

The University of North Carolina at Asheville

“A Great Event, and Even Greater for its Consequences:”

Re-examining the Metanarrative of the Galileo Affair

A Senior Thesis Submitted to the Faculty of the Department of History in

Candidacy for the Degree of Bachelor of Arts in History

by

William Voit

Asheville, North Carolina

21 November, 2003

“I urge theologians, scientists, and historians, motivated by a spirit of sincere collaboration, to deepen an examination of the Galileo case, and in a loyal recognition of errors, from whatsoever side they come, put an end to the mistrust to which this affair still gives rise in many minds.”<sup>1</sup> On November 10, 1979, Pope John Paul II spoke these words to the Pontifical Academy of Sciences.<sup>2</sup> In this address, he attempted to mend wounds opened 350 years before by the famous trial of Galileo Galilei, an incident that has come to be known as the Galileo Affair. Galileo’s life and his conflict with the Roman Catholic Church are often cited as the prime example in the metanarrative, or important historical theme, of the “science versus faith” conflict in modern civilization. However, in the attempt to force Galileo into this framework, the personal religious statements of the eminent scientist are often ignored. In order to gain a complete understanding of Galileo’s role in the metanarratives of the early modern age, one must first examine the historiographical data about Galileo, and then follow the development of his relationship with the Church throughout his life.<sup>3</sup> By examining the religious statements of Galileo and his interaction with the Church, one will discover that the Galileo Affair speaks less about the conflict between faith and science, and more about the conflict within a faith, a conflict over scriptural interpretation.

Modern historians have written on Galileo’s relationship with the Church in several different ways. Some historians attribute mostly pure motives to Galileo, and have asserted that his challenge to the Church was driven by a sense of duty. For example, two preeminent scholars on this subject, Stillman Drake and Maurice Finocchiaro, emphasized the honest motivations behind Galileo’s religious statements in their works. In his book *Galileo: Pioneer*

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<sup>1</sup> Paul Poupard, ed., *Galileo Galilei: Toward a Resolution of 350 Years of Debate, 1633-1983* (Pittsburgh, PA: Duquesne University Press, 1987), xiv.

<sup>2</sup> *Ibid.*, xiii.

<sup>3</sup> In this paper, the term “Church” will refer to the Roman Catholic Church.

*Scientist*, Drake highlighted Galileo's earnest insistence that scriptural interpretation be metaphoric, rather than literal.<sup>4</sup> Finocchiaro pointed out in *The Galileo Affair* that Galileo's positions on scripture and science were radical for his time, which exposed the scientist to a degree of danger a mere opportunist might not have risked.<sup>5</sup> John Hedley Brooke also posited that Galileo's positions derived from honest motives in that he sincerely felt that scripture should not be used to form conclusions about the natural world, as scripture was concerned only with salvation.<sup>6</sup>

Jerome Langford, however, pointed out that Galileo may have had more self-interested motivations when he crafted his religious statements. In his work *Galileo, Science, and the Church*, Langford stated that Galileo's exhortation that all Biblical interpretation be prudently done resulted as much from the numerous attacks launched against him by Ptolemaic academics as from a genuine concern for the misapplication of the scriptures.<sup>7</sup> Though Galileo was disturbed by the use of scripture in scientific discourse, he felt that it was appropriate to interject Biblical notions into a debate about nature if scientific inquiry was unable to explain a phenomenon.<sup>8</sup> In these situations, Galileo was eager to challenge Aristotelian opponents who failed to outwit him in scientific debates, and sought more favorable outcomes in religious contests.<sup>9</sup> Some historians view that as evidence of Galileo's desire for self-aggrandizement over honest discourse.

Thomas Campanella made note of Galileo's own personal Catholic faith when he discussed the scientist's religious statements. Campanella wrote that Galileo's attempts to

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<sup>4</sup> Stillman Drake, *Galileo: Pioneer Scientist* (Toronto: University of Toronto Press, 1990), 175.

<sup>5</sup> Maurice A. Finocchiaro, ed., *The Galileo Affair: A Documentary History* (Berkeley: University of California Press, 1989), 9.

<sup>6</sup> John Hedley Brooke, *Science and Religion: Some Historical Perspectives* (Cambridge: Cambridge University Press, 1991), 54.

<sup>7</sup> Jerome J. Langford, *Galileo, Science, and the Church* (Ann Arbor: University of Michigan Press, 1992), 50.

<sup>8</sup> Dudley Shapere, *Galileo: A Philosophical Study* (Chicago: University of Chicago Press, 1974), 16.

reconcile the Bible with scientific exploration stemmed from his genuine belief that science was an essential and divinely sanctioned means of understanding nature.<sup>10</sup> Campanella summed up Galileo's position this way:

...any attempt to forbid Christians to study the book of nature is a crime against Christianity itself. For if the Christian religion is true, then it not only has no fear of other truths, but also should welcome any further knowledge of the natural world as additional insights into the wisdom and goodness of God. In short the Church damages itself if it cuts off any access to God which may be found in the book of nature.<sup>11</sup>

In other words, Galileo believed that Christianity required scientific study for the sake of its survival. Peter Machamer also made note of the fact that Galileo believed that the study of nature was another, equally valid avenue by which to see the manifestation of God's hand.<sup>12</sup> Richard Blackwell wrote that Galileo's faith inspired in him a desire to correct errant interpretations of scripture, as Galileo felt that Christianity was done great harm by those who maintained wrong scriptural interpretations out of their own stubbornness.<sup>13</sup>

Some historians, like James Brophy, wrote that Galileo viewed scientific discovery as a matter of public welfare, and tailored his religious statements to promote science for that reason. For example, Brophy paraphrased Galileo by stating, "God...may know infinitely more than we can ever know; but what we know mathematically we know as well as He does."<sup>14</sup> Ludovico Geymonat also believed that Galileo felt that science was an issue related to the public welfare. Geymonat noted that Galileo believed that science could be of great benefit to society in

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<sup>9</sup> Ibid.

