G. J. RHETICUS AND THE AUTHORSHIP OF THE ANONYMOUS *EPISTOLA DE TERRAE MOTU*

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TABLE OF CONTENTS

ABSTRACT

This thesis considers the anonymously published treatise entitled *Epistola de terrae motu* and the question of its authorship. The authorship of this treatise was attributed to G. J. Rheticus by Reijer Hooykaas in a publication released in 1984; however, that attribution is not decisive. The first chapter introduces *De terrae motu* and is followed by a second chapter that contains a review of the relevant historiography relating to scholarship on Rheticus. The third chapter presents Rheticus' biography. The fourth chapter considers the inconclusive reasoning for the attribution of authorship to Rheticus. The fifth and sixth chapters consider the environment of scriptural hermeneutics in the early modern period, both theoretically and with recourse to specific texts, respectively. The seventh chapter concludes this thesis with a synthesis of the arguments herein which ultimately indicate that it is conceivable that Rheticus wrote *De terrae motu* but an early seventeenth-century Catholic author is more likely.

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CHAPTER 1: INTRODUCTION

In a letter addressed to Georg Joachim Rheticus from 1543, bishop Tiedemann Giese referred to a small tract previously written by Rheticus, in which the author united Copernicanism and Scripture.[1] Unfortunately for the field of the history of science, this text was lost, as were many of Rheticus' manuscripts.[2] However, in a presentation to the Royal Netherlands Academy of Sciences in 1975, historian Reijer Hooykaas revealed a great discovery that he made over two years prior: while collecting materials for the Copernicus Commemoration of 1973, Hooykaas discovered an anonymous tract that reconciled Copernicanism with Scripture bound together with other early seventeenth-century tracts. The collection is entitled *Idea physicae cui adjuncta est epistola cujusdam anonymi de terrae motu* and is listed under the authorship of David Gorlaeus, the author of the volume's first text.[3]

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[1] Karl Heinz Burmeister, *Georg Joachim Rhetikus 1514-1574, Eine Bio-Bibliographie*, vol. III (Weisbaden: Pressler-Verlag, 1968), pp. 54-55. The letter is dated 26 July 1543, two months after the death of Nicolaus Copernicus and the publication of his *De revolutionibus orbium coelestium*. In this letter, Giese encourages Rheticus to append his "*opusculum*," or his "little work," to an improved second edition of *De revolutionibus*; however, for reasons unknown, Rheticus did not. Giese's letter to Rheticus is the only contemporary reference of such a work by Rheticus. This letter was initially published in 1615 by Joannes Broscius but, Hooykaas argues, remained virtually unknown. The letter was next published in 1854 in a volume of Copernicus' works and this mention of Rheticus' small work that reconciled Copernicanism and Scripture became of interest to scholars of Copernicus. For more, see R. Hooykaas, *G. J. Rheticus' Treatise on Holy Scripture and the Motion of the Earth* (Amsterdam: North-Holland Publishing Company, 1984), pp. 14-16.

[2] Also lost was Rheticus' biography of Copernicus, which would have offered great insight into their relationship and Rheticus' perception of his teacher.

[3] Hooykaas, *G. J. Rheticus*, pp. 9, 14. Contrary to Hooykaas' claim, the copy of *De terrae motu* that he acquired from the library at the University of Greifswald was bound with only *one* other tract, which was indeed written in the early seventeenth century. Hooykaas later discusses Gorlaeus and this volume in brief, but does not clarify with what other texts he found it bound at Greifswald. Additionally, this volume at Greifswald is not the only surviving copy of the text. Hooykaas briefly mentions that the copy that he used at Greifswald was identical to a copy at the British Library (p. 167), but he makes no further mention of any other volumes. The libraries of the University of Zürich, the University of Edinburgh and the University of Erlangen-Nuremburg also have copies of this 1651

Hooykaas concluded that this text was the missing "*opusculum*" by Rheticus, and, although its title in the 1651 publication is *Epistola de terrae motu* (*Letter on the Motion of the Earth*), Hooykaas argues that a more likely title and one more appropriate to the content of the text would be *De terrae motu et scriptura sacra* (*On Holy Scripture and the Motion of the Earth*).[4] This text, along with Hooykaas' justification of its authorship and some background historical information, was finally published in 1984.

This thesis re-examines *De terrae motu* in order to assess Hooykaas' attribution of authorship to Rheticus. Through such a re-examination, Rheticus is demonstrated to be a *possible* candidate for authorship of the text; however, such an assertion is far from conclusive. *De terrae motu* has more in common with early seventeenth-century hermeneutical texts written by Catholic authors than it does with any sixteenth-century texts, and the evidence presented in this thesis suggests that this later composition is more likely. Such a conclusion, while unfortunate for future scholarship on Rheticus because it removes *De terrae motu* from Rheticus' corpus, also corrects scholarship as conclusions regarding Rheticus' theology can no longer be drawn from the contents of *De terrae motu*.

Before considering the specific details of this text, the context of its composition and publication must be understood. Following I. Bernard Cohen, Kenneth Howell suggests that there was no real "Copernican Revolution" until

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Gorlaeus volume; however, this list of libraries in possession of a first edition publication of the treatise is surely not comprehensive.

[4] Hooykaas, *G. J. Rheticus*, p. 51.

Johannes Kepler altered and refined Nicolaus Copernicus' heliocentric theory.[5] Kepler adopted the heliocentric model of the cosmos presented by Copernicus in *De revolutionibus orbium coelestium*[6] and explicitly asserted this model as a physical reality. Prior to Kepler, many astronomers ascribed to an 'instrumentalist' view of the Copernican cosmos, utilising Copernicus' heliocentrism only as a mathematical tool for calculations on planetary positions, angles, and so forth.[7]

The reluctance to adopt the physical structure of Copernicanism is rooted both in Copernicanism's rejection of an Aristotelian physics, upon which university education was so dependent, and in its disagreement with literal readings of certain passages of Scripture. Aristotelian physics asserted a geocentric cosmos, which was comprehensively presented in Claudius Ptolemy's second-century astronomical text, the *Almagest*. This Ptolemaic astronomy, based on Aristotelian physics, was upheld for over a millennium. As Christian exegesis developed, the early Church Fathers determined this Ptolemaic description of the cosmos to be in agreement with descriptions of nature in the Bible and so it became entrenched in university curricula and in Christian theology. Therefore, when Copernicus published his heliocentric theory, it was not immediately embraced.[8]

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[5] Kenneth J. Howell, *God's Two Books: Copernican cosmology and biblical interpretation in early modern science* (Notre Dame, IN: University of Notre Dame Press, 2002), p. 9. Howell's reference is to I. Bernard Cohen, *Revolution in Science*, (Cambridge: Harvard University Press, 1985), pp. 106, 125.

[6] Nicolaus Copernicus, *On the Revolutions of the Heavenly Spheres,* trans. A. M. Duncan (Vancouver: David & Charles, 1976), hereafter referred to by its abbreviated Latin title, *De revolutionibus*.

[7] This instrumentalist stance is suggested by Andreas Osiander, a Lutheran who oversaw the publication of *De revolutionibus*, and employed by astronomers at the University of Wittenberg immediately following the publication of *De revolutionibus*.

[8] Copernicus was not alone in suggesting a heliocentric cosmos; it was also suggested by Rheticus, in support of Copernicus, in the *Narratio prima*, and previously suggested by Aristarchus of Samos. Copernicus was, however, the first to publish an astronomy that truly rivalled the Ptolemaic system, was mathematically demonstrable, and subsequently supported and developed upon by later astronomers.

In the years directly following the publication of *De revolutionibus*, there was little debate over Copernicus' heliocentric theory as his book at first made a very small impact. Although it disagreed with a literal reading of Scripture, this matter was not much debated until the seventeenth century. In the seventeenth century, there were many texts written, circulated, and published that both agreed and disagreed with heliocentrism and addressed Scripture in order to demonstrate their position. Texts on this subject prior to the seventeenth century did exist but were not common, as Copernicanism had not yet taken root.

The subjects and themes of *De terrae motu* are very similar to those seventeenth-century texts that endeavour to reconcile Copernicanism with Scripture, but they also *could* be indicative of an earlier date of composition. *De terrae motu* explicitly focuses on reconciling the work of the author's teacher, which promotes a heliocentric cosmos, with Scripture through a careful consideration of the subjects of astronomy and theology and an exposition of many passages of Scripture. In doing so, the text repeatedly invokes the authority of Saint Augustine, arguing that natural philosophy and Scripture concern different matters and, although Scripture concerns higher matters than natural philosophy, natural philosophy too has merit and can uncover truths about nature that are not revealed in Scripture.

De terrae motu opens thus: "It is mathematically certain that to obtain a consistent explanation of the phenomena of the heavenly bodies, the mobility of the earth should be assumed. What, however, should be laid concerning this matter

according to Holy Scripture?"[9] This opening immediately asserts that a Copernican cosmos is more accurate than a Ptolemaic cosmos, while also recognising that much remains to be said regarding the relation between such a claim and Scripture. This is the subject of *De terrae motu*. The text considers the fields of natural philosophy and scriptural interpretation, their relation to one another, and the purpose of each field of study. This is to the end of arguing that although Scripture literally suggests a geocentric cosmos, such a suggestion does not indicate that what is contained in Scripture is the ultimate physical truth.

The author of *De terrae motu* cites Saint Augustine, arguing that "the obscurities of nature" ought not to be simply affirmed but rather researched and investigated, as long as that investigation does not "exceed the limits of the Catholic faith."[10] Although nature ought to be investigated, it remains necessary to defer to the authority of Scripture ultimately.[11] There is a tension in *De terrae motu* regarding ultimate authority because the text first stresses the importance of natural philosophical investigation and the truth of heliocentrism but maintains deference to Scripture and to the Church. This tension is understood in light of the author's assertion that the aim of Scripture is to guide humanity to salvation. One must "assent firmly to the articles of the faith" because these are the articles in

[9] *De terrae motu* [English translation] in *G. J. Rheticus' Treatise on Holy Scripture and the Motion of the Earth* by R. Hooykaas (Amsterdam: North-Holland Publishing Company, 1984), p. 65; *De terrae motu* in *Idea physicae cui adjuncta est epistola cuiusdam anonymi de terrae motu* by David Gorlaeus (Utrecht, 1651), p. 1. Quotation is taken from the Hooykaas volume, here and below.
[10] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, p. 65; *De terrae motu* in Gorlaeus, *Idea physicae*, p. 1.
[11] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, p. 66; *De terrae motu* in Gorlaeus, *Idea physicae*, pp. 2-3.

Scripture most critical in the quest for salvation.[12] However, the passages of Scripture that concern nature are not strictly related to one's quest for salvation and are therefore not necessarily described with perfect physical accuracy. Where nature is concerned, Scripture does not speak "in the manner of the philosophers."[13] The author writes, "We do not study the passages about nature as if Scripture were a philosophical textbook, but rather as books in which the Holy Spirit desired to teach us something necessary for our salvation."[14] When Scripture describes nature it is in order to convey a higher message about salvation, not a physical description of the structure of God's created universe.

With the parameters of the study of Scripture and the study of natural philosophy thus defined, the author of *De terrae motu* then embarks on a more specific consideration of certain passages of the Bible that appear to be making natural philosophical claims and the relation of these passages to natural philosophical truths demonstrated by the philosophers. These considerations are very specific, examining even the specific phrasing of those passages. Ecclesiastes, Psalms, Esdras, Job, Isaiah, Proverbs, and Jeremiah, among other books of the Bible are all scrutinised. This appears to contradict the author's earlier assertion that Scripture does not concern natural philosophy; however, with his recourse to specific passages of Scripture, the author attempts to explain that although the Bible describes natural philosophical matters without absolute accuracy, these

[12] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, p. 67; *De terrae motu* in Gorlaeus, *Idea physicae*, p. 4. Quotation is taken from the Hooykaas volume, here and below.
[13] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, p. 67; *De terrae motu* in Gorlaeus, *Idea physicae*, p. 5.
[14] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, p. 71; *De terrae motu* in Gorlaeus, *Idea physicae*, p. 12.

descriptions are really written in a figurative manner, accommodated to human perception and understanding, and intended to point one towards salvation rather than perfect knowledge of nature.

More specifically, *De terrae motu* considers passages of the Bible that describe the foundation of the earth,[15] the placement of the land, waters, and heavens,[16] as well as passages that relate more explicitly to the Copernican debate regarding whether the earth or the sun is at the centre of the cosmos. *De terrae motu* considers at length passages of the Bible that describe the earth as immobile along with passages that describe the sun as mobile.[17] Although these considerations point out where Scripture provides an inaccurate description of the physical cosmos, this does not make Scripture unnecessary or subordinate to natural philosophy. The author of *De terrae motu* explains that the language in Scripture is accommodated to human understanding in order to convey greater truths about salvation.[18] Scripture resorts to inaccurate descriptions of nature because human understanding of the world is from a particular perspective and is imperfect.

This recourse to the principle of accommodation[19] is common in early modern hermeneutical texts, but the author of *De terrae motu* takes particular care

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[15] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, pp. 82-85; *De terrae motu* in Gorlaeus, *Idea physicae*, p. 33-37.
[16] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, pp. 86-92; *De terrae motu* in Gorlaeus, *Idea physicae*, p. 37-46.
[17] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, pp. 92-100; *De terrae motu* in Gorlaeus, *Idea physicae*, p. 46-63.
[18] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, pp. 67-68, 87, 98; *De terrae motu* in Gorlaeus, *Idea physicae*, pp. 5-9, 39, 57-58.
[19] The principle of accommodation asserts that Scripture was written at a particular time for a particular people and, for those reasons, the language used in Scripture can reflect certain interpretations of events or appearances that are not absolutely true. The use of this principle spans Judeo-Christian history but, with respect to its relation to astronomy at least, is most prevalent in the seventeenth century. In the early seventeenth century, around Galileo's conflict and trial with the

to cite this principle in the writings of Saint Augustine. The author continually defers to Augustine along with Scripture and the Church, emphasising that his views are consistent with those suggested by Augustine. The author insists that Augustine too believed that Scripture concerned salvation and did not always report accurate natural philosophical information.[20] Thus, in defending a new astronomical model, the author is able to locate the foundations of his argument in the authority of a traditional Church figure. Using the principles suggested by Augustine, the author of *De terrae motu* is able to demonstrate that Copernicanism and Scripture are indeed compatible.

Similar hermeneutical texts that argued in favour of the compatibility between Copernicanism and Scripture were common in the seventeenth century. Early seventeenth-century astronomers who, following Copernicus, studied and taught his heliocentric cosmos were eager to reconcile their astronomy with Scripture. Although Hooykaas dated *De terrae motu* in the sixteenth century, arguing that Rheticus was its author, the text has much in common with many of the seventeenth-century hermeneutical texts and was indeed published in the seventeenth century.

De terrae motu was published as an appendix to Gorlaeus' *Idea physicae* in 1651. Gorlaeus was born in 1591 and died in 1612 at only age twenty-one. Christoph Lüthy writes that Gorlaeus was a student of theology who identified

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Catholic Church for his teachings about and writings on Copernicanism and heliocentrism, many texts were written that attempted to reconcile Scripture with Copernicanism. Invoking the principle of accommodation in order to argue that Scripture did not actually present an astronomical system contrary to Copernicanism was very common.

[20] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, p. 68; *De terrae motu* in Gorlaeus, *Idea physicae*, p. 8.

specifically with Arminianism,[21] but he eventually came to be known primarily as a founder of modern atomism. He wrote only two manuscripts, both in 1611, and both were published posthumously, the *Exercitationes philosophicae* in 1620 and the *Idea physicae* in 1651.[22]

The *Idea physicae* primarily concerns Gorlaeus' atomism but theology is also considered, as divine providence plays a role in the formation and early behaviour of the atoms. His work was not well known but was circulated in Arminian circles in the Netherlands and in England.[23] Lüthy further writes that the *Idea physicae* was "exceptionally rare"[24] and had "limited circulation,"[25] both at the time of its publication and in subsequent years. It was printed in Utrecht by Johannes Janssonius van Waesberge, a well-established printer and publisher, yet it was not widely received.[26] The joint publication of the *Idea physicae* and *De terrae motu* was the only time *De terrae motu* was published until Hooykaas' rediscovery of it and subsequent republication in 1984, and so *De terrae motu* was circulated equally as rarely as the *Idea physicae*.

Lüthy acknowledges Hooykaas' attribution of the authorship of *De terrae motu* to Rheticus. He argues that it is surprising that the two texts were published

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[21] Arminianism is related to early Calvinism but differs importantly in its positions on predestination and salvation. Arminians believe that in order to attain salvation God's grace is first required but that one must also do good and exercise one's free will.

[22] Christoph Lüthy, "Gorlaeus (Van Goorle, Van Gooirle), David" in *Complete Dictionary of Scientific Biography*, Vol. 21 (Detroit: Charles Scribner's Sons, 2008), *Gale Virtual Reference Library*, accessed July 15, 2013, http://go.galegroup.com/ps/i.do?id=GALE%7CCX2830905706&v=2.1&u=udalhousie&it=r&p=GVRL&sw=w, p. 158.

[23] Lüthy, "Gorlaeus (Van Goorle, Van Gooirle), David," pp. 158-59.

[24] Christoph Lüthy, *David Gorlaeus (1591-1612): An enigmatic figure in the history of philosophy and science* (Amsterdam: Amsterdam University Press, 2012), accessed July 15, 2013, doi: 10.5117/9789089644381, pp. 19, 32.

[25] Lüthy, *David Gorlaeus*, p. 14.

[26] Lüthy, *David Gorlaeus*, pp. 32-33.

together because Gorlaeus was not a Copernican and Rheticus was not a metaphysician or atomist and the content of the texts are very different. Apparently the publisher did not know who wrote *De terrae motu* because it was anonymously appended, and so the reason that the texts were published together is not immediately evident.[27] Hooykaas also acknowledges that the two texts are on different subjects but he cites the publisher's letter to the reader that explains that they were published together because they were both unpublished at that time and they both attempted to convince the reader of "unusual standpoint[s]." Both texts argued against Aristotelian philosophy, which was taught at Dutch universities at the time and which the publisher wished to oppose.[28] Although there are many differences between the two texts and authors, the texts did experience a similar reception, as neither was widely known. Lüthy describes their reception as "stillbirths" because of their lack of impact.[29] If Rheticus did indeed write *De terrae motu*, it is unclear where the text was between the time of its composition and its publication in 1651.

Although Lüthy is satisfied with Hooykaas' attribution of authorship, the anonymity surrounding its publication, its differences in content to the *Idea physicae*, and Lüthy's bewilderment at a text by Rheticus being published with a text by Gorlaeus, call into question Hooykaas' easy attribution. Gorlaeus' text was published posthumously so it is possible that *De terrae motu* was also a posthumous publication. However, as this thesis will demonstrate contrary to Hooykaas'

[27] Lüthy, *David Gorlaeus*, p. 33.
[28] Hooykaas, *G. J. Rheticus*, pp. 168-69. Quotation is taken from p. 168.
[29] Lüthy, *David Gorlaeus*, p. 34.

arguments, the contents of *De terrae motu* do not agree with the attribution of the text to Rheticus as easily as Hooykaas suggests.

When dating an anonymous text, all possibilities surrounding its composition must be considered. Perhaps Hooykaas was correct that Rheticus wrote the text. Perhaps Rheticus never intended to publish it and wanted it to fall out of circulation. Perhaps Rheticus intended the text to be a scribal publication. Perhaps Rheticus intended it to be published anonymously and distanced himself from it after its composition. Perhaps Rheticus did try to publish the text under his name but his identity became dissociated from it. Alternatively, perhaps Rheticus did not write the treatise and it was written at a later date. Perhaps it was written in the seventeenth century when so many other texts on similar subjects were written. Perhaps someone from the circle of Galileo wrote it who was familiar with the hermeneutics that arose following Galileo's trial. Or, as it was published in the Netherlands, perhaps a Dutch astronomer wrote it and was never associated with the text. There is a multitude of possibilities surrounding the composition of this text. The evidence presented in the following chapters indicates that although it is possible that Rheticus wrote *De terrae motu*, a seventeenth-century Catholic author, perhaps from Galileo's circle, is the most likely candidate. These two possibilities will be the focus of this thesis.

As previously explained, Hooykaas attributed *De terrae motu* to Rheticus, dating the text nearly a century prior to what this thesis ultimately suggests, as well as prior to its publication date and to the genre with which it so nicely fits. Rheticus was certainly a supporter of Copernicanism, encouraging Copernicus to publish his

heliocentric theory and publishing the *Narratio prima* in 1540 as a *précis* to Copernicus' *De revolutionibus*. Additionally, Rheticus was an enthusiastic Lutheran who studied at Wittenberg in the early years of Martin Luther's Protestant Reformation. That Rheticus would regard the compatibility of his astronomy and his theology with importance is not surprising. Giese's 1543 letter to Rheticus verifies that Rheticus regarded the matter as sufficiently significant to write a text that reconciles Copernicanism with Scripture. However, it remains to be conclusively demonstrated that, as Hooykaas argues, *De terrae motu* is certainly that text to which Giese referred.

Since Hooykaas' publication of *De terrae motu*, there has been little critical consideration of it and its authorship, and this thesis returns to it for the first comprehensive evaluation since 1984. Hooykaas defended his attribution of the authorship of *De terrae motu* through four primary arguments, but these arguments and his attribution of the text to Rheticus have not been sufficiently examined. Through a consideration of Rheticus' biographical information, the text of *De terrae motu* itself, and the appropriate contextual information regarding early modern scriptural hermeneutics, this thesis arrives at a more definitive position regarding the authorship of the text. The research done in this thesis is the first re-examination of Hooykaas' attribution of authorship and, by revealing the evidence that is contrary to the determination that Rheticus wrote *De terrae motu*, it is clear that such a re-examination was necessary. Although this thesis does not reach a decisive conclusion regarding who wrote *De terrae motu*, it indicates that Hooykaas' determination that its author was Rheticus is also not decisive. Thus, this thesis

cautions against scholarship on Rheticus following Hooykaas' 1984 publication that relies on *De terrae motu* in order to suggest arguments regarding Rheticus' theological views.

In order to complete such a study, the arguments contained within this thesis are largely based on what scenario is most probable rather than what is certain. It is demonstrated that *De terrae motu* is in need of re-examination and that Hooykaas' 1984 publication overlooked certain details, as did subsequent scholarship that considered *De terrae motu*. However, the evidence that suggests that *De terrae motu* is likely a product of the seventeenth century and by a Catholic author is founded on arguments that favour the probability of that scenario over the probability of Rheticus composing the text. This does not eliminate Rheticus as a candidate for authorship of the text; rather, it cautions future scholarship not to use *De terrae motu* decisively in studies on Rheticus.

Following this first chapter which revealed the complexities surrounding *De terrae motu*, the second chapter of this thesis addresses existing scholarship on Rheticus in order to orient what is thus far understood about Rheticus' life and works. This indicates the need for further research on Rheticus generally and certainly further research on *De terrae motu* specifically. The third chapter considers Rheticus' biography in order to assess the environment in which he worked at the time that he wrote his lost treatise. This yields an understanding of his intellectual concerns and early exposure to astronomy and theology, and reveals the influences throughout his life that would have led him to write a text that reconciles Copernicanism with Scripture. The fourth chapter addresses Hooykaas'

defence of the authorship of *De terrae motu* and the scholarly reaction to it, both when the text was initially published and in more recent years. This yields an understanding of what work has been done thus far to prove its authorship and to what the work in this thesis is contrasted, further indicating the need to re-examine the authorship of *De terrae motu*. The fifth chapter contains an examination of early modern scriptural hermeneutics in general alongside an examination of the content and style of hermeneutics of the text itself. This demonstrates how *De terrae motu* participates in the tradition of scriptural hermeneutics and suggests that the style of the treatise is more characteristic of a seventeenth-century hermeneutical text. The sixth chapter advances the conclusions of the fifth chapter by examining a series of specific hermeneutical texts that explicitly address Copernicanism and its relation to Scripture. This further indicates with what other texts *De terrae motu* shares its themes and style, indicating in greater detail that the treatise was most likely written in the seventeenth century and specifically by a Catholic author. The seventh and final chapter synthesises the arguments presented in the thesis.

This is all to the end of engaging with Hooykaas' 1984 attribution of authorship, which has, thus far, largely been taken for granted. Through employing these methods, this thesis addresses *De terrae motu* with a new rigour that has not been employed since Hooykaas and corrects the existing body of scholarship on Rheticus that had taken his authorship of *De terrae motu* for granted. Such a study has revealed that parts of Hooykaas' argument are persuasive and it is conceivable that Rheticus did indeed write *De terrae motu*. However, a more compelling case can be made that a seventeenth-century Catholic author composed the text, and, more

specifically, perhaps even someone from the circle of Galileo. For this reason, the text cannot be taken as conclusive evidence regarding Rheticus' theological position and must be only hypothetically considered in any subsequent scholarship on Rheticus.

CHAPTER 2: HISTORIOGRAPHICAL OVERVIEW

Apart from the specific consideration of the authorship of *De terrae motu*, this thesis contributes to the underdeveloped study of Rheticus in the history of early modern astronomy, and to discussions regarding the interaction between natural philosophy and theology in the early modern period. There is no significant body of original research on Rheticus in the way that there is on other early modern astronomers, including Nicolaus Copernicus, Galileo Galilei, and Johannes Kepler. Although Rheticus was not as innovative a thinker as the aforementioned astronomers, he was certainly central in the earliest dissemination of Copernicanism. The field of the history of early modern astronomy itself is by no means understudied and there are many detailed and impressive works on astronomers and their astronomy. Rheticus does, on occasion, feature in these considerations; however, most scholarship on Rheticus is confined to either considerations about how he directly influenced the dissemination of Copernicanism, or biographical considerations. Few considerations of Rheticus treat *De terrae motu* in detail or even Rheticus' theology more generally and so this area of scholarship requires much development. This chapter outlines the existing scholarship on Rheticus, which reveals the need for its development and demonstrates the oversight of scholars in the history of science to thoroughly attend to Rheticus in the way that they have attended to other astronomers.

Karl Heinz Burmeister's three-volume study of Rheticus, written throughout the 1960s, set the standard for subsequent Rheticus scholarship. His first volume

comprised a traditional biographical examination of Rheticus; his second volume contained his extensively annotated bibliography; and his third volume consisted of a compilation of Rheticus' correspondence, both in the original Latin and in Burmeister's German translation. Immediately following the publication of each volume, historian of early modern astronomy Edward Rosen wrote extensive reviews, highlighting both the strengths and the weaknesses of Burmeister's books. Rosen corrects some details about Rheticus' biography,[1] explains Burmeister's use of letters and manuscripts and points out certain inconsistencies in Burmeister's arguments based on these,[2] and also corrects Burmeister's identification of certain correspondents and dating of certain documents.[3] Amidst this criticism, however, Rosen also asserts that this work of Burmeister's is not soon to be superseded and that it is fundamental to any study of Rheticus.

