

# **Galileo Was Wrong: The Church Was Right**

2-Volume book by Robert A. Sungenis, Ph.D. ( Excerpt #5 – 24 Mar 08 )

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## **Pope Alexander VII and the 1664 Index of Forbidden Books**

Thirty-one years after Pope Urban VIII and his Sacred Congregation of the Index condemned heliocentrism as “formally heretical” and “erroneous in faith,” on March 5, 1664, Pope Alexander VII attached condemnations of the works of Copernicus, Galileo, and Kepler to a papal bull appropriately titled *Speculatores Domus Israel* (“Watchman over the House of Israel”), signed by the pope himself and which declared that the *Index of Forbidden Books* was part of the papal bull and thus bore his direct papal authority.<sup>1</sup> In this way, the pope’s decree against books teaching heliocentrism was in the *forma specifica* venue, one of the highest magisterial vehicles for the dissemination of papal authority. The pope also mentions past decrees against heliocentrism, which implies that the decree of 1633, which stated that heliocentrism was “formally

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<sup>1</sup> ¶6: “All these things were ordered to be carried out carefully and accurately according to Our mind, and the resulting general Index, including all the Tridentine and Clementine documentation, has now been composed. By Our order, it has also been revised and printed at the press of Our apostolic household, with the insertion of this present Bull. Therefore, on the advice of the aforesaid cardinals, We, by Our apostolic authority, and by means of this present Bull, confirm and approve the said general Index, with each and every thing contained in it.” *Index Librorum Prohibitorum et Expurgandorum Novissimus, Pro Catholicis Hispaniarum*, Regnis Philippi IV, Regis Cathol., Ill., AC. R. D.D. Antonii A Sotomaior O.P., Supremi Præsidis, & in Regnis Hispaniarum, Siciliae, & Indiarum Generalis Inquisitoris, c. jussu ac studiis, luculenter & vigilantissimè recognitus, Madriti [Madrid], Ex Typographæo Didaci Diaz, Subsignatum Lido Huerta, M. DC. LXVII [1667]. “*Index Librorum Prohibitorum*, Alexandri Septimi [Alexander VII] Pontificis Maximi jussu editus: Copernicanæ Astrologiæ Epitome. vide, Ioannis Kepleri; Copernicus. vide, Nicolaus.” (p. 30); “Galileo Galilei. Vide, *Dialogo di Galileo*.” (p. 52); “Ioannis Kepleri Epitome Astronomiæ Copernicanæ” (p. 73), attached to: “...Bullam Alexandri VII, P. M. qualis est in limine Editonis Superioris Anni, qui est M, DC, LXIV [1664]. Nam licet nonnulla contineat, quæ ad illam. Editionem, ejusque dispositionem speciatim pertinent; non sufficieba tamen ea ratio, ut ejus lectione non fruerentur hic Fideles. Alexandr Papa VII; AD perpetuam rei Memoriam. *Speculatores Domus Israel*...” (p. 137)

heretical” and “erroneous in faith,” were personally and canonically confirmed by Alexander VII. Needless to say, this highly authoritative bull was the chosen means the pope determined to be a “Watchman” for the Church, to protect it from heretical and erroneous ideas that would damage the faith of its people.

### **Alexander VII’s Papal Bull** *Speculatores Domus Israel*

Having been constituted, in the mysterious designs of divine Providence, as watchman over the house of Israel, that is, the holy Church of God, We continually strive with particular zeal to exercise Our pastoral vigilance by alerting the Lord’s flock to imminent dangers, so that the sheep redeemed by the precious blood of our Lord and Saviour Jesus Christ shall not be seduced from the path of truth, but rather, may continue their happy journey toward the goal of eternal blessedness by persevering in that path under the guidance of salutary doctrine.

1. Thus, it is of very great importance in the governance of the church to teach sound morality and to condemn false doctrines; for the former activity promotes upright conduct, while the latter enables the pure light of faith to shine forth. The Apostolic See, therefore, realizing clearly that reading is an excellent way for men to learn what they should believe and how they should behave, exercises – as it has always exercised – a particularly alert vigilance in laying down norms for the reading of books. For by means of these norms – designating by name authors and writings which faithful Christians should abstain from reading – discernment is effected between good and evil literature, that is, between harmless and harmful books.

2. In this matter, Our venerable brethren the cardinals of the Holy Roman Church who have been appointed to supervise the Index of books deserving prohibition (in whole or in part), have been devoting their attention – not only by their own will and initiative, but also in attentive obedience to Our own special command – to the following problem. After Our predecessor of happy memory Pope Clement VIII promulgated an Index of forbidden books that followed the form of the earlier Index ordered by the holy Council of Trent, many more books were prohibited, and their authors condemned, both by the Roman Pontiffs who succeeded the said Pope Clement and by their congregation of cardinals. Nevertheless, there has been no officially compiled and published catalog setting out in a clear and well-ordered manner all these prohibited books and condemned authors, with the result that great confusion has arisen regarding this matter – confusion that will only keep increasing in the future unless opportune provisions are made.

3. Therefore, desirous of confronting the difficult task of finding a true solution, and after mature and diligent deliberation which has involved a number of the aforesaid cardinals who were designated to deal with this problem more effectively, We have decreed, firstly, that they undertake to compose a new Index including not only those books that have been prohibited (or otherwise censured) after the promulgation the most recent Index by Our predecessor Clement, but also those contained in his own list and the earlier

one. Secondly, as regards the method of ordering the names of authors and subjects, We have decided that a simple list in alphabetical order will henceforth be used instead of the previous threefold system of classification. Although that original system had features that were initially praiseworthy, experience has shown that a simpler format, unencumbered with additional annotations – many of them becoming less relevant over the course of time – will be more convenient. Readers will now be able to find any given author in the Index without difficulty, and this will be of special benefit to booksellers. It is in the public interest that they, above all, have at their disposition an Index that is clear and easy to use; for a mistake on their part may well cause many others to fall into error.

4. As things turned out, the system used previously for distinguishing the various categories of books often proved deceptive for many readers – learned as well as simple. For they thought the order in which the books were condemned corresponded to the degree of gravity – as if persons reading books listed in the first pages of the Index would always incur more severe sanctions than those who might read the books appearing further down the list. Actually, it can easily be inferred from the Council of Trent’s system of classification that this is not the case. For what it gave precedence to was only the distinction between books condemned on account of the vices and defects of their authors and those reprobated because of the pernicious doctrine and errors they contained. This was followed by distinguishing books that give the author’s own name from those published under a pseudonym. So it has happened that many books, placed in this third and last category solely because their authors were unknown, are much worse than some others mentioned in the first and second categories. Hence, We have decided to eliminate completely this source of confusion, lest it become the occasion of dangerous laxity in these matters.

5. While ordering this previous system of classification to be discontinued, We have decided, nevertheless, that some acknowledgment of it should still be retained. Hence, in the censure of each book, the aforesaid earlier classifications and annotations (wherever these exist) will be cited, along with the decrees by which the books were originally censured. In this way the case history of each censured book will be made known.

6. For the same reason, We have seen to it that the Tridentine and Clementine Indices, together with their appendices, have been reproduced in this new general Index, along with all relevant decrees promulgated up till now since the publication of our predecessor Clement’s Index. In this way, nothing that might be useful in satisfying the investigative zeal of even the most studious Catholic reader could seem to have been omitted. All these things were ordered to be carried out carefully and accurately according to Our mind, and the resulting general Index, including all the Tridentine and Clementine documentation, has now been composed. By Our order, it has also been revised and printed at the press of Our apostolic household, with the insertion of this present Bull. Therefore, on the advice of the aforesaid cardinals, We, by Our apostolic authority, and by means of this present Bull, confirm and approve the said general Index, with each and every thing contained in it. Furthermore, We command and admonish all persons residing in whatever

place, collectively and individually, to observe its prescriptions inviolably and unswervingly, under pain of incurring the penalties contained in the Constitution published by order of our predecessor of happy memory Pope Pius IV in regard to the aforesaid Tridentine Index.<sup>2</sup> And in order to do away with the variations found in older decrees laying down penalties for transgressors, We also restore by the present Bull each and every one of the penalties inflicted in any form whatsoever by previous apostolic constitutions and other documents dealing with these matters – without prejudice, however, to those prescriptions regarding condemned books and authors which are customarily published each year on Holy Thursday in an Apostolic Letter. These prescriptions We do not intend to change, or even discuss, in any way at all.

**7.** Consequently, We command each and every one of our venerable brethren, the patriarchs, archbishops, bishops and other Ordinaries of places, as well as those beloved sons who are their vicars and officials, the inquisitors of heretical depravity, the superiors of every kind of religious Order, congregation, society, or institute, and all others who are, or will be in future, in any way concerned, to do all in their power to see that this general Index is made widely available and observed. Let them be mindful that the office committed to them involves the duty of both keeping the sheep of the Lord's flock away from poisonous pastures, and filling them with nourishing food. God forbid that any of these shepherds, through malice or negligence, should cease to fulfill this duty! For then they will find themselves obliged to give an account before a severe Judge, for all the enormous and very grave evils that inevitably arise from their failure.