<sup>10</sup> Thomas Campanella, *A Defense of Galileo* (Notre Dame, Indiana: University of Notre Dame Press, 1994), 29.

<sup>11</sup> Ibid.

<sup>12</sup> Peter Machamer, ed., *The Cambridge Companion to Galileo* (Cambridge: Cambridge University Press, 1998), 289-290.

<sup>13</sup> Richard J. Blackwell, *Galileo, Bellarmine, and the Bible: Including a Translation of Foscarini's Letter on the Motion of the Earth* (Notre Dame, Indiana: University of Notre Dame Press, 1991), 113.

<sup>14</sup> James Brophy and Henry Paolucci, eds., *The Achievement of Galileo* (Smyrna, DE: Griffon House Publications, 2001), 8.

revealing inherent truths of universe. He believed that science was not merely to be confined to the world of academics, which explains why Galileo often wrote in Italian, not Latin.<sup>15</sup>

The primary sources of the Galileo Affair demonstrate two broad points; that the Church tolerated Galileo's views when they dealt with science, but censored him when he used religious arguments. The conflict upon which the Galileo Affair was based began in 1543, when Nicholas Copernicus, a Polish monk, published his work *De Revolutionibus*.<sup>16</sup> In it, he proposed that the Sun occupied the center of the universe, a theory called Copernicanism or heliocentrism. This theory opposed the dominant astronomical model of the time, called alternately the Ptolemaic, Aristotelian, or geocentric model, which held that the Earth lay at the center of the universe.<sup>17</sup> The Church did not take an official position on Copernicanism for over seventy years, and despite the fact that virtually all Church officials were geocentrists, dissent on the matter was tolerated until 1616.<sup>18</sup>

By 1597 Galileo had articulated his first public defenses of Copernicus and his doctrines. In several letters to academics he asserted that heliocentrism was more probable than geocentrism.<sup>19</sup> Also in that year, Galileo wrote to the famous scientist Johannes Kepler on this issue, and stated: "...our teacher Copernicus, who though he will be of immortal fame to some, is yet by an infinite number (for such is the multitude of fools) laughed at and rejected."<sup>20</sup> Here Galileo cast his scientific lot with Copernicus. Though the "fools" adherent to "that other view," clearly a reference to Aristotelians, dominated the philosophical mindset of the Church, its officials took no actions to suppress these statements.

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<sup>15</sup> Ludovico Geymonat, *Galileo Galilei: A Biography and Inquiry Into his Philosophy of Science* (New York: McGraw-Hill, 1965), 61.

<sup>16</sup> Rivka Feldhay, *Galileo and the Church: Political Inquisition or Critical Dialogue?* (Cambridge: Cambridge University Press, 1995), 260.

<sup>17</sup> Ibid.

<sup>18</sup> Blackwell, 54.

<sup>19</sup> Dava Sobel, *Galileo's Daughter* (New York: Walker Publishing, 1999), 52.

The publication of Galileo's first major work further demonstrated the Church's tolerance of Copernicanism at this time. *Sidereus Nuncius*, published in 1610, recorded Galileo's first celestial observations with the newly invented telescope. This work included an investigation of the nature of the Moon, observations of new stars and of the planets, and of his discovery of the Jovian moons. In each of these areas, Galileo demonstrated overt Copernicanism. Galileo stated that the Jovian moons, "...make their journeys and orbits with a marvelous speed around the star of Jupiter...while meanwhile all together, in mutual harmony, complete their great revolutions every twelve years about the center of the world, that is, about the sun itself."<sup>21</sup> Here Galileo stated with surprising openness that the center of the world, the Renaissance term for the universe, was the sun itself, a clear endorsement of the Copernican model. He sanctioned Copernicanism again when he wrote, "...our vision offers us four stars wandering around Jupiter like the Moon around the Earth while all together with Jupiter traverse a great circle around the Sun in the space of 12 years."<sup>22</sup> Galileo endorsed other ideas in *Sidereus Nuncius* that were antithetical to the Aristotelian model. For example, he asserted, "...the Moon is by no means endowed with a smooth and polished surface, but is rough and uneven and, just as the face of the Earth itself, crowded everywhere with vast prominence, deep chasms, and convolutions."<sup>23</sup> Galileo even acknowledged that these findings conflicted with the prevailing beliefs of the day: "By oft-repeated observations...we have been led to the conclusion that we certainly see the surface of the Moon to be not smooth, even, and perfectly spherical, as the great crowd of philosophers have believed about this and other heavenly bodies..."<sup>24</sup>

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<sup>20</sup> *Letter to Kepler*, quoted from Sobel, 52.

<sup>21</sup> Galileo Galilei, *Sidereus Nuncius* (Chicago: University of Chicago Press, 1989), 31.

<sup>22</sup> *Ibid.*, 84.

<sup>23</sup> *Ibid.*, 36.

<sup>24</sup> *Ibid.*, 40.

Galileo's Copernicanism went so far as to seek out criticism in order to refute it. Citing the motion of the Jovian moons around Jupiter, Galileo wrote:

We have moreover an excellent and splendid argument for taking away the scruples of those who, while tolerating with equanimity the revolution of the planets around the Sun in the Copernican system, are so disturbed by the attendance of one Moon around the Earth while the two together complete the annual orb around the sun that they conclude that this constitution of the universe must be overthrown as impossible.<sup>25</sup>

In other words, the critics of the Copernican system, who said that there could not be two centers of rotation in the universe (the Moon around the Earth and the Earth around the Sun) had to be wrong, because the Jovian satellites, in revolving around Jupiter, evinced at least two centers of rotation, regardless of whether Jupiter orbited the Sun or the Earth. This demonstrated that Galileo's interest in Copernicanism was more than academic. He had invested himself in the argument, and thus made himself a prime target for the Church.