Burmeister's work on Rheticus was the first effort to examine Rheticus in his own right, and, following Burmeister, scholars have been much indebted to him. Rosen was correct to note that Rheticus is an understudied figure, which is a grave oversight in the history of science because of his close relationship with Copernicus,

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[1]These corrections include noting that Rheticus *did* print his name on the first edition of his *Narratio prima* whereas Burmeister says he did not; explaining that "Rheticus" is not his original last name, but that Rheticus adopted it after Rhaetia, his birthplace; correcting the nature of a quotation that Burmeister attributed to Copernicus; as well as minor details about certain colleagues and acquaintances of Rheticus'. For more, see Edward Rosen, review of *Georg Joachim Rhetikus, 1514-1574. Eine Bio-Bibliographie. Band I: Humanist und Wegbereiter der modernen Naturwissenschaften*, by Karl Heinz Burmeister, *Isis* 59:2 (Summer 1968): pp. 231-33.

[2] Importantly, Rosen notes that Burmeister does mention Rheticus' lost tract that reconciles Copernicanism with Scripture and incorrectly dates when it must have been written. Burmeister factors this text into his consideration of Rheticus as much as is possible without being in possession of it, as it was believed to be lost. For more, see Edward Rosen, review of *Georg Joachim Rhetikus, 1514-1574. Eine Bio-Bibliographie. Band II: Quellen und Bibliographie*, by Karl Heinz Burmeister, *Isis* 60:1 (Spring 1969): pp. 117-19.

[3] For more, see Edward Rosen, review of *Georg Joachim Rhetikus, 1514-1574. Eine Bio-Bibliographie. Band III: Briefwechsel*, by Karl Heinz Burmeister, *Isis* 61:1 (Spring 1970): pp. 137-39.

his role in disseminating Copernicanism, and encouraging Copernicus to publish *De revolutionibus*.[4] Since Burmeister, there has only been one other attempt to produce a comprehensive biography of Rheticus and that was *The First Copernican* by Dennis Danielson in 2006. Danielson's book is much indebted to Burmeister's earlier biography, but it also departs from Burmeister in many ways, incorporating many of the corrections that Rosen noted, as well as utilising more recent scholarship on numerous aspects of sixteenth-century astronomy that would have been unavailable to Burmeister.[5] This book details Rheticus' life from his birth and childhood, through his education and professional career, emphasising his time spent with Copernicus, and continues until Rheticus' death in 1574. The text of *De terrae motu* is mentioned very briefly and Hooykaas' attribution of authorship is not questioned. Danielson notes the significance of Saint Augustine in *De terrae motu* and the concern to distinguish between the fields of natural philosophy and theology but he does not discuss how this text contributes to a greater understanding of Rheticus or his life.[6] *The First Copernican* is concise and comprehensive and chronicles the important aspects of Rheticus' life in an objective fashion, without making any arguments regarding the nature of Rheticus' work. Thus, it provides a very helpful biographical image of Rheticus.

Just as these biographical treatments of Rheticus are important but few, so too are critical engagements with Rheticus and his works important but few. These

[4] Rosen, review of Burmeister, *Georg Joachim Rhetikus, Band III*, p. 137.
[5] Danielson thanks Burmeister explicitly for his foundational contribution to scholarship on Rheticus, and also many more contemporary scholars. See Dennis Danielson, *The First Copernican: Georg Joachim Rheticus and the Rise of the Copernican Revolution* (New York: Walker & Company, 2006), pp. 207-08.
[6] Danielson, *The First Copernican*, p. 108.

critical examinations are often limited either in their scope or in their specific relation to Rheticus, preferring to consider Rheticus within a larger Copernican framework, rather than in his own right. However, these treatments are also invaluable to any scholarship on Rheticus, providing in detail the context of Rheticus' work. In 2011, Robert Westman published an important, and relatively large, volume entitled *The Copernican Question: Prognostication, Skepticism, and Celestial Order*, in which he addresses Copernicanism in its broadest application. He begins with the astronomical context into which Copernicus was born and proceeds to Isaac Newton, whose physics arguably completed the reorganisation of the cosmos that Copernicus' heliocentrism began. Westman's focus is, of course, on Copernicus himself, and those astronomers throughout the sixteenth and seventeenth centuries who adopted and developed his astronomy. Westman is investigating why Copernicus became concerned with astronomy, what it was that Copernicus was so interested in clarifying about astronomy, and why and how aspects of Copernicanism were adopted and developed in the way that they were by Copernicus' successors. Westman emphasises the importance of astrology and its link to astronomy in Copernicus' intellectual environment and onwards, and considerations of the theological environment also enter into these discussions. Westman argues that natural philosophers were concerned with correlating celestial motions with terrestrial events, and utilising these correlations to make predictions about the future and investigate ways in which biblical prophecies were being fulfilled. Thus, there was a great need for an accurate astronomical system, if

conclusions drawn from astronomical calculations were to have significance with respect to the interpretation of the events described in Scripture.[7]

Westman's detailing of Copernicanism involves considerations of Rheticus at various turns: as Copernicus' sole pupil; as student of the University of Wittenberg, where astrology and astronomy were considered to be of the utmost importance by professor Philip Melanchthon; and as an astronomer and mathematician who was connected to and influenced various other prominent astronomers. Rheticus is represented as an integral figure in this Copernican transformation. Westman also emphasises Rheticus' religious nature, which is important for this correlation between astronomy, astrology, and the Bible that is so prevalent throughout Westman's book.

Westman only makes brief reference to the text of *De terrae motu*, however, conforming to Hooykaas' attribution of authorship. This text, Westman argues, clearly evidences Rheticus' concern to unite astronomy with Scripture and Copernicus' own concern to do the same, as it was likely written during Rheticus' time with Copernicus. Westman notes that Giese expressed his hope that it would be appended to Copernicus' *De revolutionibus*, demonstrating the natural fit between astronomy and Scripture. With respect to the specific theology contained within the treatise, however, Westman suggests that the style of the treatise, with its deference to Saint Augustine among other authorities, was "plausible for a Lutheran such as Rheticus" but that it may not have satisfied all Lutherans who prioritised the more personal relationship with Scripture. It was closer to "Varmian Catholicism" (or

[7] Robert S. Westman, *The Copernican Question: Prognostication, Skepticism, and Celestial Order* (Berkeley, CA: University of California Press, 2011), pp. 1-22.

moderate Polish Catholicism, to which Copernicus adhered), and perhaps, if Copernicus had lived longer, he would have encouraged Rheticus to publish it, as Giese did.[8] Clearly, Westman is concerned with Rheticus, his works, and even his theology, but it is within a larger narrative about the development and propagation of Copernicanism, rather than a close examination of Rheticus himself.

In Westman's earlier article "The Melanchthon Circle, Rheticus, and the Wittenberg Interpretation of the Copernican Theory," Rheticus features more prominently in his own right. This article considers the University of Wittenberg, and specifically the influence that the religious and educational reformer Melanchthon had there. Under Melanchthon, who encouraged natural philosophical studies, a prominent circle of astronomers arose that included Rheticus. When the members of this group eventually learned of Copernicanism, they ascribed to it only as an instrumental tool to make calculations about the heavens. That is, they did not accept Copernicanism's main tenet that the sun is the centre of the universe and the earth is mobile, but they did accept Copernicus' mathematics for calculating planetary angles and positions. Westman dubbed this the "Wittenberg Interpretation" of Copernicanism.[9] He traces Melanchthon's role at the University of Wittenberg, Melanchthon's stance regarding Copernicanism, the principal students who studied under Melanchthon, and finally arrives at a specific consideration of Rheticus. Westman focuses on Rheticus' unique personality, the nature of his *Narratio prima* (Rheticus' major astronomical work), and, significantly, a

[8] Westman, *The Copernican Question*, pp. 130-31.
[9] Robert S. Westman, "The Melanchthon Circle, Rheticus, and the Wittenberg Interpretation of the Copernican Theory," *Isis* 66:2 (June 1975): pp. 164-93.

psychoanalytical consideration of Rheticus' relationship with Copernicus. This is all to the end of indicating that Rheticus did not partake in this instrumentalist "Wittenberg Interpretation" of Copernicanism but rather assumed a realist stance. That is to say, Rheticus believed that Copernican heliocentrism indicated the physical structure of the cosmos, instead of merely supplying mathematical formulas for celestial calculations. Westman gives fair consideration to Rheticus; however, again, his consideration serves a larger work on the broader subject of Copernicanism, and Rheticus himself is not fully examined.[10]

The question of realism versus instrumentalism that arises out of Westman's "The Melanchthon Circle" is present also in Peter Barker and Bernard R. Goldstein's article "Realism and Instrumentalism in Sixteenth Century Astronomy: A Reappraisal." Barker and Goldstein generally argue that the categories of instrumentalism and realism are anachronistic when applied to the sixteenth century because sixteenth-century astronomers did not conceive of astronomy in such dichotomous terms. They do, however, equate Rheticus' Copernicanism with Kepler's, and argue that they both fully endorse heliocentrism, implying that there is something fundamentally realistic in Rheticus' heliocentrism.[11]

Similarly, Owen Gingerich considers Rheticus' role in the reception of Copernicanism and his stance on the reality of a Copernican cosmos. He highlights Rheticus' use of the term "hypothesis" to describe Copernicanism and argues that

[10] Similarly, Rheticus is mentioned in Katherine A. Tredwell and Peter Barker's article "Copernicus' First Friends: Physical Copernicanism from 1543-1610," *Filozofski Vestnik* 25:2 (2004): pp. 143-66; however, he only merits a two-page spread and is relevant only insofar as he related directly to Copernicus.

[11] Peter Barker and Bernard R. Goldstein, "Realism and Instrumentalism in Sixteenth Century Astronomy: A Reappraisal," *Perspectives on Science* 6:3 (1998): pp. 232-58.

"hypothesis" had a different meaning in the sixteenth century than it does today. In the sixteenth century, "hypothesis" referred to "an arbitrary geometrical device by which the observed celestial motions can be explained." Gingerich goes on to suggest that the nature of these "hypotheses" as either hypothetical models or real models was later highly contested.[12] Gingerich makes no explicit assertion about which category Rheticus fits into; however, he details Rheticus' involvement in the publication of *De revolutionibus* and implies that Rheticus adhered to a more realist stance.

Barker, Goldstein, and Gingerich, while all addressing Rheticus, are still only addressing a particular aspect of his thought – that is, the status of his realism – rather than a comprehensive study of him. Moreover, *De terrae motu* is rarely featured in publications in any substantive way. Apart from Westman's brief consideration of it in *The Copernican Question*, only Alfredo Dinis, Kenneth Howell, Jesse Kraai, Nienke Roelants, and Katherine Tredwell consider *De terrae motu* in any critical capacity.

In his 1996 article "G. J. Rheticus on Copernicanism and Bible," Alfredo Dinis argues that *De terrae motu* is an example of how early Copernicans tried to maintain the autonomy of natural philosophy and demonstrate its harmony with Scripture even when the two appeared to contradict each other.[13] Dinis primarily expounds the hermeneutics used in *De terrae motu* after citing Hooykaas' rediscovery of the text and attribution of its authorship to Rheticus. Problematically, he does not

[12] Owen Gingerich, "From Copernicus to Kepler: Heliocentrism as Model and as Reality," *Proceedings of the American Philosophical Society* 117:6 (1973): pp. 513-22.
[13] Alfredo Dinis, "G. J. Rheticus on Copernicanism and Bible," *Revista Protuguesa de Filosofia* 52:1 (Jan.-Dec. 1996): pp. 299-300.

question or examine Hooykaas' attribution and so Dinis' argument depends on Hooykaas being correct. Futher, Dinis suggests, as Hooykaas does, that *De terrae motu* not only indicates Rheticus' theological position but also Copernicus'. Dinis acknowledges that Rheticus and Copernicus were officially members of two distinct Christian confessions but maintains that they shared theological views.[14] If Hooykaas is proven incorrect in his attribution of *De terrae motu* to Rheticus, Dinis' claims based on this text regarding the theological positions of both Rheticus and Copernicus will be proven invalid and his arguments incorrect. Thus, the absence of a further examination of Hooykaas' claims is a great oversight in Dinis' article.

Kenneth Howell makes a similar oversight in his use of *De terrae motu* in his 2002 book *God's Two Books*. Howell uses *De terrae motu* as a part of his larger examination of the interaction between Scripture and the study of nature, but he does not consider that the text may not have a guaranteed significance because it is not certainly written by Rheticus. Howell cites Giese's letter to Rheticus to indicate the proof that Rheticus authored *a* treatise on the subject of Copernicanism and Scripture and he briefly reviews Hooykaas' justification for this treatise being *De terrae motu*, but only as a summary, not as an examination.[15] He goes on to argue that *De terrae motu* is highly concerned to dispel any charge of novelty, a charge that all humanists abhorred, and Rheticus, recipient of a humanist education at the university of Wittenberg, would indeed wish to avoid such a charge.[16] Howell argues that Rheticus' deference to Saint Augustine in *De terrae motu* indicates his concern

[14] See Dinis, "G. J. Rheticus," p. 299, and Hooykaas, *G. J. Rheticus*, p. 184.
[15] Howell, *God's Two Books*, pp. 57-59.
[16] Humanism is the Renaissance revival of classicism and particularly classical learning within the universities. Melanchthon was a well-known humanist.

to locate his attitude towards Scripture in "this important historical precedent."[17] Howell further asserts that this concern to avoid the charge of novelty was also in the *Narratio prima*, in which Rheticus consistently orients Copernicus as a correction and extension of Ptolemy.[18] Following that, Howell dwells on many of the specific considerations in *De terrae motu*; however, because he does not concern himself with the validity of the attributed authorship, if Rheticus is proven not to be the author, Howell's examination of Rheticus in *God's Two Books*, which hinges on this text, will be doubtful.

The same can be said for Jesse Kraai's 2001 dissertation. Kraai spends some time considering *De terrae motu* and its role in the astrology of Rheticus; however, he does little to further the question of authorship. Kraai, like Howell, acknowledges Hooykaas' discovery of the treatise, but does not even explain Hooykaas' proofs, let alone critically engage with them in any way.[19]

Again, doing nothing to defend Rheticus' authorship of *De terrae motu*, yet depending entirely on it for her argument, Nienke Roelants posits that Rheticus is not the simple realist Copernican that scholarship depicts him to be. In this 2012 article, Roelants does not investigate Hooykaas' attribution of authorship, or provide any further evidence; yet, her argument is drawn entirely from claims made in the treatise. She argues that Rheticus was not ultimately a realist Copernican because of his deference to Scripture and to the Church in *De terrae motu*. That is to say, Rheticus believed that one could obtain *a posteriori* knowledge of the cosmos,

[17] Howell, *God's Two Books*, p. 59.
[18] Howell, *God's Two Books*, p. 60.
[19] See Jesse Kraai, "Rheticus' Heliocentric Providence: a study concerning the astrology, astronomy of the sixteenth century" (PhD diss., University of Heidelberg, 2001).

through which Copernicanism is a demonstrated certainty; however, one cannot obtain causal knowledge of the heavens in this life, or *a priori* knowledge, and for that reason, Rheticus is not ultimately a realist Copernican because he was aware that there was a level of knowledge beyond his grasp.[20] These claims are entirely based on *De terrae motu*, lending Roelants' argument an instability that would not be there had she addressed the question of the authorship of the text. Elsewhere, however, she claims to have found additional information to support Rheticus as the author, including the presence of certain Protestant themes and linguistic similarities between the treatise and the *Narratio prima*, but she does not reveal what they are.[21] Providing these proofs within her paper would have given it a greater strength as she would not only be upholding the source for her original argument, but she would also be contributing information to an underdeveloped field and engaging directly with Hooykaas' 1984 publication.

The only scholar either to question publicly Hooykaas' attribution of authorship or to provide a counterargument is Katherine Tredwell. In a conference paper given in 2005, Tredwell specifically attempts to debunk some of Hooykaas' foundational claims for asserting the authorship of *De terrae motu*. She also provides her own arguments regarding why Rheticus is likely *not* the author. From this, Tredwell concludes:

> Hooykaas acknowledges that the *Treatise* appeared at first glance to be a typical specimen of early seventeenth-century debate over the Earth's motion, and that both the arguments it advances and the arguments it refutes were in circulation before its publication in 1651. I propose that

[20] Nienke W. J. Roelants, "The Physical Status of Astronomical Models Before the 1570s: The Curious Case of Lutheran Astronomer Georg Joachim Rheticus," *Theology and Science* 10:4 (2012): 367-390.
[21] Nienke Roelants, e-mail message to author, December 5, 2012.

> the similarity is not coincidental: the *Treatise* was in fact written in the seventeenth century. If we wish to make a further attempt at identifying him (the author was almost certainly male), we have a few facts with which to begin. He was a Copernican, meaning that he accepted heliocentrism as a description of physical reality, and he produced a work on Copernican astronomy. He may also have had a Copernican teacher. Possibly he was Catholic. He may have been associated with Gorlaeus, if the printer obtained the manuscript of the *Treatise* along with the *Idea physicae*. Then again, the work might have been arisen from the same debate that inspired Galileo to write the *Letter to the Grand Duchess*. Other contexts might be imagined for the *Treatise*. Barring further evidence in support of Hooykaas, however, we cannot treat it as a reliable source of information about Rheticus' biblical hermeneutics.[22]

Although she denies Hooykaas' arguments, Tredwell does make certain positive assertions regarding the text based on the evidence that she believes to be demonstrated. This results in a conclusion totally contrary to what Hooykaas presents in his 1984 publication of *De terrae motu*. The results of this thesis concur with Tredwell's statement but are presented in more detail than her conference paper is able to provide.

In her 2005 doctoral dissertation, Tredwell raises some of the same issues that she presented in her conference paper; however, her conclusions regarding the authorship of the treatise are less definitive. The dissertation considers the exact sciences in Lutheran Germany, and focuses largely on Wittenberg and Melanchthon. In that consideration, an extensive discourse on Rheticus emerges and she considers his relationship with Melanchthon, the *Narratio prima*, and his general enterprises in mathematics and astronomy. She mentions *De terrae motu*, but does not utilise it in her own original research. Tredwell comments on the relative silence regarding

[22] Katherine A. Tredwell, "Melanchthon and Rheticus: Scripture Cosmology, and History at Wittenberg" (paper presented at the Third International Pascal Center Workshop "Interpreting Nature and Scripture," Redeemer College, Ontario, July 18-23, 2005), pp. 25-26.

the use of the treatise in critical examinations of astronomy or of Rheticus. She suggests that the question of the authorship of the treatise has not been fully answered, and perhaps it is for this reason that scholars are reluctant to comment on it.[23] Tredwell's research on Rheticus is particularly helpful in her consideration of his relationship to Melanchthon and the theological concerns that they share, and it is certainly the most helpful and innovative work that critically studies Rheticus' work and legacy.

In her dissertation, when Tredwell mentions Hooykaas' publication that "he *believed* [my emphasis] to be the missing treatise," she clearly expresses her dissatisfaction with his easy attribution.[24] She briefly explains Hooykaas' rationale for the authorship and notes its limited presence in critical scholarship. Tredwell further argues that since Hooykaas' publication there has been much work done on the relationship between Lutheranism and astronomy, in particular Sachiko Kusukawa's study of Melanchthon, and this sets a stage for a re-examination of *De terrae motu* that was not available to Hooykaas. Tredwell suggests that "it would be surprising to find a theologically indistinct tract written by a Wittenberg-trained astronomer."[25] Rheticus, of course, was Wittenberg trained and, for this reason, should exemplify some of those theological conventions so common at Wittenberg. Tredwell not only critiques the easy attribution of authorship, but also presents a comprehensive program of investigation in order to determine with more confidence whether Rheticus is the author of the treatise. She argues,

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[23] See Katherine Tredwell, "The Exact Sciences in Lutheran Germany and Tudor England" (PhD diss., University of Oklahoma, 2005).
[24] Tredwell, "The Exact Sciences," p. 106.
[25] Tredwell, "The Exact Sciences," p. 107.

> Melanchthon himself had a set of stock images on which he drew whenever he wrote on astronomy… These themes surface also in the writings of other members of the Melanchthon circle. Rheticus must have written the tract alluded to at an early date, when he would have been most likely to draw on intellectual resources he acquired at Wittenberg in order to mount a religious defence of an astronomical subject… The lack of provenance for the work, combined with the absence of clear Philippist traits, argue against ready acceptance of Hooykaas' identification of Rheticus as the author. A comparison of the *Treatise on Holy Scripture* with the *Narratio prima* and with Melanchthon's writings should precede any attempt to derive new information about Rheticus' theology from the treatise.[26]

Although the *Narratio prima* does not contain those distinctly Philippist theological traits, it is not a hermeneutical work. *De terrae motu* is entirely hermeneutical and one would therefore expect it to be Philippist in ways that the *Narratio prima* need not be. However, there ought to be other similarities between the *Narratio prima* and *De terrae motu* including language, phrasing, and style.

Tredwell does not conclude as radically against Hooykaas in her dissertation as she did in her conference paper, but she does make her scepticism clear. This program of investigation that Tredwell suggests in order to glean meaningful information about *De terrae motu* and its authorship is contained within the considerations of this thesis.[27] Tredwell's scholarship was crucial for the research in this thesis, helping to frame the immediate problems with Hooykaas' attribution of *De terrae motu* to Rheticus. Tredwell certainly produced the most helpful work in

[26] Tredwell, "The Exact Sciences," pp. 107-08.

[27] Tredwell is the only scholar to publicly express discontent at Hooykaas' determination; however, others have privately expressed that the matter is not entirely resolved, including Peter Barker (Peter Barker, e-mail message to Stephen Snobelen, October 11, 2012; Peter Barker, e-mail message to author, April 18-19, 2013) and Reink Vermij (Reink Vermij, e-mail message to author, October 30, 2012). On the other hand, some have indicated that they are convinced of Hooykaas' argument, including Dennis Danielson (Dennis Danielson, e-mail message to author, December 3, 2012) and Robert Westman (Robert Westman, e-mail message to author, October 29, 2012). Clearly, there are differing views on the status of the authorship, and this thesis contributes to this discussion.

re-examining *De terrae motu* and this thesis is much indebted to her; however, this thesis also moves beyond the scholarship that Tredwell provided, considering *De terrae motu* in greater detail and further exploring alternate possibilities regarding the possible identity of the author.

Hooykaas did much to identify the authorship of *De terrae motu*, but he did not prove, beyond argument, that Rheticus must be its author. Subsequent scholarship falls short in its assessment of the treatise and Hooykaas' published volume; however, Tredwell indicates a potential path for future studies of the treatise. This thesis develops upon Hooykaas and Tredwell's respective arguments and ultimately asserts that Rheticus' authorship of the *De terrae motu* is conceivable but it is not likely. Rather, the text is more likely a product of a Catholic author in the early seventeenth century and, perhaps from a Galilean context specifically. This assertion corrects existing scholarship on Rheticus and accommodates a more accurate understanding of Rheticus' theological position, which can no longer depend on the content of *De terrae motu*.

CHAPTER 3: THE LIFE AND TIMES OF GEORG JOACHIM RHETICUS

The details of Rheticus' biography clarify that he had not only a strong relationship with Copernicus, but also a deeply Lutheran educational and professional environment. Thus, it is not surprising that he would be concerned to unite Copernicanism with Scripture and would have produced a work that did just that. Understanding the Copernican and Lutheran aspects of Rheticus' background will yield a better understanding of what theological matters and themes Rheticus would have primarily concerned himself with and what significance astronomy had with respect to theology. This better indicates how it was possible for Rheticus to engage in a formal reconciliation between the two disciplines. This chapter examines Rheticus' early life, education, career, and final years, providing a focus on the moments of his life and aspects of his environment that were theologically inclined. Although Rheticus was an early Lutheran, due to relationships with various Catholics throughout his life, it is conceivable that a hermeneutical text written by Rheticus, while certainly firmly Copernican, may have remaining vestiges of Catholicism contained within it. This chapter reveals that Rheticus received astronomical and theological exposure that would make such a text possible for him to compose, and that one would expect certain traits to arise in the text based on this exposure, including Philippism, humanism, and both Lutheranism and Catholicism.

Georg Joachim Iserin, Rheticus' name at birth, was born on 16 February 1514 in Feldkirch, part of the ancient Roman province Rhaetia, to a German father, Georg

Iserin, and an Italian mother, Thomasina de Porris. He enjoyed a comfortable childhood, as his mother was of noble descent and his father was a successful doctor.[1] His family was Roman Catholic and he spent much time during his youth in Italy.[2] Rheticus was raised in an environment of mixed languages and, although he was known by the common German name Joachim in Feldkirch, when in Italy he was known as Giorgio, the Italian form of his first name.[3] However, during his adolescent years, his father met an unfortunate end: rumours had been circulating about Iserin's dabbling in sorcery, and he was accused of taking advantage of his patients on numerous occasions, stealing from them and swindling them. Eventually, Iserin was formally accused and executed for his crimes. As was the custom at the time, the family was stripped of their surname to leave the convicted criminal Iserin without a legacy, and they reverted to Thomasina's surname. When his mother eventually remarried and took her new husband's name, Georg decided to adopt a toponym,[4] common in the humanist tradition at the time. Thus, Georg Joachim de Porris, once Georg Joachim Iserin, officially became Georg Joachim Rheticus, after his home province of Rhaetia.[5]

Danielson writes that Rheticus never expressed anger or discontent at his father's fate; however, the early loss of Iserin could have left Rheticus with "an unfulfilled longing for a father whom he could properly honor and emulate."[6] Westman also notes this paternal void in Rheticus' life, and speculates that Rheticus'

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[1] Danielson, *The First Copernican*, p. 13.
[2] Hooykaas, *G. J. Rheticus*, p. 24; K. H. Burmeister, "Georg Joachim Rheticus as a Geographer and His Contribution to the First Map of Prussia," *Imago Mundi* 23 (1969), p. 73.
[3] Danielson, *The First Copernican*, p. 13.
[4] A toponym is a name that is derived from one's birthplace.
[5] Danielson, *The First Copernican*, pp. 16-17.
[6] Danielson, *The First Copernican*, p. 17.

eventual relationship with Copernicus and reverence for him may have developed in an effort to compensate for his lost father.[7] Whether or not this psychoanalytical reading of Rheticus' reaction to the loss of his father is accurate, Copernicus certainly did eventually become an important male figure in Rheticus' life.

Similarly, Philip Melanchthon was a prominent male figure throughout Rheticus' education and early professorship at the University of Wittenberg. Rheticus attended the grammar school in his town and went on to study in Zürich for a short period; however, he began to truly excel as a student at Wittenberg. He enrolled at Wittenberg in 1532, and it was there that he met Melanchthon. The two men became close, with Rheticus eventually studying mathematics and astronomy under Melanchthon and excelling.[8] The University of Wittenberg taught a humanist style of education, but more importantly, it was a centre of the Protestant Reformation. Martin Luther was a professor there when Rheticus arrived and Melanchthon assisted with many of Luther's envisioned religious and, to a lesser extent, educational reforms.