**8.** Notwithstanding anything contrary to the above: that is, any constitutions or edicts – whether apostolic or published by general, provincial or synodal councils in either general or special form – and regardless of any apostolic confirmation or other kind of backing, even by an oath, of any statutes, customs or privileges, indults and apostolic letters, in any shape or form or with any kind of clauses or decrees, that may have been in any way conceded, confirmed, approved or introduced; We specially and expressly derogate each and every one of these, sufficiently for their own derogation and that of their

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<sup>2</sup> From “All these things” to “aforesaid Tridentine Index” the Latin is: Quae omnia, cum iuxta mentem nostram diligenter et accurate fuerint executioni mandata, composito Indice generali huiusmodi, dui etiam regulae Indicis Tridentini, cum observationibus et instructione memorato Indici Clementino adiectis appositae fuerunt: nos, de praedictorum cardinalium consilio eundem Indicem generalem, sicut praemittitur, iussu nostro compositum atque revisum, et typis camerae nostrae apostolicae iam impressum, et quem praesentibus nostris pro inserto haberi volumus, cum omnibus et singulis in eo contentis, auctoritate apostolicâ, tenore praesentium, confirmamus et approbamus, ac ab omnibus tam universalibus quam singularibus personis, ubicumque locorum existentibus, inviolabiliter et inconcusse observari mandamus et praecipimus, subpoenae in constitutione recolendae memoriae Pii Pappae IV etiam praedecessoris nostri super dicti Indicis Tridentini confirmatione editâ contentis.

whole import – special, specific, express and singular – and indeed, word for word.

**9.** It is Our will that copies or exemplars of this present Bull, including printed copies, once they have been signed by a public notary and stamped with the seal of an ecclesiastical dignitary, are to be given exactly the same credence, in all places and by all peoples, as would be given to this original if it were shown or exhibited.

Given in Rome, at St. Mary Major's, under the ring of the Fisherman, on the 5<sup>th</sup> day of March 1664, in the 9<sup>th</sup> year of Our pontificate.

**In original,  
this page contained mast heads  
for the 1664 Alexandrian Bull**

Within the Index attached to the bull there are separate pages of condemnation for the books of Copernicus, Galileo, and Kepler.

- Copernicus is on page 30
- Galileo is on page 52
- Kepler is on page 73



What is significant about the genre of Alexander VII's decree is not only its *forma specifica* venue but also how popes following him regarded Alexander's previous decrees. For example, in Pius IX's dogmatic declaration on the Immaculate Conception in 1854, he cites as supporting documentation the writings of Alexander VII more than any other pope. In reference to Alexander VII's apostolic constitution, *Sollicitudo Omnium Esslesiarum* of December 8, 1661, Pius IX says Alexander VII "authoritatively and decisively declared the mind of the Church" when he wrote: "Concerning the most Blessed Virgin Mary, Mother of God...her soul, in the first instant of its creation and in the first instant of the soul's infusion into the body, was, by a special grace of God...preserved free from all stain of original sin."<sup>3</sup> Here we see that Alexander VII's apostolic constitution, which could not have been considered on the same level as an infallible dogma since Pius IX lays sole claim to doing so in 1870, is, nevertheless, categorized as an official document that "authoritatively and decisively declared the mind of the Church," (NB: the doctrine of papal infallibility had not yet been defined and established for either *Sollicitudo* or *Ineffabilis*. That important wrinkle in Catholic magisterial protocol would only be formally established in 1870, and the Church reserves the right to make papal infallibility retroactive to any previous papal document. Prior to 1870, and the Church reserves the right to make papal infallibility retroactive to any previous papal document. Prior to 1870, *Ineffabilis Deus* was designated as an "apostolic constitution"). As such, the logical question is: should not Alexander VII's 1664 papal bull, *Speculatores Domus Israel*, which is on the same or similar level of papal authority as his previous 1661 apostolic constitution, be given the same designation of a "authoritative and decisively declaring the mind of the Church," especially since in the prior fifty years (1616-1664) the "mind of the Church" had already been "declared and defined" tating that heliocentrism was "formally heretical" and "erroneous in faith"?

Some might argue that since Pius IX made *Ineffabilis Deus* (the doctrine of the Immaculate Conception) "infallible" this implies that Alexander VII's apostolic constitution of 1661 was not infallible, and neither was his papal bull of 1664. Argumentation along those lines, however, is self-defeating, since the only way Pius IX could have used Alexander VII's apostolic constitution as support for *Ineffabilis Deus* is if Pius IX held to the absolute truthfulness of Alexander's apostolic constitution on the Immaculate Conception, *Sollicitudo Omnium Esslesiarum*, regardless whether it is "infallible" under the 1870 definition.

At this point it must also be understood that categorizing the Immaculate Conception as an infallible dogma doesn't make it any more true. Truth as truth, at least from the divine perspective, doesn't change with the level of authoritative format given to it by the Church. The various levels of authority given to certain doctrines are more for our limitations and weaknesses than an admission that there are degrees of truth. When a dogma is declared "infallible" it means that all debate and doubt among human beings must stop,

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<sup>3</sup> *Ineffabilis Deus*, Pope Pius IX, December 8, 1854

and those who deliberately reject the dogma will now be excommunicated. As such, the “infallibility” of a dogma does not make it truer, *per se*; rather, it makes our required allegiance to the doctrine absolute and unequivocal. In regard to doctrinal propositions, there can only be truth or error. If the Church regards a certain doctrine on the lowest rungs of authority (*e.g.*, as either “safe,” “very common,” or “probable”) this does not make the doctrine any less true if it is indeed already true. It only shows that the Church has either not studied the doctrine sufficiently or that no divine revelation has been given regarding its truth or falsity. Be that as it may, there has been no time in history where one pope has declared a previous pope’s apostolic constitution false, and for all intents and purposes, it will never happen. By the same token, no pope has ever declared Alexander VII’s bull, *Speculatores Domus Israel* false, and never will.

Interestingly enough, in his apostolic constitution on the Immaculate Conception, Alexander VII refers back to Paul V, the pope who dealt with Galileo in 1616, for support of the doctrine. He writes: “we renew the Constitutions and Decrees issued by the Roman Pontiffs, our predecessors, especially Sixtus IV, Paul V and Gregory XV in favor of the doctrine asserting that the soul of the Blessed Virgin...was preserved from original sin.” Alexander VII also adds penalties for those who would disobey his 1661 decree on the Immaculate Conception:

...we hereby declare that in addition to the penalties and censures contained in the Constitutions issued by Sixtus IV...we hereby decree that they be deprived of the authority of preaching, reading in public, that is to say teaching and interpreting...and hereby renew the above Decrees and Constitutions of Paul V and Gregory XV.

He then adds a reference to the *Index* in connection with his decree on the Immaculate Conception:

Moreover, as regards those books in which the said sentence, feast and relative veneration are called into question or are contradicted in any way whatsoever, according to what has already been stated, either in writing or verbally, in discourses, sermons, lectures, treatises and debates – that may have been printed after the above-praised Decree of Paul V, or may be printed hereafter we hereby prohibit them, subject to the penalties and censures established by the *Index of Prohibited Books*, and *ipso facto*, without any further declaration, we desire and command that they be held as expressly prohibited.<sup>4</sup>

Here we see that Paul V’s decrees are considered as authoritative as Alexander VII’s, and it is no coincidence that both these popes issued and/or approved strong condemnations against heliocentrism; and they, along with Urban VIII, were just as adamant to preserve the explicit scriptural truth that

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<sup>4</sup> Alexander VII: *Sollicitudo Omnium Esslesiarum*, December 8, 1661.

the sun revolved around the Earth as they were to protect the implicit scriptural truth that Mary was immaculately conceived. It is obvious that none of them considered their decrees on either subject “reformable.” Their absolute resolve on both issues is a fact of history that no one can change, be it pope, priest or parishioner. The question remaining for the modern Church is: will we be forced to succumb to the world’s pressure to regard these successors of Peter as making an erroneous judgment on one doctrine but making a correct judgment on another, or will we be honest and admit that they were guided by the same Holy Spirit to affirm both doctrines as true?

### **The Decrees of Benedict XIV**

After the 1664 papal bull of Alexander VII, the next official declarations concerning the aftermath of the Galileo affair occurred in 1741 and 1758 when under the reign of Pope Benedict XIV (1740-1758) the Holy Office granted an imprimatur to the first edition of the complete works of Galileo in addition to omitting the general prohibition of Copernican books for the new *Index*. As we noted earlier, however, the imprimatur was granted under the condition that the stipulations of the Padua Inquisitor, Paolo A. Ambrogio, be observed. The result was that the publication in 1744 had to exclude Galileo’s *Letter to Christina* and the *Letter to Castelli*, which were two of Galileo’s most formidable defenses of Copernicanism. Furthermore, Galileo’s *Dialogue of the Two Great World Systems* had to be printed in Volume IV and accompanied by the 1633 sentence against Galileo (*i.e.*, “vehemently suspected” of “formal heresy”), as well as the text of Galileo’s abjuration. The most important feature of the re-publication was that it was required to contain a preface emphasizing the “hypothetical” character of the book’s contents. This requirement shows the consistency of the Church’s position, for the same permission was granted to the works of Copernicus in 1620.