However, the Church took no actions to suppress *Sidereus Nuncius*, though it certainly had the power to do so. The Church reviewed all books seeking publication in Catholic areas at that time, including *Sidereus Nuncius*. The Church published the documentation of this review with the work in 1610; it stated, "...in the book entitled *Sidereus Nuncius* by Galileo Galilei there is nothing contrary to the Holy Catholic Faith, Principles, or good customs...."<sup>26</sup> Both the Secretary of the Council of Ten, Bartholomaeus Cominus, as well as by the Coadjutor of the Congregation on Blasphemy, Baptista Breatto, approved the work.<sup>27</sup> *Sidereus Nuncius* espoused a Copernican theory that many in the Church opposed, yet it escaped condemnation.

Though *Sidereus Nuncius* established Galileo's Copernican leanings, the scientist, instead of being condemned for his position by Church authorities, received praise for it. For example, Galileo was surprised at the warmth of his reception in Rome when he made the trip from

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<sup>25</sup> Ibid.

<sup>26</sup> Ibid., 34.

Florence in 1611. He wrote to his friend Salviati the same year, “I have been received and feted by many illustrious cardinals, prelates, and princes of this city who wanted to see the things I have observed and were much pleased, as I was too on my part....”<sup>28</sup> Indeed, the Collegio Romano, the nucleus of Jesuit knowledge and education in the world, officially endorsed Galileo’s work, and with its own telescopes confirmed his findings.<sup>29</sup> Moreover, the publication of *Sidereus Nuncius* garnered Galileo a coveted audience with Pope Paul V, as well as the friendship of Maffeo Cardinal Barberini, who later became Pope Urban VIII.<sup>30</sup> Barberini opposed Copernicanism, but admired the mathematical elegance of the system and the passion of Galileo, its chief proponent.<sup>31</sup> Barberini wrote to Galileo, “I pray the Lord God to preserve you, because men of great value like you deserve to live a long time to the benefit of the public.”<sup>32</sup> Paul V, Barberini, the Collegio Romano, and the “cardinals, prelates, and princes” all took part in a favorable reaction to *Sidereus Nuncius* on the part of the Church. Though the Church’s faith-based position and Galileo’s science-based position differed in *Sidereus Nuncius*, that difference did not stir the Church to action against Galileo or his work. These facts are difficult to reconcile with the popular notion that the prevailing metanarrative of the Galileo Affair was “science versus faith,” for such a conflict would have had the opportunity to surface at this time.

The real conflict of the Galileo Affair emerged when Galileo wrote *Bodies in Water*, his letters on sunspots, and the *Letter to the Grand Duchess Cristina*. After *Sidereus Nuncius*, Galileo’s next achievement, *Bodies in Water* in 1612, continued to challenge the principles of the Aristotelian system. Most of the work dealt with a new way of explaining why certain objects

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<sup>27</sup> Ibid.

<sup>28</sup> *Letter to Salviati*, quoted from Sobel, 40.

<sup>29</sup> Sobel, 40.

<sup>30</sup> Ibid., 43.

<sup>31</sup> Ibid., 138.

<sup>32</sup> *Barberini’s Letter to Galileo*, quoted from Sobel, 44.



(“bodies”) float and others do not, which challenged Aristotelian explanations.<sup>33</sup> Galileo also mentioned other elements of his research in the introduction. For example, Galileo noted the existence and rotation of sunspots, a discovery which he called, “...a great event, and even greater for its consequences.”<sup>34</sup> In this, Galileo asserted the imperfection of the Sun, contrary to the physics of Aristotle. In *Bodies in Water*, Galileo openly stated that he intended to challenge accepted Aristotelian teachings in his approach.<sup>35</sup>

In his letters on sunspots, Galileo proved equally candid in his support of Copernicanism. Galileo wrote three letters on sunspots, each a correspondence with German scientist Marcus Welser about the nature of the newly observed solar phenomenon.<sup>36</sup> Galileo published them – in Rome, with Church approval – along with Welser’s four responses in 1613.<sup>37</sup> It is important to note that Galileo consulted with Carlo Cardinal Conti in writing the letters on sunspots, and received assurances that his ideas did not contradict the Bible.<sup>38</sup> Conti’s unofficial certification covered the following statement, taken from the *First Letter on Sunspots*: “With absolute necessity we shall conclude, in agreement with the theories of the Pythagoreas and of Copernicus, that Venus revolves about the Sun just as do all the other planets....”<sup>39</sup> Galileo’s clear Copernicanism and a Cardinal’s acceptance of it cannot be reconciled in the “science versus faith” metanarrative. However, they can be harmonized in the framework of a different metanarrative, that of a conflict within a faith over authority.

Galileo addressed the issue of established scientific authority, and whether or not the Church would allow one to challenge it, in *Bodies in Water*. Galileo pointed out that his

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<sup>33</sup> Galileo used ice as an example, and argued that ice floats not because it is unable to pierce the water’s surface, as Aristotle held, but because it is less dense, and thus lighter, than the surrounding water.

<sup>34</sup> Galileo Galilei, *Discourse on Bodies in Water* (Urbana, Illinois: University of Illinois Press, 1960), 2.

<sup>35</sup> *Ibid.*, 3.

<sup>36</sup> Sobel, 54.

<sup>37</sup> *Ibid.*, 57.

<sup>38</sup> *Ibid.*, 59-60.

differences with Aristotle did not result from misunderstanding his teachings, but from informed dissent:

I resolved to write the present discourse...to demonstrate that it was not out of capriciousness, or for that I had not read or understood Aristotle, that I sometimes swerve from his opinion, but because several Reasons persuade me to it, and the same Aristotle hath taught me to fix my judgment on that which is grounded upon Reason, and not on the bare Authority of the Master...<sup>40</sup>

Here Galileo articulated one of the central tenets of his belief structure, that authority alone did not supply sufficient justification for adherence to a philosophy. In *Sidereus Nuncius* Galileo applied this notion to Aristotle, but it soon resurfaced in a much more controversial religious context.