Although born into a Roman Catholic family, Rheticus became a Lutheran when he studied at Wittenberg. He was much taken with the spirit of reform and how, especially at Wittenberg, it interacted with humanist education. There was increasing freedom with regards to how one could read the Bible, as well as nature, and Rheticus embraced both.[9] However, Hooykaas argues, Rheticus was likely a moderate Lutheran, who, at least, avoided giving any offence to Roman Catholics. He

[7] Westman, "The Melanchthon Circle," pp. 187-90.
[8] Danielson, *The First Copernican*, pp. 18-20.
[9] Danielson, *The First Copernican*, pp. 18-21.

may have ascribed to Lutheran theology, but he did not cause any trouble about religious matters. Not only was his family Roman Catholic, but so too were both Copernicus and Giese.[10] Clearly, Rheticus had close ties to both Roman Catholics and Protestants, but it is from the Protestant tradition that his intellectual training comes. Understanding Rheticus' exposure to theology *and* natural philosophy at Wittenberg yields an understanding of the foundational education that would have influenced his writing of a treatise on Copernicanism and Scripture.[11]

Not only was Rheticus' lifetime rife with religious tumult, but religious dissent was also growing in the years before Rheticus' birth. Hans J. Hillerbrand argues that there were voices of complaint before the Reformation but there was not yet "widespread alienation from the Church" as there would be when Luther began his reforms.[12] There was some discontent with the Church but no systematic plan to address it. The rule of the Emperor of the Holy Roman Empire of the German Nation was largely ineffective by 1500, and power began to shift to the princes. This gave rise to increased nationalism and secularism as the princes held more power than the Emperor and they used their power to resist Rome and certain papal demands, including heavy taxation. Anti-clerical sentiments emerged because of the previous flow of German funds to Rome, which in turn increased Germany's

[10] Hooykaas, *G. J. Rheticus*, pp. 23-24.
[11] Many of the following considerations of the educational environment at Wittenberg and Rheticus' relationship with Copernicus are rooted in a conference paper presented in March of 2013. For more detail on Luther, Melanchthon, Wittenberg, and Copernicus than is provided in this thesis, see Shannon Higgins, "Rheticus, Mathematical Realism, and Harmony with the Divine" (paper presented at the annual History Across the Disciplines Graduate Conference, Halifax, Nova Scotia, March 15-17, 2013).
[12] Hans J. Hillerbrand, *The Division of Christendom: Christianity in the Sixteenth Century* (Louisville, KY: Westminster John Knox Press, 2007), p. 22.

nationalism. Thus, Germany was displaying early signs of resisting Rome and turning to secular authorities.[13]

Further, distinctions between divine and natural law were also surfacing. Humanism emerged and with it the secularisation of morals. Humanism was not anti-Christian but it did assert that morality did not depend on definitions provided by Church authorities, which further eroded Rome's hold on the German peoples. These early humanists were not anti-Church entirely; rather, they resisted the Church's universal authority and did not want the Church to act as a secular body. It was into this disrupted German state that Luther was born and when he began his reformation efforts, he had to redefine not only Christian theology but also other social aspects.[14]

As the spearhead of the Protestant Reformation Luther spent most of his energy on religious reform, but he also spent *some* time on educational reform. He was concerned about the status of universities because he believed that the best way to overcome heretics was with books and through education.[15] It is important to train young members of society because the state of Christianity will one day be left in their hands. However, current universities were in no way properly formed or equipped to assume this role as trainer of Christian youths; in fact, Luther believed

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[13] Roy Pascal, *The Social Basis of the German Reformation: Martin Luther and His Times* (New York: Augustus M. Kelley Publishers, 1971), pp. 2-21.
[14] Pascal, *The Social Basis of the German Reformation*, pp. 8-11.
[15] Martin Luther, "To the Christian Nobility of the German Nation Concerning the Reform of the Christian Estate, 1520," in *Luther's Works: The Christian in Society I*, ed. James Atkinson (Saint Louis: Concordia Publishing House, 1966), p. 196.

it preferable to remain uneducated than receive an improper education, such as current universities had to offer.[16]

The reforms that Luther suggests for universities are, first, based on a thorough and proper teaching of Scripture, not informed by Roman Catholic authorities or tradition, but by a fresh interpretation without mediating commentaries. Second, these reforms involve the elimination of Aristotelian philosophy because, to Luther, little of value was then taught in universities, and what little was taught, was too informed by ancient Greek education.[17] Luther identifies those aspects of education that are *not* acceptable in the reformed curriculum at Wittenberg, but the only positive assertion he makes about the curriculum is that Scripture must be taught well. It is not until Melanchthon, who was much more of an active educational reformer whereas Luther was a religious reformer, that much of Luther's imaginings about a reformed education come into practice.

Following the Diet of Worms in 1521,[18] Luther was outlawed by Emperor Charles V, and was confined to Wartburg as a precautionary measure. Melanchthon then assumed the role of the primary reformer at Wittenberg and there were more changes under him than there were under Luther. Melanchthon agreed with Luther that universities are important for Christianity because they facilitate the chronicling of Church history and accommodate man's use and appreciation of the

[16] Martin Luther, "To the Councilmen of All Cities of Germany That They Establish and Maintain Christian Schools, 1524," in *Luther's Works: The Christian in Society II*, ed. Walther I. Brandt (Saint Louis: Concordia Publishing House, 1962), pp. 350-55, 368.
[17] Luther wrote about current universities, "The heathen teacher Aristotle rules." See Luther, "To the Christian Nobility," p. 200.
[18] This was an imperial assembly held by the Holy Roman Empire in Worms to address Luther and the effects of the Protestant Reformation.

advanced intellect given to him by God.[19] However, Melanchthon begins to depart from Luther's position on natural philosophy. Melanchthon gave several orations on the role of natural philosophy in education, and taught mathematics and astronomy, cultivating a prominent group of natural philosophers who studied beneath him, whereas Luther all but ignored the subject.

From Luther's lectures on Genesis, one can access a general image of the value that Luther apparently bestowed upon natural philosophy and, in particular, astronomy. Luther first dignifies the study of astronomy because it is the study of God's heavens. He argues that humans, unique amongst God's creations, were made able to comprehend the heavens and for this reason should utilise their ability. In addition to this general endorsement of astronomy, Luther acknowledges certain particulars about astronomy, including retrograde motion, stellar light, and eclipses; however, apart from a brief mention of these phenomena, he does not expound any astronomical aspects in detail.[20] Astronomy is only valuable to Luther insofar as it is the examination of God's heavens by God's most intellectually gifted creations.

For Melanchthon, on the other hand, astronomy possesses a greater dignity and importance than it does for Luther. First, Melanchthon similarly dignifies astronomy alongside cosmography, naming them "the most beautiful disciplines."[21] Melanchthon argues that the study of these disciplines is divine because the laws of

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[19] Philip Melanchthon, "On the Role of the Schools," in *Orations on Philosophy and Education*, ed. Sachiko Kusukawa, trans. Christine Salazar (Cambridge: Cambridge University Press, 1999), pp. 12-20.

[20] Martin Luther, *Luther's Works: Lectures on Genesis 1-5 I*, ed. Jaroslav Pelikan (Saint Louis: Concordia Publishing House, 1958), pp. 29-41.

[21] Philip Melanchthon, "Preface to *On the Sphere*," in *Orations on Philosophy and Education*, ed. Sachiko Kusukawa, trans. Christine Salazar (Cambridge: Cambridge University Press, 1999), p. 107 and Philip Melanchthon "On Astronomy and Geography," in *Orations on Philosophy and Education*, ed. Sachiko Kusukawa, trans. Christine Salazar (Cambridge: Cambridge University Press, 1999), p. 115.

creation are embedded within the heavens, which astronomy reveals, and they evidence the rational creation of the heavens by the "Architect."[22] The language of the "Architect" of the heavens indicates a geometer God, and is part of a tradition that reaches back to Plato, is present in Neoplatonic philosophy, and reaches forward into the seventeenth century in the works of Kepler.[23] This conception of God justifies natural philosophy, particularly astronomy and mathematics, because it is the study of the geometer God's creation.

Melanchthon's participation in this ancient tradition points at his humanism – a concern that Luther did not have. Luther maintained the importance of ancient languages for understanding Scripture better;[24] however, Melanchthon was able to find some value within the established structure of the universities and he reoriented it to suit the reformed needs of Wittenberg. Peter Barker argues that the scholarship under Melanchthon at Wittenberg was primarily humanist, and Melanchthon and his students were humanists with "high-level astronomical competencies" before they were proper astronomers.[25]

Even if Melanchthon did prioritise humanist learning over mathematics or astronomy, he still trained a remarkable group of astronomers. In addition to Rheticus, Erasmus Reinhold and Caspar Peucer studied under Melanchthon, and they were all impressive mathematicians and astronomers. Following Rheticus' later stay with Copernicus, Reinhold, Peucer, and Melanchthon all became aware of

[22] Melanchthon, "On Astronomy and Geography," p. 118.
[23] Peter Barker, "The Role of Religion in the Lutheran Response to Copernicus," in *Rethinking the Scientific Revolution*, ed. Margaret J. Osler (Cambridge: Cambridge University Press, 2000), p. 82.
[24] Luther, "To the Councilmen," pp. 357-58, 364.
[25] Barker, "The Role of Religion," pp. 61.

Copernican heliocentrism. Melanchthon himself resisted the Copernican theory for years until he finally allowed it to be taught a mathematical tool for celestial calculations. Similarly, Reinhold and Peucer never commented on the physical structure of the Copernican cosmos or ever mentioned the motion of the earth, but they otherwise completed mathematical works based on Copernicus' heliocentrism and taught it to others in this instrumentalist capacity.[26] Rheticus alone emerged from this circle of astronomers who studied under Melanchthon as the only realist Copernican. Although Melanchthon was a great educational reformer, departing from the literal biblical interpretation of the heavens was too much for him.

Although Melanchthon and Luther differed from one another greatly with respect to their priorities for reform, they both still embraced Scripture as the ultimate truth. They had many differences in character, which even Melanchthon himself pointed out. In his funeral oration for Luther, Melanchthon praised the work that Luther had done for Christianity, but he also criticised Luther's severity.[27] The differences between Melanchthon and Luther sometimes caused tensions in their relationship; however, they remained close friends, and Melanchthon even wrote a biography of Luther. James Weiss argues that in this biography Melanchthon presents Luther in a humanist light, trying to make him more palatable to a broader audience. This biography emphasised Luther's few humanist traits, such as his

[26] For more on Melanchthon, Reinhold, and Peucer's reception of Copernicanism, see Gingerich, "From Copernicus to Kepler," pp. 514-17; Howell, *God's Two Books*, pp. 53-67; and Westman, "The Melanchthon Circle", pp. 172-81.

[27] Philip Melanchthon, "At Luther's Funeral," in *Orations on Philosophy and Education*, ed. Sachiko Kusukawa, trans. Christine Salazar (Cambridge: Cambridge University Press, 1999), pp. 256-59.

interest in Augustine and his traditional university education.[28] Melanchthon was clearly concerned with Luther's broad reception and, although Luther was more severe than Melanchthon, Melanchthon was still Luther's greatest advocate and assistant in the reformation of both religion and education at Wittenberg.

Clearly this tumultuous environment at Wittenberg, where both religion and education were being redefined, oriented Rheticus to receive new theological and astronomical information. Rheticus was closer to Melanchthon, the moderate reformer, than he was to Luther, the radical reformer, indicating that Rheticus was a certain supporter of the Protestant Reformation but was not personally an extreme Reformer. Under Melanchthon, Rheticus' education always enforced the importance of Scripture, but it also encouraged natural philosophical investigation. When Rheticus left Wittenberg in 1538 to embark on an academic tour to various scholars, he was religiously oriented, and also receptive to new and radical information, not bound to any educational dogma. When he eventually met Copernicus, he indeed found new information that consumed him for many years.

Any one definitive reason for Rheticus' departure from Wittenberg is unclear; however, there were different contributing factors. First, there was much turmoil at Wittenberg at in 1538. A former colleague of Rheticus, Simon Lemnius, was in a dispute with Luther for writing slanderous and lewd poetry. Luther called for his arrest, but Lemnius fled. Lemnius later wrote a tract that associated himself with respectable and moderate individuals at Wittenberg, including Melanchthon and Rheticus. Rheticus' desire to avoid conflict with Luther, even by mere

[28] James Weiss, "Erasmus at Luther's Funeral: Melanchthon's Commemorations of Luther in 1546," *The Sixteenth Century Journal* 16:1 (1985), pp. 92-103.

association with Lemnius, could be one factor that led to his departure from Wittenberg.[29]

Second, Rheticus had astrological interests and believed that accurate astronomy could lead to successful interpretation of the heavens. Celestial events could be correlated to historical events, which could be extended to interpretations of events in Scripture and biblical prophecy could thus be interpreted. Upon leaving Wittenberg, Rheticus visited many prominent scholars, many with astrological concerns, and learning from them could have been another motivation that caused Rheticus to depart.[30] Throughout his travels, Rheticus visited astrologer and mathematician, Johann Schöner, printer Johannes Petreius, cartographer Peter Apian, humanist Joachim Camerarius, physician and astrologer Achilles Gasser, and humanist Heinrich Zell. Kraai, Tredwell, and Westman all suggest that Rheticus would have at best had no more than a vague familiarity with Copernicus and his ideas at the time he left Wittenberg, if he had even heard of him at all. It is more likely that Rheticus heard details about Copernicus throughout his travels and then resolved to meet him.[31]

In 1539, Rheticus arrived in Frauenburg and met Copernicus for the first time. This encounter not only led to the publication of Rheticus' *Narratio prima*, but it also led to the publication of Copernicus' *De revolutionibus*, as Rheticus constantly encouraged Copernicus to publish his heliocentric theory formally. The *Narratio prima* was a *précis* to *De revolutionibus*, paving the way for the new heliocentrism,

[29] Danielson, *The First Copernican*, pp. 27-30; Kraai, "Rheticus' Heliocentric Providence," pp. 65-72.
[30] Kraai, "Rheticus' Heliocentric Providence," pp. 62-63, 73.
[31] Kraai, "Rheticus' Heliocentric Providence," p. 76; Tredwell, "The Exact Sciences," p. 91-92; Westman, *The Copernican Question*, p. 115.

but still differing in details from what Copernicus would eventually publish. Rheticus was clearly deeply invested in the Copernican theory, encouraging Copernicus to publish, and endeavouring to make its passage smoother by first publishing the *Narratio prima*. Rheticus oversaw the initial stages of preparing *De revolutionibus* for publication before he was offered a professorship in Leipzig that he could not turn down.[32] Both Rheticus' involvement in the preparation of *De revolutionibus* and his *Narratio prima* indicate that he fully believed in the reality of the Copernican cosmos, unlike his colleagues at Wittenberg. Rheticus writes that Copernicus was left to build astronomy anew after years of scholarly adherence to Ptolemaic astronomy,[33] and thus Copernican astronomy was intended to totally replace Ptolemaic astronomy.

This was, however, problematic. Not only did universities, Wittenberg included, teach Ptolemaic astronomy, but also the concepts of a geocentric cosmos and a static earth were religious doctrines, both within the Roman Catholic Church and within the new Reformed tradition. Copernicanism was a controversial stance to assume and could have caused academic and religious problems for Rheticus. The *Narratio prima* does not address Scripture in light of Copernicanism explicitly but in a few brief statements, Rheticus does represent Copernicanism as compatible with

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[32] Danielson, *The First Copernican*, p. 109. Rheticus then left the task of overseeing the publication of *De revolutionibus* to fellow Lutheran Andreas Osiander. Osiander attached to *De revolutionibus* an anonymous letter to the reader that suggested that the contents of the text were merely hypotheses to be used only as tools for mathematical calculations and not to be taken as a physical reality. Because Osiander did not attach his name to the letter, it was initially assumed to have been written by Copernicus and the immediate reception of Copernicanism was in this instrumentalist Osianderian light, very much contrary to Rheticus' attitude towards Copernicanism.

[33] Georg Joachim Rheticus, "Narratio prima," in *Three Copernican Treatises: the* Commentariolus *of Copernicus, the* Letter Against Werner*, the* Narratio prima *of Rheticus*, 3rd edition, trans. Edward Rosen (New York, NY: Octagon Books, 1971), p. 132.

Christianity. In that work, Rheticus glorifies and dignifies astronomy. He writes, "A boundless kingdom in astronomy has God granted to my learned teacher. May he, as its ruler, deign to govern, guard, and increase it, to the restoration of astronomic truth."[34] God created the heavens, and Copernicus, led by God, is uncovering God's masterful creation. Rheticus writes that Copernicus is working "with the aid of divine kindness,"[35] and so, Copernicus' astronomy is sanctioned by God.

This divine deference and dignity of astronomy is not uncommon to early modern natural philosophical texts. Copernicus himself glorifies astronomy, writing, "What is nobler than the heaven, the heaven which contains all things?"[36] Clearly Rheticus was working within a tradition that deferred to God, and so, the extent to which Rheticus' care to reconcile Copernicanism with the divine in the *Narratio prima* and his divine deference can be deemed significant is unclear. Understanding not only Rheticus' educational environment, but also his work in natural philosophy reveals what his concerns were throughout his life and what resources and motivations he would have had for writing a treatise on Scripture and Copernicanism.

If indeed *De terrae motu* was written by Rheticus, knowing his theological position from that text would greatly illuminate the briefer theological references in the *Narratio prima* and clarify their significance. Copernicus was, of course, Catholic, as was Giese who encouraged Rheticus to include his treatise on Copernicanism and Scripture with future editions of *De revolutionibus*. It is certainly plausible that

[34] Rheticus, *Narratio prima* in *Three Copernican Treatises*, p. 131.
[35] Rheticus, *Narratio prima* in *Three Copernican Treatises*, p. 109.
[36] Copernicus, *De revolutionibus*, p. 35.

whatever treatise Rheticus wrote was written to be intentionally palpable to Catholics, as it was being attached to a work by a Catholic author and was so approved by the Catholic Bishop Giese. In fact, Dinis maintains that Rheticus did write *De terrae motu* and that Rheticus wrote it not only to be palatable to Catholics, but specifically *for* a Catholic audience.[37] On the other hand, Rheticus himself, although born a Catholic, was a converted Lutheran and was employed by a Lutheran university. He would also want to remain true to his own faith, as well as appease his Lutheran employers, colleagues, and friends. For these reasons, Rheticus' treatise on the reconciliation of Copernicanism with Scripture may have had *both* Catholic and Lutheran themes throughout.

Regardless, Rheticus did not attach his treatise to a second edition of *De revolutionibus*, as Giese suggested in 1543. Rheticus had assumed his aforementioned professorship in Leipzig in 1542; however, he was constantly preoccupied and spent little time there. He travelled to visit different scholars abroad and was constantly reprimanded by the university for not fulfilling his teaching and administrative duties at the university. He existed thus for just short of a decade, and no further mention of his treatise was made. In 1551, however, he was accused of having inappropriate and exploitative relations with one of his students. The student's father reported it to the university, and Rheticus fled Leipzig. In addition to this accusation, Rheticus also left behind in Leipzig various creditors with whom he had bad loans.[38]

[37] Dinis, "G. J. Rheticus," p. 302.
[38] Danielson, *The First Copernican*, pp. 143-56.

Despite this scandal and Rheticus' bad reputation in Leipzig, he was offered a professorship at the University of Vienna about two years later; however, he declined the position. He instead settled in Kraków in 1554, practicing both medicine and mathematics and communing with scholars until 1572 when he left Kraków and went to Cassovia, in the region known as Scepusia, for unknown reasons. He continued his work there, and soon after, Valentin Otto arrived to work with Rheticus. Otto reignited in Rheticus a fire for mathematics and motivation to complete new groundbreaking work, much as Rheticus himself had inspired Copernicus decades ago. In late 1574, however, while Otto was away on an errand for Rheticus, the latter contracted a respiratory infection. Otto returned immediately as Rheticus' condition worsened, and shortly after, Rheticus passed away from the infection on 4 December 1574.[39]

Understanding the events of these sixty years of Rheticus' life reveals Rheticus' early exposure to both Roman Catholicism and Lutheranism and his concern with astronomy. He was born a Catholic; however, he converted to Lutheranism during the early fervour of the Protestant Reformation. He worked closely with Melanchthon and Copernicus, both of whom encouraged innovative thought and deeply influenced Rheticus, yet one was a Lutheran and the other a Catholic. Rheticus clearly upheld the importance of astronomy and studied it constantly, as well as he upheld the authority of Scripture and God, as both Melanchthon and Copernicus did themselves. It is certainly fitting that he would write a text concerned with uniting Copernicanism with Scripture; however, the

[39] Danielson, *The First Copernican*, pp. 159-93.

nature of the theology within such a text is unclear. Rheticus was a moderate Lutheran with much Catholic exposure, and the treatise that he wrote was appropriate to be attached to a text by a Catholic author, as Giese encouraged. No biographical information indicates that *De terrae motu* must be the treatise that Rheticus composed, but it is certainly possible. In the subsequent considerations of the text of *De terrae motu* in this thesis, Rheticus' Lutheran and Catholic associations must be remembered.

CHAPTER 4: THE REDISCOVERY AND RECEPTION OF *DE TERRAE MOTU*

Hooykaas first announced his discovery of *De terrae motu* on 10 March 1975 before the Royal Netherlands Academy of Sciences, over two years after he claims to have identified the authorship of the treatise.[1] Two publications followed this announcement: one, a journal article, the other, the 1984 volume in which the text was actually published. Hooykaas presents four main arguments in defence of the authorship of the treatise, none of which have been sufficiently questioned. This chapter considers each of Hooykaas' arguments in order to reveal the level of credibility of his attribution of authorship to Rheticus. Tredwell's counter-arguments are central to this discussion, as are receptions of Hooykaas' publication. From these considerations, it is demonstrated that Hooykaas provided a somewhat persuasive argument that Rheticus wrote *De terrae motu*; however, he did not sufficiently prove his case. Further, scholarship has failed considerably in its silence on the matter of questioning, challenging, or re-examining Hooykaas' attribution of authorship. This chapter demonstrates the need for the re-examination of *De terrae motu* because of the faults in Hooykaas' argument and its lack of critical assessment by other scholars.

In the same year that Hooykaas published his book containing the text of *De terrae motu*, he also announced his identification of the treatise in the *Journal for the History of Astronomy*. He provides an abbreviated account of the arguments that he

[1] R. Hooykaas, De outset verhandeling over het Copernicanisme en de Heilige Schrift [The oldest tract on Copernicanism and Holy Scripture]. Voordracht gehauden in de Koninklijke Nederlandse Academie van Wetenschappen te Amsterdam op 10 maart 1975, cited in Hooykaas, *G. J. Rheticus*, p. 9.

presents in his published book for the attribution of authorship, and he explains some of the content in the text. However, he provides no bibliographic information or technical specifics about the treatise.[2] All of the specifics of the treatise were revealed when Hooykaas finally published *G. J. Rheticus' Treatise on Holy Scripture and the Motion of the Earth*. This volume contained a full defence of the authorship of *De terrae motu*, commentary on the content, and situational information regarding Rheticus and the text's composition. In this publication, Hooykaas writes explicitly of his discovery of the treatise:

> Shortly before the Copernicus Commemoration of 1973, when I was collecting materials for a work on "The Reception of Copernicanism in the Netherlands", I came across a certain *anonymous* pamphlet to which, at first, I paid little attention. It seemed to be just one of the multitude of polemical writings that appeared after the Galileo trials in which the debate raged about the compatibility of the motion of the earth with the teaching of Holy Scripture. It was bound together with early 17th century tracts; apparently there had not been the slightest suspicion that it was much older.[3]

Hooykaas suggests that the arguments in *De terrae motu* are very similar to arguments independently suggested by those seventeenth-century astronomers, with whose work the treatise was bound. On closer inspection, however, Hooykaas realised that the treatise was worth greater attention and, through a careful examination of the text, he concluded that it must be the missing Rheticus treatise.

The four primary arguments that Hooykaas presents in order to defend his attribution of authorship are, however, problematic. These arguments are interdependent as his third and fourth arguments depend entirely on the truth of

[2] R. Hooykaas, "Rheticus's Lost Treatise on Holy Scripture and the Motion of the Earth," *Journal for the History of Astronomy* 15:2 (June 1984): 77-80.
[3] Hooykaas, *G. J. Rheticus*, p. 17.

the first and second. Thus, if either of the first or second arguments are disproven, his subsequent arguments become irrelevant. The first two arguments largely concern the dating of *De terrae motu*, and the second two concern a more specific identification of who must have written it, given his established dating.

As his first argument, Hooykaas asserts: "The tract has been written in the first half of the 16th century."[4] To demonstrate this, he suggests that the treatise shows a "theological vagueness" that was characteristic of early reformers who still hoped for some compromise between "Lutherans and papalists", and it refers repeatedly to Saint Augustine, who was much loved by both groups. Additionally, the treatise typically takes its biblical quotations from the Vulgate, which was common unless newer translations from the original Greek or Hebrew were available. The treatise uses these newer translations on occasion, which demonstrates, in Hooykaas' terms, its "humanistic predilection" for ancient languages. It refers to Johannes Campensis' translation of Psalms from the original Hebrew, and it used biblical commentaries by Nicholas of Lyra, with additions by Paul of Burgos, which often referred back to the Hebrew of the Old Testament. From this evidence, Hooykaas concludes that "the author belonged to those moderates who, before the Council of Trent…made the rift between Rome and the Reformation definitive, had some reason to hope for a reconciliation on the basis of patristic theology and the Apostles' Creed."[5] Thus, Hooykaas argues that the treatise must have been written by a moderate reformer before 1545.

[4] Hooykaas, *G. J. Rheticus*, p. 17.
[5] Hooykaas, *G. J. Rheticus*, pp. 17-18.

However, Katherine Tredwell problematises this assertion in her 2005 conference paper. She concedes that the comments in the treatise do appear to be "conciliatory in tone" if Hooykaas is granted his pre-Tridentine dating; however, when examined more closely, there is nothing *necessarily* pre-Tridentine about them and they thus need not actually be "conciliatory." Tredwell argues that the comments are equally conformable to the image of a post-Tridentine Catholic who is determined to declare orthodoxy when espousing a cosmology that the Church might be inclined to view with suspicion. Additionally, Tredwell stresses that the use of Augustine is not at all unique to the sixteenth century, and thus, in conclusion, the treatise need not be pre-Tridentine.[6]

The issues that Tredwell raises with Hooykaas' *terminus ad quem* of *De terrae motu* are certainly accurate. Hooykaas could be correct in his assertion; however, the themes that he identifies as pre-Tridentine are not *necessarily* so. Early Lutheranism was not yet distinctly defined from early Catholicism and therefore certain confessional distinctions may not be possible in very early texts written by Reformation authors. Further, the "theological vagueness" could also result from a Lutheran author writing a hermeneutical text that is to be attached to a Catholic work and intentionally presenting a theologically vague text to appease both factions. Hooykaas' initial argument regarding this *terminus ad quem* of *De terrae motu* is thus problematic as it is conceivable but not conclusive.

Reference to Augustine in works of scriptural hermeneutics was very common and is not a trait that necessarily indicates someone with conciliatory

[6] Tredwell, "Melanchthon and Rheticus," p. 22.

intentions. Howell argues that Augustine was concerned to reconcile Scripture with itself and with natural truths, which introduced the principle of accommodation to his writing. Further, most early Copernicans invoked this Augustinian principle of accommodation, and they also called upon the Augustinian separation of natural philosophical and theological questions;[7] however, these are all early *seventeenth-century* Copernicans. The principle of accommodation is present in *De terrae motu*, as is the need to separate the fields of natural philosophy, but, as Howell noted, these principles are most common in early seventeenth-century Copernican texts.