The road to the imprimatur was long and arduous, however. Rome was very cautious about what would be allowed and disallowed in the text. The events unfolded as follows. On September 29, 1741, Ambrogio wrote to the Inquisition in Rome seeking for permission for the Padua seminary to publish Galileo’s complete works, with the promise to make the *Dialogo* hypothetical and to include Galileo’s abjuration. On October 9, the Inquisition approved the project. Ambrogio wrote a second letter to the Inquisition on February 10, 1742 requesting permission to keep the *Dialogo* intact as it was written by Galileo but to include a preface that stipulated the Church’s 1633 condemnation of both Galileo and the *Dialogo*. The seminary also wanted to include Galileo’s *Letter to Christina*. Excerpts from the book’s preface that Ambrogio submitted to the Inquisition are as follows:

O learned Christian reader, here is a beautiful example of humility and submission to the decisions of the Holy Roman Church. What I present to you is Galileo Galilei’s famous Dialogue on the Two Chief Systems, Ptolemaic and Copernican. In this Dialogue, he [Galileo] showed too much fondness for the second [Copernicanism], which is not compatible with Holy Writ; thus, he later repented and performed a solemn abjuration and retraction...Indeed, I have wanted the remedy to precede the disease in print, by prefacing **to the dialogue**

**itself the sentence pronounced against him and the ready mortification he showed toward the venerable decisions of the Holy Office; for he declared that what he had written on the subject, impulsively and out of intellectual vanity, was not only false but also improbable, because it was contrary to the divine scriptures. Given, then, that the Copernican hypothesis is false and untenable, and that I also condemn and detest it in the clearest manner and for the same reason, you can make use of the other admirable doctrines that are coincidentally found scattered on almost every page.<sup>5</sup>**

On March 17, 1742 Rome replied and stated that as long as the stipulated guidelines were followed, the imprimatur could be granted. Excerpts from the reply are recorded below. We notice the extreme care the Sacred Congregation took to abide by the decrees of 1616 and 1633 when granting the *imprimatur*.

Last September the Father Inquisitor informed this Supreme Congregation of the petition made to him for permission to reprint all of Galilei's works. To obtain it, the printer obliged himself to print all declarations that might be prescribed by this Supreme Congregation; to include in the fourth volume the abjuration made by the author; to do everything possible to change the exposition to a hypothetical one, as it had been done there [in Padua] for the reprinting of Pourchot; and finally to have the correction done with the assistance of men who are learned and of proven Catholic religion....The committee of Consultants specially appointed by His Holiness decided that one should reply to the Father Inquisitor of Padua to permit the printing of the works in question, but only on the conditions described by the Father Inquisitor....Note that the needed searches have been made in the archives and the chancellery of this Supreme Tribunal in regard to Galileo's works.<sup>6</sup>

On May 20, 1742, Ambrogio again wrote to Rome on behalf of the editors and asked if, instead of changing the *Dialogo's* text they could make deletions and changes in the marginal postils of the book. They also stated that they would not be including Galileo's *Letter to Christina* but would like to include a published essay by biblical scholar Augustin Calmet, a French Benedictine friar who defended the geocentric worldview based on an exegesis from Scripture. Rome responded on June 6 stating that it wanted more information on how and why the Church had previously decided that the Copernican system could be permitted as a hypothesis. Friar Luigi Maria Giovasco was assigned to this task. On June 13, the Inquisition approved the book on the following recommendation by Giovasco. We notice in the Inquisition's approval that the heliocentric system is tied directly to Pythagoras, thus

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<sup>5</sup> Translated from the anonymous Italian text transcribed and published by Mayaud, Rome: Editrice Pontifica Università Gregoriana, 1997, pp. 136-137, as cited in Finocchiaro's *Retrying Galileo*, pp. 127-128.

<sup>6</sup> Mayaud, pp. 137-138, *Retrying Galileo, op. cit.*, p. 128.

showing the 1742 Church's recognition that the battle over cosmology was a longrunning one, which began when the Church Fathers held fast to the fixed Earth of Scripture against the moving Earth of the Greek philosophers:

...On the Revolutions of the Heavenly Spheres by Nicolaus Copernicus...and a work by Diego de Zúñiga ...supported the ancient opinion of Pythagoras, who taught that the Sun was the motionless center of the world and that the terraqueous globe of the Earth turned around it with perpetuated motion. The Carmelite Father Paolo Antonio Foscarini adopted such a system and defended it against the censure of theologians, who judged it false and contrary to Sacred Scripture. This system, which is commonly called Copernican for having been reawakened by Copernicus from the ashes of the ancient philosophy of Pythagoras, was denounced to the Sacred Congregation of the Index. On March 5, 1616, this Congregation published a decree prohibiting the system as a false Pythagorean doctrine contrary to Sacred Scripture and prejudicial to Catholic truth. But there was this difference: that Father Foscarini's Letter was prohibited absolutely, whereas Copernicus' book and Diego de Zúñiga Commentaries on Job were merely suspended, until corrected.

Rome then responds to the specific request of Ambrogi. We notice again how close the Inquisition follows the history so as to show the continuity of the thinking process from 1616 to 1742:

Then some publishers approached the same Sacred Congregation of the Index to have the above corrections of the above-mentioned works and to be able to publish them, exempt from the announced suspension...So another decree appeared declaring that the system should be understood as condemned only when it was expounded as an absolute thesis, but not when it was expounded as a hypothesis to better know the revolutions of the heavenly spheres. These corrections appeared in a decree of the Sacred Congregation of the Index of the year 1620. They emended the chapters of Copernicus' work in such a way that the printed text is left intact where it speaks problematically, and it is changed to mere hypothesis where it speaks in the manner of a doctrinal and absolute thesis. Corrected in this way, Copernicus' work is even today free of any condemnation. Indeed, all astronomers study the moon by following Copernicus and tell us that they follow such a system in the manner of a hypothesis and not in the manner of a thesis, for they think it is more useful for contemplating the oppositions and phenomena of the stars. In the year 1633, there appeared the Dialogue of Galileo Galilei...in which he established the Pythagorean system in the manner of a thesis. So it was prohibited...because it defended and advocated such a system in the manner of a thesis and not in the manner of an imagined hypothesis

Thus it seems that by reprinting in Padua the works of Galileo Galilei, among which there is the prohibited Dialogue...by including

the decrees and Galileo's retraction, as the printer promises; with the marginal notes referring to the prohibition to speak of the subject in the manner of a thesis and to the fact that one may discuss it only in the manner of a hypothesis; with the addition of Father Calmet's dissertation, which for its part confutes such a system if taken in the manner of a thesis; by all these means one remedies very well the damage of this printing, and one corrects the daring of the modern philosophers who accuse of injustice the Roman condemnation and censure of such a system.<sup>7</sup>

As the Inquisition is writing this letter in 1742, various astronomical phenomena had been and were being discovered, which some astronomers presumptuously interpreted as demonstrating the Earth was moving through space. Here we quote from *Galileo Was Wrong: The Church Was Right, Volume I*, to give the details of these events:

As early as 1640 the astronomer Giovanni Pieroni observed that various stars shifted their position in the sky during the year. As we noted earlier, Francesco Rinuccini brought this evidence to Galileo's attention in 1641, but Galileo was unimpressed. Robert Hooke, three decades later, in 1669, noticed the same kind of shifting for one star in particular, named *Gamma Draconis*. Since everyone from the time of Copernicus had been looking for physical evidence of a moving Earth, Hooke actually thought he had discovered the first parallax as proof. Almost another thirty years later (1694), John Flamsteed observed the same kind of shifting in the star Polaris. Another thirty years later, James Bradley (d. 1762) set out to determine whether Hooke's observations were, indeed, a parallax of *Gamma Draconis*. During the years of 1725-1728 he noticed that during the course of a year the star inscribed a small ellipse in its path, almost the same as a parallax would make. In the heliocentric system, parallax is understood as a one-to-one correspondence between Earth's annual revolution and the star's annual ellipse, but Bradley noticed that the star's ellipse was not following this particular pattern.

At this point, astronomical science was still waiting for a confirmed parallax of any star, since no one had ever measured one. A confirmed measurement of parallax would not be made until more than a century later by Friedrich Bessel in 1838. So Bradley, reasoning that *Gamma Draconis* was too far away to register a parallax, found another explanation, and it was rather an ingenious one. He theorized that the star's annual ellipse was being formed because the speed of light was finite. That is, the star wasn't actually moving in the sky; rather, its light moving at a finite speed, was hitting a moving Earth, an Earth that for six months was moving toward the star, and in the next six months was moving away from the star. While the Earth moved toward the star, the star's light would

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<sup>7</sup> Mayaud, pp. 146-148, *Retrying Galileo, op. cit.*, p. 130-131.

hit the Earth sooner, but while the Earth moved away, the light would hit it later. Bradley reasoned that, if light's speed was infinite, there would be no such effect, but since it is finite, these back-and-forth movements of the Earth would translate into seeing the star move in an ellipse in the sky over the course of a year. This explanation was a welcome relief for the heliocentric view, since until Bradley, no one, including Galileo who died in 1642, had supplied any real evidence that the Earth could be revolving around the sun.<sup>8</sup>

As we proceed to show in the following paragraphs of Volume I, neither stellar aberration nor stellar parallax prove that the Earth is in motion; rather, a moving Earth is only one of at least two ways to explain these particular stellar phenomena. The geocentric solution, of course, is a rotating universe of fixed stars around a fixed Earth – the cosmology of Scripture and Catholic tradition. Nevertheless, the Catholic magisterium was willing to accommodate the aspirations of the then Copernican alternative by allowing various scientific treatises to at least regard a moving Earth as a hypothesis for the simple reason that modern astronomers “think it is more useful for contemplating the oppositions and phenomena of the stars,”<sup>9</sup> which is the Church's factual acknowledgment of stellar aberration and/or stellar parallax but without any commitment to the Copernican interpretation. One was permitted to “contemplate” the Copernican version of stellar aberration and stellar parallax if it made charting the heavens easier (just as naval navigators today use the geocentric system to chart positions at sea, even though they believe heliocentrism is the actual reality), but he could not declare it as the actual reality.<sup>10</sup>

The crucial point to be made here is this: although the Church of 1616 did not have the evidence of stellar aberration or parallax available to the Church of 1742, nevertheless, both ecclesiastical authorities allowed Copernicanism as a hypothesis, since both agreed that Scripture provided the only correct interpretation of celestial events – a fixed earth within a rotating universe, not

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<sup>8</sup> Galileo Was Wrong: The Church Was Right, Vol. I, pp. 130-131.