One of the most important events in the Galileo Affair began in December of 1612, when the Grand Duchess Madama Cristina of Lorraine, matron of the powerful Medici family, invited Galileo's friend Benedetto Castelli, a Benedictine monk, to breakfast.<sup>41</sup> The Duchess turned the conversation toward the question of Copernicanism and its ability to be reconciled with certain passages in the Bible.<sup>42</sup> Castelli's letter to Galileo on the subject elicited the famous *Letter to the Grand Duchess Cristina* in 1616 in response, which Galileo intended for publication. The *Letter to the Grand Duchess Cristina* served as Galileo's formal attempt at reconciling Copernicanism and scripture.

In the *Letter to the Grand Duchess Cristina*, Galileo affirmed that the Bible and Church scholars were, "...of supreme authority, I consider it rank temerity for anyone to contradict them – when employed according to the usage of the holy Church."<sup>43</sup> As he accepted the authority of

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<sup>39</sup> *First Letter on Sunspots*, quoted from Sobel, 55.

<sup>40</sup> Galileo, *Bodies in Water*, 3.

<sup>41</sup> Richard S. Westfall, *Essays on the Trial of Galileo* (Notre Dame, Indiana: University of Notre Dame Press, 1989), 68.

<sup>42</sup> For the more famous examples, see Psalm 104:5, Joshua chapter 10, and Genesis chapter 1.

<sup>43</sup> Galileo Galilei, "Letter to the Grand Duchess Cristina," in *The Modern World* (Asheville, NC: Pegasus Press, 1999), 6.

scripture, Galileo also affirmed his belief in its infallibility. He wrote, “I think in the first place that it is very pious to say and prudent to affirm that the holy Bible can never speak untruth – whenever its true meaning is understood.”<sup>44</sup> Then followed the crux of the matter: “But I believe nobody will deny that it is often very abstruse, and may say things which are quite different from what its bare words signify.”<sup>45</sup> Galileo contended that the authors of the Bible had phrased its declarations, “...in order to accommodate them to the capacities of the common people, who are rude and unlearned.”<sup>46</sup> He went on to say that scientific propositions differed significantly from Biblical ones, in that science had no bearing on salvation, while salvation was the sole concern of the Bible.<sup>47</sup>

Here Galileo developed a controversial position on Scripture, at least for the time – that it did not speak on scientific matters. He reiterated this point later in the *Letter to the Grand Duchess Cristina*: “...I think that in discussions of physical problems we ought to begin not from the authority of scriptural passages, but from sense-experiences and necessary demonstrations....”<sup>48</sup> This did not, however, demonstrate a science-faith conflict, for Galileo did not deny that God possessed the authority to speak on science (to Galileo, God existed as an omnipotent being with the authority to say anything He wanted). Rather, Galileo believed that the Bible had been intentionally written to be understood by the “rude and unlearned” and only for exposition on matters of faith. In his words, “...the primary purpose of the sacred writings...is the service of God and the salvation of souls.”<sup>49</sup> To use it in other ways was both unhelpful in answering the questions at hand and counterproductive, as, “...in expounding the

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<sup>44</sup> Ibid.

<sup>45</sup> Ibid.

<sup>46</sup> Ibid.

<sup>47</sup> Ibid., 7.

<sup>48</sup> Ibid.

<sup>49</sup> Ibid.

Bible if one were always to confine oneself to the unadorned grammatical meaning, one might fall into error.”<sup>50</sup> This demonstrated a conflict within a faith, for Galileo made explicit arguments in support of one religious interpretation, and did not oppose religion altogether.

Galileo’s religious position was also controversial in that he elevated nature to a status as equally exalted as the Bible. He wrote, “the holy Bible and the phenomena of nature proceed alike from the divine Word, the former as the dictate of the Holy Ghost and the latter as the observant executrix of God’s commands.”<sup>51</sup> Galileo’s words that the Bible and nature proceeded “alike” from God contrasted sharply with the view held by Aristotelians and theologians, who considered the Earth an imperfect and sinful realm. These same theologians considered the Bible perfect and inerrant, a position with which Galileo agreed in the *Letter to the Grand Duchess Cristina*. Galileo’s statement that nature met those criteria as well was drastic. It was drastic, however, not outside of the faith, but within it.

Galileo even stated in several places in the *Letter to the Grand Duchess Cristina* that nature had several advantages over scripture. For example, he wrote:

It is necessary for the Bible, in order to be accommodated to the understanding of every man, to speak many things that appear to differ from the absolute truth so far as the bare meaning of the words is concerned. But nature, on the other hand, is inexorable and immutable; she never transgresses the laws imposed upon her, or cares a whit whether her abstruse reasons and methods of operation are understandable to men.<sup>52</sup>

In short, Galileo contended that scripture was necessarily complex, while nature could not mislead those who studied it. Additionally, Galileo believed that science could then be used in interpreting scripture correctly: “...having arrived at any certainties in physics, we ought to

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<sup>50</sup> Ibid., 6.

<sup>51</sup> Here Galileo referred to Jesus as the “divine Word” in the tradition of St. John, see John 1.1-5; Galileo, *Letter to the Grand Duchess Cristina*, 7.

<sup>52</sup> Ibid.

utilize these as the most appropriate aids in the true exposition of the Bible....”<sup>53</sup> Thus, Galileo not only removed the Bible as a tool for understanding nature, but also extended to nature the role of assisting with the understanding of the Bible.

Galileo did not hold an atheistic position, for he rationalized his arguments on theological grounds: “...I do not feel obliged to believe that that same God who has endowed us with senses, reason, and intellect has intended to forgo their use and by some other means to give us knowledge which we can attain by them.”<sup>54</sup> In defense of his positions, Galileo quoted respected Church fathers such as St. Augustine, Father Tertullian, and Cardinal Baronius, the last of which coined the famous phrase, “the intention of the Holy Ghost is to teach us how to go to heaven, not how heaven goes.”<sup>55</sup> This adage, often mistakenly attributed to Galileo, does effectively encapsulate his views on scripture and science.