Tredwell highlights Galileo's *Letter to the Grand Duchess Christina* as a seventeenth-century text that shares much with *De terrae motu*. In his *Letter*, Galileo simultaneously expounds Copernicanism, and declares his Catholicity and defers to the Church, all of which are also done by the author of *De terrae motu*. The two texts are further similar in their deference to Augustine and use of Augustinian principles, such as the principle of accommodation. Galileo writes, "It was not only consideration for the incomprehension of the masses but the prevailing opinion at that time which led the scriptural writers to accommodate themselves, in matters not necessary to salvation, more to received opinion than to the essential truth of the matter."[8] Previously, Galileo cited this opinion in Saint Augustine, arguing that natural philosophy and Scripture address different matters and, for that reason, Scripture does not always contain the "essential truth" of natural philosophy.[9] This

[7] Howell, *God's Two Books*, pp. 31, 205.
[8] Galileo Galilei, "Letter to the Grand Duchess Christina," in *Selected Writings*, trans. William R. Shea and Mark Davie (Oxford: Oxford University Press, 2012), p. 81.
[9] Galileo, *Letter*, pp. 69-70.

exact argument, and its attribution to Saint Augustine, is also present in *De terrae motu*.

De terrae motu is not only similar to the seventeenth-century *Letter to the Grand Duchess Christina*, but it is also similar to works of Kepler. Kepler repeatedly defers to God and Scripture throughout his works of astronomy. In Kepler's first major astronomical work, *Mysterium cosmographicum*, he writes, "I shall say nothing which would be an affront to Holy Scripture, and that if Copernicus is convicted of anything along with me, I shall dismiss him as worthless."[10] Kepler's book is an exposition and extension of Copernicanism, yet he maintains this scriptural deference. This priority given to Scripture is even more pronounced in his later *Astronomia nova*. The preface to this text explains the compatibility between Copernicanism and Scripture and, like *De terrae motu* and Galileo's *Letter*, invokes the principle of accommodation. Kepler writes, "Scripture also speaks in accordance with human perception when the truth of things is at odds with the senses, whether or not humans are aware of this."[11] Clearly, the simultaneous deference to Scripture and use of the principle of accommodation are common features of early modern astronomical texts. The same can be said for references to Augustine, although Kepler himself only mentions Augustine once in passing and does not defer to his authority, as was so common in other seventeenth-century hermeneutical texts.

Furthermore, Galileo was Catholic and Kepler was Lutheran, and both employed similar hermeneutical methods in their works. Divine deference applies

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[10] Johannes Kepler, *Mysterium cosmographicum: The Mystery of the Universe*, trans. A. M. Duncan (New York, NY: Abaris Books, Inc., 1981), p. 75.
[11] Johannes Kepler, *New Astronomy*, trans. William H. Donohue (Cambridge: Cambridge University Press, 1992), p. 60. Hereafter referred to by its Latin name, *Astronomia nova.*

equally to both Christian confessions, as well as it applies equally to both the sixteenth and seventeenth centuries. Hooykaas' argument that *De terrae motu* must be pre-Tridentine is thus contestable. Indeed, *De terrae motu* seems to be *more* characteristic of a post-Tridentine reconciliation between Copernicanism and Scripture, participating in the same debates as Galileo's *Letter* and Kepler's *Astronomia nova* did.

The Council of Trent itself served to formalise Roman Catholic doctrine and define Protestant and Reformation heresies. The Council sat four times between the years 1545 and 1563. Reformation propaganda made the Catholic Church seem unwilling to reform, but that was not the case.[12] Criticism of papal authority and certain Church practices, as well as calls to translate the Bible into vernacular languages pre-existed Luther's Reformation.[13] Thus, a council designed to address reform would respond to earlier Catholic calls for reform as well as to the emerging Protestant threat.[14] The Council of Trent was initially established largely to rein in clerical behaviour for which the Catholic Church was coming under much criticism but it later expanded to doctrinal details and the question of interpretation and authority was unavoidable.

Hooykaas argues that the Council of Trent not only attempted to silence and address Protestants, but also Erasmian Counter-Reformers.[15] The Counter-Reformation within the Catholic Church was partially born from the Catholic

[12] Hillerbrand, *The Division of Christendom*, p. 268.
[13] Merry E. Wiesner-Hanks, *Early Modern Europe, 1450-1789* (Cambridge: Cambridge University Press, 2006), p. 153.
[14] Hillerbrand, *The Division of Christendom*, p. 275.
[15] Hooykaas, *G. J. Rheticus*, p. 6.

response to the Protestant Reformation and partially to address areas of the Church that truly did need reform.[16] Humanist Desiderius Erasmus was central to the movement, directly engaging Luther but also encouraging religious toleration. However, Erasmian humanism, which promoted using original texts of the Bible and updated translations, was stifled as a result of the Council of Trent.[17] The Council eventually resolved that the Vulgate was to be the official and accepted version of the Bible and its interpretation must depend entirely on the authority of the Church Fathers. Along with the rejection of interpretations of Scripture that contradicted the Church Fathers, any translations of the Bible other than the Vulgate were also rejected because they disrupted the unique and approved interpretation of Scripture.[18]

Howell suggests that this determination came to have a significant bearing on the interpretation of nature and hermeneutics. The Council of Trent was not explicitly concerned with natural philosophy, but rather with the implications of the Protestant doctrine of *sola scriptura*;[19] that is, how *sola scriptura* affected more narrow theological issues and general matters of biblical interpretation. When those doctrinal decisions were made during the Council of Trent, however, the implications of *sola scriptura* and biblical interpretation spread to natural philosophical considerations. The Roman Catholics maintained a position that was

[16] Robert S. Westman, "The Copernicans and the Churches," in *God and Nature: Historical Essays on the Encounter between Christianity and Science*, eds. David C. Lindberg and Ronald L. Numbers (Berkeley: University of California Press, 1986), p. 86.
[17] Hooykaas, *G. J. Rheticus*, p. 26.
[18] Westman, "The Copernicans and the Churches," pp. 86-87.
[19] *Sola scriptura* is the Protestant notion, shared by Lutherans and Calvinists alike, that the most accurate way to interpret biblical passages is through a close reading of Scripture itself. The Church Fathers, on whom the Roman Catholics relied for scriptural interpretation, did not hold interpretive authority for Protestants.

informed by the Church Fathers, while the Protestants maintained a more literalist and Biblicist approach.[20]

All Vatican-approved scriptural interpretation now had to utilise the Vulgate and rely on the exegesis of the Church fathers. *De terrae motu* refers to Apocryphal books,[21] which may imply that a Catholic author is more likely than a Protestant one. The Apocrypha was referred to by Protestants on occasion, but was more commonly cited in Catholic hermeneutics. Additionally, the treatise primarily uses the Vulgate, but it also refers to other translations, as Hooykaas rightly notes. This use of other translations does necessarily suggest that it must have been written by a Protestant, just as its primary use of the Vulgate does not mean it must have been written by a Catholic. A group of mostly Spanish humanist Catholics advocated for the use of Greek and Hebrew at the Council of Trent,[22] demonstrating that use of particular translations does not strictly denote the confession of the author. The acceptable use of particular versions of the Bible and of authoritative interpretations of it were technically defined in the Council of Trent, but this was not a hard rule to which every Roman Catholic adhered. Thus, with the varied use of Biblical texts, it cannot be said that the treatise is clearly written by a Christian of a particular confession, or definitively written either before or after the Council of Trent.

Hooykaas' suggestion that the treatise is "theologically vague", which contributes to his argument that the treatise was written before the Council of

[20] Howell, *God's Two Books*, pp. 25-28.
[21] For references to Esdras, see *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, pp. 74, 83, 90; *De terrae motu* in Gorlaeus, *Idea physicae*, pp. 18, 34, 43. For a reference to Ecclesiasticus, see *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, p. 96; *De terrae motu* in Gorlaeus, *Idea physicae*, p. 54.
[22] Westman, "The Copernicans and the Churches," pp. 84-86.

Trent, is also a questionable claim. Tredwell notes that theological vagueness is, in itself, a vague concept.[23] Moreover, the content of *De terrae motu*—that is, the reconciliation of Copernicanism and Scripture—does not necessitate recourse to very specific theology, as it is primarily concerned with astronomy rather than any theological doctrine. That the treatise does not expound particular Catholic or Lutheran doctrines and is in that way vague, but otherwise is fairly standard in its theological references. For example, it refers to God as the "*artifice*" ("Architect"), which is a Platonic notion and was used in seventeenth-century astronomical texts, shortly before the time that this treatise was published.[24] In the *Timaeus*, the God that Plato describes is a geometer, creating the cosmos according to mathematics and various ratios.[25] Kepler also used this notion, naming God "the Architect of this most perfect work," in reference to the cosmos.[26] Kepler dwells much on the specific geometry that was used in God's creation of the world in order to demonstrate how mathematical God and the cosmos are, as well as to demonstrate the dignity of astronomy as the investigation of God's creation.[27] The use of this term is a part of an ancient tradition that extends into the seventeenth century and it thus does not denote a particular time of composition or authorial confession.

The same can be said for the mention of nesting elements in the treatise, another ancient concept. Plato describes the mixing and nesting of the elements in the creation of the world in the *Timaeus*, and this notion persisted in the early

[23] Tredwell, "Melanchthon and Rheticus," p. 22.
[24] *De terrae motu* [English translation], in Hooykaas, *G. J. Rheticus*, p. 65; *De terrae motu* in Gorlaeus, *Idea physicae*, p. 1.
[25] See Plato, *Timaeus*, trans. Peter Kalkavage (Newburyport, MA: Focus Publishing, 2001).
[26] Kepler, *Mysterium cosmographicum*, p. 225.
[27] See Kepler, *Mysterium cosmographicum*, particularly for his discussions regarding the Platonic Solids.

modern period. This ancient dependence, both on the notion of God the Architect and on nesting elements, may initially seem to go against Protestantism which prefers to distance itself from ancient associations because of the perceived corruption of Christianity; however, Kepler was also heavily dependent on Platonism, and Kepler, like Rheticus, was a Lutheran. Thus far, it remains unclear whether a Protestant or a Catholic wrote this text, but this arguable "theological vagueness" clearly does not necessitate a pre-Tridentine composition of *De terrae motu*.

Additionally, the position assumed within *De terrae motu* regarding *sola scriptura*, the Protestant concern to rely solely on Scripture and not on the interpretations of the Church Fathers, also wavers and furthers the lack of clarity regarding whether this text was written by a Catholic or a Protestant. The text specifically examines the passages of Scripture that refer to the mobility of the heavens but also look back to Aristotle and Augustine. The primary dependence on Scripture but paired with some attention to authorities makes this treatise neither a traditional Lutheran stance nor a traditional Catholic stance. Further, the author of the treatise writes that he is "simply keeping to the Word and acquiescing in it,"[28] which could be seen as consistent with the principle of *sola scriptura*.

To complicate matters, however, the author makes reference to the "Catholic faith,"[29] which is not necessarily indicative of either a Roman Catholic or a Protestant because both confessions regarded their faith as "catholic" or "universal."

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[28] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, p. 66; *De terrae motu* in Gorlaeus, *Idea physicae*, p. 3. Quotation is taken from the Hooykaas volume.
[29] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, pp. 65, 70, 73, 82; *De terrae motu* in Gorlaeus, *Idea Physicae*, pp. 1, 11, 16, 33.

However, the author defers specifically to the "Catholic Church of Christ," which does appear to have specifically Roman Catholic connotations, as well as to the "Church" on several occasions.[30] This deference to the Church as the final authority, rather than Scripture of God, is not a typically Lutheran stance to assume. As noted previously, the Lutheran Kepler deferred to God and to Scripture, but makes no mention of the "Church." The Catholic Galileo, however, asserts his "Catholic piety" and defers to the "Holy Church."[31] *De terrae motu* is more similar to the Catholic text of Galileo than it is to the Lutheran text of Kepler in its manner of deference; however, if the text was written before the Council of Trent, as Hooykaas argues, the differences in seventeenth-century established rhetoric between Protestants and Catholics would be less clear. For example, Melanchthon uses the same phrase, "Catholic Church of Christ," in his works.[32] Melanchthon was one of Luther's closest allies in the Protestant Reformation and still used that terminology. Additionally, as a student of Melanchthon it is certainly possible that Rheticus would have adopted similar language to Melanchthon.

Further, as explained previously, if Rheticus did write *De terrae motu*, these ambiguities in apparently Catholic or Protestant language *could* be intentional in order to appease both Catholics and Protestants. It is certainly conceivable that an

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[30] "*Ecclesiae Catholicae Christi*," *De terrae motu* in Gorlaeus, *Idea physicae*, p. 63; *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, p. 101. Quotation is taken from the Gorlaeus volume. For instances of specific deference to the "Church" ("*ecclesia*"), see also *De terrae motu* in Gorlaeus, *Idea physicae*, p. 16, 32; *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, pp. 73, 82.

[31] Galileo, *Letter*, pp. 65-66.

[32] "*Ecclesiae Catholicae Christi*," see: Philip Melanchthon, "Protestants ad Caesarem," in *Philippi Melanchthonis opera quae supersunt omnia*, volume IV, ed. Carolus Gottlieb Bretschneider (Halis Saxonum, 1837), p. 158; Philip Melanchthon, "Testimonium. Omnibus lecturis has literas," in *Philippi Melanchthonis opera quae supersunt omnia*, volume VI, ed. Carolus Gottlieb Bretschneider (Halis Saxonum, 1839), p. 271; Philip Melanchthon, "Loci praecipui theologici," in *Philippi Melanchthonis opera quae supersunt omnia*, volume XXI, ed. Carolus Gottlieb Bretschneider (Halis Saxonum, 1854), p. 602.

early Reformer, such as Rheticus, would defer to the Church in a polemical text but it is not sufficiently likely to dispel a more convincing argument that such specific deference is characteristic of a Catholic writer. At any rate, *De terrae motu* is an astronomical text as much as it is theological and specific confessionalism may not be a concern.

Thus, Hooykaas' first argument, that the treatise must have been written in the first half of the sixteenth century, is inconclusive. There is nothing necessarily pre-Tridentine about *De terrae motu* and, in fact, it is more characteristic of a seventeenth-century Catholic text than of a sixteenth-century Protestant text. However, this assessment if not definitive and nothing specific regarding the *terminus ad quem* of the treatise can be concluded other than it must have been written before 1651, the date of its publication.

Hooykaas' second argument regarding the authorship of *De terrae motu* concerns its *terminus a quo*. Hooykaas states: "More precisely, the work must have been written after 1532." Hooykaas claims this because there are references to works published as late as 1532. Hooykaas notes various works commented upon in the treatise, but the latest text is Johannes Campensis' *Enchiridon Psalmorum*, the first edition of which was published in Nuremberg in 1532.[33] *De terrae motu* is now, according to Hooykaas, located within a time frame of 13 years, between 1532 and 1545, and was written by a moderate reformer.

Tredwell's conference paper easily concedes this point, as does this thesis. No text is used in the treatise later than Campensis' *Enchiridon Psalmorum*, and so

[33] Hooykaas, *G. J. Rheticus*, p. 18.

the treatise must have been written between 1532 and 1651, beyond any argument. This 119-year span is very large and encompasses many astronomers. If the text was written in the seventeenth century, it is surprising that there are no textual references later than Campensis' 1532 work; however, such an hypothesis is not certain and so additional information must be sought in order to narrow down, if not the time frame, at least some of the extenuating circumstances.

Hooykaas' following two arguments are based largely on the dating that he assigned *De terrae motu*, already casting a shadow on their validity. His third argument proposes: "The work must stem from the circle of Copernicus' friends", because of an apparent familiarity with the development of Copernicus' ideas after the circulation of the "Commentariolus."[34] Further, Hooykaas argues that the author of *De terrae motu* must have had access to a manuscript of *De revolutionibus*. *De terrae motu* does not mention the title of Copernicus' *magnum opus*, but neither did the manuscript version of *De revolutionibus* itself. Unlike other sixteenth-century admirers of Copernicanism, the treatise accepts not only the mathematics of Copernicanism, but also that it is "conformable to nature." That is to say, the author of the treatise "follows Copernicus' *physical* arguments for the motion of the earth and, like Copernicus, he combines Aristotelian and Platonic cosmological ideas." These physical arguments are not developed in the "Commentariolus" and thus indicate an early familiarity with *De revolutionibus*.[35] Therefore, according to

[34] This is Copernicus' first astronomical work, which was an informal account of his heliocentric theory that was circulated in a few copies, roughly thirty years before the publication of *De revolutionibus*. His astronomical theory was essentially formulated at the time of its composition; however, the "Commentariolus" lacks certain specific details present in *De revolutionibus*. Hooykaas roughly dates the "Commentariolus" at 1514.
[35] Hooykaas, *G. J. Rheticus*, p. 18.

Hooykaas, the treatise was written between 1532 and 1545, by a moderate reformer who was close to Copernicus.

As Tredwell suggests,[36] this point hinges on Hooykaas' first argument that the treatise must have been written before the Council of Trent. If the treatise was written after that date, which this chapter has demonstrated to be possible, there is no reason that the author must have only had access to manuscript versions of *De revolutionibus*. The published version of *De revolutionibus* could have been used in order to detail Copernicus' physical arguments regarding the motion of the earth. Thus, the author need not be one of Copernicus' intimates.

Hooykaas' fourth and final argument boldly asserts: "The author must be Rheticus." Before the discovery of this treatise, it was known that both Giese and Rheticus had treatises on the reconciliation of Copernicanism with Scripture, so, Hooykaas argues, this treatise is likely one of those. However, evidence favours Rheticus over Giese. There are parallel passages and similar language in the treatise to the *Narratio prima* and to *De revolutionibus*.[37] However, Hooykaas' primary argument based on the language of *De terrae motu* is the presence of the phrase "*praeceptor meus*."[38] Rheticus used this title for Copernicus in the *Narratio prima* and Giese even referred to Copernicus as "*praeceptor tuus*" in his letter to Rheticus from July of 1543. Additionally, the author of the treatise says that he will not go into astronomical details here because he has done so elsewhere. This assertion fits

[36] Tredwell, "Melanchthon and Rheticus", p. 23.
[37] For the similar passages in *De terrae motu* to the *Narratio prima*, see *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, pp. 72, 81, 97, 101. For similar passages in *De terrae motu* to *De revolutionibus*, see *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, pp. 73, 74, 81, 82, 92, 98, 101.
[38] This means "my teacher," or in Hooykaas' more literal rendering of the Latin into English, "my preceptor."

Rheticus, not Giese. *De terrae motu* also refers to land in the southern hemisphere, which Ptolemy thought to be covered in water. This passage resembles a passage from a letter from Rheticus to the duke Albrecht of Prussia. These quirks in the language indicate that Rheticus, not Giese, is the most likely author of the treatise.[39] Thus, Hooykaas' arguments culminate to suggest: the treatise was written between 1532 and 1545 by Rheticus, who was a moderate reformer and close friend of Copernicus.

Tredwell's treatment of this final argument emphasises that the similarities in language between *De terrae motu* and both the *Narratio prima* and the letter to Albrecht are not sufficient to produce conclusive evidence. These similarities, she suggests could be rooted in a common source, for example. Additionally, if Hooykaas' previous arguments are discounted, the use of "*praeceptor meus*" by the author of the treatise could be a self-conscious imitation of Rheticus. *De terrae motu* only contains this phrase twice,[40] whereas it is used repeatedly throughout the *Narratio prima*. This could be because the *Narratio prima* is specifically expounding the Copernican theory and *De terrae motu* is more concerned with Scripture. Both the *Narratio prima* and *De terrae motu* are concerned with promoting Copernicanism, but the *Narratio prima* promotes the physical arguments in favour of Copernicanism and *De terrae motu* promotes the theological arguments. However, given the regular use of "*praeceptor*" in the *Narratio prima* and Rheticus' clear and continuous reference to Copernicus in that text, one would anticipate its more

[39] Hooykaas, *G. J. Rheticus*, pp. 18-19.
[40] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, pp. 72, 101; *De terrae motu* in Gorlaeus, *Idea physicae*, pp. 15, 63.

frequent use in *De terrae motu*. Tredwell's suggestion that the use of this phrase in *De terrae motu* is in conscious imitation of Rheticus is certainly possible.

Tredwell offers two further considerations regarding the style of composition of the *Narratio prima* and *De terrae motu*. First, she advances her argument against Hooykaas by noting that the treatise writes in the royal "we", rather than the singular "I" that the *Narratio prima* uses.[41] This is a minor difference but it does indicate that at least the style of writing between the two texts is very different, if not a product of different authors. Second, Tredwell suggests that the treatise contains substantially less Greek than the *Narratio prima*, and this is an indication that they were not written by the same individual. Rheticus received a humanist education at Wittenberg under Melanchthon and, thus, use of Greek would be expected. The treatise contains only some short Greek phrases, whereas the *Narratio prima* contained longer ones.[42] Clearly, there are certain differences in style, and the similarities are not enough to resist those differences and prove that Rheticus wrote *De terrae motu*, especially if Hooykaas' previous arguments are discredited.

Apart from the four primary arguments outlined and addressed previously, Hooykaas offers one final consideration regarding the identification of Rheticus as the author of *De terrae motu*. He asserts that even a first reading of the treatise indicates that the author was of an imbalanced character. Hooykaas argues that the

[41] Tredwell, "Melanchthon and Rheticus", p. 23.
[42] Tredwell, "Melanchthon and Rheticus", p. 24. See also the short Greek phrases in *De terrae motu* in Gorlaeus, *Idea physicae*, pp. 3, 12, 14-15, 31, 34, 39, 59; and other than equally short phrases, the longer Greek passages in Georg Joachim Rheticus, *Narratio prima*, edited by Henri Hugonnard-Roche and Jean-Pierre Verdet (Wroclaw: Ossolineum 1982), pp. 41, 55, 57, 58, 68, 82, 85, 86.

treatise shows "waverings" in its style and composition, which paralleled Rheticus' wavering religious life. Such an imbalance in character, Hooykaas suggests, would yield such a treatise.[43] Hooykaas does not explain this point in detail and it is unclear whether the claim has any validity. Apart from the author's assertion that Scripture does not address matters of natural philosophy but, rather, addresses matters of salvation,[44] followed by a detailing of how Scripture does indeed describe natural philosophy and the motions of the heavens,[45] there is nothing in the treatise to suggest an unbalanced character. Perhaps it was contradictory to suggest that Scripture is not concerned with natural philosophy and then to attempt to concern it; however, it can also be read as a simple response to critics. Although Scripture may not intend to address natural philosophy, acknowledging the passages that anti-Copernicans focus on could only strengthen the treatise. Hooykaas' conclusion that Rheticus wrote the treatise does not hinge on this final argument, and it certainly does not gain any strength from it.

Hooykaas' primary arguments and his secondary argument are thus proven to be insufficient to attribute authorship of *De terrae motu* to Rheticus. Each argument that Hooykaas makes relates to the others but the initial argument is itself unstable, as the text was not necessarily written before the Council of Trent. With this exposition in mind, it is surprising that subsequent scholars, with the exception

[43] Hooykaas, *G. J. Rheticus*, pp. 18-19, 24.
[44] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, p. 68; *De terrae motu* in Gorlaeus, *Idea physicae*, p. 8.
[45] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, pp. 92-100; *De terrae motu* in Gorlaeus, *Idea physicae*, pp. 46-63.

of Tredwell, have failed to notice or address these problems within Hooykaas' defence of authorship.

Reviews published on Hooykaas' 1984 volume do not challenge or critically examine his attribution of authorship. Robert K. DeKosky's review does not even address the authorship other than to acknowledge that Hooykaas identified the text. Rather, DeKosky dwells on Hooykaas' claim that by revealing Rheticus' theological position, one can deduce Copernicus' stance on astronomy and Scripture. He says that Hooykaas "furnishes no direct evidence for his claim that 'Rheticus's treatise was as conformable to Copernicus's opinions on the Bible as the *Narratio prima* was conformable to Copernicus's ideas on the system of the universe.'"[46] DeKosky expresses his discontent at Hooykaas' assertions regarding the *implications* of the treatise, but he does not evaluate Hooykaas' *identification* of the treatise. This is a definite shortcoming in DeKosky's review because the treatise had only just been identified and published and no one publicly analysed its validity.

Noel Swerdlow's review addresses the identification of the authorship in more detail than DeKosky's, but he still does not comprehensively analyse Hooykaas' argument. Swerdlow admits that he was sceptical of the authorship when it was initially announced but, when presented with the published volume, he was convinced by the arguments presented within it. Swerdlow does, however, raise one puzzling matter regarding the authorship. Swerdlow argues that the discussion of astronomical hypotheses in the treatise is "uncharacteristic" of Rheticus. The

[46] Robert K. DeKosky, review of R. Hooykaas, *G. J. Rheticus' Treatise on Holy Scripture and the Motion of the Earth*. Amsterdam, Oxford, and New York: North-Holland Publishing Company, 1984, in *Annals of Science* 44:5 (1987), p. 539.

treatise says that astronomical hypotheses cannot be known certainly, which seems contrary to the *Narratio prima*. Hooykaas attributed this to Rheticus' wavering mind, but Swerdlow presents a more reasonable alternative by suggesting that it has more to do with the different intended audiences for the two texts. *De terrae motu* lacks astronomical technicalities and is modest because it was written for a religious audience – the author is intentionally appearing humble and placating an Osianderian crowd.[47] These considerations of Swerdlow's certainly do add to Hooykaas initial argument; however, Swerdlow does not explain his positions to their fullest potential. That is to say, *why* he was initially sceptical of the authorship of the treatise and *how* Hooykaas' published argument persuaded him otherwise remain unclear. Thus, Swerdlow certainly provides a more critical evaluation of Hooykaas' publication than DeKosky does; however, it remains incomplete.

In his 2003 doctoral dissertation, Jesse Kraai attempts to further Hooykaas' argument regarding the authorship of *De terrae motu*. Kraai cites a letter from Rheticus to Paul Eber in June of 1541 in which Rheticus mentions a book being commented upon by the Emperor and being recommended for censure. This book contains "sophistical exchanges." Burmeister thought it likely referred to *De revolutionibus*, but Kraai believes that it refers to the treatise, as, he argues, "if any work ever contained [sophistical exchanges] it is the *Treatise on Holy Scripture and the Motion of the Earth*."[48] Perhaps Kraai's supposition is correct, but it remains far from definitively demonstrated that this book of "sophistical exchanges" *must* be *De*

[47] N. M. Swerdlow, review of R. Hooykaas, *G. J. Rheticus' Treatise on Holy Scripture and the Motion of the Earth*. Amsterdam, Oxford, and New York: North-Holland Publishing Company, 1984, in *Journal for the History of Astronomy* 17:49 (May 1986), pp. 134-5.
[48] Jesse Kraai, "Rheticus' Heliocentric Providence," pp. 119-20. Quotation is taken from p. 120.

terrae motu. If Rheticus did indeed write this treatise, then perhaps it is to that text that this phrase refers; however, the phrase itself does not prove that this text must be by Rheticus. Kraai tries to contribute to this discussion of the validity of the authorship, yet he does not lay the case to rest.