<sup>9</sup> Stated by Friar Luigi Mario Govasco, assigned by the Inquisition to answer the inquiry of the Padua inquisitor, Paolo Ambrogio, Mayaud, p. 148.

<sup>10</sup> This rationale for allowing Copernicanism as a hypothesis answers Antonio Maria Grandi's objection, voiced by the Commissary General of the 1820 Index for support of Canon Settele's imprimatur, arguing that “If the system had been judged erroneous or heretical, the Church would never have allowed it to be maintained even as a hypothesis; the reason is that otherwise those who studied it would be placed at risk of sinning against the Faith, in case they judged the system to be manifestly demonstrated” (*Retrying Galileo*, pp. 206-207). As such, the hypothesis of Copernicanism would be no more dangerous than Jesus' use of hypothetical stories (e.g., parables) to express a given point, even at the risk of having the sinfully obstinate audience misinterpret the hypothesis (cf., Matt. 13:10-17). If the true interpretation is known and has been declared, it is the responsibility of the audience to adhere to that interpretation.

vice-versa. This historical fact may be the watershed of the whole controversy, since at no time after the Church's 1616 decision to allow Copernicanism as a hypothesis did the Church ever rescind that allowance or permit more than that allowance. Today, as far as the Catholic Church is concerned, modern astronomers can speak and write about Copernicanism with relative freedom, provided they understand that, in the legal forum of the discussion, the Church still maintains that geocentrism is the only official interpretation the Church has ever, or will ever, accept as the correct one, and that all other models are mere hypotheses that can never be regarded as true. The simple reason is: several hypotheses can coexist in theory, but there can only be one true model in reality.

### **Pope Benedict XIV and the 1758 Index**

Regarding the 1758 decision, we noted earlier that no *carte blanche* permission was given to Copernican cosmology; rather, the decree contained precautionary and limiting stipulations very similar to the 1741 decision. We can understand these stipulations if we reflect on the prohibitions in the 1619 edition of the *Index*. It, as well as subsequent editions, had two categories of prohibitions for Copernican works: specific works and general works. The edition of 1758 excluded only the general. Still included were Copernicus' *De Revolutionibus*, Galileo's *Dialogo* and Kepler's *Epitome*, obviously intending to give no endorsement to Copernican cosmology.

In light of its conclusion, the events that led to the 1758 decision are important to know. In July 1753, Pope Benedict XIV issued a bull titled *Sollicita ac Provida* directing reforms of the criteria for publications that would be prohibited by the *Index of Forbidden Books*. In January 1754, Agostino Ricchini, secretary to the Congregation of the Index, inquiring to the pope for additional reforms, desired to remove the ban on various books if proper corrections were made to them.<sup>11</sup> Among the examples he cited were works by Descartes, Copernicus and Galileo. Without much ado, Benedict XIV approved Ricchini's request on February 12, 1754. The important point that cannot be missed in this simple transaction is that the basis upon which any changes to the Index were approved, or any prohibitions of the heliocentric system were relaxed, centered consistently upon the stipulation that the proposed book must contain the "proper corrections," namely, that the use of the Copernican system not be promoted as a thesis, but as a hypothesis. Hence, on that specific basis, on April 1757, with the apparent approval of Benedict XIV, the Congregation of the Index eliminated the prohibition concerning "all books teaching the earth's motion and the sun's immobility,"<sup>12</sup>

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<sup>11</sup> Finocchiaro notes: "...Agostino Ricchini, proposed to the pope...the possibility of lifting the prohibition of some books after proper correction" (*Retrying Galileo*, p. 138).

<sup>12</sup> Finocchiaro, *ibid.*, p. 139, citing various sources, including *Le Opere di Galileo Galilei*, vol. 19, p. 419; Karl Gebler's *Galileo and the Roman Curia*, pp. 312-313; Pierre-Noël Mayaud, *La Condamnation des Livres Coperniciens et sa Révocation à la Lumière de Documents Inédits des Congrégations de l'Index et de l'Inquisition*, 1997, p. 197.

and thus the new *Index* was published in 1758, although it still included the prohibition against Copernicus, Foscarini, Zúñiga, Kepler and Galileo, perhaps because they stood “uncorrected” in their present form.

Not surprisingly, Galileo historians analyzing the situation from hindsight and predisposed to viewing heliocentrism as the correct model of cosmology, puzzle over what, in the words of Mayaud, seems to be an “illogical decision,” or in the words of Finocchiaro, seems to be an “incomplete censure” by the *Index*. As they see it, a complete exoneration of Copernicus, Foscarini, Zúñiga, Kepler and Galileo was long overdue. What they fail to see, however, is that the Church was being entirely consistent to what its previous authorities had decreed. Copernicus, Foscarini, Zúñiga, Kepler and Galileo had already been condemned and there would be no lifting of their condemnations for the simple fact that heliocentrism was not suddenly proven correct in 1757. The Church maintained the decision made in 1620 to allow Copernicanism to be published as a hypothetical model and nothing more. Those that advocated it as more than a hypothesis (*e.g.*, Copernicus, Foscarini, Zúñiga, Kepler and Galileo) logically deserved to retain the status of being censured.

We must also conclude, then, that the removal of the all-inclusive sentence: “all books teaching the earth’s motion and the sun’s immobility” did not mean that other books could be published that taught heliocentrism as a fact. The 1758 *Index* laid the foundation for the meaning and intent of its decision to remove the all-inclusive sentence when it specified that Descartes, Copernicus and Galileo could be published if they contained the “proper corrections.” Obviously, the Congregation of the *Index* would not require Descartes, Copernicus and Galileo to treat heliocentrism hypothetically yet allow “all [other] books teaching the earth’s motion” to do so as a fact. Accordingly, the 1758 decision contains no specific stipulation that “all [other] books” could treat heliocentrism as a fact. Hence, the intended meaning must be that “all [other] books” teaching heliocentrism could do so only if they published it as a hypothesis, just as it was required of Descartes, Copernicus and Galileo. Since logic demands consistency, the burden of proof rests with any contrary assessment.

Nevertheless, the question may surface as to why the 1758 *Index* chose to remove the all-inclusive sentence at all if it remained firm in its intent to bar all books that taught heliocentrism as a fact. The probable reason is that the all-inclusive sentence might have been erroneously interpreted to mean that no other book could even teach heliocentrism as a hypothesis. But since the Church, even in 1616, never said heliocentrism was prohibited from being presented as a hypothesis, it was better, in light of Ricchini’s specific request to publish heliocentric works with the “proper corrections,” to delete the all-inclusive sentence so as to give no suggestion that hypothetical works on heliocentrism were barred from publication.

This potential problem in the all-inclusive sentence stems from the paragraph in which it was originally drafted in 1616. The decree reads:

And whereas it has also come to the knowledge of the said Congregation that the Pythagorean doctrine – which is false and altogether opposed to Holy Scripture – of the motion of the Earth and the immobility of the Sun, which is also taught by Nicolaus Copernicus in *De revolutionibus orbium coelestium*, and by Diego de Zúñiga [in his book] on Job.... Therefore, in order that this opinion may not insinuate itself any further to the prejudice of the Catholic truth, the Holy Congregation has decreed that the said Nicolaus Copernicus, *De revolutionibus orbium*, and Diego de Zúñiga, *On Job*, be suspended until they be corrected; but that the book of the Carmelite Father, Paolo Antonio Foscarini, be altogether prohibited and condemned, and that all other works likewise, in which the same is taught, be prohibited, as by this present decree, it prohibits, condemns, and suspends them all respectively.<sup>13</sup>

The phrase, “and that all other works likewise, in which the same it taught,” is ambiguous with respect to whether the decree was referring only to books, like Foscarini’s, that taught heliocentrism as a fact but had already been published and thus could not be corrected, or also included works that taught heliocentrism as a fact but had not yet been published and thus could still be corrected. That the latter condition may be included in the decree’s intent is noted by the addition of “suspends” to the clause “it prohibits, condemns, and suspends them all respectively,” since a single work within the class “all other works” could not be “suspended” unless there was the intent to allow it to be corrected before being published, which also happened in the case of Copernicus’ book. But since this latter possibility is not clearly stated in the decree, the decree could give the impression that even works that taught heliocentrism as a hypothesis would also be prohibited from being published. Since such was not the case due to the fact that the 1758 Index allowed Copernicus and Galileo’s works to be published if “properly corrected,” then it appears it was best to eliminate the general prohibition but keep the specific prohibition.