Controversy built steadily as Galileo’s unpublished opinions circulated among the intellectuals of Italy. The debate over Copernicanism reached a climax, and in February of 1616 the Pope convened a group of 11 Church scholars to investigate and vote on whether or not Copernicanism was heretical.<sup>56</sup> Within a month they had formed a conclusion, and on March 5 the Congregation of the Index issued the Edict of 1616.<sup>57</sup> The panel deemed Copernicanism, “false and contrary to Holy Scripture,” and added that it was a “foolish and absurd” astronomical model.<sup>58</sup> Both Roberto Cardinal Bellarmino, who served as the Pope’s theological advisor, and Father Michelangelo Seghizzi, who had served on the panel, came to Galileo in person, informed

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<sup>53</sup> Ibid.

<sup>54</sup> Ibid., 8.

<sup>55</sup> Ibid., 9.

<sup>56</sup> Sobel, 77.

<sup>57</sup> Ibid., 78-79.

<sup>58</sup> *Edict of 1616*, quoted from Sobel, 78-79.

him of the decision, and reminded him of his obligation to renounce Copernicanism. Galileo assented in front of both men.<sup>59</sup>

Though circulated in 1615, Galileo could not find anyone to publish the *Letter to the Grand Duchess Cristina* until 1636, and then in Strasbourg, beyond the control of the Church.<sup>60</sup> The fact that his work remained unpublished, and thus ineligible to be censured by the Edict of 1616, coupled with Galileo's renunciation of Copernicanism to Bellarmino and Seghizzi, spared him the judgment of the Inquisition at this time. The Church's treatment of Galileo following the Edict of 1616 left staunch opponents of Copernicanism without a condemnation of their principle rival or his doctrine. Neither Galileo's writings, which contained overt defenses of Copernicanism, nor the scientist himself garnered criticism in the Edict of 1616, despite the fact that his prominence in the debate served as the driving force behind the Copernican movement. The actions of important Church figures in the months that followed the proclamation remained conciliatory toward Galileo. For example, Galileo described an audience with the Pope on March 11, 1616, in a letter to the Tuscan secretary of state:

[the Pope] answered that he was well aware of my uprightness and sincerity of mind, and when I gave evidence of being still somewhat anxious about the future, owing to my fear of being pursued with implacable hate by my enemies, he consoled me and said that I might put away all care, because I was held in so much esteem both by himself and by the whole congregation of cardinals...he assured me several times that he bore me the greatest good will...<sup>61</sup>

Even some of the most staunchly Aristotelian Church officials defended Galileo. On May 26, Cardinal Bellarmino drafted a letter defending Galileo against rumors that the Church had condemned him and forced him to repent, which it had not.<sup>62</sup>

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<sup>59</sup> Sobel, 78.

<sup>60</sup> Ibid., 67.

<sup>61</sup> *Letter to the Tuscan Embassy*, quoted from Sobel, 80.

<sup>62</sup> *Bellarmino's Letter*, from Finocchiaro, 153.

Beyond Galileo himself, the very scope of the Edict of 1616 made clear that the Church's main interest lay in securing its own primacy in the interpretation of scripture. While the Church only suspended *De Revolutionibus* until it made changes in the text, the Church completely proscribed another book, by Father Paolo Antonio Foscarini.<sup>63</sup> These two works differ in that Copernicus only wrote a scientific discussion of a model that the Church could simply discard as bad science, while Foscarini wrote openly and enthusiastically about the truth of the Copernican system from a religious standpoint, which could not be harmonized with the recent Edict. The Church was concerned with religious authority, and thus discussing Copernicanism from a scientific viewpoint – or a hypothetical viewpoint, as the Church called it – remained possible.

Why this transformation in the Church's position, from 70 years of tolerance of Copernicanism to an outright condemnation of it, came about is intrinsically linked to events of the Galileo Affair. For the decades preceding Galileo, Copernicanism had been an academic issue, used only by philosophers and scientists to help explain tidal motions or new stellar phenomena. That changed when the debates over Copernicanism began to involve the Bible. When laymen began to make their own conclusions about Scripture, the Church interceded. In this, the Church demonstrated that its concern with maintaining a monopoly on the interpretation of scripture was sparked by the successes of the Protestant Reformation.

In Galileo's time, the Roman Catholic Church was losing believers to new Protestant denominations, especially to the Lutherans in Germany.<sup>64</sup> In response, the Church convened the Council of Trent in an attempt to solve the problems through a combination of internal reforms and external inflexibility. One issue on which the Church refused to compromise was the interpretation of scriptures by laymen. The council affirmed in 1546, "no one, relying on his

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<sup>63</sup> Sobel, 79.

<sup>64</sup> Ibid., 72.

own judgment and distorting the Sacred Scriptures according to his own conceptions, shall dare to interpret them.”<sup>65</sup> Church leaders at Trent even crafted an oath that Catholics asserted on this issue: “I also accept Sacred Scripture in the sense in which it has been held, and is held, by Holy Mother Church, to whom it belongs to judge the true sense and interpretation of the Sacred Scripture, nor will I accept or interpret it in any way other than in accordance with the unanimous agreement of the Fathers.”<sup>66</sup> Church officials viewed Galileo’s willingness to interpret the Bible as a part of what the Counter-Reformation was fighting against.

It was fortunate for Galileo that his *Letter to the Grand Duchess Cristina* had not been published, and thus was not officially listed on the Church’s Index of prohibited books. In addressing himself to theological matters, Galileo would have effected his own undoing – he challenged Church authorities who reserved for themselves the right to interpret scripture, a right that Galileo had demanded for his own purposes. This also revealed that the Galileo Affair had less to do with a conflict between science and faith, and more to do with a conflict inside a faith, between those who promoted new interpretations and those who strove to maintain traditional authority. In short, the actions of Galileo Affair revealed more about the Reformation and the Church’s response to it than about the metanarrative of “science versus faith.”

