict between science and religion. Levinson argues that defining science versus religion as an essential conflict is a vast oversimplification, which leads to details being ignored about specific conflicts. He examines many instances of this conflict, one being the Galileo Affair. His article provides context for facts that are often not considered in the Galileo Affair as a product of oversimplification.

Lindberg, David C., and Ronald L. Numbers, editors. *When Science and Christianity Meet*. University of Chicago Press, 2008. *When Science and Christianity Meet* is a book edited

by David C. Lindberg and Ronald L. Numbers. Lindberg was the Professor Emeritus of History and Science at the University of Wisconsin-Madison. He was also the president of the History of Science and was awarded its highest prize- the Sarton Medal. With Numbers, he wrote this book, detailing the intricate relationship between traditional religion and emerging scientific theories. Chapter two of the book focuses explicitly on Galileo's life. Other than providing information about Galileo's idea of heliocentrism, it also explains why heliocentrism was such a controversial idea at the time and how it broke barriers by going against the traditional teachings of the Catholic church, which was the established authority at the time. While the book doesn't go into any detail about the lasting significance of Galileo's life, it provides a plethora of information about Galileo and the heliocentric model.

Linder, Douglas O. "The Trial of Galileo: An Account." *Famous Trials*, www.famous-trials.com/galileotrial/1014-home. Accessed 27 Oct. 2019. Douglas Linder was educated at Stanford Law School and has a J.D.. His website, Famous Trials, contains famous historical trials throughout history. Linder's page on the trial of Galileo provides all known information from a legal perspective. This analysis helps to understand the Galileo affair in terms of the trial. The source also provides links to a bunch of other sources, primary and secondary.

Machamer, Peter. "Galileo Galilei." Edited by Edward N. Zalta. *Stanford Encyclopedia of Philosophy*, 4 Mar. 2005, plato.stanford.edu/entries/galileo/. Accessed 25 Nov. 2019. This source from Stanford college provides information from all aspects of Galileo's life. While it relatively stays within the facts, it gives enough information that those facts can be taken and used in an argument.

"Papal Encyclicals Online." *Papal Encyclicals Online*, Hyperdo Media, www.papalencyclicals.net/about. Accessed 12 Jan. 2020. With transcripts/translations of EVERY meeting of the Council of Trent, this site is a goldmine for understanding the Counter-Reformation. Rather than saying what happened, these transcripts will allow me to get into the minds of the Catholic officials, and their perspectives on Martin Luther and the Protestant Reformation.

Pedersen, Olaf. *Galileo's Religion*. articles.adsabs.harvard.edu/cgi-bin/nph-iarticle_query?1985gamf.conf...75P&defaultprint=YES&filetype=.pdf. Formally educated at the University of Copenhagen, Olaf Pedersen was a professor in the history of science at Aarhus University. His report, "Galileo's Religion," focuses on Galileo's personal religious convictions. Pedersen examines multiple viewpoints, and gives his own opinion on the validity of each. His report provides the context for Galileo's trial by showing any issues Galileo may have developed with the Church earlier in his life. It also explains the significance of Galileo's personal life, and how it may have played in to his conviction.

Rabin, Sheila. *Nicolaus Copernicus*. Edited by Edward N. Zalta. *Stanford Encyclopedia of Philosophy*, plato.stanford.edu/entries/copernicus/#Revo. Accessed 24 Nov. 2019. This source, published in a Stanford encyclopedia, describes the life of Nicolaus Copernicus, a famous astronomer. Section 2.3 tells about his manuscript, "On The Revolutions." This manuscript is one of the first to contain a fully fleshed out theory of heliocentrism. This is useful to write a paper about the Galileo Affair because showing the history of heliocentrism allows for one to more fully understand Galileo's version of heliocentrism.

Reston, James, Jr. *Galileo: A Life*. HarperCollins Publishers, 1994. James Reston Jr. is an independent writer with an expertise in history, U.S. history, and U.S. politics. He also was an assistant to Secretary of the Interior at one point. In his biography *Galileo: A Life,* he gives plenty of information about Galileo's life, including his conflict and subsequent trial in the Catholic Church. Reston goes into full detail about the significance of Galileo's clash with the Church. What Reston's biography provides that not many other sources can is a chapter titled "Apology". This chapter talks about the Pope's recognition of the Church's mistake in condemning Galileo, and explains the significance of Galileo's condemnation in the Church today.