In her 2005 conference paper, Tredwell not only specifically addresses Hooykaas' arguments, but she also presents her own arguments that suggest that Rheticus was *not* the author of the treatise. Tredwell thus provides a greater contribution to the analysis of the treatise than anyone since Hooykaas. She suggests two additional reasons that Rheticus is not a likely candidate for authorship; however, they still are insufficient to settle the debate.

First, Tredwell argues that Rheticus would not have quoted Campensis at the time that Hooykaas asserts that the treatise must have been written because of a patronage dispute. Copernicus was in a dispute with the bishop of Ermland, Johannes Dantiscus, between 1539 and 1541. However, the treatise quotes Campensis who was a member of Dantiscus' *familia*, which Rheticus would not have done in the middle of a dispute. Rheticus demonstrated his sensitivity to questions of patronage when he wrote the *Narratio prima*, establishing patronage ties with the Duke of Prussia in an effort to further protect Copernicus and his theory. Therefore, it is unlikely that he would brazenly quote someone whose patron was in a dispute with Copernicus.[49] This is a careful observation and seems quite accurate. Moreover, Dantiscus condemned all Lutherans[50] and so, on a personal level, as a Lutheran, Rheticus is unlikely to quote a member of Dantiscus' *familia*, unless Rheticus

[49] Tredwell, "Melanchthon and Rheticus," pp. 24-25.
[50] Hooykaas, *G. J. Rheticus*, p. 22.

intended this unlikely reference to Dantiscus to further disguise his authorship of *De terrae motu* along with the identity of Copernicus. Again, this evidence is not conclusive, but it does question Hooykaas' easy attribution of authorship to Rheticus.

Tredwell's final argument against Rheticus' authorship of *De terrae motu* is that the text treats the question of the eternity of the world differently than Melanchthon did. Melanchthon argued that discussions regarding the eternity of the world should only ever assert their conclusions to be "probable." However, *De terrae motu* asserts that the arguments regarding Aristotle's proofs of the eternity of the universe are "valid" (a stronger claim than Melanchthon would make), only to be disproven by Scripture.[51] Because the author of *De terrae motu* does not himself ascribe to an eternal universe, coupled with the fact that this is a very minor part of the text, dwelling on this distinction in the language of "probable" or "valid" is not significant to disproving Rheticus as the author.

Let it suffice to say that although Tredwell's arguments are not conclusive, she certainly provides some evidence to counter Hooykaas' attribution of authorship. She asserts that the treatise was likely written in the early seventeenth century, at the same time as the tract with which it was published and bound, and at the same time as the many other texts around the time of Galileo's trial on the same subject. Hooykaas considers certain aspects of the treatise carefully; however, when Tredwell's arguments are examined, Hooykaas' determination of authorship is insufficient on its own, as are the majority of scholarly reactions to it. This chapter

[51] Tredwell, "Melanchthon and Rheticus," p. 25.

indicates that Hooykaas' 1984 publication was in need of further consideration, as is the authorship of *De terrae motu* in general. This chapter extends Tredwell's arguments by examining her claims in more detail alongside Hooykaas' own claims. It remains possible that Rheticus did indeed write *De terrae motu* but it is far from demonstrated. In order to further deduce the likely authorship of the text, the trends of early modern scriptural hermeneutics and hermeneutical texts in contrast to *De terrae motu* must be examined, which will further complicate and question Hooykaas' immediate attribution of the text to Rheticus.

CHAPTER 5: GENERAL TRENDS OF EARLY MODERN SCRIPTURAL HERMENEUTICS

References to God and to Scripture are common in early modern astronomical texts, especially when related to the Copernican theory, in an effort to justify this new astronomy in a divine context. Catholics and Protestants alike were concerned to reconcile their natural philosophy with their theology. This chapter contains a theoretical consideration of the trends in hermeneutical styles and methods throughout the early modern period, situating *De terrae motu* in a more specific theological context than Hooykaas provided. The arguments presented in this chapter are based on what scenario for the authorship of the text is most probable. Unfortunately, as will be demonstrated presently, the evidence offered in this chapter equally favours either a Catholic or a Protestant author. That ambiguity *could* indicate that Rheticus wrote the text because of his connections to both Lutheranism and Catholicism, as discussed previously. However, the themes and style of *De terrae motu* do favour a seventeenth-century style of composition over a sixteenth-century style, arguing against Rheticus' authorship of the text.

De terrae motu contains various references that would suit either a Protestant or a Catholic author and makes references that relate it both to the sixteenth and seventeenth centuries. This lack of clarity is not entirely surprising when one considers the lack of clarity throughout the early modern period: the early moderns simultaneously looked back to the medievals and the ancients in order to ground themselves in history *and* looked forward to the future, making many new discoveries. The Protestant Reformation is an example of this desire to

return to a purer Christianity that existed before its corruption by the Roman Catholic Church and the Church Fathers while also moving forward with a vision for a better Christianity. Similarly, Copernicus' heliocentric discovery was new and revolutionary; however, he cites ancients who also proposed the motion of the earth and his successors are eager to dispel any charge of novelty.[1] Both the theology and the natural philosophy of the early modern period drew from the past in order to progress into the future. *De terrae motu* draws on the authority of Saint Augustine, a long accepted Church authority, as well as Scripture alone, all while promoting and justifying Copernicus' new heliocentric theory with Scripture. The themes that *De terrae motu* draws on cross confessional and temporal boundaries and the text looks back to the past while pushing into the future as much as the early modern period itself does.

Copernicus himself was born a Catholic and died a Catholic, and was strong both in his faith and in his astronomy. Although the conflict between Copernicanism and Scripture had not yet arisen, Copernicus remained aware of the potential disputes that could arise from suggesting a heliocentric cosmos. In his prefatory letter to *De revolutionibus*, addressed to Pope Paul III, Copernicus appealed to the autonomy of mathematics in his own attempt to reconcile his new theory with apparently contradictory passages of Scripture. He writes, "There may be triflers who though wholly ignorant of mathematics nevertheless abrogate the right to make judgements about it because of some passage in Scripture wrongly twisted to

[1] For Copernicus' efforts to align himself with ancient theories regarding a mobile earth and a central fire, see Copernicus, *De revolutionibus*, pp. 25-26. For Rheticus' efforts to orient Copernicus as an extension and correction of Ptolemy, see Rheticus, *Narratio prima* in *Three Copernican Treatises*, pp. 109, 132. See also Howell, *God's Two Books*, pp. 59-60.

their purpose… Mathematics is written for mathematicians."[2] Copernicus attempts to bestow some dignity to mathematics and astronomy and separate them from the contents of Scripture. Although these debates regarding the place of Scripture in natural philosophical matters were not yet widespread, they eventually became heated in the seventeenth century, particularly regarding the trial of Galileo, and so Copernicus was quite proactive by addressing them in *De revolutionibus*.

De revolutionibus was only published as Copernicus was on his deathbed; however, it was in the process of printing and publishing before this. Rheticus, of course a Lutheran, encouraged Copernicus to publish the text and he initially oversaw its printing. When he was eventually unable to continue his work with the text because of other duties, Osiander, another Lutheran, assumed Rheticus' position.[3] Osiander attached an anonymous letter to *De revolutionibus* that argued that the hypotheses presented within the text by Copernicus be taken only as mathematical models and that they had no bearing on reality. As previously described, Copernicus was aware of the potential problems with his theory, as was Osiander. However, Copernicus' concern was explicitly Scriptural, whereas Osiander's was institutional. Osiander was concerned with preserving the Aristotelian hierarchy of disciplines where mathematics was distinct from true natural philosophy. Mathematical hypotheses could be used to derive information, but they need not represent any physical reality. Howell speculates that this could be Osiander's attempt to allow Copernicanism to be taught in universities that were

[2] Copernicus, *De revolutionibus*, pp. 26-27.
[3] Westman, "The Copernicans and the Churches," p. 80.

steeped in Aristotelian education rather than any hermeneutical concern.[4] Whatever the case may be, both Copernicus and Osiander were clearly immediately concerned that *De revolutionibus* would not be well received.

Copernicus and Osiander were of different Christian confessions, yet, in their case, the Catholic was more willing than the Protestant to contradict the accepted reading of Scripture and the accepted Aristotelian position that the cosmos were geocentric. Although Copernicus and Osiander both saw the need to address conflict with Scripture, *De revolutionibus* did not come under direct fire upon its publication. Copernicanism was circulated and received with varying degrees of support but its relation to Scripture did not arise with any urgency.

There are no clearly documented comments from either Luther or Calvin about Copernicus; however, Melanchthon did write about Copernicanism, denouncing its physical reality. Melanchthon eventually allowed the theory to be taught as a means for astronomical calculations but he did not believe that the cosmos was heliocentric or that the earth was in motion.[5] Wittenberg was the primary seat for the earliest dissemination of Copernicanism and Melanchthon's attitude towards Copernicanism was critical to its earliest reception.[6] Rheticus, of course, promoted and taught Copernicanism, including both its mathematics and its physical reality; however, most natural philosophers and astronomers agreed with Melanchthon's interpretation of Copernicanism, including Reinhold and Peucer. Melanchthon also believed that there was a strong link between theology and

[4] Howell, *God's Two Books*, pp. 44-48.
[5] Westman, "The Copernicans and the Churches," pp. 82-84.
[6] Howell, *God's Two Books*, p. 10.

education and, more specifically, he believed that astronomy could be used to combat atheists as it evidenced God's work in this world.[7]

Although Melanchthon embraced astronomy as a means to prove the existence of God and allowed aspects of Copernicanism to be taught, he was also very suspicious of novelty and looked back in time for reform instead of looking forward.[8] Melanchthon was a humanist and regarded the revival of forgotten or neglected knowledge as fundamentally important. He believed strongly in the clarity of Scripture and the importance of affirming it. Although he stressed the importance of natural philosophy, it was always subject to the Bible and he used the Bible to either confirm or deny arguments suggested by natural philosophical investigation.[9]

De terrae motu is similar to Melanchthon's approach in certain ways. The treatise primarily uses the Vulgate, as Hooykaas noted, but also references other translations. The use of other translations parallels Melanchthon's desire to look back to more original and incorrupt knowledge; however, the primary dependence on the Vulgate simultaneously contradicts that. Melanchthon himself did use the Vulgate for certain lectures but used what he deemed to be better-translated editions of the Bible for others.[10] That *De terrae motu* uses the Vulgate so thoroughly implies that it may not have a close Philippist association and one would expect otherwise from a text written by Rheticus.

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[7] Howell, *God's Two Books*, pp. 39-51.
[8] Howell, *God's Two Books*, p. 56.
[9] Howell, *God's Two Books*, p. 71.
[10] Timothy J. Wengert, *Human Freedom, Christian Righteousness: Philip Melanchthon's Exegetical Dispute with Erasmus of Rotterdam* (New York: Oxford University Press, 1998), p. 32.

In addition to its use of the Vulgate, there are other aspects of *De terrae motu* that resist its easy categorisation as a Protestant text. Although the text criticises Academics and asserts that one must surrender to the Word,[11] it also suggests that this theory must "submit to the judgement of the Church."[12] It is unlikely that, at the height of the fervour of the Protestant Reformation at Wittenberg, one trained by Melanchthon would encourage submission to the Church. The author of *De terrae motu* writes, "And if, maybe through our imprudence, anything which will be contrary to the Holy Church, to the Holy and Catholic faith and the authority of God's Word has escaped our notice, let it be annulled and condemned."[13] This, at the same time, defers both to the Church (Catholic deference) and to God's Word (Protestant deference). Because *De terrae motu* does not immediately reveal whether it aligns itself more with Catholicism or Protestantism, and because this aspect of the text is so foundational to Hooykaas' attribution of a *terminus ad quem* to *De terrae* motu, a closer look at Catholic and Protestant doctrine, as well as modes of biblical interpretation, is required.

In the mid-sixteenth century, confessional distinctions were not yet entirely defined. When dealing with such early texts as *De terrae motu* in the Protestant Reformation, if it was indeed written by Rheticus, it is difficult to define what precisely characterises a Catholic text versus a Protestant text, unless they espouse a very specific doctrine. The themes of the text must be examined alongside

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[11] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, p. 66; *De terrae motu* in Gorlaeus, *Idea physicae*, p. 3.
[12] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, p. 82; *De terrae motu* in Gorlaeus, *Idea physicae*, p. 32. Quotation is taken from the Hooykaas volume, here and below.
[13] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, p. 73; *De terrae motu* in Gorlaeus, *Idea physicae*, p. 16.

predominant themes in both Catholic and Protestant hermeneutics in order to determine with which confession *De terrae motu* most closely aligns. Such a consideration is not flawless because of the lack of confessional distinctions during the mid-sixteenth century in comparison to the seventeenth century but it does help orient the style of hermeneutics used in *De terrae motu*.

In the initial movement to publish *De revolutionibus*, the Lutheran Rheticus and Osiander worked together with the Catholic Copernicus and Giese without their different religions disrupting their natural philosophical work. Westman argues that the conflict between Scripture and *De revolutionibus* only came to the forefront years after its publication but, until Galileo's outright conflict with the Catholic Church, the main theological discussion that had bearing on natural philosophy was how to interpret the Bible. This did not stem from the publication of *De revolutionibus* or any direct debates about heliocentrism; rather, it came from the Protestant Reformation and differing ideas about how Scripture should be read and interpreted. Questions circulated regarding to what extent the Bible ought to be read literally, how far allegorical interpretation can extend, and on whose authority these decisions rest.[14] The answers to these questions differed greatly between Protestants and Catholics.

One of Luther's primary problems with the Catholic interpretation of Scripture was that it relied too heavily on allegory and the authority of the Church Fathers. Luther often resorted to the historical meaning of the Bible in order to combat the Catholic allegorical assertions. The primary meaning of Scripture in the

[14] Westman, "The Copernicans and the Churches," p. 76.

Protestant Reformation shifted from allegorical interpretations of biblical events that were given contemporary significance to a historical reading that recounted past events.[15]

That is not to say, however, that a Protestant reading of the Bible is strictly literal. Protestants believed that that Bible was a unified story that flowed from the Old Testament into the New Testament in a single narrative but, in order for this to be possible, Protestants did have to engage with some method of biblical interpretation, other than the despised Catholic allegorical or anagogical interpretation of Scripture.[16] Protestants believed in the sufficiency and clarity of Scripture and believed that where Scripture was unclear or required interpretation, other parts of Scripture would illuminate the unclear passage.[17] Protestants thus rejected the authority of the Church Fathers and *sola scriptura* was their official stance.

The Catholic Church addressed these Protestant objections to Catholicism in the Council of Trent, asserting that the Vulgate was the only acceptable translation of the Bible and the only acceptable interpretation of it was by the Church Fathers. Although not all Catholics adhered to these Tridentine decisions, as discussed in the fourth chapter, many did for the most part. For example, Howell notes, Jesuit astronomer Christopher Clavius made various assertions about what *seemed* to be going on in Scripture in relation to nature but he made no definitive claims. This

[15] Peter Harrison, *The Bible, Protestantism and the rise of natural science* (Cambridge: Cambridge University Press, 1998), p. 122.
[16] Westman, "The Copernicans and the Churches," pp. 89-90.
[17] Howell, *God's Two Books*, pp. 26, 42.

comes from Clavius' knowledge that only the Church Fathers can make certain interpretations of Scripture.[18]

After the Council of Trent, and following Clavius' example, biblical interpretation became more complicated because there were now specific restrictions placed on it. This particularly complicated natural philosophical work done by Catholics because any discoveries that disagreed with a literal reading of Scripture could not be easily excused through an alternative interpretation of the problematic passage of Scripture. However, as previously mentioned, both Protestants and Catholics had to depart from a literal reading of Scripture and resort to Scriptural interpretation for different ends. Catholics primarily relied on allegory and Protestants relied on a historical reading of Scripture. They both, however, utilised the principle of accommodation within their interpretive structures.

In his 1993 book on the use of accommodation within the Judeo-Christian tradition, Stephen D. Benin defines accommodation thus: "Divine accommodation/condescension alleges, most simply, that divine revelation is adjusted to the disparate intellectual and spiritual level of humanity at different times in history."[19] Benin's work considers accommodation not only in a strictly scriptural sense, but in all aspects of Judeo-Christian history. Peter Harrison's *The Bible, Protestantism, and the rise of natural science* is more specific to the principle of accommodation being applied to Scripture in order to reconcile it with natural philosophy. Harrison emphasises the seventeenth-century belief that biblical

[18] Howell, *God's Two Books*, p. 185.
[19] Stephen D. Benin, *The Footprints of God: Divine Accommodation in Jewish and Christian Thought* (Albany, NY: State University of New York Press, 1993), p. xiv.

language accommodated itself to the time that it was written and to the people contemporary with that time.[20] Harrison further writes, "The literal interpretation of the Bible is thought to have acted as an impediment to the advancement of the sciences… However, this seventeenth-century dispute was more to do with the rights of individuals to make their own determinations about how the books of nature and Scripture were to be read."[21] Harrison's assessment is correct but, although the use of accommodation is famous in the seventeenth century, it extends before and after the seventeenth century and is by no means limited to this period. At that time, the Catholic Church resisted personal interpretation of Scripture, while Protestants generally allowed it as long as it remained within the literal-historical framework, but both confessions employed the principle of accommodation.

Accommodation was also a useful tool for Protestants and Catholics alike because it allowed apparently contradictory passages in the Bible to be reconciled. Westman argues that because the Bible had passages that contained "references to the stability of the earth, the sun's motion with respect to the terrestrial horizon, the sun at rest, and the motion of the earth," accommodation was utilised to reconcile these apparently contradictory passages.[22] The principle of accommodation asserts that the Bible is accommodated to human speech and understanding and, for that reason, a literal reading of the Bible cannot be trusted as a true source for all information. The Bible is written in order to communicate with imperfect humans and so different language is used in order to assert various points; however, this

[20] Harrison, *The Bible*, p. 132.
[21] Harrison, *The Bible*, p. 267.
[22] Westman, "The Copernicans and the Churches," p. 90.

language is not always consistent with itself or with the natural world, depending on what information was being conveyed. From this principle of accommodation, the "Two Books" theory emerged. That is, that Scripture and nature both contain the same truth about God and creation; however, they are written in two separate manners and must therefore be interpreted in separate manners. Like accommodation, this "Two Books" theory is present in Augustine and was used by both Protestants and Catholics.[23]

Not only was this principle a tool common to Protestants and Catholics in general, but also it was the Copernicans' most significant tool for justifying their heliocentric cosmos. Non-Copernicans also used accommodation, but the early Copernicans particularly embraced it.[24] Howell argues that Copernican accommodation was not a new exegetical strategy; rather, it was applying old methods to new situations. He suggests that scriptural hermeneutics were more complicated than literal versus figurative interpretation and that all biblical interpretation is entrenched in Church history. Methods evolved, but accommodation as a tool always existed. The early Church Fathers used the principle of accommodation to explain the anthropomorphisation of God and, with the publication of *De revolutionibus*, it was being reemployed to explain the apparent geocentrism in Scripture.[25] Howell previously argued that there was a growing concern in the early modern period to provide a "true account of the heavens" through different means and models, and with two such opposing

[23] Westman, "The Copernicans and the Churches," pp. 90-95.
[24] Howell, *God's Two Books*, pp. 5, 11.
[25] Howell, *God's Two Books*, pp. 221-23.

astronomical models as geocentrism and heliocentrism, accommodation was an invaluable interpretive tool for the heliocentrists in order to combat the accepted geocentrism.[26]

Howell's assessment regarding the concern for an accurate cosmology is correct. Certainly with the publication of *De revolutionibus* and the slow but sure adoption of it by more astronomers, notably Kepler and Galileo, there was a concern to define what the true cosmic structure was. But that is not to say that this concern did not already exist to any extent. In the ancient world, Plato wrote his *Timaeus* that described creation and outlined the cosmographical structure, and Aristotle wrote *On the Heavens*. Of course, Ptolemy's *Almagest* also defined in more detail and with more mathematics how the cosmos functioned. These representations were determined in their times to be accurate. The need to provide an accurate cosmology is not uniquely early modern, but the concern certainly does increase during this period with two strong rival astronomies.

De terrae motu is certainly characteristic of the early modern period, whether it was written in the sixteenth or seventeenth century. It clearly exhibits this *increased* early modern concern to provide an accurate cosmological account and, as is so common in early modern astronomical texts, it frequently calls on the principle of accommodation in order to convey the physical accuracy of Copernicanism and unite it with Scripture. The author of *De terrae motu* writes, "When there is mention in the sacred writings of the things of nature, it is clear that the Holy Spirit does not want to speak of them in the manner of Philosophers, but in

[26] Howell, *God's Two Books*, p. 24.

another way."[27] One cannot use the same language to interpret the works of "Philosophers" as one does to interpret Scripture. The treatise asserts that one should "assent firmly to the articles of faith;"[28] however, a description of nature does not always relate to faith and need not be simply assented to. This relates to the position expressed by Copernicus in the prefatory letter to *De revolutionibus*: Copernicus believed that mathematics should be left to the mathematicians and that mathematics was not the concern of Scripture. Similarly, the author of *De terrae motu* argues that "many passages of Scripture could be collected by way of showing that Scripture often accommodates itself to popular understanding, and does not seek exactness in the manner of the Philosophers."[29] Separate modes of interpretation must always be applied to Scripture and natural philosophy.

The author of *De terrae motu* most clearly and succinctly grounds his use of accommodation in Augustine and summarises his position thus:

> St. Augustine has the prudent insight that Scripture has deliberately forgone an exact description of the nature of things since, as he says elsewhere, the Spirit of God did not wish to teach men things which would not be an aid to anybody's salvation. For who would maintain that knowledge of physics is necessary for salvation? Further he takes also into account how Scripture borrows a style of discourse, and idiom of speech or a method of teaching from popular usage, *so that it may also fully accommodate itself to the people's understanding, and not conform to the wisdom of this world*.[30]

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[27] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, p. 67; *De terrae motu* in Gorlaeus, *Idea physicae*, pp. 4-5. Quotation is taken from the Hooykaas volume, here and below.
[28] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, p. 67; *De terrae motu* in Gorlaeus, *Idea physicae*, p. 4.
[29] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, p. 87; *De terrae motu* in Gorlaeus, *Idea physicae*, p. 39.
[30] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, pp. 68-69; *De terrae motu* in Gorlaeus, *Idea physicae*, p. 8.

The author is thus justifying the Copernican position in light of Scripture because Scripture apparently does not accurately address all matters of nature. Importantly, this stance is located in Saint Augustine, both an important authority of the Catholic Church and important to Lutherans.

Although known for his position on accommodation in Scripture, this mode of biblical interpretation did not originate with Augustine. As previously noted, Benin's book traces the history of accommodation in the Judeo-Christian tradition, and, though he notes the significance of accommodation to the medieval period, it does not begin there. Benin argues that medieval Jewish and Christian philosophers believed that the teaching of God's work was an extremely difficult task but was made possible through the Torah and incarnation of Christ, respectively. God's word could only be transmitted to humans through imperfect and worldly objects and that was the purpose of Scripture and of Christ so that God could accommodate himself to human understanding.[31] In Benin's survey, the roots of this medieval stance reach back to the first century of the Common Era and, of course, stretch past the early modern period, when it was used to reconcile Copernicanism with Scripture, to the eighteenth century.

Benin begins his consideration of the principle of accommodation with Justin Martyr, a first-century Christian apologist. Justin wanted to account for Christians' non-observance of the Mosaic Code and comes to argue that some of the demands that God makes in the Torah were God "accommodating [harmosámenos] Himself to

[31] Benin, *The Footprints of God*, p. xiv.

the people."[32] From this early stage in Christian history, the Bible was being reinterpreted to account for manners of speech that related to the historical context of when the Torah was written. Although not yet applied to matters of natural philosophy, the concept of accommodation is deeply entrenched in Christian history.

In Benin's later consideration of the medieval period, his emphasis is predictably on Augustine. Benin notes that in one of Augustine's earliest works, *De magistro*, Augustine "raises questions about the meaning of vocabulary and signs," arguing that words are signs.[33] Scripture, for Augustine, bridged the gap between the human and the divine, as the words of Scripture have greater meaning than their literal interpretation suggests. Scripture is a communicator and, in order to communicate, it must use language and, thus, signs. Augustine held that Scripture is cryptically written and must be carefully examined in order to extract truth.[34] On the matter of natural philosophy and Scripture, Augustine writes, "When they are able, from reliable evidence, to prove some fact of physical science, we shall show that it is not contrary to our Scripture."[35] Augustine allows that knowledge of nature may depart from what Scripture literally says and, in those cases, one must interpret Scripture accordingly. Further, Augustine argues that Scripture "has been written to nourish our souls" and relates to salvation, rather than perfect knowledge of nature.[36] Although Augustine is not the first to use accommodation, it is an

[32] Benin, *The Footprints of God*, p. 4.
[33] Benin, *The Footprints of God*, p. 94.
[34] Benin, *The Footprints of God*, pp. 95-97.
[35] Augustine, *The Literal Meaning of Genesis*, volume I, trans. John Hammond Taylor (New York: Newman Press, 1982), p. 45.
[36] Augustine, *The Literal Meaning of Genesis*, vol. I, p. 43-44. Quotation is from p. 43.

important principle that recurs in various works by him, which he applies to reconciling natural philosophy and Scripture.

When Benin's survey progresses into the early modern period, the perpetuation of these Augustinian principles is obvious. Luther greatly admired Augustine and, in his great concern to read Christianity back into the Old Testament and align Scripture with history, accommodation was an important principle for him. Following principles of accommodation, it was easy to reconcile the Old Testament with the New Testament, along the same lines as Justin did.[37] Calvin, on the other hand, focused more on the person of Christ than on Scripture itself. Scripture became, for Calvin, a means to access knowledge of Christ. Calvin considered God to be inaccessible and made Christ the object of faith, and he is known through Scripture. Benin writes, "Since for Calvin all knowledge and truth were contained in Scripture, and since knowledge and truth could not be obtained by humans but had to be given them, then Scripture, in some way or other had to be tempered to the human capacity."[38] The accommodation of the language in Scripture to human capacities is necessary for understanding of Christ, as God will always be beyond human understanding, even if the guides to divine understanding are accommodated to human understanding.

From this Reformation use of accommodation, Benin goes on to address the eighteenth century. He argues that the principle of accommodation then becomes a means to bridge the gap between the secular and sacred.[39] He does not extensively

[37] Benin, *The Footprints of God*, pp. 186-87.
[38] Benin, *The Footprints of God*, p. 189.
[39] Benin, *The Footprints of God*, pp. 199, 212.

consider the role of accommodation in natural philosophy in any of these far-reaching time periods; however, his point that accommodation has a long history in Christian biblical interpretation is well received.