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<sup>13</sup> Original Latin: “...Et quia etiam ad notitiam praefatae Sacrae Congregationis pervenit, falsam illam doctrinam Pithagoricam, divinaeque Scripturae omnino adversantem, de mobilitate terrae et immobilitate solis, quam Nicolaus Copernicus *De revolutionibus orbium coelestium*, et Didacus Astunica in *Job*, etiam docent.... ideo, ne ulterius huiusmodi opinionem in perniciem Catholicae veritatis serpat, censuit, dictos Nicolaum Copernicum *De revolutionibus orbium*, et Didacum Astunica in *Job*, suspendendos esse, donec corrigantur; librum vero Patris Pauli Antonii Foscarini Carmelitae omnino prohibendum atque damnandum; aliosque omnes libros, partim idem docentes, prohibendos: prout praesenti Decreto omnes respective prohibet, damnat atque suspendit. In quorum fidem praesens Decretum manu et sigillo Illustrissimi et Reverendissimi D. Cardinalis S. Caeciliae, Episcopi Albanensis, signatum et munitum fuit, die 5 Martii 1616” (Antonio Favaro, *Galileo E L’Inquisizione*, p. 63; *Le Opere di Galileo Galilei*, vol. 19, p. 323). Part of above translation taken from de Santillana’s *The Crime of Galileo*, as cited by Fantoli in *Galileo: For Copernicanism and For the Church*, pp. 223-4.

## The Efforts of Pietro Lazzari

In any case, the decision to continue the censure of Copernicus, Foscarini, Zúñiga, Kepler and Galileo, became all the more significant in the face of the initial arguments put forth by the Jesuit consultant, Pietro Lazzari, professor of church history at the Roman College, to remove the general prohibition. Lazzari tries to convince the Congregation of the Index by first citing all the modern astronomers who hold to heliocentrism. The pressure his words put upon the Congregation were unprecedented. It seems his objective was to make them appear foolish if they did not accept the heliocentric system as a thesis. He writes:

...I now come to the second point and reflection: that not one of these reasons, and still less the whole set, remains nowadays to retain the clause [“all books teaching the earth’s motion and the sun’s immobility”]. First, then, the opinion of the earth’s motion is prevalent in the principal academies, even in Italy, and among them most celebrated and competent physicists and mathematicians. Second, they explain Scripture in the sense that is proper and most literal. Third, they advance a kind of demonstration in their favor.

....Soon after our decree or thereabouts [1633], this opinion [of heliocentrism] began to get established, mostly through the work of Kepler...Bacon of Verulam also said...that in his time the opinion was beginning to spread and expand. In book 1 of *Kosmotheoros*, Christiaan Huygens asserted: “Nowadays all astronomers, except those who are of a retarded mind or whose beliefs are subject to the will of men, accept without doubt the motion of the earth and its location among the planets.”<sup>14</sup> This is even more true today after the discoveries of Newton or those made with the benefit of his system. It is enough to read the proceedings and journals of academies, even Catholic ones, and the works of the most celebrated philosophers and mathematicians, or even dictionaries and similar books that report on the most widely accepted opinions. And indeed, in the article on

Copernicus in the *Encyclopedia*, or *Reasoned Dictionary of the Sciences*, the famous mathematician D’Alembert writes: “Nowadays this system is generally followed in France and England, especially after Descartes and Newton each tried to confirm it by means of physical explanations....It would be desirable that a country as full of intelligence and learning as Italy recognize an error so harmful to scientific progress and that she think of this subject as we do in France! Such a change would be worthy of the enlightened pontiff who governs the Church nowadays. Friend of the sciences and himself a scholar, he ought to legislate to the inquisitors on this

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<sup>14</sup> *Kosmotheoros, sive de Terris Coelestibus, Earumque Ornatu, Conjecturae, 1698, Hagae Comitum, p. 14.*

subject, as he has already done for more important subjects....In France one supports the Copernican system without fear....”<sup>15</sup>

To put as much pressure on the Congregation of the Index as he could muster, Lazzari adds an arsenal of heliocentric supporters, quoting from the 1749 *Chambers’s Universal Dictionary*: “According to the Copernican hypothesis, which now seems generally accepted and even has a demonstration [Bradley’s stellar aberration] the sun is at the center of the system of planets...and our earth among them revolve around it in different periods...” and the 1750 *Philosophical Grammar of the Sciences*, which, speaking of geocentrism, says: “We have not reason to believe it; instead we have some demonstrations to the contrary.” He cites Fr. Paolo Frisi’s *Dissertation on the Diurnal Motion of the Earth*, which was granted an “imprimatur of the general of his order; and it was signed ‘Rome, at the ex college of Saints Blaise and Charles, 24 January 1756’ and was based on the reports of two of his theologians.” He continues:

Here in Rome itself we can find that this is true. I have frequently had occasion to speak with the two celebrated **mathematicians of the order of St. Francis of Paola**, with Fathers Boscovich and Maire...I can attest that this is also their opinion. And the said Father Boscovich, who has tried to reconcile the modern discoveries with the earth’s rest, has told me several times that he regards his reconciliation and the earth’s rest most improbable from the point of view of pure natural reason, and that to believe this it is necessary to bind the intellect in deference to Faith

Lazzari adds the 1743 *Institutions of Physics*, wherein the famous Madame du Châtelet says: “The insuperable difficulties of the consequences drawn from it induced Copernicus to abandon it entirely and adopt the contrary hypothesis, which corresponds so well to the phenomena that now its certainty is not far from demonstration,” and Keill’s *Introduction to True Physics and Astronomy*, stating: “Induced by these indubitable reasons, we brought the earth into

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<sup>15</sup> Jean D’Alembert, *Copernic*, in Diderot and D’Alembert 1751-1780, 4, pp. 173-174, as cited in *Retrying Galileo*, pp. 142-143. We note here that Lazzari’s quote of D’Alembert is only a few years prior to the French Revolution of 1789, which precipitated an almost total rejection of Church authority in France. As Finocchiaro describes it: “The French Revolution affected the Galileo affair not only in the general and indirect ways...but also in a very specific and concrete way....In 1798 a French army occupied Rome, abolished the papal government, and established a Roman Republic. Pope Pius VI was deported to Florence, and the Inquisition palace in Rome was ‘plundered to some extent by a French military rabble, and a part of the archives burned.’ In 1800 a new pope, Pius VII, was elected in Venice, and in 1806 he was allowed to return to Rome with limited powers of government....In 1809, Napoleon again abolished papal government in Rome; the pope responded by excommunicating him. As a result, the pope was arrested and deported to France, and on 2 February 1810 everything in Rome pertaining to papal government was ordered moved to France. This situation did not change until 1814, when Napoleon freed the pope, restored the papal state, and began returning Church records and archives to Rome” (*Retrying Galileo*, pp. 175-176).

heaven, placed it among the planets, and thrust the sun down to the center.” Lazzari adds “Bradley’s letter to Halley on the aberration of fixed stars and chapter 3 of book 3 of MacLaurin’s *Account of Sir Isaac Newton’s Philosophical Discoveries*. And there is a great multitude of others who speak in a similar or more striking vein.” Lazzari, hoping to persuade the Congregation of the Index by subtle suggestions of its ineptitude if it doesn’t accept heliocentrism, then says:

...it is expedient in the present situation for the Index to remove that clause....To retain it does no good....Who among young people studying mathematics does not read *Wolff’s Elements*? *Varenius’ Geography*? The Introduction of Keill, of Musschenbroek, and of Madame du Châtelet? Who does not consult *Chambers Dictionary*? All these books mentioned so far have been republished in Italy; all are found in every bookshop of average stock; all are sold, bought, and lent. Who does not want to be informed about Newton’s system or does not have available the book of some Newtonian?....Shall we ensure that some qualification be inserted every few pages, using that single word ‘hypothesis’ as a panacea?....Protestants are very deeply convinced of the falsity of the system of the motionless earth and of the existence to demonstrations to the contrary...with the intention of showing that in Rome there is the greatest ignorance of the most well known things or the blindest obstinacy. And so they exploit it...in connection with other points regarding either the interpretation of Scripture, or the definition of dogmas, or the understanding of Church Fathers....Thus, why should we not prevent them from doing so, and take away from them such a powerful weapon?

Lazzari also marginalizes geocentrists as those who “now deny the system of the moving earth with the most fervor and commitment are either strange in their other opinions, or barely educated in their basic elements of geometry and mechanics,” while citing what he believes are the various proofs of heliocentrism: “To name a few items, such are the laws of the aberrations of the moon...the motion of fixed stars, called aberration of starlight; the nutation of the equatorial axis; the laws of the tides; the motions of comets; *etc.*,” all of which, we might add, have been shown by modern science to be totally inept at proving heliocentrism. Lazzari also tried his hand at convincing the Congregation of the Index by an appeal to the proper interpretation of Scripture based on two ways of viewing motion, claiming that “the defenders of the Copernican system...believe that while defending such a system they can keep a sense that is more proper and natural than any other.” His argument is as follows:

We must distinguish two kinds of motion and rest. The first is absolute; involves what is called imaginary space; and is not subject to any sensation. The other is relative to the bodies that are involved and that determine location, which is also called relative. Thus, when a ship is in motion, whoever is sitting astern moves with absolute motion and stands still at rest relative to the ship. Now, absolute motion is the one that is the subject of the reflection of philosophers since it is not possible to apprehend it with any sensation; relative

motion is the only one that is the subject of common sense. Thus, civil society has coined the words “motion” and “rest” to express, in accordance with the common usage of words, relative motion and relative rest. And in accordance with this common manner of speaking, this meaning is not improper but really most proper....Thus, if Sacred Scripture is construed in this manner when it speaks of the motion of the sun and the rest of the earth, namely as meaning relative motion and rest, in relation to us and the place where we are, exactly as in that ship, then I am construing it in a sense that is proper, obvious, natural, and in harmony with the common definition of words.