In the years that followed the Edict of 1616, Galileo avoided debates about Copernicanism, choosing instead to continue his study of the Jovian moons, the rings of Saturn, and the problem of determining longitude.<sup>67</sup> However, some of Galileo’s letters from that time demonstrated that Copernican notions still permeated the scientist’s mind, and his willingness to

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<sup>65</sup> *Decree of the Council of Trent (1546)*, quoted from Sobel, 72.

<sup>66</sup> *Decree of the Council of Trent (1564)*, quoted from Sobel, 72.

<sup>67</sup> Galileo’s limited telescope led him to believe that Saturn was orbited by two massive moons, which would not be resolved as rings until much later; Sobel, 81.



explore Copernicanism hypothetically grew. For example, in a 1618 letter to the Archduke of Austria, with which Galileo included his *Treatise on Tides*, he wrote this:

I send you a treatise on the causes of the tides...knowing as I do that it behooves us to obey the decisions of the authorities and to believe them, since they are guided by a higher insight than any to which my humble mind can itself attain, I consider this treatise which I send you to be merely a poetical conceit, or a dream...this fancy of mine...this chimera.<sup>68</sup>

This letter demonstrated Galileo's desire to utilize Copernican arguments, but also his willingness to stay within the realm of hypothetical science. In so doing, he avoided Church condemnation.

In 1623, the opportunity to return to a more overt defense of Copernicanism presented itself. The College of Cardinals elected Maffeo Cardinal Barberini, Galileo's longtime friend from Rome, to become Pope Urban VIII.<sup>69</sup> Suor Maria Celeste, Galileo's daughter and a member of the order of the Poor Claires, attested to Urban VIII's admiration for Galileo. She wrote to her father, "The happiness I derived from the gift of the letters you sent me...by that most distinguished Cardinal, now elevated to the exalted position of Supreme Pontiff, was ineffable, for his letters so clearly express the affection this great man has for you, and also show how highly he values your abilities."<sup>70</sup> Barberini's installation as Pope afforded Galileo the opportunity for which he had been longing: to write a book openly addressing the veracity of the Copernican model. With papal approval, Galileo would have been free to write on any topic he wanted, and so he traveled to Rome in April of 1624 to meet the new Pope. The affection between the two men garnered Galileo papal audiences once a week throughout his stay in Rome.<sup>71</sup>

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<sup>68</sup> *Letter to Leopold*, quoted from Sobel, 83.

<sup>69</sup> Sobel, 95.

<sup>70</sup> *Maria Celeste's Letter to Galileo (10 August, 1623)*, quoted from Sobel, 99.

<sup>71</sup> Sobel, 138.

Galileo told his patron Prince Cesi before he left for Rome that he intended to discuss a return to writing about Copernicanism with the new Pope.<sup>72</sup> At this point, the Edict of 1616 had done little to dissuade scientists outside of Catholic-controlled areas to renounce Copernicanism. Instead, the mathematical accuracy of the model led more and more intellectuals to use the model to explain celestial motion, and Galileo found himself in danger of falling behind these scientists by not pursuing his studies of the matter.<sup>73</sup> No records of the meetings between Galileo and Urban VIII exist, but Galileo evidently succeeded in attaining whatever assurances he required, for he soon took up a pen once more to defend Copernicanism after eight long years of silence. Two works followed, one wholly scientific that the Church tolerated, and one with religious elements that the Church condemned.

Galileo first wrote a response to Monsignor Francesco Ingoli, who had written a short essay in 1616 on the falseness of Copernicanism.<sup>74</sup> Galileo's *Reply to Ingoli* of 1624 contained heated language, and criticized Ingoli for his arguments against Copernicus, which Galileo considered trite and unpersuasive.<sup>75</sup> Even with this tone, Galileo attempted to satisfy the criterion of being hypothetical while still remaining true to his beliefs. "Note, Mr. Ingoli, that I do not undertake this task with the thought or aim of supporting as true a proposition which has already been declared suspect and repugnant to a doctrine higher than physical and astronomical disciplines in dignity and authority."<sup>76</sup> An explicit endorsement of Copernicanism later in the work undermined this distinction, which was central to Galileo's argument. "If any place in the world is to be called its center, that is the center of celestial revolutions; and everyone who is

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<sup>72</sup> Ibid., 135.

<sup>73</sup> Ibid., 136-137.

<sup>74</sup> Ibid., 139.

<sup>75</sup> *Reply to Ingoli*, quoted from Finocchiaro, 156-157.

<sup>76</sup> Ibid., 155.

competent in this subject knows that it is the sun rather than the Earth which is found therein.”<sup>77</sup> Galileo here confirmed that he remained a Copernican, but by specifically ceding the religious question, his ensuing scientific arguments did not breach the protocol of the Edict of 1616, or challenge the religious authority of the Church.

The Church took no action after Galileo published the *Reply to Ingoli*, despite the scientist’s clear defense of Copernicus and his contemptuous treatment of Ingoli.<sup>78</sup> The Church again ignored Galileo because he avoided religious arguments, which is consistent with the treatment he received throughout the whole of the Galileo Affair. Not until Catholic officials believed that laymen had infringed on the Church’s religious authority did they issue an immediate condemnation. Scientific argumentation that avoided religion, as it had before the Edict of 1616, remained acceptable for Galileo to discuss. Galileo’s case consistently demonstrated that the Church did not act based on whether he supported Copernicanism, for he clearly had and was not punished. The Church, however, acted when Galileo took his beliefs into their sphere of influence.