The fact that the use of the principle of accommodation is so historically far-reaching indicates that it is a difficult concept to use in order to help date *De terrae motu*. It was certainly used in the Reformation, as Benin makes explicit, but Protestants and Catholics alike also used it in the seventeenth century, *particularly* in discussions regarding the status of astronomy and of heliocentrism. Although Catholics and Protestants shared the principle of accommodation, they still differed in their biblical interpretations, as well, as are outlined previously in this chapter. These methods of interpretation for both Catholics and Protestants, however, did not ensure that either confession would agree amongst themselves on how to interpret particular passages. Howell argues that Protestants were often as divided amongst themselves as they were divided from the Catholics when it came to matters about natural philosophy, and particularly astronomy, because both groups were able to appeal to the principle of accommodation but both groups also officially ascribed to geocentrism.[40] Thus, Catholic and Protestant modes of interpretation are easy to define in theoretical terms, but the applications of these modes are not always as simple as their definitions.

Just as the different modes of biblical interpretation between Catholics and Protestants are complicated in their application, the ways in which their respective theological positions influenced their natural philosophy are also complicated. Gary

[40] Howell, *God's Two Books*, p. 225.

B. Deason argues that there was no systematic natural philosophy within Reformation theology.[41] Of course, as previously described, Melanchthon played a significant role in the study of natural philosophy in the Protestant world, but it was not strictly a part of Lutheran theology. Deason suggests that since Protestants believe in the passivity of all of nature, including man, God is bestowed with more power for Protestants than he is for Catholics because through his radical sovereignty he controls everything and matter has no inherent power.[42] Other than the passivity of nature, no other natural philosophical method was defined and Protestant natural philosophers had to apply the theological principles with which they were familiar to their natural philosophy in the manner that they saw fit. This left enough room for multiple methods and approaches to the study of nature to arise and it is not surprising that, as Howell suggests, Protestants were as divided amongst themselves as they were divided from the Catholics.

Similarly, William B. Ashworth Jr. argues that there was no distinct "Catholic science" either. He asks questions that relate to whether the faith of Catholic natural philosophers truly affected their studies, what role the Church played in the practice of natural philosophy, and whether patterns of thought emerge amongst these Catholic natural philosophers. In sum, he asks, "What difference did the Catholic faith make for the seventeenth-century scientist?"[43] In order to answer this question, he considers the work of Marin Mersenne, René Descartes, Pierre

[41] Gary B. Deason, "Reformation Theology and the Mechanistic Conception of Nature," in *God and Nature: Historical Essays on the Encounter between Christianity and Science*, eds. David C. Lindberg and Ronald L. Numbers (Berkeley: University of California Press, 1986), p. 173.
[42] Deason, "Reformation Theology," p. 184.
[43] William B. Ashworth, Jr., "Catholicism and Early Modern Science," in *God and Nature: Historical Essays on the Encounter between Christianity and Science*, eds. David C. Lindberg and Ronald L. Numbers (Berkeley: University of California Press, 1986), pp. 136-37.

Gassendi, Blaise Pascal, and Nicolas Steno. From such a study he concludes that Catholics, particularly Mersenne and Pascal, were as able to disregard authority in matters of natural philosophy as Protestants were.[44] These Catholic natural philosophers were all motivated by their faith, but this motivation led them all to different conclusions. Ashworth argues, "It means that nothing was inherently denied to the Catholic scientist by his personal faith. He could be, and was, rationalist, empiricist, skeptic, mechanical philosopher, mystic, natural theologian, atomist, or mathematizer."[45] Thus, on a personal level, there was nothing that was necessarily beyond the reach of a Catholic that was within the reach of a Protestant.

However, the obvious objection to such a statement arises regarding the status and authority of the Roman Catholic Church in matters of natural philosophy. Ashworth complicates his argument of Catholic capability in natural philosophy by arguing that the Catholic Church was not more resistant to new ideas than any other institution, but it did uniquely have the hierarchy and bureaucracy to deal with their disagreements systematically.[46] This gave the impression of a more aggressive attitude amongst Catholics than amongst Protestants towards innovation in natural philosophy but was actually just institutional organisation and efficiency. As Ashworth puts it, "The lack of a Catholic pattern considerably weakens the case for a Protestant one."[47] With individual Catholics established to be able to do the same work as individual Protestants, and the Catholic Church as no less resistant to

[44] Ashworth, "Catholicism," p. 143.
[45] Ashworth, "Catholicism," p. 147.
[46] Ashworth, "Catholicism," p. 148.
[47] Ashworth, "Catholicism," p. 147.

innovative natural philosophy as Protestant groups, the easily identifiable traits of a Catholic natural philosophy are removed.

Thus, a distinctly Catholic or Protestant natural philosophy cannot be defined and, although distinctly Catholic and Protestant doctrines can be defined, the application of these doctrines to the interpretation of Scripture cannot always be distinguished from each other. *De terrae motu* does not contain any specific theological doctrines that allow it to be easily identified as a Catholic or a Protestant work. Additionally, although accommodation was used well before the sixteenth century and well after the seventeenth century, its specific application to questions of natural philosophy and particularly astronomy, which this chapter gestures to, is *more* characteristic of the seventeenth century, making this later date of composition more probable. Thus, the contents of *De terrae motu* slightly favour a seventeenth-century composition rather than a sixteenth-century composition, although the specific Christian confession of the author remains undetermined.

CHAPTER 6: EARLY MODERN HERMENEUTICAL TEXTS AND THEIR RELATION TO *DE TERRAE MOTU*

The theoretical consideration of early modern scriptural hermeneutics in the previous chapter indicated that natural philosophical texts do not always contain themes or subjects that clearly indicate the theology of the author. *De terrae motu* appears to suit seventeenth century trends in Copernican texts but a theoretical consideration did not indicate whether it was more likely to have been written by a Catholic or a Protestant author. Given the multitude of texts written on the subject of Copernicanism and Scripture, a close reading of these particular texts indicates some of the themes that actually did appear in the writings of Protestant and Catholic authors over the sixteenth and seventeenth centuries that were inaccessible from a theoretical perspective.

By considering *De terrae motu* against Rheticus' *Narratio prima*, other hermeneutical texts produced in Wittenberg in the sixteenth century, as well as both Catholic and Protestant hermeneutical texts from the seventeenth century, this chapter corroborates the supposition of the previous chapter, that *De terrae motu* has more in common with seventeenth-century texts than sixteenth-century texts, and also indicates that a Catholic author is more likely than a Protestant author. The arguments presented in this chapter are based on the *probability* that the author of the text is Catholic and from the seventeenth century, rather than any certain evidence that indicates the identity of the author. Such specific considerations between various texts will involve attention to the medium in which the hermeneutics are presented, a consideration of the language utilised to express a

given position regarding astronomy and Scripture, and an eye to the specific content and matters addressed in the texts.

The first text to which *De terrae motu* will be compared is Rheticus' *Narratio prima*. This comparison indicates whether there are further similarities or differences than Hooykaas outlined in 1984 and, with more confidence, whether Rheticus could indeed be the author. This consideration will be followed by an examination of two texts regarding astronomy and Scripture from Wittenberg, written during Rheticus' lifetime: Melanchthon's *Initia doctrinae physicae, dictata in Academia Vvitenbergensi* and Peucer's *Elementa doctrinae de circulis coelestibus, et primo motu*. Such a consideration further indicates whether the treatise is characteristic of a student of Wittenberg and early Lutheran reformer.

The chapter then moves on to a consideration of those hermeneutical texts written in the early seventeenth century that are from the genre that immediately preceded the anonymous publication of the treatise. Although the immediate context of the Protestant Reformation had passed by this time, the process of "confessionalisation" lasted well beyond the sixteenth century. Lutherans, Calvinists, and Catholics began to define their distinct confessions more precisely, and these distinctions became not only a part of their religious practices, but also a part of their secular laws.[1] These later seventeenth-century texts display the confessional differences more clearly than the sixteenth-century texts do and allow for a later and more theologically-specific comparison to *De terrae motu*.

[1] Wiesner-Hanks, *Early Modern Europe*, pp. 151, 366.

However, there was not total silence regarding the Copernican theory between the Wittenberg scholars and the early seventeenth-century authors. A late sixteenth-century scholar Diego de Zuñiga published in favour of the Copernican theory in his *In Job commentaria*, and this text will be considered in due course. Following Zuñiga, the early seventeenth century saw the publication of many more texts that were concerned with reconciling Copernicanism with Scripture, from Protestants and Catholics alike. From this genre, this chapter considers Kepler's *Astronomia nova*, Foscarini's *Letter to Fr. Sebastiano Fantone, General of the Order, Concerning the Opinion of the Pythagoreans and Copernicus About the Mobility of the Earth and the Stability of the Sun and the New Pythagorean System of the World* and Galileo's *Letter to the Grand Duchess Christina*. The examination of the aforementioned texts indicates that the treatise is somewhat characteristic of the sixteenth century, but more characteristic of the seventeenth century. It shares many similarities with Galileo's *Letter* and little with the texts by the Wittenberg authors, and, from this perspective, was *most likely* written by a Catholic who perhaps either had access to Galileo's *Letter* or who was in discussion with Galileo. However, to complicate this assertion, this chapter concludes with a return to the treatise itself with an examination of two particular passages that *could* work within the frame of a Galilean authorship, but also strongly recall Rheticus. Thus, Hooykaas' attribution of authorship to Rheticus is certainly conceivable, but a seventeenth-century Catholic, if not Galilean, authorship is more probable.

The content of Rheticus' *Narratio prima* arose previously in this thesis in relation to Rheticus' Copernicanism and in Hooykaas' defence of the authorship of

the treatise. Hooykaas relied on the *Narratio prima* primarily for its use of the term "*praeceptor meus*," Rheticus' common means of referring to Copernicus, which also appears in *De terrae motu*. Apart from this "*praeceptor*" argument that Hooykaas asserts, the similarities between the *Narratio prima* and the treatise are few. The *Narratio prima*, like the treatise, engages with Aristotle, but that is not something unique to be expected only from Rheticus; rather, engagement with Aristotle is to be expected from any early modern astronomical text, as he, along with Ptolemy, were the leading astronomical authorities.[2] More interestingly, Rheticus asserts in the *Narratio prima* that misinformation about the heavens comes from humanity's terrestrial perspective.[3] This assertion is not the same as positing the principle of accommodation as the author of *De terrae motu* does; however, it is similar to accommodation insofar as incorrect interpretation, be it of Scripture or of nature, is related to imperfect human understanding.

Thus, the similarities between the *Narratio prima* and *De terrae motu* are few and relatively insignificant when contrasted with the differences. The two texts share the language related to "*praeceptor*" and an expected engagement with Aristotle, but little else. Before expounding the differences between the texts, however, it is important to note that the *Narratio prima* and *De terrae motu* are two different genres of writing. If Rheticus did write both texts, one would still expect certain differences in style, language, and structure between them. The *Narratio prima* primarily concerns astronomy and mathematics, whereas *De terrae motu*

[2] See Rheticus, *Narratio prima* in *Three Copernican Treatises*, pp. 139, 141 for examples of his engagement with Aristotle.
[3] Rheticus, *Narratio prima* in *Three Copernican Treatises*, p. 171.

primarily concerns astronomy and theology. The author of *De terrae motu* concedes its lack of mathematical astronomy, but asserts that the reason for this is because he has written a detailed astronomical text already.[4] The theological component of the *Narratio prima*, however, is also shallow, but no acknowledgement of this is made. There are brief theological references in the *Narratio prima*, deferring to God,[5] dignifying the study of astronomy and astronomers by bestowing them with divine inspiration and knowledge,[6] and asserting the divinity within the natural world.[7] These references, however, are nothing more than what would be expected from a natural philosophical text from this time, and none of them are hermeneutical or exegetical.

More tangible religious aspects of the *Narratio prima* do arise, but they are few. Rheticus praises Giese, a Catholic bishop, twice,[8] and is, of course, expounding the views of Catholic Copernicus, demonstrating that he is not hesitant as an early Lutheran reformer to have Catholic ties. Rheticus also defers to Holy Writ[9] ("*Sacrae Literae*")[10] in the *Narratio prima* over the Church, as the author of *De terrae motu* does. *De terrae motu* does refer to "*sacra litera*"[11] and also to "*sacra Scriptura*,"[12] but these references are alongside references to the Church. Unlike the *Narratio prima*, *De terrae motu* repeatedly refers to the Catholic Church and Catholic faith, in

[4] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, p. 72; *De terrae motu* in Gorlaeus, *Idea physicae*, p. 14.
[5] See Rheticus, *Narratio prima* in *Three Copernican Treatises*, pp. 111, 140, 162, 164, 184, 186.
[6] See Rheticus, *Narratio prima* in *Three Copernican Treatises*, pp. 131, 144, 163.
[7] See Rheticus, *Narratio prima* in *Three Copernican Treatises*, pp. 137, 139, 143, 147, 148, 176, 185.
[8] Rheticus, *Narratio prima* in *Three Copernican Treatises*, pp. 109, 192.
[9] Rheticus, *Narratio prima* in *Three Copernican Treatises*, p. 144.
[10] Rheticus, *Narratio prima* in *Three Copernican Treatises*, p. 59.
[11] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, pp. 65, 67, 70, 71, 72, 76, 83, 95; *De terrae motu* in Gorlaeus, *Idea physicae*, pp. 2, 4, 10, 13, 15, 21, 34, 52.
[12] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, pp. 65, 66, 80, 84, 88, 89; *De terrae motu* in Gorlaeus, *Idea physicae*, pp. 1, 2, 28, 35, 40, 41.

addition to Scripture, and is thus more expectedly Catholic in its references than the *Narratio prima* is.

The *Narratio prima* does, however, contain astrological considerations, which, for Rheticus, had religious significance. In the *Narratio prima*, Rheticus explains how by using Copernicus' astronomy, one arrives at a more accurate depiction of the cosmos, which correlates to historical events and thereby accommodates a correct interpretation of biblical events.[13] Precise astronomy is thus critical to correct biblical interpretation. This would be expected from an early Lutheran, as Luther himself was concerned with uniting Scripture with history. However, there is no astrology in *De terrae motu*. If Rheticus is indeed the author of this text, one would expect to find at least some astrology. This is expected because, first, *De terrae motu* is explicitly on the subject of Copernicanism and Scripture and, second, Rheticus wrote and defended a thesis at Wittenberg regarding astrology.[14] Astrology was a constant concern for Rheticus throughout his academic and religious life and it would be surprising that Rheticus would compose an astronomical and theological text and not mention astrology.

Similar to the notable absence of astrology in *De terrae motu* is the absence of mythology. The *Narratio prima* contains various considerations of ancient myths, whereas *De terrae motu* has none.[15] The presence of ancient myths is not surprising for a student of Melanchthon because Melanchthon was a strong humanist. Rheticus

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[13] Rheticus, *Narratio prima* in *Three Copernican Treatises*, p. 121.
[14] Edward Rosen, "Rheticus, George Joachim," in Volume 11 of *Complete Dictionary of Scientific Biography* (Detroit: Charles Scribner's Sons, 2008), accessed July 15, 2013, *Gale Virtual Reference Library*, http://go.galegroup.com/ps/i.do?id=GALE%7CCX2830903646&v=2.1&u=udalhousie&it=r&p=GVRL &sw=w, p. 396.
[15] See Rheticus, *Narratio prima* in *Three Copernican Treatises*, pp. 164, 188.

received a humanist education at Wittenberg and would have been familiar with such stories. The section of the *Narratio prima* that contains these references stands apart from the rest of the text, which is more strictly mathematical and astronomical. In a text such as *De terrae motu*, where the subject matter is more theological and philosophical, one would expect mythology to feature more than in the *Narratio prima*, especially if Rheticus wrote both texts. *De terrae motu* is also concerned with refuting the argument that Copernicanism is novel, and attention to ancient mythology would have aided such a case.

Both the differences and similarities between the treatise and the *Narratio prima* are numerous; however, the differences overwhelm the similarities. It is difficult to conclude whether the two texts could have been written by Rheticus on these grounds because they are of such different primary subjects. If Rheticus did write *De terrae motu*, it would be intended for a different audience than the *Narratio prima* and attempting to convey a difference message. For that reason, it is quite conceivable that he would have employed different language and style in its composition than in the composition of the *Narratio prima*.

However, Rheticus was not the only Wittenberg-trained scholar to be writing on matters of astronomy and theology: both Melanchthon and Peucer, in their respective textbooks about natural philosophy, treat Copernicanism with reference to Scripture. These two treatments are very similar to each other, both in content and style; however, they are very dissimilar to *De terrae motu*. Melanchthon and Peucer both encourage a more literal reading of Scripture than does *De terrae motu*

and interpret the apparent immobile earth and geocentrism in the Bible as physical truths.

Howell argues that Melanchthon's *Initia doctrinae physicae*, first published in 1549, demonstrates the way natural law (revealed through the study of nature) and moral law (revealed through Scripture) interact and relate to each other. For Melanchthon, the two fields were deeply intertwined and the study of natural philosophy was a means of causal inquiry into the meaning of Scripture; that is, natural philosophy would reveal how God's creation of the world, as described in Scripture, and other events play out in the present time. Natural philosophy did not only have a bearing on Scripture, but Scripture also had a bearing on natural philosophy. Scripture was important to interpretations of nature and came to play a significant role for Melanchthon in his consideration of the motion of the earth—he argued that the testimony in Scripture that the earth is stationary should be enough to settle any debate.[16] That is not to say, however, that Melanchthon rejected Copernicanism in any capacity; rather, he used Copernican mathematics in order to calculate planetary positions without, of course, any recourse to a mobile Earth.[17] Melanchthon's *Initia doctrinae physicae* was likely based on his lectures on Ptolemy and Copernicus appears, alongside others, in order to correct some of Ptolemy's mathematics.[18]

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[16] Howell, *God's Two Books*, pp. 51-53.
[17] Sachiko Kusukawa, "Introduction," in Philip Melanchthon, *Orations on Philosophy and Education*, ed. Sachiko Kusukawa, trans. Christine Salazar (Cambridge: Cambridge University Press, 1999), p. xxi.
[18] Sachiko Kusukawa, *The Transformation of Natural Philosophy: The case of Philip Melanchthon* (Cambridge: Cambridge University Press, 1995), pp. 145, 148.

Although the *Initia doctrinae physicae* is specifically about natural philosophy, Melanchthon could not have completed such a study without Scripture. The first book of the *Initia* contains a lengthy discussion of God and the certainty of his existence demonstrated by the study of both nature and Scripture.[19] This first book also contains his teachings on astronomy, immediately following his discussion of God, demonstrating the connection between the two subjects. The second and third books contain his teaching regarding matter, the nature of change, causation, and so forth.

A second edition of the *Initia* was later published in 1550. Both versions of the text contain much of the same information; however, Westman notes that the 1550 edition is less negative in its representation of the Copernican theory, though it was still not supportive of the theory.[20] This passage that Westman refers to falls under the heading "What is the motion of the earth?"[21] Melanchthon promotes a geocentric universe and addresses the Copernican hypothesis thus:

> But on this subject, either from a love of novelty or in order to display their wit, some may have argued that the earth is moved, and they assert that neither the eighth sphere nor the sun is moved, since indeed they attribute motion to the other celestial spheres, and they place the earth also among them.[22]

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[19] Philip Melanchthon, *Initia doctrinae physicae*, second edition (Wittenberg, 1550), ff. 24r-28v; Philip Melanchthon, "Initia doctrinae physicae" in *Philippi Melanchthonis opera quae supersunt omnia*, vol. XIII, ed. Carolus Gottlieb Bretschneider (Halis Saxonum, 1846), pp. 198-202 (this is a reprint of the original 1549 edition of Melanchthon's *Initia*).

[20] Westman, *The Copernican Question*, p. 161.

[21] "*Quis est motus* mundi?" in Melanchthon, *Initia* [1549 ed.], p. 216. The translations from Latin into English that follow in this chapter are my own with assistance and corrections from Ian Stewart.

[22] "*Sed hic aliqui vel amore novitatis, vel ut ostentarent ingenia, disputarent moveri terram, et contendunt nec octavam sphaeram, nec solem moveri, cum quidem caeteris coelestibus orbibus motum tribuant, Terram etiam inter sidera collocant*" in Melanchthon, *Initia* [1549 ed.], p. 216.

Clearly contained within this passage is not only resistance to a heliocentric model but also disdain and ridicule for those who do ascribe to it. Melanchthon frames the concept of a mobile earth as a vain effort to appear intelligent. Following this passage, Melanchthon appeals to the clarity of Psalms and Ecclesiastes that it is the sun and not the earth that moves.[23]

In the 1550 revised edition of the text, this critical passage is edited with the passage that was so critical of Copernicus and those who ascribe to his system. In its place, the *Initia* simply reads:

> But on this subject, some say that the earth is moved, and they assert that neither the eighth sphere nor the sun is moved, since they attribute motion to the other celestial spheres, and they place the earth also among them.[24]

The passages are identical except for the removal of the harsh characterisation of those who ascribe to the Copernican theory and the verb "*disputare*" (to argue) is replaced with the less emphatic "*dicere*" (to say). This passage is followed by the same reference to Psalms and to Ecclesiastes in favour of an immobile earth.[25]

Clearly, Melanchthon's attitude towards Copernicus softens as it evolves; however, the same mode of hermeneutics is employed in each case: a more literal reading of Psalms and Ecclesiastes is preferred over taking Copernicus' astronomy in its entirety and ascribing to its physical reality. There is much engagement with Ptolemy throughout the *Initia* with appearances by Copernicus in order to produce more accurate calculations regarding planetary positions and angles. There is no

[23] Melanchthon, *Initia* [1549 ed.], p. 217.
[24] "*Sed hic aliqui disputarent moveri terram, et dicunt nec octavam Sphaeram, nec Solem moveri, cum quidem caeteris coelestibus orbibus motum tribuant, Terram etiam inter sidera collocant*" in Melanchthon, *Initia* [1550 ed.], f. 39v.
[25] Melanchthon, *Initia* [1550 ed.], f. 40r-v.

need to invoke the principle of accommodation in order to reconcile his astronomy with Scripture, as Scripture itself is trusted entirely.

Melanchthon does make physical arguments throughout the *Initia*, but his Scriptural arguments indicate his hermeneutical style more clearly. He writes,

> Another Psalm says about the earth: He who founded the earth on its immovability, and that it not be moved forever and ever. And the first chapter of Ecclesiastes says: Moreover, the earth stands in eternity, the sun rises and sets, returning to the place whence it rose. And it is reckoned as one of the miracles that God wishes the sun to stop, and likewise for it to return. Let us close then, being confirmed by divine testimonies; let us embrace the truth, and not be led astray by the chief ones amongst those who think it the glory of the mind to throw the arts into confusion.[26]

For Melanchthon, both Psalms and Ecclesiastes clearly assert the immobility of the earth and the mobility of the sun, and any contrary motion must be a miracle of God. This "divine testimony" is evidence enough and those who argue otherwise desire glory for their innovative thought, not something that Melanchthon regards as worthy of credit.

It is clear that, along with resisting physical Copernicanism in preference for a literal reading of Scripture, Melanchthon also resisted novelty for novelty's sake. *De terrae motu* similarly tries to root itself in tradition, as do later seventeenth century Copernicans, so this resistance to novelty is a common theme between Melanchthon and Copernican texts including *De terrae motu*. Melanchthon refers continually to Plato and Aristotle as authorities but Scripture remains his focus in

[26] "*De terra alius Psalmus inquit: Qui fundavit terram super stabilitatem suam, non movebitur in aeternum et semper. Et Ecclesiastes in primo capite inquit: Terra autem in aeternum stat, oritur Sol et occidit, et ad locum suum tendens ibi oritur. Et inter miracula recensetur, quod Deus Solem voluit consistere, Item, regredi. His divinis testimoniis confirmati, veritatem amplectamur, nec praestigiis eorum, qui decus ingenii esse putant, conturbare artes, abduci nos ab ea finamus*" inMelanchthon, *Initia* [1549 ed.], p. 217.

the *Initia*, whereas *De terrae motu* invokes Augustine often as an authority in order to orient the author's attitude towards interpretation of Scripture and to actually help make the interpretations. The *Initia* and *De terrae motu* share their attention to Scripture; however, Melanchthon's *Initia* relies on Scripture in a more literal capacity than *De terrae motu* does.

Timothy J. Wengert argues that Melanchthon's exegetical style was much informed by Patristic and medieval interpreters, even though this account appears to rely solely on Scripture. He did uphold the Lutheran *sola scriptura* but not without any influence from authorities. Wengert explains that explicit citation of the Church Fathers is not extensive in Melanchthon's work, but that they influenced his thought much more than is immediately apparent. Melanchthon simultaneously relied on and critiqued Patristic works.[27]

This ambiguous relation to Church authorities in Melanchthon's work is somewhat similar to *De terrae motu*. Hooykaas argued that the "theological vagueness" of *De terrae motu* could be attributed to an early reformer who still hoped for reconciliation between the Roman Catholics and Reformers, and that the text showed "waverings" that were indicative of Rheticus' "unbalanced character." If the treatise is indeed to be attributed to Rheticus, then these "waverings" seem more likely to be from the first cause than the second. Additionally, Rheticus could have consciously maintained this ambiguity, as a moderate Reformer with important Catholic connections. As previously discussed, Hooykaas did not clearly defend his claim of an "unbalanced character." Given the manner in which

[27] Wengert, *Human Freedom, Christian Righteousness*, pp. 31-44.

Melanchthon used the Church Fathers, implicitly and explicitly, Rheticus could have been doing the same if he did indeed write *De terrae motu*.

More specifically, Wengert argues that Melanchthon regarded much of Nicholas of Lyra's knowledge of language to be lacking which caused problems in Lyra's interpretation of Scripture.[28] *De terrae motu*, on the other hand, references Lyra's use of the original Hebrew of the book of Genesis.[29] This demonstrates that Melanchthon had significant understanding of Lyra, which would unsurprisingly be passed on to his student, but the treatise assumes a contrary stance to Melanchthon on Lyra's use of Scripture. This matter is minute in detail when contrasted to the body of Melanchthon's exegetical work and to *De terrae motu*; however, it does provide some insight into the differing opinions of the two authors on the same individual.

The *Initia* in general is a much larger consideration of natural philosophy than *De terrae motu* is, which makes the two texts difficult to compare. The *Initia* is a textbook; however, it does contain a moment of Copernican theory wrestling with Scripture. It is similar to *De terrae motu* in its ambiguous relation to exegetical authorities but the differences between the two texts overwhelm that. Further, Rheticus' fellow Wittenberg-trained astronomer Peucer is much more similar to Melanchthon in his thought and his *Elementa is* very similar to the *Initia*. This similarity makes the differences between *De terrae motu* and the *Initia* and *Elementa* all the more stark. If Peucer's text was so similar to Melanchthon's, and Peucer and

[28] Wengert, *Human Freedom, Christian Righteousness*, p. 39.
[29] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, p. 77; *De terrae motu* in Gorlaeus, *Idea physicae*, p. 22.

Rheticus both had close personal and academic relationships to Melanchthon, one would expect the similarities between all three authors to be stronger.