Quite ingeniously, Lazzari then refers to the same argument to which many appeal today – the concept of the “center of mass” discovered by Newton. He writes:

For in truth modern philosophers and astronomers do not regard it [the sun] as immobile at all, as they did; that is, they supposed its center to be immobile, and at most supposed it only moving around its own axis. After Newton, the moderns generally regard as immobile only the common center of gravity of the sun and all planets and comets; and they think that the sun as well as the earth and the planets turn around this center, although the sun has such a greater mass and is so much closer to the said center that it moves much less than all the other planets. But there is no need to linger on this....That is, nowadays the principle foundation of the prohibition [“all books teaching the earth’s motion and the sun’s immobility”] no longer subsists...”

As we know today, Lazzari’s arguments advocating Newton’s “common center of gravity” cannot be used to support heliocentrism. As noted in Volume I of *Galileo Was Wrong: The Church Was Right*, modern astronomy now holds that the sun and Earth are not isolated bodies in the universe; rather, at the least, the sun is pulled by the gravity of the Milky Way and thus revolves around the galaxy’s center in order to escape its gravity. Since these stars, which are thousands of light-years away, duly affect our solar system with such strong force, it has become naive and specious for anyone nowadays to insist that we are required to limit ourselves to the two-body system of the sun and the Earth in order to determine what revolves around what. In short, it can no longer be claimed that heliocentrism is proven by Newton’s laws of motion. From the perspective of the entire universe, the center of mass depends on far more than the sun and the Earth. According to Newton himself, if the universe’s masses are properly distributed, the Earth itself could serve as the center of mass.<sup>16</sup> Indeed, for the Earth to be the center of mass, it alone

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<sup>16</sup> “That the center of the system of the world is immovable. This is acknowledged by all, although some contend that the Earth, others that the sun, is fixed in that center” (*Philosophiae Naturalis Principia Mathematica*, Book 3: The System of the World, Proposition X, Hypothesis I). The Latin original is: Centrum systematis mundane quiescere. Hoc ab omnibus consensum est, dum

would be stationary among all the celestial bodies, for according to Newton, the center of mass for the universe must be motionless.<sup>17</sup> Unfortunately, scientists of Lazzari's time were adept at playing the 'Newton card' to silence geocentrists, but as it turns out, it is not a trump card but only a joker that deceived many into thinking that Galileo was right. Indeed, if there ever existed a scientific discovery that backfired on its proponents, this was it. As modern cosmologist Fred Hoyle admits:

Although in the nineteenth century this argument was believed to be a satisfactory justification of the heliocentric theory, one found causes for disquiet if one looked into it a little more carefully. When we seek to improve on the accuracy of calculation by including mutual gravitational interactions between planets, we find – again in order to calculate correctly – that the center of the solar system must be placed at an abstract point known as the “center of mass,” which is displaced

Quite appreciably from the center of the Sun. And if we imagine a star to pass moderately close to the solar system, in order to calculate the perturbing effect correctly, again using the inverse-square rule, it could be essential to use a “center of mass” which included the star. The “center” in this case would lie even farther away from the center of the Sun. It appears, then, that the “center” to be used for any set of bodies depends on the way in which the local system is considered to be isolated from the universe as a whole. If a new body is added to the set from outside, or if a body is taken away, the “center” changes.<sup>18</sup>

Lazzari's argument, namely, that we are to understand Scripture's description of the sun's motion and the Earth's rest as “relative motion” and “relative rest,” respectively, is also specious. It is the classic error of begging-the-question, for it believes, based presumptuously upon Newton's laws, that heliocentrism is correct, and thus feels justified in making relative all motion or rest recorded in the narratives of Holy Scripture. Galileo did the same. He started with his presumptuous premise, namely, ‘the Earth moves,’ which then led him to the false conclusion that Scripture's language had to be modified to fit the premise. Thus the syllogism:

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aliqui terram, alii solem in centro systematis quiescere contendunt. Videamus quid inde sequatur.”

<sup>17</sup> In Proposition XI, Theorema XI, Newton adds: “That the common center of gravity of the Earth, the sun, and all the planets, is immovable. For that center either is at rest or moves uniformly forwards in a right line; but if that center moved, the center of the world would move also, against the Hypothesis.” Original Latin is: Commune centrum gravitates terræ, solis & planetarum omnium quiescere. Nam centrum illud (per legum corol. iv) vel quiescent vel progredietur uniformiter in directum. Sed centro illo semper progrediente centrum mundi quoque movebitur contra hypothesin. See Chapters 3, 6, 9 in Volume I of *Galileo Was Wrong: The Church Was Right* for further study on Newton's laws and their relation to geocentrism.

<sup>18</sup> Fred Hoyle, *Nicolaus Copernicus*, 1973, p. 85.

- Premise A: The Earth moves.
- Premise B: Scripture says the Earth does not move.
- Conclusion: Scripture is speaking in relative or metaphorical terms.

Of course, no one had proven that Premise A was correct, thus the Conclusion of Lazzari's syllogism was invalid. Conversely, basing one's syllogism on the inerrancy of Scripture and the missing proofs of modern science, the proper format would be:

- Premise A: Scripture says the Earth is not in motion.
- Premise B: Modern science has not proven that the Earth moves.
- Conclusion: The Earth does not move.

In retrospect, Scripture and the common man of biblical times were certainly aware of the difference between relative motion and absolute motion. It is not a hard concept to understand or an experience that is remote from every day living. Geometrically speaking, if there is no fixed center among things that move, then everything, to some degree, is in motion. But this is precisely why the Fathers fought for a fixed Earth. It gave a stable and dependable reference point for everything in the universe, both spiritual and physical. Once man knows he is in the very center of things, everything is within his grasp. As physicist Amitabha Ghosh admits: "As long as terra firma had its immobile status...there was no problem. All motions were with respect to the Earth, just as we observe. The difficulty started once the firm ground was lost."<sup>19</sup>

Lazzari also appeals to various and sundry beliefs in Catholic history that were later discovered to be in error:

Nor is it relevant to say that here one is dealing with the interpretation of Scripture and an opinion considered to be against the Faith. It would be unfortunate if, whenever there has been a consensus in the past, we try now to maintain the old shared

opinions. Once it was a common opinion, which was supported by citing Scripture, that the heavens were moved by intelligent beings. Thus at about the same time, in Sfondrati said: "It was and is the opinion of almost all philosophers and theologians that the heavens are moved by intelligent beings." In question 6 of article 3 of *De Potentia*, St. Thomas says that it belongs to the Faith.<sup>20</sup>

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<sup>19</sup> Amitabha Ghosh, *Origin of Inertia: Extended Mach's Principle and Cosmological Consequences*, Montreal, Apeiron, 2000, p. 7.

<sup>20</sup> All quotes from Lazzari's letter taken from Ugo Baldini's *Saggi sulla cultura della Compagnia di Gesù*, Padua: Cooperativa Editrice Libreria Università di Padova, 2000, pp. 489v-491v, as cited in *Retrying Galileo*, pp. 139-151.

Lazzari's desperate attempt to cast a cloud over the Church's geocentric tradition is fatuous. Although the idea that angels moved the heavenly bodies had floated in and out of the patristic and medieval eras, there was no consensus among either group that it was a reality. In fact, in *De Potentia* 6, 3, Aquinas quotes Augustine from *De Trinitate* 2, 10, saying: "How angels do these things, or rather how God does them through his angels, my sight is not keen enough to see, my reason too diffident to unravel, my mind too slow to grasp; nor can I answer with assurance all the queries that could be made on this matter." Aquinas himself makes no firm conclusion, but only says: "Although an angel *may cause* the movement of the heavens..."<sup>21</sup> In reality, the whole purpose of *De Potentia* 6, 3 was to refute the ideas that angels could perform miracles at will without limitation. In other sections of *De Potentia*, Aquinas shows us his understanding of movement by natural causes: "Although the local movements of the lower bodies as well as other movements are brought about by certain fixed natural causes..."<sup>22</sup> As for Scripture, there exists no passage which states that angels move the heavenly bodies. The most that could be gleaned from Scripture is that angels can exercise extraordinary powers in the temporal realm. Conversely, Scripture is replete with passages that specify the Earth is at rest and the sun moves.

Secondly, the patristic and medieval eras give testimony of an absolute from start to finish, whereas an angelic impetus for the heavenly bodies did not even come up for discussion within magisterial ranks.

Consequently, after all the pressure Lazzari brought to bear on the Congregation of the Index, in the final tally, although the 1758 decision excised the "all books" prohibition, none of Lazzari's arguments convinced the Congregation to lift the ban on Copernicus, Foscarini, Zúñiga, Kepler or Galileo, or to consider heliocentrism as more than a hypothesis. No permission was granted that Copernicus' model could be published without the previously required "proper corrections."

### **The Rebuff to Astronomer Joseph Lalande and its Legal Implications**

The solidity of Benedict XIV's 1758 approval of the acts of the Sacred Congregation in continuing the ban on Copernicanism was confirmed with legal overtones when French astronomer, Joseph Lalande, while visiting Rome

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<sup>21</sup> "Ad quintum dicendum, quod Angelus etsi caelum moveat..." (*De potentia*, q. 6 a. 3 ad 5).