Galileo spent the next six years writing his *Dialogue on the Two Chief World Systems – Ptolemaic and Copernican*.<sup>79</sup> This work served as the culmination of Galileo’s labors since 1613, when the Copernican issue came to the fore in Galileo’s life. Galileo staged the book as four days of debates on various topics related to the heliocentric/geocentric question, as argued by the three characters of Salviati, Sagredo, and Simplicio.<sup>80</sup>

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<sup>77</sup> Ibid., 179.

<sup>78</sup> Sobel, 142.

<sup>79</sup> Ibid., 144.

<sup>80</sup> Salviati was the Copernican, and served as Galileo’s voice in the *Dialogue*. Sagredo was an “unbiased” observer, who validated Salviati’s arguments by first being skeptical and then being persuaded by his reasoning. Simplicio was an arrogant Aristotelian with a penchant for quoting Latin and self-aggrandizement, who presented the Ptolemaic worldview and served as Galileo’s target of criticism.

As in the *Reply to Ingoli*, Galileo clearly asserted the veracity of Copernicanism while he attempted to appear neutral in the debate. His dedication praised both Ptolemy and Copernicus as intelligent philosophers who deserved admiration and respect.<sup>81</sup> However, Galileo closely thereafter demonstrated his Copernican sympathies, and stated in his own voice, "...I have taken the Copernican side in the discourse, proceeding as with a pure mathematical hypothesis and striving by every artifice to represent it as superior to supposing the earth motionless...."<sup>82</sup> Galileo supported Copernicanism many in the body of the *Dialogue*. For example, Salviati (Galileo) said to Simplicio, "I might add that neither Aristotle nor you can ever prove that the earth is *de facto* the center of the universe; if any center may be assigned to the universe, we shall rather find the sun to be placed there, as you will understand in due course."<sup>83</sup> Salviati then proceeded to dismantle Simplicio's geocentric arguments, and concluded that, "...the earth, no less than the moon or any other planet, is to be numbered among the natural bodies that move circularly."<sup>84</sup> Even these clear Copernican arguments failed to distinguish the *Dialogue* from previous works in which Galileo openly heralded Copernicanism.

However, Galileo soon proceeded beyond science to use philosophic arguments. For example, he challenged the order of the universe as defined by the religious authorities, who considered the Earth a sinful realm. Galileo asserted, "For my part I consider the earth very noble and admirable precisely because of the diverse alterations, changes, generations, etc. that occur in it incessantly. If not being subject to any changes, it were a vast desert of sand...."<sup>85</sup> Here Galileo praised the Earth not for its beauty, but for its imperfections. He stood the logic of

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<sup>81</sup> Galileo Galilei, *Dialogue Concerning the Two Chief World Systems – Ptolemaic and Copernican* (Los Angeles: University of California Press, 1953), 4.

<sup>82</sup> *Ibid.*, 5-6.

<sup>83</sup> *Ibid.*, 33.

<sup>84</sup> *Ibid.*, 44.

<sup>85</sup> *Ibid.*, 58.

the day on its head again, just as he did in the *Letter to the Grand Duchess Cristina* in asserting that Nature could be used to interpret the Bible, as opposed to the other way around. This time, however, his work had been published.

Galileo used religion more directly elsewhere in the *Dialogue*. On the third day, for example, Galileo utilized God in support of his arguments. Simplicio noted, after having been bested once again by Salviati, “But must we not admit that nothing has been created in vain, or is idle, in the universe?”<sup>86</sup> Salviati responded:

It seems to me that we take too much upon ourselves, Simplicio, when we will have it that merely taking care of us is the adequate work of Divine wisdom and power, and the limit beyond which it creates and disposes of nothing... We should be quite content in the knowledge that God and Nature are so occupied with the government of human affairs that they could not apply themselves more to us even if they had no other cares to attend to than those of the human race alone.<sup>87</sup>

Here Galileo expounded on God’s place in the universe, a function that the Church reserved for itself after the Council of Trent. Moreover, Galileo used God as a rationale for his Copernican argument, and continued in the following pages to form religious explanations for scientific phenomena, as in the *Letter to the Grand Duchess Cristina*.<sup>88</sup>

Galileo’s religious statements in the *Dialogue* were not limited to scientific arguments. For instance, he included in the work several discussions on the nature of God. In one such discussion Galileo claimed that human knowledge of the mathematical sciences equaled God’s understanding of them.<sup>89</sup> Salviati posited, “...the divine intellect indeed knows infinitely more propositions...but with regard to those few which the human intellect does understand, I believe that its knowledge equals the Divine....”<sup>90</sup> This position, which Simplicio described as “very

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<sup>86</sup> Ibid., 367.

<sup>87</sup> Ibid.

<sup>88</sup> Ibid., 367-369.

<sup>89</sup> Ibid., 103.

<sup>90</sup> Ibid.

bold and daring,” did not serve to support any specific scientific point Galileo made.<sup>91</sup> Instead, Galileo chose to end the first day of the *Dialogue* with a discussion of the relative knowledge of God and man. These religious musings differentiated the *Dialogue* from the previous works by Galileo that the Church tolerated. The religious proclamations of the *Dialogue* set the Church against Galileo. He had openly endorsed Copernican beliefs since the publication of *Sidereus Nuncius*, and they had been ignored because they did not contain religious proclamations. However, Galileo’s extension of his arguments out of science and into religion and Aristotelian philosophy alienated his allies in the Church.<sup>92</sup>

As Pope, Urban VIII held ultimate authority over the actions of the Church, and therefore was the only man who could punish Galileo for his writings. Two main elements of the *Dialogue* turned Urban VIII against Galileo. First, the tone of the book ardently defended Copernicanism, and thus extended beyond the boundary of hypothetical speculation required by the Edict of 1616. Second, the character Simplicio clearly caricatured Aristotelians in general, but some of the Pope’s advisors suggested that it parodied Urban VIII himself.<sup>93</sup> Urban VIII had requested that Galileo reiterate in the *Dialogue* a particular point from *The Assayer*, another of Galileo’s works, about the infinity of God that the Pope had especially liked. Galileo complied, but put the lines into the mouth of Simplicio, in which they seemed sarcastic at best, insulting at worst.<sup>94</sup> This aspect of the *Dialogue* lent credence to Urban VIII’s suspicions.