Peucer's *Elementa* was first published in 1551. It ultimately assumes the same position as Melanchthon does in his *Initia* with respect to the Copernican theory, and also like Melanchthon's *Initia* mentions Copernicus on many occasions, additionally noting that Copernicus is not the first to propose a heliocentric cosmos.[30] He accepts Copernicus' mathematics to better predict the placements of the planets but he does not accept his main tenets that the earth is mobile and that the sun is at the centre of the cosmos. Peucer asserts, "That the earth may be deemed fixed and unmoved in the middle of this world," and, again, like Melanchthon, appeals to Psalms and Ecclesiastes to prove the immobility of the earth.[31] *Elementa* is generally fairly technical, referring to Scripture occasionally, and focusing on stricter mathematics; however, Scripture is still invoked as the primary authority in order to disprove the Copernican theory. The *Elementa* cannot be totally relied upon as a perfect model against which *De terrae motu* can be contrasted, however, for the same reasons that were discussed for Melanchthon. The *Elementa* is a textbook that considers broader natural philosophical matters than *De terrae motu* does and it depends on a literal reading of Scripture in order to assert its astronomical conclusions.

Westman argues that in Peucer's more mature work (i.e., his *Hypotyposes Orbium Coelestibus*) Peucer still assumes a moderate stance with respect to the

[30] See Caspar Peucer, *Elementa doctrinae de circuliscoelestibus, et primo motu* (Wittenberg, 1551), pp. 103, 105, 118, 166, 217, 257, 310, 320, 333 for references to Copernicus. Peucer cites Aristarchus as Copernicus' ancient forerunner; see Peucer, *Elementa*, p. 118.
[31] "*Quod terra in medio mundi hae reat fixa & immota*" in Peucer, *Elementa*, p. 122.

Copernican theory. The title of this work is a direct reference to the full title of *De revolutionibus*, and throughout the text Peucer uses the mathematical elements of Copernicus' astronomy but still not the physical model of Copernicanism. Peucer instructed the readers of his text to directly consult *De revolutionibus* if they wanted more information on Copernicanism and the physical structure of the cosmos that his theory proposes. Westman further argues that Peucer was not as insistent as Rheticus was regarding the teaching of Copernicanism, but he did, at least, promote its limited use.[32]

If *De terrae motu* did indeed stem from this Wittenberg circle of scholars, it is certainly very unique. There are certain similarities between it and Melanchthon and Peucer's work, as well as to the *Narratio prima*, but they are limited. However, Rheticus was the sole realist Copernican at Wittenberg at the time, so, perhaps, he is the only one who would have had the need to compose such a text. If none of the other scholars at Wittenberg believed the Copernican theory to be true, they would not have attempted to reconcile it with Scripture because Scripture is already in agreement with a geocentric cosmos. On the other hand, there was no negative reaction to the Copernican theory before Copernicus published *De revolutionibus* that would have necessitated such a thorough response as *De terrae motu* provides. While a pre-emptive response to theological concerns is conceivable, especially as Copernicus himself addressed certain of these concerns in his introductory remarks to *De revolutionibus*, *De terrae motu* goes into great depth and addresses many concerns that do arise in the seventeenth century in the same manner as

[32] Westman, *The Copernican Question*, pp. 164-65.

seventeenth-century texts address the issues. This style of treatise is very common in the seventeenth century when there were more realist Copernicans and a more open debate about the role of Scripture in natural philosophy. It would have certainly been very intuitive of Rheticus to anticipate the exact problems that arose in seventeenth-century debates regarding Copernicanism and respond to them in so similar a manner.

That is not to say, however, that there was total silence on the matter of Copernicanism and Scripture since the Wittenberg reaction to the Copernican theory until the early seventeenth century. For example, in his 1584 work *In Job commentaria*, Deigo de Zuñiga confronts the reconciliation of Copernicanism with Scripture. Zuñiga taught philosophy and theology at the University of Salamanca and was largely informed by Augustinianism; however, Zuñiga did not assume Augustine's recourse to the principle of accommodation in matters of astronomy. Westman argues that Zuñiga does not fit in to the Copernican-accommodationist mould that is so relied upon in the seventeenth century because Zuñiga uses a literal reading of Job in order to justify his Copernicanism. The University of Salamanca encouraged the Copernican theory to be taught but only as an hypothesis,[33] and so in his support of the physical reality of Copernicanism, Zuñiga was boldly going against his university.

The passage of the Bible that Zuñiga determined justified the Copernican theory was Job 9:6. In *In Job commentaria*, Zuñiga writes the heading, "He disturbs

[33] Westman, "The Copernicans and the Churches," pp. 92-93.

the earth from its place and makes its pillars shake."[34] Following this, Zuñiga briefly but definitively explains how a literal reading of this passage supports the Copernican theory. Zuniga writes:

> Neither Ptolemy nor other astronomers know the reason for this motion. However, concerning these matters reasons are revealed most eloquently by Copernicus regarding the motion of the earth, and they are demonstrated to agree best with the remaining motions.[35]

Zuñiga asserts that, with respect to this passage of Job, Copernicus is better able to describe the motions of the heavens than Ptolemy or other astronomers are because this passage clearly indicates a mobile earth.

This reading of Scripture mediates between the Wittenberg approach and the later seventeenth century approach to reading Copernicanism in the Bible. The Wittenberg approach uses a largely literal reading of passages of Scripture that imply an immobile earth, whereas the seventeenth century astronomers assume an accommodationist reading of Scripture in order to imply a mobile earth. Zuñiga uses a literalist reading, like the Wittenberg astronomers, and applies it to this passage of Job in order to argue, like the seventeenth century astronomers, a mobile earth. However, Zuñiga soon came under fire for presenting such an argument. Later in his life, he recanted his Copernicanism but *In Job commentaria* was not revised.[36]

Although *In Job commentaria* is an example of a sixteenth-century work by a Catholic scholar who supported Copernicanism, its method is entirely different from *De terrae motu*. The Copernicanism in *In Job commentaria* is also only a brief

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[34] "*Qui commouet terram de loco suo, & colunae eius concutiuntur*" in Deigo de Zuñiga, *In Job commentaria* (Rome, 1584), p. 140. The translation is my own. See also Job 9:6.
[35] "*Cuius motus ratione neque Ptolemaeus, neque alij astrologi cognouerunt. Verumtamen harum rerum rationes dissertissime ex motu terrae a Copernico declarantur, & demonstratur, & relinqua omnia aptius conuenire*" in Zuñiga, *In Job commentaria*, pp. 141. The translation is my own.
[36] Westman, "The Copernicans and the Churches," p. 93.

consideration within a larger project and so *De terrae motu* does not appear to have resulted from such an environment. The late sixteenth century was clearly not entirely silent on the subject of Copernicanism and Scripture; however, it was not the hotbed of debate that the seventeenth century was.

Copernican debates in the seventeenth century raged amongst Catholics and Protestants alike. Johannes Kepler's introduction to his *Astronomia nova*, published in 1609, is an excellent example of a Lutheran Copernican response to questions regarding Scripture and heliocentrism. Initially, this introductory passage was to be in Kepler's *Mysterium cosmographicum*, published in 1596, but the Tübingen University Senate censored it.[37] This introduction additionally acknowledges Rheticus as an important astronomical mind,[38] which is not surprising given the amount that Kepler and Rheticus had in common. For example, both astronomers were Lutheran. Further, both astronomers were educated in similar environments, as Tübingen and Wittenberg had much in common. Johann Staupitz, a graduate of Tübingen and Augustinian scholar, went to Wittenberg to teach and brought many men with him, both scholars and Augustinians, many of whom assumed important positions at the university. The statues of the arts faculty at Wittenberg were also largely taken from that at Tübingen. Melanchthon himself even taught at Tübingen before going to Wittenberg.[39] Additionally, there is a direct connection between

[37] Owen Gingerich, "Forward," in Johannes Kepler, *New Astronomy*, trans. William H. Donohue (Cambridge: Cambridge University Press, 1992), p. xii.
[38] See Kepler, *Astronomia nova*, p. 32.
[39] Kusukawa, *The Transformation of Natural Philosophy*, p. 13-14; 37.

Rheticus and Kepler, as Victorinus Strigelius, a student of Melanchthon, taught Michael Maestlin who, of course, taught Kepler.[40]

For these reasons, certain similarities could be expected between works on Copernicanism and Scripture by Rheticus and Kepler, as they shared their faith, their disposition towards Copernicanism, and aspects of their education. Of course, with Kepler working in the century following Rheticus, one would also expect Kepler's works to display a degree more maturity than those of Rheticus. The introduction to the *Astronomia nova* certainly does demonstrate certain similarities to *De terrae motu*, but it is also notably different. This introduction initially opens very different than *De terrae motu*: it is dedicated to Kepler's Lutheran patron.[41] Rheticus' *Narratio prima* was also written to a Lutheran, Johannes Schöner,[42] and these addresses were not uncommon in natural philosophical texts at the time. The absence of any addressee is notable in *De terrae motu*, but that could also be a product of its anonymity. Additionally, the actual content of *De terrae motu* is equally dissimilar from the content of Kepler's introduction to the *Astronomia nova*, with only minor similarities. This is surprising given the similarities in the education of Rheticus and Kepler and their shared Lutheranism.

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[40] Westman, *The Copernican Question*, p. 260. Additionally, Rheticus had Joachim Camerarius, a humanist and professor at Leipzig, inscribe one of Camerarius' own Greek poems that lauded the discoveries of Copernicus and astronomy in general into his personal copy of *De revolutionibus*. Interestingly, years later, Kepler inscribed a Latin translation of this poem in his copy of *De revolutionibus*, indicating Kepler's familiarity with and admiration for Rheticus. See Owen Gingerich, *The Great Copernicus Chase and other adventures in astronomical history* (Cambridge: Cambridge University Press, 1992), pp. 72-73.

[41] Kepler, *Astronomia nova*, p. 30.

[42] Rheticus, *Narratio prima*, p. 109.

Kepler launches his consideration of Scripture by first appealing to optics and indicating that the sense of sight can be misleading.[43] He writes that Scripture, "speak[s] with humans in the human manner"[44] and is accommodated to a human perspective, which, optics tells us, is not always absolutely correct. Kepler thus invokes the principle of accommodation, which is, of course, also present in *De terrae motu*. Kepler complicates this assertion, however, by further suggesting that this does not mean that our sense of sight is wrong or, by extension, that Scripture is wrong; rather, they provide alternate truths. Scripture speaks according to the human senses, providing a sensory truth, but not an ultimate truth.[45] *De terrae motu* also considers the difference between one's sensory perception and ultimate truth, explaining that it appears to humans from their terrestrial perspective that the sun rises; however, astronomy indicates that it is actually the motion of the earth that gives this appearance.[46] This similarity is interesting but it alone does not indicate anything conclusive about the authorship.

The particular similarities between the two texts are more conspicuous in their consideration of the passage of the Bible from Joshua 10. Joshua 10 was mentioned in the sixteenth century in considerations of astronomy, but it reached its fame in the seventeenth century when it became a common central passage in Copernican debates.[47] Kepler calls on Joshua 10 as an example in order to put his principle of accommodation to work. Joshua 10 states that at the battle of Gibeon,

[43] Kepler, *Astronomia nova*, p. 59.
[44] Kepler, *Astronomia nova*, p. 60.
[45] Kepler, *Astronomia nova*, p. 61.
[46] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, p. 98; *De terrae motu* in Gorlaeus, *Idea physicae*, p. 57-59.
[47] Richard J. Blackwell, *Galileo, Bellarmine, and the Bible: Including a Translation of Foscarini's Letter on the Motion of the Earth* (Notre Dame: University of Notre Dame Press, 1991), p. 23.

God made the sun stand still and not set, giving the Israelites the time they needed to win the battle.[48] The standard accommodationist argument, and the one that Kepler makes is that the sun only stands still from a terrestrial perspective, rather than it stood still from its regular rotation around the earth.[49] *De terrae motu* also considers this passage, although among many others, and argues along the same lines as Kepler. The author of *De terrae motu* writes, "It is clear that [Joshua] does not speak as a mathematician…and that Scripture does not depart from ordinary speech."[50] *De terrae motu* is briefer than the introduction to the *Astronomia nova* in its consideration of Joshua 10, but the two texts convey the same message about it. This passage, as will be demonstrated, arises repeatedly throughout the seventeenth century as an example of how Scripture is accommodated to the human senses.

That Scripture is accommodated to the human senses is not a problem for Kepler because, in Scripture, "You do no hear any physical dogma here. The message is a moral one."[51] Kepler suggests a disciplinary distinction here – Scripture treats morality and natural philosophy treats nature. Kepler writes,

> I hope that, with me, [the reader] will praise and celebrate the Creator's wisdom and greatness, which I unfold for him in the more perspicacious explanation of the world's form, the investigation of causes, and the detection of errors of vision. Let him not only extol the Creator's divine beneficence in His concern for the well-being of all living things, expressed in the firmness and stability of the earth, but also acknowledge His wisdom in its motion, at once so well hidden and so admirable.[52]

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[48] See Joshua 10:12-14.
[49] See Kepler, *Astronomia nova*, p. 61 for the details of Kepler's treatment of Joshua 10.
[50] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, p. 99; *De terrae motu* in Gorlaeus, *Idea physicae*, p. 60. Quotation is taken from the Hooykaas volume.
[51] Kepler, *Astronomia nova*, p. 63.
[52] Kepler, *Astronomia nova*, p. 65.

Astronomy does not encroach upon or compromise God's creation; rather, it explores God's creation in detail.

Howell acknowledges Kepler's distinction between astronomy and theology but cautions not to oversimplify this distinction.[53] Kepler does not want the Bible to be read as if it were a text on physics, even though certain Biblical passages appear to address physics. The Bible was not intended to be physically accurate, so, although Kepler believed in the unity, clarity and sufficiency of Scripture, he also promoted this accommodationist interpretation. To arrive at a full understanding of God's creation, one must have recourse to both Scripture and astronomy.[54] Kepler certainly sees distinctions between astronomy and theology, but the two remain related insofar as they reveal God's creation of this world.

As for the authorities who would assert a more literal reading of Scripture and grant Scripture astronomical authority, accusing heliocentrism of compromising Scripture, Kepler argues in favour of the use of reason over simple acceptance of authoritative interpretation of Scripture. He writes,

> As for the opinions of the pious on these matters of nature, I have just one thing to say: while in theology it is authority that carries the most weight, in philosophy it is reason. Therefore, Lactantius is pious, who denied that the earth is round, Augustine is pious, who, though admitting the roundness, denied the antipodes, and the Inquisition nowadays is pious, which, though allowing the earth's smallness, denies its motion. To me, however, the truth is more pious still, and (with all due respect for the Doctors of the Church) I prove philosophically not only that the earth is round, not only that it is inhabited all the way around at the antipodes, not only that it is contemptibly small, but also that it is carried along among the stars.[55]

[53] Howell, *God's Two Books*, p. 116.
[54] Howell, *God's Two Books*, pp. 120-24.
[55] Kepler, *Astronomia nova*, p. 66.

This passage simultaneously places reason ahead of authority and notes the shortcomings of previous Church authorities. Kepler aptly demonstrates that Church authorities have been wrong in the past and indicates that by following truth, one will be guided to a heliocentric conclusion.

De terrae motu, while promoting heliocentrism, does not reject the validity of Church authority as Kepler does. *De terrae motu* relies heavily on Augustine for its theory of accommodation, for keeping Scripture and the study of nature separate, and for more general theology. The *Astronomia nova* is more explicitly Lutheran than *De terrae motu* is in this rejection of authority and dependence on Scripture alone. Additionally, the *Astronomia nova* also contains more astronomical and philosophical proofs for heliocentrism than the treatise does. The two texts shares their recourse to the principle of accommodation, particularly to the ways in which the faculty of sight misleads people and how Scripture is accommodated to human perception, and for keeping the study of Scripture and the study of nature as separate enterprises. More specifically, the two texts also share their consideration of Joshua 10, which was not an uncommon consideration but was notably common in seventeenth-century hermeneutical texts. Because of the clearly Lutheran language in the *Astronomia nova* that is not in *De terrae motu*, a much earlier Lutheran, as Rheticus was, with an ambiguous relation to Catholicism could have written the text, but a seventeenth-century Lutheran could not.

Gingerich asserts that Kepler's introduction to the *Astronomia nova* was very influential in its day and was repeatedly reprinted alongside Galileo's *Dialogue Concerning Two Chief World Systems*. Further, Gingerich argues that due to

similarities between Kepler's introduction and Galileo's *Letter to the Grand Duchess Christina*, Galileo must have had access to Kepler's introduction. However, as a Catholic already under scrutiny from Catholic authorities, it would have been too dangerous for Galileo to directly cite Kepler.[56] In addition to Kepler's introduction, Galileo also had access to Zuñiga's *In Job commentaria*, which he references once in his *Letter*,[57] as well as Foscarini's *Letter to Fr. Sebastiano Fantone*. Howell argues that the many overlapping themes and considerations between Focsarini's *Letter* and Galileo's *Letter* makes their connection obvious.[58] Before turning to Galileo's *Letter*, a look at Foscarini's *Letter* will better contextualise the state of Catholic scriptural hermeneutics in the early seventeenth century.

Westman argues that Foscarini was not the first to attempt such a text, as both Zuñiga and Kepler preceded him, but that his *Letter* was certainly the most extensive to that date.[59] Foscarini names himself the first to attempt such a project,[60] but this does not help date *De terrae motu* because Kepler's obviously existed, although Foscarini did not reference it. Westman asserts that Foscarini certainly did know of the *Astronomia nova* and cited it in other work, but in his *Letter* he did not consider it a true or extensive effort to reconcile Copernicanism

[56] Gingerich, "Forward," p. xii.
[57] Galileo, *Letter*, p. 83.
[58] Howell, *God's Two Books*, p. 182.
[59] Westman, *The Copernican Question*, p. 490.
[60] Paolo Antonio Foscarini, "Letter to Fr. Sebastiano Fantone, General of the Order, Concerning the Opinion of the Pythagoreans and Copernicus About the Mobility of the Earth and the Stability of the Sun and the New Pythagorean System of the World," in Richard. J. Blackwell, *Galileo, Bellarmine, and the Bible: Including a Translation of Foscarini's Letter on the Motion of the Earth* (Notre Dame: University of Notre Dame Press, 1991), p. 223.

with Scripture.[61] Although other attempts existed, Foscarini regarded his own text as doing something somewhat new.

Foscarini's *Letter*, published in 1615, is addressed to a Catholic priest but his relation to past Church Fathers is ambiguous. Early in the *Letter*, Foscarini debunks the authority of the ancients, but he does not name any specific figures. He writes, "Thus the majestic white beards of the ancients were wrong; they have been believed too easily and their false imaginations have been solemnized."[62] Clearly Foscarini is comfortable in disregarding ancient authority at times, yet, on the contrary, he writes, "If all the best conditions and best possible circumstances are given, and if something contrary to divine authority is presented to us (even if it is so clear that one cannot evade it), one still ought to reject it, and judge with certainty that what is presented is a deception and that it is not true."[63] Here, specific deference to *divine* authority is maintained. This dismissal of *and* dependence on authority is also present in *De terrae motu*. In addition to maintaining deference to divine authority, Foscarini also maintains certain ancient authority, as he constantly aligns Copernicus with Pythagoras.[64] This connection did not arise in *De terrae motu*, but the ambiguous relation to the ancients is shared.

In his specific consideration of Scripture, Foscarini considers passages belonging to six different categories:

> Passages which state that the earth is stationary and does not move,… passages which say that the sun is moved and rotates around the earth,… passages which say that the heavens are at the top and the earth is at the

[61] Westman, "The Copernicans and the Churches," p. 100.
[62] Foscarini, *Letter*, p. 219.
[63] Foscarini, *Letter*, p. 220.
[64] Foscarini, *Letter*, pp. 217, 220-22, 225-26, 232, 235, 247.

> bottom,… passages describing hell as in the center of the world,… passages which always contrast heaven to earth, and also earth to heaven, as having a relation like a circumference to its center and a center to its circumference,… [and] passages (taken from the Fathers and the theologians rather than from Sacred Scripture) which say that after the day of judgement the sun will become stationary in the east and the moon in the west.[65]

Herein, Foscarini wishes to address all passages of Scripture that imply natural philosophical authority, as well as what the Church Fathers assert on this matter. Within this consideration, however, Foscarini does defer to the "Holy Church" and the "Highest Pastor,"[66] which confuses his examination. He is simultaneously critiquing Church authority and deferring to its authority.

Along with an ambiguous relationship to authority, *De terrae motu* and Foscarini's *Letter* also share their use of the principle of accommodation. Foscarini dwells on the use of the principle of accommodation at length, and asserts, "Scripture serves us by speaking in the vulgar and common manner."[67] Like Kepler, Foscarini also considers Joshua 10 and applies the principle of accommodation to it.[68] Part of his consideration of accommodation involves the separation of theology and natural philosophy. Scripture is about salvation, not nature: "The wisdom of God revealed to us in the Sacred Scriptures is called 'saving wisdom' and not 'absolute wisdom'."[69] *De terrae motu* shares these positions with Foscarini's *Letter*, but they are more importantly located in Augustine, who was a common source for the two texts.

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[65] Foscarini, *Letter*, pp. 223-25.
[66] Foscarini, *Letter*, p. 226.
[67] Foscarini, *Letter*, p. 232. See Foscarini, *Letter*, pp. 226-37 for the entirety of his consideration of accommodation.
[68] Foscarini, *Letter*, p. 224
[69] Foscarini, *Letter*, p. 233.

In more specific terms, the stance assumed with respect to the Church and the Pope is very interesting in the *Letter*. As previously described, Foscarini did defer to them, but he later qualifies this deference, informed by the distinction of what Scripture does and does not address: "*The church together with its visible head, the Supreme Pontiff* (assisted by the Holy Spirit whose primary intention is our sanctification) *cannot err, in matters of faith and out salvation only. But the Church can err in practical judgements, in philosophical speculations, and in other doctrines which do not involve and pertain to salvation*."[70] This is a similar stance to what *De terrae motu* asserts, arguing that there is a distinction between matters that relate to natural philosophy and matters that relate to faith, although Foscarini's *Letter* is more explicit.

Foscarini's *Letter* is more similar to *De terrae motu* than the other texts that have been considered in this chapter with its ambiguous relationship to the Church, its use of accommodation, its desire to separate the fields of theology and natural philosophy, and specific reference to Joshua 10. None of the similarities are particularly remarkable because of how common they are in hermeneutical works at this time. Apart from its theology, the *Letter* is also very philosophical, which is not the case in *De terrae motu*. The *Letter* considers solidity of matter, voids, natural place of elements, motion, distinctions between the empyreal and corporal heavens, and so forth. The physical arguments in favour of heliocentrism are also much more developed in the *Letter* than in *De terrae motu*, and so clearly the concerns of the letter are broader than those of the treatise.

[70] Foscarini, *Letter*, pp. 234-35.

Howell further illuminates Foscarini's philosophical and theological stance expressed in the letter. He argues that Foscarini believed that natural philosophical disputes, such as the motion of the earth, could never be resolved through Scripture because Scripture is concerned with salvation and elevating humanity beyond this world. Natural philosophy is not a matter of faith and does not contribute to salvation, and is therefore not contained in Scripture. Howell also notes that Foscarini's *Letter* contains various arguments that do not always relate to each other or even agree with each other,[71] a point that Hooykaas also made regarding the arguments in *De terrae motu*. While *De terrae motu* and Foscarini's *Letter* do share some similarities, the tone and philosophical concerns of each text are different. They are both are more similar to Galileo's *Letter to the Grand Duchess Christina*.

The conflict surrounding Galileo began in the 1610s although Galileo's trial and condemnation was not until 1633.[72] The Catholic Church officially denounced Copernicanism in a trial in February of 1616. This trial did not concern Galileo specifically but did concern the relation between Copernicanism and Scripture.[73] That Galileo did not heed the ruling of this 1616 trial and continued to teach and propagate Copernicanism was the main factor that led to his trial and condemnation in 1633. The turmoil throughout this period involved questions not only about natural philosophy alone but also about methodology and epistemology; that is, questions about how truth is uncovered.[74]

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[71] Howell, *God's Two Books*, p. 196.
[72] Maurice A. Finocchiaro, *The Galileo Affair: A Documentary History* (Berkeley: University of California, 1989), accessed July 15, 2013, http://ezproxy.library.dal.ca/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=42272&site=ehost-live, p. 1.
[73] Blackwell, *Galileo, Bellarmine, and the Bible*, p. 112.
[74] Finocchario, *The Galileo Affair*, p. 6.

Throughout this conflict, the Thirty Years War was unfolding, which was largely a power dispute between Catholics and Protestants.[75] This war began over religious disputes but it later expanded to concern more general territorial claims. Protestant and Catholic sides of the war both won and lost battles but both sides were also seriously injured and neither was able to capitalise on their victories.[76] This war and the damage it incurred put much stress on Protestant and Catholic institutions alike and Galileo's conflict with the Church took place throughout this period. The decisions made at the 1616 and the 1633 trials thus held greater significance than simply the teaching of the Copernican theory by astronomers. These decisions became an expression of the authority of the Catholic Church at a time when their authority was being strongly contested.

Galileo's *Letter* was written and circulated in manuscript form in 1615, shortly before the 1616 trial, and in the same year that Foscarini's *Letter* was written. However, Galileo's *Letter* was not published until 1636, after his personal trial with the Church.[77] William R. Shea asserts that Galileo had two lines of argument in his *Letter*, the first being that there are many matters in Scripture that are above the reach of human reason but that there is nothing in Scripture that is contrary to reason, which is the way that Galileo is able to assert the supremacy of Scripture over natural philosophy without giving Scripture supreme authority on all details of natural philosophy.[78] In the *Letter*, Galileo writes that theology is above

[75] Finocchario, *The Galileo Affair*, p. 12.
[76] Wiesner-Hanks, *Early Modern Europe*, pp. 291-92.
[77] Westman, *The Copernican Question*, p. 436.
[78] William R. Shea, "Galileo and the Church," in *God and Nature: Historical Essays on the Encounter between Christianity and Science*, eds. David C. Lindberg and Ronald L. Numbers (Berkeley: University of California Press, 1986), p. 126.

natural philosophy because of its "elevated subject matter."[79] Second, Galileo asserts that Scripture ought to be interpreted as literally as possible, except where there is demonstrated truth against it, in which case Scripture should be reinterpreted according to that truth.[80] In Galileo's words,

> The writings of secular scholars contain some statements about the natural world which are demonstrably true, and others which are simply asserted. As regards the former, it should be the task of wise theologians to show that they are not contrary to Scripture; as regards the latter—those which are stated but not conclusively demonstrated—if there is anything in them which is contrary to Scripture, they should be regarded as undoubtedly false, and their falseness should be demonstrated by all possible means.[81]

Thus, natural philosophy is given its domain when it is "demonstrably true" but Scripture has the final authority on matters of natural philosophy that are unresolved.

Howell agrees with Shea's characterisation of Galileo's *Letter* for the most part; however, Howell indicates three modes of Galileo's interpretation of Scripture whereas Shea only gave two. Howell writes that Galileo first asserted belief in Scripture when demonstrations are uncertain; second, belief in the demonstration when it is certain and reinterpret Scripture accordingly; and third, where possible, interpret Scripture literally, such that it agrees with the demonstration.[82] These three principles are essentially the same as those that Shea outlines but provided in more detail. Both Howell and Shea are correct to note these modes of interpretation and they all obviously arise in the *Letter*.