<sup>22</sup> "Ad undecimum dicendum, quod licet motus locales inferiorum corporum sint a determinatis motoribus naturalibus..." (*De potentia*, q. 6 a. 3 ad 11) consensus to the doctrine of a fixed Earth and a moving sun, whereas no such consensus exists regarding angelic forces moving celestial bodies. Thirdly, geocentrism was confirmed by the magisteriums under several pontiffs, pontiffs that guided and approved the process of condemning Copernicanism

in 1765, attempted to have Galileo's *Dialogo* taken off the Index by Lalande's citing the fact that the 1758 Index had withdrawn the general ban on books about Copernican cosmology. The head of the Congregation of the Index promptly told Lalande that since the prohibition against Galileo and his *Dialogo* was precipitated by a canonical trial, the sentence pronounced against Galileo would first have to be revoked in order for any lifting of the prohibition to occur.<sup>23</sup>

The importance of this canonical protocol cannot be underestimated. If the head of the Congregation of the Index indeed spoke truthfully for the Church on this matter, he informs us in no uncertain terms that for any rehabilitation of either Galileo or his heliocentric theory to occur, a formal and legal reversal of his sentence and condemnation would first have to take place, either by the then present magisterium or any future magisterium. If there is no subsequent formal and legal exoneration of Galileo, then, according to the canonical protocol of the Catholic Church, Galileo and his heliocentric theory remain condemned to this very day. Since the Church has not initiated any official, formal or legal rescission of Galileo's condemnation, by all appearances it remains in force.

### **The Disclaimer on Isaac Newton's *Principia Mathematica***

Lalande and Lazzari represented a contingent of scholars who were advancing the theories of Isaac Newton to support heliocentrism. But there was an equally strong force against succumbing to the Newton factor. Isaac Newton, who, coincidentally was born in the same year Galileo died, 1642, published his famous work titled *Principia Mathematica* forty-five years later in 1687. It was, and is now, the most famous book ever written on physics and mathematics. It was the *Principia* that single-handedly gave geocentrism its most difficult challenge, since, apparently, Newton's laws of motion: (a) required the sun to be larger than the Earth, and (b) required the smaller body to revolve around the larger body. As we noted previously, Newton's laws actually stated that both the smaller and the larger body revolved around the center of mass that was located somewhere between the two bodies, but since the distance of the center of mass between the Earth and the sun was near the center of the sun, in all practicality, Newton's book was well on its way to convincing the world that heliocentrism could be the only possible answer to the question of celestial revolutions.

But Newton's *Principia* had formidable competition from the Catholic Church. In 1739-1742, when the three-volume edition of the *Principia* was published in Geneva, the Catholic Church apparently had enough power to assign two Minim friars from the Franciscan order, Thomas Le Seur and François

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<sup>23</sup> As stated verbatim by Finocchiaro in *Retrying Galileo*, p. 154, with citation to Lalande's 1764 work, *Astronomie*, second edition, vol. 1, pp. 536-41, ¶¶ 1103-4. Also cited in Karl Gebler's *Galileo and the Roman Curia*, 1879, p. 313, and Walter Brandmüller's *Galilei e la Chiesa, ossia il diritto di errare*, 1992, p. 162.

Jacquier as editors (although they are commonly mistaken for Jesuits). Their editing of the *Principia* was for the purpose of introducing Newton's work to the educated class of the Roman papal court. As one author judged their edition:

With its rich editorial content, extensive summaries and detailed index, the Jesuit edition remains the most ambitious and perhaps the most useful edition ever published. It was reissued in Geneva in 1760, Prague in 1780-85, and finally in Glasgow in 1822 and 1833, with further changes by J. M. F. Wright.<sup>24</sup>

The most significant feature of the above editions of the *Principia* in light of the heliocentric/geocentric debate was that the Preface contained a disclaimer, or what was then known as a "Declaratio," stating that although Newton assumed the heliocentric system to be true, this was not the belief of the editors, Le Seur and Jacquier, who represented the Catholic Church. Hence, each reader of the *Principia* would understand that although the editors wrote as if they accepted Newton's heliocentrism, they did not, in fact, agree with it at all. All the editions carried this wording:

Newton in his third book assumes the hypothesis of the earth's movement. The author's [Newton's] propositions could not be explained except on the same hypothesis. Hence we have been obliged to put on a character not our own. But we profess obedience to the decrees obedience to the decrees made by the Supreme Pontiffs against the movement of the earth.<sup>25</sup>

This is quite a statement. The Pontiff reigning at the time was Benedict XIV, the same pontiff that eventually gave approval to remove the prohibitory sentence ["all books teaching the earth's motion and the sun's immobility"] from the *Index*. Hence, whatever allowance he had given to science in 1742 and 1758 it certainly was not to be interpreted as supporting the heliocentric system. In fact, we take strict notice that Le Seur and Jacquier did not attribute the "decrees...against the movement of the earth" as coming merely from "theologians" or even cardinals in high places, but from the "Supreme Pontiffs" up to their own day. Their specific use of the plural "Pontiffs" recognizes all the previous popes whom they understood as holding the same truth as Benedict XIV. All of them, without exception, had condemned the notion of a moving Earth. As editors commissioned by the Church and under

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<sup>24</sup> Isaac Newton and the Scientific Revolution, an exhibition of books from Dr. **and Mrs. R. Ted Steinbock, Moutain Goat Press, Louisville KT, 2006.**

<sup>25</sup> Philosophiæ Naturalis Principia Mathematica, Isacco Newtono, PP. Thomæ Le Seur & Francisci Jacquier, Genevæ, MDCCXXXIX [1739]. Original Latin: "DECLARATIO: Newtonus in hoc tertio Libro Telluris motæ hypothesim assumit. Autoris Propositiones aliter explicari non poterant, nisi eâdem quoque factâ hypothesi. Hinc alienam coacti sumus gerere personam. Cæterum latis a summis Pontificibus contra Telluris motum Decretis nos obsequi profitemur." Above translation taken from Rev. William W. Roberts in *The Pontifical Decrees Against the Doctrine of the Earth's Movement*, p. 53.

her authority as Minim friars, Le Seur and Jacquier would never have been able to attribute the rejection of heliocentrism to all the “Supreme Pontiffs” unless they were permitted to do so by those very popes; and unless the consensus of allegiance to the pope on this matter was pervasive throughout the continents under her control.

Interestingly enough, Pietro Lazzari, noted earlier for his long letter seeking to convince the Inquisition in favor of Copernicanism in 1741, mentions Le Seur and Jacquier in his letter as “two celebrated mathematicians of the order of St. Francis of Paola”<sup>26</sup> and attempts to use them as corroborating testimony of the position that “nowadays the prevalent opinion among the most competent astronomers and physicists is that the earth moves around the sun.” Hence, either Lazzari did not know of Le Seur and Jacquier’s devotion to geocentrism, or he was purposely distorting the truth.

The relevant pages of the 1739-1742 editions of Newton’s *Principia* are on display below:

**pp. 29 & 30 omitted – mastheads of the Newton book, *Principia***

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<sup>26</sup> As cited in Finocchiaro’s *Retrying Galileo*, p. 143, with an endnote identifying them as: “The Minim Fathers François Jacquier (professor of experimental physics at the University of Rome from 1746) and Thomas Le Seur (professor of applied mathematics from 1749)...They were the coeditors of the famous edition of and commentary to Newton’s *Principia* in 1739-1742” (*ibid.*, p. 394), yet neither Finocchiaro nor his alternate source, Baldini, mention that Jacquier and Le Seur disavowed themselves from Newton’s heliocentrism and gave their full allegiance to the pontiffs who condemned Copernicanism.



The most significant aspect of the *Declaratio* was that it persisted in all Latin volumes of the *Principia* for the next hundred years. The last volume on record to contain Le Seur and Jacquier's disclaimer was the 1833 Glasgow (or Glasguæ) edition, two years before the Index of Gregory XVI (see facsimiles above). This late date (1833) proves once again that the Pontiffs of the Catholic Church were the main authorities against the censoring of the heliocentric system. By 1833, Newton was a household word and anyone worth his scientific salt had read his book and most likely agreed with it, at least in principle. That his book still contained the *Declaratio* in 1833 meant that the Catholic Church still believed in geocentrism and, consequently, the imprimatur granted to Settele in 1822 really had no effect on that consensus. Unfortunately, these facts were not added to the 1992 speech of John Paul II.

These matters are quite sobering. If we consider that in the present day we are less than 175 years from the publication of the last *Declaratio* on Newton's *Principia* (the most formidable defense of heliocentrism up to that time) it means that any belief in heliocentrism in Catholic society today is virtually in its infancy. As we noted in Volume I of *Galileo Was Wrong: The Church Was Right*, during this 175-year period (1833-2008) some of the most sophisticated scientific experiments ever performed demonstrated that the Earth was standing still in space. Already in 1818 the stage was being prepared. Dominique Arago tested the refraction of starlight and found that regardless

how he adjusted his apparatus the results always showed the Earth was at rest. Augustin Fresnel and Armand Fizea tried in vain to upset his results since they knew of and rejected its geocentric implications. The same results were again confirmed by an even more sophisticated experiment performed by George Airy in 1871. The final nail in the coffin came from the Michelson-Morley experiment of 1887, and all similar interferometer experiments performed through 1932. They all gave the same results – the Earth was standing still in space. After 1932, equipment with even more precision, masers and lasers, were employed, but the same results persisted.