Rudavsky, Tamar. "Galileo and Spinoza: Heroes, Heretics, and Hermeneutics." *Journal of the History of Ideas*, vol. 62, Oct. 2001, pp. 611-31, www-jstor-org.ezproxy.bpl.org/stable/3654330?Search=yes&resultItemClick=true&searchText=galileo&searchText=heliocentrism&searchUri=%2Faction%2FdoBasicSearch%3FQuery%3Dgalileo%2Bheliocentrism&ab_segments=0%2Fbasic_SYC-4693%2Fcontrol&refreqid=search%3A49d2480a884af117979ad06b87d12afb&seq=1#metadata_info_tab_contents. Accessed 14 Oct. 2019. Tamar Rudavsky is a professor in the Department of Philosophy at Ohio State University, and has a Ph.D. from Brandeis University. Her journal article does not focus on the details of the Galileo Affair. It mentions small bits in passing, but the true focus is on the much broader conflict between science and religion. Rudavsky's main point is that by defining the overarching fight, it can provide context for more specific conflicts, such as the Galileo Affair. For example, she argues that saying science has historically been persecuted by religion is a dangerous line of thinking, as it can very easily lead to an antagonistic view of religion.

"Science Source Images." *Science Source Images*, www.sciencesource.com/archive/Ptolemaic-geocentric-model-of-the-heavens--artwork-SS2141884.html. Accessed 14 Jan. 2020. This site gave me an image of the geocentric model. I used that image in my paper to help the readers of my paper understand what the geocentric model looked like.

Segre, Michael. "Light on the Galileo Case?" *Isis*, vol. 88, no. 3, Sept. 1997, pp. 484-504, www.jstor.org/stable/236153. Accessed 14 Oct. 2019. Michael Segre is a professor in the history of science. His article focuses on the modern day repercussions of the Galileo Affair, and how religious institutions nowadays are dealing with the actions the church

took against Galileo. In his article, he also explains the significance of the reaction of the church and various popes throughout the late 1900s.

Sobel, Dava. *Galileo's Daughter*. Walker Publishing Company, 1999. Dava Sobel is an American writer who specializes in expansion on popular science. Her book contains translated transcripts of correspondence between Galileo and his eldest daughter, throughout both of their lives. Sobel's book provides a translation of every letter that Galileo and his daughter sent each other, and provides the historical context. This source gives a perspective that has heretofore been unseen. While the details concerning Galileo's run-in with the Church are sparse, it makes up for it by giving rich detail about Galileo's familial interactions.

"The Trial of Galileo." *History Teaching Institute of Ohio State University*, hti.osu.edu/scientificrevolution/lesson_plans/galileo_trial. Accessed 14 Dec. 2019. This lesson plan is most likely reliable in all aspects, as a professional college utilizes the information on it. It contains things such as transcriptions of Galileo's deposition, and letters from him to other notable figures of the time. All of these primary sources will assist me in understanding the thoughts of all the important figures during the Galileo Affair.

Tucker, Steven, Dr., and Beth Harris, Dr. "An Introduction to the Protestant Reformation." *Khan Academy*, www.khanacademy.org/humanities/world-history/renaissance-and-reformation/protestant-reformation/a/an-introduction-to-the-protestant-reformation. Accessed 28 Nov. 2019. Khan Academy is a reputable source that provides information on a broad range of topics. As such, there is no guarantee that the information about any one given topic will be extremely specific. However, the page about the Protestant Reformation provides very good broad information. It discusses all reasons that things played out the way they did, and even goes so far as to provide the perspective of the religious institution as well.

Wootton, David. *Galileo Watcher of the Skies*. Yale UP, 2010. David Wootton is the Anniversary Professor of History at the University of York. His formal education took place at Oxford and Cambridge. His book, *Galileo: Watcher of the Skies,* gives a detailed history of Galileo's life. The book contains facts about his life, as well as explaining the significance of his discoveries and achievements. Certain chapters within the book focus on Galileo's idea of heliocentrism, and how it broke barriers by competing with the established authority of the Catholic Church. It also goes into excruciating detail about Galileo's trial by the Catholic inquisition, and what exactly occurred during said trial.