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[79] Galileo, *Letter*, p. 74.
[80] Shea, "Galileo and the Church," p. 127.
[81] Galileo, *Letter*, p. 76.
[82] Howell, *God's Two Books*, pp. 88-91.

In the *Letter*, Galileo immediately problematises the current attitudes towards heliocentrism. He accuses scriptural exegetes of using Scripture improperly in order to condemn heliocentrism as heretical.[83] He further notes the origin of *De revolutionibus* by a Catholic man and the Church's early reaction to its publication: "As soon as the book was printed it was received by the Holy Church and was read and studied throughout the world, without anyone expressing the slightest scruples about its content."[84] Although this is an exaggeration, as there were those who disagreed with the content of *De revolutionibus*,[85] Galileo's point is certainly well received that *De revolutionibus* was not a concern of the Church until the early seventeenth century. Galileo writes, "They would have us, even in purely scientific questions which are not articles of faith, completely abandon the evidence of our senses and of demonstrative arguments because of a verse of Scripture whose real purpose may well be different from the apparent meaning of the words."[86] This statement reveals Galileo's attitude towards the changed outlook of the Church in regard to Copernican heliocentrism and hints at his view that theology and natural philosophy should be kept more separate.

As previously discussed, this notion of separating theology and natural philosophy was common. It was in Augustine, Kepler, Foscarini and *De terrae motu*, and now it appears in Galileo. On this subject, Galileo famously quotes Cardinal Cesare Baronio: "The intention of the Holy Spirit is to teach us how one goes to

[83] Galileo, *Letter*, p. 63.
[84] Galileo, *Letter*, p. 64.
[85] Recall the Wittenberg reaction to Copernicanism.
[86] Galileo, *Letter*, p. 64.

heaven, not how the heaven goes."[87] When the two fields are mixed, mistakes arise in the interpretation of them both. To demonstrate this, Galileo cites interpretations of Scripture and nature that were later proven to be incorrect, such as the attack on the Medicean planets and on the natural darkness of the moon.[88]

Somewhat contradictory to Galileo's stance that the fields of theology and astronomy should be largely kept distinct, Galileo applies the principle of accommodation to passages of Scripture in order to justify heliocentrism. This is contradictory because if Scripture does not contain natural philosophy, accommodation should not be needed to explain how Scripture does not contradict demonstrated truths of nature. This same apparent contradiction is also in *De terrae motu*. Regardless, Galileo synthesises the principle of accommodation with the principle of keeping theology and nature distinct:

> Scripture has not hesitated to veil some of its most important statements, attributing to God himself qualities contrary to his very essence, solely in order to be accessible to popular understanding. Who then would be so bold as to insist that it had set aside and confined itself rigorously to the narrow literal meaning of the words when speaking in passing about the Earth, water, or the Sun or some other part of creation? This is all the more unlikely since what it says about these things has nothing to do with the primary intention of Holy Writ, namely divine worship and the salvation of souls, and matters far removed from the understanding of the masses.[89]

Scripture is not intended to provide natural truth, but Galileo later asserts that natural philosophy can help one interpret Scripture.[90] Scripture makes itself accessible to "popular understanding" but natural philosophy can uncover in this

[87] Galileo, *Letter*, p. 70.
[88] Galileo, *Letter*, p. 72.
[89] Galileo, *Letter*, p. 67.
[90] Galileo, *Letter*, p. 68.

accommodated language the truth that it really contains. To exemplify his point, Galileo calls on Joshua 10, like others before him, utilising the same argument that Kepler, Foscarini and *De terrae motu* employ.[91] Galileo also notes that Scripture accommodated itself historically. It was written for a particular people at a particular time, and this historical context must be remembered in order to interpret the text accurately.[92] Howell argues that the separation of theology and natural philosophy is not always perfectly maintained in Galileo's writing but that it is the most important principle for him. Each field has different concerns and subjects and the two need not always mix.[93] Galileo further notes that Scripture does not even always agree with itself, nor do the Church Fathers always agree upon its interpretation. In these respects, the principle of accommodation must be invoked to reconcile apparently different passages of Scripture and natural philosophy can certainly help this effort.[94]

Much of Galileo's position is informed by the work of Saint Augustine, as Galileo repeatedly refers to him and invokes his authority. The opening lines of the *Letter* note Augustine's warning of "the need for caution in coming to firm conclusions about obscure matters which cannot be readily understood by reason alone"[95] and Galileo continues to refer to Augustine throughout the *Letter*. Importantly, Galileo cites his argument in Augustine that if Scripture appears to be wrong in light of demonstrated truths of nature it is only because it was interpreted

[91] Galileo, *Letter*, pp. 90-93.
[92] Galileo, *Letter*, p. 81.
[93] Howell, *God's Two Books*, pp. 188, 192.
[94] Galileo, *Letter*, pp. 80, 84.
[95] Galileo, *Letter*, p. 61.

wrong.[96] The use of Augustine, a revered Catholic figure, helps Galileo ground this letter in Christian tradition when otherwise Galileo does not have much recourse to authority. He writes, "So I declare (and I believe that my sincerity will speak for itself) my willingness to submit to removing any errors which, through my ignorance in matters of religion, may be found in this letter…I have no desire for any gain from it which is not in keeping with Catholic piety."[97] He may state that he is pious, but his definition of piety may differ from that of the Church.

Along with this grounding in Augustine, Galileo also takes care to ground heliocentrism in ancient theories asserting that Copernicus was not entirely novel.[98] In this respect, *De terrae motu* is very similar to Galileo's *Letter*, as it also is similar in their shared use of accommodation and their stance regarding the separation of theology and natural philosophy. Additionally, both texts specifically reference Joshua 10, although *De terrae motu* also references many other passages of the Bible. Further, both texts specifically cite Augustine's *De genesi ad litteram*, finding their grounding in Augustine from the same text. It is quite plausible that *De terrae motu* arose from this Galilean environment because of these similarities. [99]

If such an environment is to be granted, however, the question then arises regarding who the teacher ("*praeceptor*") is and what the work is to which *De terrae motu* refers on two occasions. In the first instance, the author of the text writes, "For reason cannot produce any other hypotheses nearer the truth…as is amply

[96] Galileo, *Letter*, pp. 85-86.
[97] Galileo, *Letter*, p. 65-66.
[98] Galileo, *Letter*, p. 71.
[99] Hooykaas also contrasts Galileo's *Letter* to *De terrae motu* and notes the similarities between the texts, but rather than seeing the context that gave rise to Galileo's *Letter* as the possible context for *De terrae motu*, Hooykaas states that Galileo need not have directly borrowed Rheticus' ideas from his treatise and that they likely arose independently. See Hooykaas, *G. J. Rheticus*, p. 176.

demonstrated mathematically by my venerated master in his work."[100] The author of *De terrae motu* refers to some work wherein this teacher is demonstrating a system of heliocentric astronomy that best explains the motions of the heavens and the earth. In the second instance, the author writes, "As, however, everyone should in his calling, and by his talent, be of some service to the Catholic Church of Christ, the work of my lord preceptor should be examined (approved)."[101] This second statement furthers the previous assertion, arguing that this work that best explains celestial motion is also a service to the Church.

If the "*praeceptor"* to whom the author refers is Copernicus, then the author of *De terrae motu* is likely Rheticus, as Copernicus did not have other students of astronomy. If the treatise was written in the seventeenth century, the identity of this "*praeceptor*" is less obvious. Perhaps a student of Galileo's wrote *De terrae motu* and, trying to alleviate the pressure on Galileo from the Church, demonstrated how Galileo's astronomy was not at odds with Scripture. Such a theory would explain his continual deference to the Church, specifically trying to appease them, rather than only deferring to Scripture. However, if that is the case, the reason for utilising the coded language of "*praeceptor*," rather than naming Galileo who was often openly under scrutiny from the Church, is not clear. Perhaps the student was protecting Galileo's identity in Galileo's later life when expressly forbidden by the Church to teach heliocentrism or a mobile earth. The author of the text thus consciously

[100] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, p. 72; *De terrae motu* in Gorlaeus, *Idea physicae*, p. 14-15. Quotation is taken from the Hooykaas volume, here and below.
[101] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, p. 101; *De terrae motu* in Gorlaeus, *Idea physicae*, p. 63.

imitates Rheticus and likens Galileo to Copernicus through using the same denomination for him, but such is only speculation.

The use of the term "*praeceptor*," however, was not totally uncommon in the early modern period and does not necessitate any connection to Rheticus. Melanchthon himself was known as the "*Praeceptor Germaniae*" ("the teacher of Germany"), and many others were also referred to with the denominator of "*praeceptor*." Perhaps Hooykaas reads too much into its use in *De terrae motu* because it was so notable in the *Narratio prima* and neglects to consider that others apart from Rheticus also used the term. There is no obvious answer to the question regarding the use of "*praeceptor*" in *De terrae motu*. The two instances of its use, when taken in isolation, perhaps imply that Rheticus wrote the treatise, but not necessarily so. When contrasted to the evidence that goes against such an assertion, those instances are not enough on their own to resolve the debate of the authorship of *De terrae motu*.

The clear similarities between *De terrae motu* and the seventeenth-century texts considered in this chapter indicate that the text was not likely written by Rheticus in the sixteenth century. A possible objection to this assertion, however, is that *De terrae motu* does not reference any texts that were published later than 1532, leaving nearly one hundred years of scriptural hermeneutics unmentioned. Kepler's introduction to the *Astronomia nova*, Foscarini's *Letter*, and Galileo's *Letter* all reference individuals or texts that were written nearer to their own respective dates of composition. Kepler mentions Tycho Brahe on several occasions,[102]

[102] See Kepler, *Astronomia nova*, pp. 48-49, 51-53, 66-67. Brahe lived from 1546-1601.

Foscarini references both Kepler and Galileo,[103] and Galileo references Cosme de Magalhães who had written a commentary on Joshua.[104] Because *De terrae motu* does not reference works or individuals later than 1532, if it was written in the seventeenth century it would be unique in that respect. This aspect of the text indicates that a sixteenth-century composition is more likely.

However, *De terrae motu*'s apparent *terminus a quo* of 1532 does not strictly rule out a seventeenth-century composition either. Perhaps the author intended the text to appear to have an earlier composition date. Perhaps the author was consciously imitating Rheticus in his use of the language of "*praeceptor*" and wanted his references to be historically accurate. This is, of course, speculation but they are factors that certainly must be considered. Apart from this puzzling *terminus a quo* and reference to the "*praeceptor*," all other factors seem to indicate a seventeenth-century authorship and that is why such speculation is not unreasonable.

In sum, the application of the principle of accommodation to Copernican debates, and the concept that natural philosophy and theology address different subjects, are notions more prevalent in seventeenth-century texts than sixteenth-century texts. Although the principle of accommodation was used in the sixteenth century, and centuries before, it was used in debates regarding Copernicanism most commonly in the seventeenth century. More specifically, using the errors that arise from the faculty of sight and applying the proofs of those errors in order to argue in favour of the principle of accommodation is a common seventeenth-century proof.

[103] See Foscarini, *Letter*, pp. 223, 241.
[104] See Galileo, *Letter*, p. 93. Magalhães lived from 1553-1624 and the text to which Galileo refers was published in 1612.

Additionally, Joshua 10 is a customary passage referred to in the seventeenth-century, although it also has a slight presence in the sixteenth century. All of these details indicate that *De terrae motu* is more similar to seventeenth-century texts than to sixteenth-century texts, in which these themes do not arise as clearly if they arise at all. Further, the language that *De terrae motu* employs, apart from "*praeceptor*," is more characteristic of the Catholic Foscarini and Galileo who are specifically deferring to the authority of the Church, rather than only to Scripture as the Lutheran Melanchthon, Peucer and Kepler all do. The evidence examined in this chapter suggests that *De terrae motu* is *most likely* a seventeenth-century text and, further, a product of a Catholic author.

CHAPTER 7: CONCLUSION

Although this thesis does not assert the authorship of *De terrae* motu with certainty, it does confidently assert that the text is more likely to be a product of the early seventeenth century, in particular of a Catholic author, than of Rheticus in the sixteenth century, as Hooykaas argues. A close reading of *De terrae motu*, paired with a careful consideration of the environment of scriptural hermeneutics in the sixteenth and seventeenth centuries implies that this context is most likely. That Rheticus wrote *De terrae motu* remains conceivable; however, the majority of the evidence presented in this thesis suggests otherwise.

In more specific terms than only an early seventeenth-century Catholic author, *De terrae motu* demonstrates traits that could indicate a Galilean context for its composition. There are numerous parallels to Galileo's *Letter*, including its deference to and frequent citations of Augustine, its deference specifically to the Catholic Church rather than deference to Scripture in general, and its reference to Joshua 10. Further, it contains specific parallels to Kepler's introduction to the *Astronomia nova*, which Galileo had access to, including the analogy of the imperfections in the sense of sight and that Scripture is accommodated to human senses. With these resources at his disposal, it is possible that a student or associate of Galileo's composed *De terrae motu*.

A potential objection to this assertion is that the text depends on the language of "*praeceptor*," keeping the identity of the teacher of the author and his work undisclosed. Galileo was not hesitant to express his support of the Copernican

theory and, indeed, to publish his own work that furthered it and refined it, coming under direct fire from the Church. Why would a text written by an associate of Galileo try to keep Galileo's identity a secret if Galileo himself never tried? Perhaps, in Galileo's later life when he was forbidden by the Church from propagating or writing about heliocentrism, the author of *De terrae motu* composed this text in an attempt to have Galileo's work received more favourably by the Catholic Church and community. Thus, the author would not name Galileo or his work, but clearly wrote his text in the same polemical style that Galileo's *Letter* was written.

However, since Galileo already wrote his *Letter*, which is itself a masterful hermeneutical text, why would an associate of Galileo compose an additional, and arguably inferior, work? Perhaps the anonymity of the text indicates that it was never intended for publication and was more of a theoretical exercise. Galileo did have students and perhaps one of them composed such a text in imitation of the *Letter* as part of his own training. If not written by a student of Galileo, there were also many hermeneutical texts written following Galileo's trial and *De terrae motu* could simply be one of the many from that genre.

A further objection to a Galilean authorship is that if *De terrae motu* was written in Italy in the early seventeenth century by a Catholic author, the route that the tract took to get to the largely Protestant Netherlands to be published in 1651 is unclear. Perhaps with consideration given to the time and place of the tract's publication, a Galilean author is a less likely candidate for its authorship than simply a Dutch author. On the other hand, Galileo's last published work before his death, *Discourses and Mathematical Demonstrations Relating to Two New Sciences*, was

published in Leiden in the Netherlands. This indicates that there were certainly routes for texts to travel from Italy to the Netherlands and, specifically, that Galilean texts made this journey. Although the publication information of *De terrae motu* complicates an assertion that the text was written in the early seventeenth century by a Catholic associate of Galileo, the contents of *De terrae motu* certainly suit such a claim. This is not a seamless supposition; however, it provides a likely alternative to Hooykaas' attribution of the text to Rheticus.

Even if not directly from Galileo's circle, *De terrae motu* is certainly more characteristic of a seventeenth-century text than a sixteenth-century one. The use of Augustine, the application of the principle of accommodation to the Copernican debate, and concept of keeping the fields of theology and natural philosophy separate, all present in Galileo's *Letter*, were also all seventeenth-century concerns. They frequently appear in the hermeneutical texts that arose in response to Galileo's trial, and as well as in both Kepler's introduction to the *Astronomia nova* and Foscarini's *Letter*.

Westman, who ascribes to Hooykaas' attribution of *De terrae motu* to Rheticus writes regarding the text, "With Copernicus's death on the eve of the Council of Trent (1545-63), this brief gesture of philosophical and exegetical openness would go unheeded until second- and third-generation Copernicans independently revived Saint Augustine's principle of accommodation more than half a century later."[1] Westman is correct to note the important overlap between *De terrae motu* and seventeenth-century texts with respect to their use of Saint

[1] Westman, *The Copernican Question*, p. 131.

Augustine and the principle of accommodation, but his statement is generally questionable. First, there are more similarities between *De terrae motu* and these seventeenth-century texts than what Westman highlights. Second, if Rheticus indeed wrote *De terrae motu*, these similarities are exceptionally coincidental and indicate a *remarkable* degree of foresight on the part of Rheticus.

Certainly, it is possible that Rheticus wrote the text and did display this foresight; however, it is not particularly likely. Further, the manner in which the author of *De terrae motu* defers to the Church is unexpected for a Lutheran such as Rheticus; however, Rheticus did have reasons for remaining connected to Catholicism. In his letter to Rheticus from 1543, Giese's reference to the "*opusculum*" ("little work") written by Rheticus that reconciles Copernicanism with Scripture does suit a description of *De terrae motu*. *De terrae motu* certainly does reconcile Copernicanism and Scripture, and it is also a short work. Such a short text would fit the description in the letter of Rheticus' "little work" and would be of an appropriate length to append to *De revolutionibus*, as Giese's letter further suggested. Giese was a Catholic bishop and *De revolutionibus* was written by the Catholic Copernicus, so a hermeneutical text that Giese thought to be appropriate to attach to *De revolutionibus* would not likely be decidedly Lutheran. If Rheticus did write *De terrae motu*, such reasoning accounts for the peculiar Catholic language in the text.

That is not to discount Hooykaas' own arguments and justifications for Rheticus' authorship of the text. Hooykaas gave *De terrae motu* very careful consideration and presents some persuasive evidence in his arguments in favour of Rheticus' authorship of the text, helpfully noting the references to other works that

gave the text an indisputable *terminus a quo* of 1532. Such a date fits nicely with the theory that Rheticus wrote *De terrae motu*, but if the text is from a Galilean environment, such an early date is puzzling. One would expect later references than 1532 to be used if the text was written in the seventeenth century, unless the author wished the text to appear to have been written at an earlier date.

However, as Lüthy noted, the publication of a text decidedly by Gorlaeus along with an anonymous text that was later determined to be by Rheticus is unusual. The two figures had little in common and the texts themselves had little in common. It is unclear how the publisher obtained this text and where it was in the interim period between its composition and its publication. As explained, it is certainly possible that Rheticus did write the treatise and that it did have these unusual circumstances surrounding its publication; however, the circumstances to accommodate such a position are unlikely. It is much more conceivable that it was written in the early seventeenth century, in the wake of Galileo's trial when so many other texts of a similar nature were written, by someone with a connection to Galileo.

Although Hooykaas' attribution of authorship to Rheticus was done with detailed attention to Rheticus' circumstances, it was not done with a consideration of why it *could not* be from another time or by another author. Hooykaas gives his brief reasoning for why, due to the "theological vagueness" of the text, it must have been written before the Council of Trent, but this is without an exposition of other post-Tridentine hermeneutical texts with which *De terrae motu* shares so many similarities. The absence of such a consideration weakens Hooykaas' argument.

Hooykaas provides other considerations that are equally weak, such as his assertion that the author of this text has a "wavering mind," which casts a shadow over his attribution more generally. Additionally, Hooykaas erroneously asserts that he found the text bound with other seventeenth-century "tracts," when it was, in fact, bound only with Gorlaeus' *Idea physicae*.

The scholarly reaction to Hooykaas' publication was equally disappointing. Excepting Katherine Tredwell, no one publicly gave the authorship of *De terrae motu* serious reconsideration, or even investigated Hooykaas' arguments. Any examination of Hooykaas' arguments would have strengthened the case that Rheticus did indeed write *De terrae motu* because Hooykaas' attribution would be corroborated. Tredwell proposed some reasons to doubt Hooykaas' attribution and suggested paths for future investigation of the authorship of the text, which was extremely helpful for the work in this thesis; however, her consideration of the matter was brief. Historiography on Rheticus, more generally, is also brief but it is very important. It frames his relationship with Copernicus well and his role in disseminating the Copernican theory, which was also foundational for this thesis; however, little is said about Rheticus as an astronomer on his own terms. This thesis contributes to the under-developed field of scholarship on Rheticus, as well as fully addresses, for the first time, the question of the authorship of *De terrae motu*. This thesis goes beyond Tredwell's scepticism, examining *De terrae motu* anew and concluding that Hooykaas' arguments in favour of Rheticus' authorship of the treatise are not definite.

Concluding that Rheticus is less likely to be the author of *De terrae motu* than an early seventeenth-century Catholic author, or even some unnamed associate of Galileo, is unfortunate for the field of scholarship on Rheticus. To remove a text from those that can be utilised when studying Rheticus is regrettable, especially one that addresses Copernicanism and Scripture, as Rheticus and particularly his theology are understudied as it is. However, such a conclusion corrects what scholarship on Rheticus does exist, increasing the quality, if not the quantity, of what can be said about the man. *De terrae motu* could still be used in scholarship on Rheticus; however, only as a means to speculate about Rheticus' theology and not to make definite assertions. Less is can now be posited about Rheticus' theological position, but what is posited, is with greater certainty and accuracy.

In the larger picture of early modern scriptural hermeneutics, there is now an additional text to consider adding to the others that were born from the turmoil surrounding Galileo's trial. In that sense, the text does not contribute much to the field but the use of language associated with Rheticus adds an interesting dynamic. Unfortunately, the identity of the author remains unknown; however, if determined, it would be interesting to examine further the parallels that are drawn between the author and Rheticus and between the unnamed "*praeceptor*" and Copernicus.

In order to make such an identification, building on this evidence presented in this thesis, a consideration of students and associates of Galileo would be required in order to determine who among them head the motivation and the means to compose such a treatise. Galileo did have various students, including Benedetto Castelli, Bonaventura Cavelieri, and Evangelista Torricelli, among others. From

there, any surviving texts by these individuals could be examined for any phrases and language, themes, and concepts that are common with *De terrae motu*. Additionally, a statistical method for determining authorship has gained recognition in recent years, which could be done between those seventeenth-century texts and *De terrae motu*, and also the *Narratio prima* and *De terrae motu*, in order to quantify the likelihood that two texts were written by the same individual.[2] These investigations would engage with the findings of this thesis and would be able to assert with more certainty whether Hooykaas' attribution of authorship to Rheticus was correct or whether it was likely a seventeenth-century Catholic work, as this thesis suggests.

The arguments presented in this thesis depend on a comparison between sixteenth-century and seventeenth-century hermeneutical trends, as well as Catholic and Protestant hermeneutical trends. The conclusion that the author of *De terrae motu* is a seventeenth-century Catholic is based on probability, rather than certainty. This thesis first, in its introductory chapter, outlines the complex circumstances surrounding the publication and re-discovery of *De terrae motu*. This is followed by a consideration of existing scholarship on Rheticus. These first two chapters indicate that Rheticus is an under-studied figure in the history of science and *De terrae motu* is specifically neglected. The third chapter set the stage for a thorough investigation of *De terrae motu* by detailing Rheticus' life and his

[2] The process, in short, uses digital transcriptions of particular texts and uncovers the rates of occurances of various words and phrases, and from this, is able to apply computational formulas to the different texts in order to yield ratios of when and where similar language and sentence structure is used. For more, see David I. Holmes, Lesley J. Gordon and Christine Wilson, "A Widow and her Soldier: Stylometry and the American Civil War," *Literary and Linguistic Computing* 16:4 (2001): pp. 403-20, and John Burrows, "'Delta': a Measure of Stylistic Difference and a Guide to Likely Authorship," *Literary and Linguistic Computing* 17:3 (2002): pp. 267-87.

circumstances, indicating that a text such as *De terrae motu* could indeed suit an author of Rheticus' training and exposure. Following this chapter, careful consideration is given to Hooykaas' arguments in favour of Rheticus' authorship, as well as the reception of his 1984 publication. This indicates that not only were Hooykaas' arguments insufficient in order to conclusively demonstrate the authorship of the treatise, but the scholarly community also failed to critically examine Hooykaas' attribution, allowing *De terrae motu* to be used in studies of Rheticus when it ought not to have been used. At the close of the fourth chapter, this thesis has outlined the details of Rheticus' life, subsequent scholarship on him, and scholarship on *De terrae motu*, which clearly indicates that Hooykaas' 1984 publication was inconclusive and called for reinvestigation.

In an effort to arrive at a more definitive conclusion regarding the authorship of *De terrae motu*, the fifth chapter of this thesis then investigates the climate of scriptural hermeneutics in the early modern period. The evidence presented in the fifth chapter indicates that the treatise is slightly more likely a product of the seventeenth-century than the sixteenth-century. The sixth chapter then examines hermeneutical texts from the sixteenth and seventeenth centuries in order to further the claims of the fifth chapter, as well as discover whether *De terrae motu* has more in common with Catholic or Protestant hermeneutical texts. The evidence presented in the sixth chapter suggests that *De terrae motu* is likely a seventeenth-century Catholic text. This conclusion, however, is merely the *most probable* scenario for the composition of *De terrae motu* and that Rheticus is the author of the text, as Hooykaas suggested, remains possible.

Although this thesis is not able to conclude with certainty by whom *De terrae motu* was written, the research presented herein is significant in order to eventually reach a conclusion. This thesis provides the first detailed examination of *De terrae motu* since Hooykaas' 1984 publication, which was much needed, and its finds Hooykaas' evidence to be inconclusive. But why is *De terrae motu* so difficult to date? Did the author intend the text to be this thoroughly anonymous, leaving no clear indication of his identity, location, profession, or confession in the treatise? The themes in *De terrae motu* do suggest a seventeenth-century Catholic author but a linguistic analysis of the text would certainly further the evidence presented in this thesis and help to arrive at a certain conclusion regarding the authorship of the treatise.

The author of *De terrae motu*, whether a seventeenth-century Catholic, or even Rheticus, concludes his work thus:

> Let us pursue, (in so far as God allows us), the knowledge of how the Lord also wished these most perfect bodies of the world to be known by us. The philosophers say that some things are known to nature, but unknown to us. To this category let us indeed consign also disputes about hypotheses. For it appears that the Lord rightly said to Job: 'Hast thou known the order of heaven, and dost thou set up its plan on the earth?'[3]

This passage asserts the importance of the study of astronomy but it also asserts the existence of certain unattainable knowledge. He argues that God is the one who allows this human investigation of his divine creation and humanity is limited by the parameters he sets. Further, the philosophers also assert that nature knows more about creation than humans do, and so any "disputes about hypotheses" must be

[3] *De terrae motu* [English translation] in Hooykaas, *G. J. Rheticus*, p. 101; *De terrae motu* in Gorlaeus, *Idea physicae*, p. 64. Quotation is taken from the Hooykaas volume. See also Job 38:33.

abandoned. In the final lines of *De terrae motu*, the author, who had so passionately argued for the reconciliation of Copernicanism with Scripture, expresses a final moment of humility and deference to God, suggesting that the truth of this matter may never be known with certainty.

Unfortunately, the same may be said for the authorship of this text. The evidence indicates that *De terrae motu* most likely arose from same environment that gave rise to Galileo's *Letter to the Grand Duchess Christina*; however, there also remains some lesser evidence that indicates that Rheticus could indeed be its author. While this matter can be further pursued in order to increase the sureness with which authorship may be ascribed, it is possible that the identity of the author of *De terrae motu* will remain uncertain.

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