Another reason for the harsh treatment Galileo received after the publication of the *Dialogue* came as a result of the pressures the Church experienced during that period. At the time, the 30 Years War dominated the politics of Europe. Urban VIII was involved in a local

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<sup>91</sup> Ibid.

<sup>92</sup> Sobel, 191.

<sup>93</sup> Ibid., 224.

<sup>94</sup> Galileo, *Dialogue*, 464.

power struggle with the Medicis, the Vatican debt had doubled since his installation, and he suspected the Spanish of plotting to depose or murder him.<sup>95</sup> The political authority of Rome was in question. Additionally, the Reformation had lost none of its momentum and successfully challenged the Church's spiritual authority in parts of Europe. It is not surprising, therefore, that when Urban VIII's advisors told him of Galileo's caricature of Simplicio and the obvious Copernican sympathies of the work, he acceded to their wishes and had a commission look into the matter.<sup>96</sup> By October of 1632, Galileo had been summoned before the Holy Office of the Inquisition.<sup>97</sup>

The rest of Galileo's life had little bearing on the development of his metanarrative, as he no longer voiced dissent on religious matters. In a poignant note penned onto the first pages of Galileo's own copy of the *Dialogue*, the eminent scientist wrote these words:

Take note, theologians, that in your desire to make matters of faith out of propositions relating to the fixity of sun and earth you run the risk of eventually having to condemn as heretics those who would declare the earth to stand still and the sun to change position – eventually, I say, at such a time as it might be physically or logically proved that the earth moves and the sun stands still.<sup>98</sup>

Though it is unclear exactly when Galileo wrote this passage, he obviously understood the implications of confounding a scientific search for truth with a spiritual one. These words served as an ominous portent for Galileo's future, and may represent the closest he actually came after his trial to the rebellion popularly ascribed to him.<sup>99</sup> On April 30, after the trial had gone on for two weeks, Galileo confessed, abjured, and repented for having promoted Copernicanism: “My error, then, has been – and I confess it – one of vainglorious ambition and of pure ignorance and

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<sup>95</sup> Sobel, 223-224.

<sup>96</sup> Ibid., 225.

<sup>97</sup> Ibid.

<sup>98</sup> Galileo, *Dialogue*, v.

<sup>99</sup> Galileo is supposed to have, after giving his abjuration, muttered, “Eppur si Muove,” or “Still it moves.” This story is almost certainly a romantic fabrication, for which there is no evidence.

inadvertence.”<sup>100</sup> Galileo lived under house arrest for the remainder of his life, and the Inquisition banned the printing of any of his books.<sup>101</sup> In this state of quiet acquiescence, John Milton found Galileo near the end of his life, and enshrined him forever in his *Areopagitica*:

I have sat among their learned men and been counted happy to be born in such a place of philosophic freedom as they supposed England was, while they themselves did nothing but bemoan the servile condition into which learning amongst them was brought; that this was it which had damped the glory of Italian wits, that nothing had been there written now these many years but flattery and fustian. There it was that I found and visited the famous Galileo, grown old, a prisoner of the Inquisition.<sup>102</sup>

Galileo died on January 8, 1642, having never again written about Copernicanism.<sup>103</sup>

To conclude, the “science versus faith” metanarrative so often perceived as the crux of the Galileo Affair actually holds little relevance in the matter. Galileo never questioned the Bible as being true, but instead he affirmed it regularly. He contended, rather, that the geocentric interpretation of the Bible was flawed, which reveals to modern historians that the conflict of the Galileo Affair was between different religious interpretations, not between science and religion. In each instance that Galileo published a work, his treatment by the Church came as a function of perceived infringement on religious authority, not scientific dissent from the preferred scientific system of the Church. While differences between Galileo’s science and the faith of the Church certainly did exist, that distinction did not lead to the conflict that has made the Galileo Affair so prominent. Instead, the conflict resulted from competing views within the faith community of the Roman Catholic Church.

Another quote from Pope John Paul II demonstrates the legacy that Galileo left behind:

“The greatness of Galileo is known to all,” though he, “had much to suffer – we cannot conceal it

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<sup>100</sup> *Galileo’s Second Deposition*, quoted from Sobel, 258.

<sup>101</sup> Sobel, 349.

<sup>102</sup> John Milton, *Areopagitica* (Oxford: Oxford University Press, 1961), 35.

<sup>103</sup> Sobel, 362; Michael Sharratt, *Galileo: Decisive Innovator* (Oxford: Blackwell Publishers, 1994), 189.



– at the hands of men and organizations of the church.”<sup>104</sup> When Pope John Paul II admitted these failings and pardoned Galileo in 1992, he demonstrated the great strides the Church has taken in reconciling itself with the memory of Galileo.<sup>105</sup> It is this reconciliation that speaks to Galileo’s humanity in a field where so much emphasis is placed on other aspects of his story. For all the scientific accolades and the popular mythology that has grown up around him, Galileo’s legacy remains fixed in the interactions of science and faith, between the realm of observation and the realm of conviction. Galileo combined the two, and his statements provide a unique angle from which to view both the scientific and religious implications of the Galileo Affair. From the scientific perspective, Galileo’s life demonstrated that struggle for rationality that has been so central to the development of the modern world. From the religious perspective, Galileo’s legacy, as Pope John Paul II declared, “leads us, in the last analysis, to that transcendent and primordial thought imprinted on all things.”<sup>106</sup>

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<sup>104</sup> Poupard, xiii-xiv.

<sup>105</sup> Fiedler, 171.

<sup>106</sup> Sobel, 374.

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