The upshot of the foregoing history is, while the Catholic Church was maintaining its belief in geocentrism by the unwavering edicts of its “Supreme Pontiffs” through 1833, whatever winds of change Newton and his followers were brewing toward heliocentrism by their new theories of gravity and motion were just as quickly being corralled into support for geocentrism by the hands-on experimental evidence of Arago, Airy, and Michelson. It was as if God was giving the Church and the world all the evidence they needed in the 175-year interim after the 1833 *Declaratio* against Newton to maintain the course in geocentric cosmology. The only way the powers-that-be could fool the world into thinking that they could escape this glaring evidence was to reinvent physical science, which is precisely what occurred in the theories of Albert Einstein in 1905, a scientist, we might add, that had a deep antipathy for the Catholic Church and anything religious (see Chapter 11). This is precisely why Einstein is considered one of the greatest scientists ever known. He saved the world from having to turn the clock back and submit itself to the medieval Catholic Church in all its power and glory. If Einstein failed, which would mean that the Catholic Church had been right all along about Galileo, we can imagine what a different world this would be. That Einstein knew what he was up against is more or less admitted in the way he chose to esteem Galileo, as a man who, in his own words, led “the passionate fight against any kind of dogma based on authority.” According to Einstein, Galileo’s *Dialogo*, the very book that was condemned by the Catholic Church, had “revolutionary factual content.” He applauds Galileo for standing up against “the host of those” who relied on the ignorance of the people and the indolence of teachers in priest’s and scholar’s garb” in order to “maintain and defend their positions of authority,” namely, the Catholic Church.<sup>27</sup> Actually, as we have seen, Galileo did no such thing. Einstein and the rest of modern science have merely created a convenient myth about Galileo. Galileo did not rebel against the authority of the Catholic Church. When he was convicted of being suspect of heresy, he abjured, and eight years later, one year before his death, he totally rejected Einstein’s universe.

### **Pius VII and Canon Settele’s Imprimatur**

As the 1833 *Declaratio* on Newton’s *Principia* shows that the history of papal decisions from 1616 onward had a significant effect on what faithful Catholics believed, conversely, the 1822 imprimatur given to Canon Giuseppe Settele was a classic case of hierarchial subterfuge. It was initiated by Maurizio

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<sup>27</sup> All quotes taken from I. Bernard Cohen’s *Revolution in Science*, p. 439.

Benedetto Olivieri who, in 1820, had advanced to the position of Commissary General of the Index. From Settele's diary dates of 1810 through 1836,<sup>28</sup> we understand that, after his second volume of *Elements of Astronomy* was disapproved by the Master of the Sacred Palace, Filippo Anfossi, on January 3, 1820 because it held the thesis that the Earth moved, Settele sent a formal appeal to Pope Pius VII. The context of Pius' receiving of the appeal is important for what may have a bearing on the issuance of Settele's imprimatur. By 1820, Pius VII had only been restored to his Vatican home for a mere seven years, after having been incarcerated in Florence from 1809 to 1814 by Napoleon's armies. The Vatican had been turned into little more than a Napoleonic police-state during that time. In his siege of Vatican property, Napoleon had confiscated all the documents dealing with Galileo's trial and had them put in a library in France. They were not returned until 1843, by happenstance. Hence, in the period between 1820-1835 when the Vatican was making crucial decisions regarding the matter of Galileo and heliocentric cosmology, it had no access to the very documents that were required to make a proper decision. It is in the context of such governmental upheaval and a vacuum of documentation that Settele's imprimatur is issued in 1822 and Galileo's name is removed from the Index in 1835.

The missing historical records become a very significant factor in light of the fact that the Congregation of the Index had already gone on record in 1765 in the case of Joseph Lalande by stating that Galileo's *Dialogo* could not be approved unless the condemnation issued at his trial in 1633 was rescinded.<sup>29</sup> Faced with no direct documentation of Galileo's trial, the Inquisitors of the Settele affair could only consult the 1758 decision under Benedict XIV. As Finocchiaro puts it:

The Inquisition, unable to consult the file of Galilean trial documents that had gone missing after the Napoleonic transfer, did the next best thing; it requested the Congregation of the Index to provide the file on the 1758 edition of the Index, which contained the partial and silent retraction of the anti-Copernican ban of 1616. The Index delivered the file to the Inquisition on March 28 [1820]. In the meantime, newspapers in Germany, France, and Holland were publishing articles about this ecclesiastical censorship.<sup>30</sup>

Without the historical records of 1616 and 1633, we might say that the 1820 Inquisition was hobbling on one leg and perhaps should have postponed their decision until the records could be retrieved. But, as the quote above reveals, the European newspapers were creating undue pressure on the Vatican,

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<sup>28</sup> Collected and published by Paolo Maffei in 1987 as *Giuseppe Settele, il suo Diario e la questione galileiana*, Foligno: Edizioni dell'Arquata.

<sup>29</sup> As Finocchiaro puts it: "But he [Lalande] was told by the head of the **Congregation of the Index that Galileo's case was different because it involved a trial, and so one would first have to revoke the sentence pronounced against him...**" (*Retrying Galileo*, p. 154).

<sup>30</sup> *Retrying Galileo*, p. 195.

complaining of censorship against Settele and clamoring for a favorable decision toward Copernican cosmology.

Although Finocchiaro refers to the 1758 decision as a “partial and silent retraction of the anti-Copernican ban of 1616,” this assessment is misleading, for we noted previously that not only were the names of Copernicus, Foscarini, Zúñiga, Kepler and Galileo kept on the Index precisely because they were condemned for teaching heliocentrism, more importantly, there was no specific provision made in 1758 (and Finocchiaro does not cite one in his book) which stated that “all books teaching the earth’s motion and the sun’s immobility” could now present heliocentrism *as a thesis rather than a hypothesis*, a fact not readily admitted by Galileo historians. Logically, it would be self-contradictory for the 1758 Index to continue the ban on Copernicus, *et al.*, for teaching, as a thesis, that the Earth moves, but then allow “all [other] books” the privilege to do the exact opposite with impunity. Moreover, if the Index, both in 1758 and on through to 1820, approved of no treatise that regarded Copernicanism as a thesis, on what precedent could the 1820- 1822 Inquisition approve Settele’s book which treated heliocentrism as a thesis? The wording of the 1822 decision indicates that it was bound by what was decreed in 1758. It states:

Their Eminences have decreed that, for the time being, now and in the future, a license is not to be refused to the Masters of the Sacred Apostolic Palace for the printing and publication of works dealing with the mobility of the earth and the immobility of the sun according to the common opinion of modern astronomers, as long as there are no other contrary indications, on the basis of the decrees of the Sacred Congregation of the Index of 1757 and of this Supreme Holy Office of 1820.<sup>31</sup>

As such, since the 1758 decision did not make any provision to treat Copernicanism as a thesis, it should have served as a “contrary indication” to the Inquisitors of 1820-22, warning them against approving thesis-laden Copernican treatises. Somehow, however, the “contrary indications” were side-stepped between the years of 1820 and 1835. Interestingly enough, in Olivieri’s lengthy Summation to the Inquisition in 1820 for the purpose of persuading it to approve Settele’s *Elements of Astronomy*, he faults Anfossi, claiming that Anfossi “cannot be excused for ignoring the Index that has been in force since 1758 and declaring prohibited books that certainly are no longer such.”<sup>32</sup> But since in 1758 neither the books that already presented

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<sup>31</sup> “E.mi DD. Decreverunt, non esse a praesenti et futuris pro tempore Magistris Sacri Palatii Apostolici recusandam licentiam pro impressione et publicatione operum tractantium de mobilitate terrae et immobilitate solis iuxta communem modernorum astronomorum opinionem, dummodo nihil aliud obstet, ad formam Decretorum Sacrae Congregationis Indicis anni 1757, et huius Supremae anni 1820” (Antonio Favaro, *Galileo e l’Inquisizione*, pp. 30-31).

<sup>32</sup> From Olivieri’s November 1820 Summation, titled, “Ristretto di Ragione, e di Fatto,” ¶29, as cited by Finocchiaro in *Retrying Galileo*, p. 205.

heliocentrism as a thesis were excused (*viz.*, Copernicus, Foscarini, Zúñiga, Kepler and Galileo), nor was there any specific provision to allow “all [other] books” to treat heliocentrism as a thesis, it seems that Olivieri is the one “ignoring” the 1758 decision, or at least reading into it more than what is there.

Olivieri, who by this time was enjoying his post as the Commissary General of the Inquisition, had already demonstrated he was capable of twisting the truth to win the day for Copernicanism when he advanced the absurd position that the popes and the Sacred Congregations of 1616 and 1633 had condemned Copernicanism merely because it was flawed for not including elliptical orbits of the planets. Olivieri posed this dubious analysis in the face of the fact that the 17th century magisterium never once mentioned anything about elliptical orbits, or any such technical defect, as being a criterion for its judgment against either Copernicus or Galileo. The magisterium’s condemnation was based on two criteria: (1) that the sun revolved around the Earth, and (2) that the Earth was motionless in space, both of which Copernicus, Foscarini, Zúñiga, Kepler and Galileo had denied. In his cleverly manipulative ways, Olivieri takes the focus off these two criteria and instead argues that the condemnations of the 1616-1633 magisteriums are presently inconsequential because Copernicus and Galileo believed that the sun was motionless in the center of the world; and since modern astronomy, courtesy of Kepler, no longer believes that to be the case, the basis for the 1616-1633 condemnation of Copernicanism and Galileo is far removed from the beliefs of astronomy in 1820 and therefore does not directly apply. In other words, because of the new cosmological revelations bequeathed to mankind from Kepler and Newton, Olivieri and his colleagues claimed to have the real truth of how the celestial bodies moved in space, and thus the 1616-1633 decisions against Galileo and Copernicanism were considered obsolete. Olivieri argues this position in his Summation to the 1820 Inquisition as follows:

Along with modern astronomers, Settele does not teach that the sun is at the center of the world: for it is not the center of the fixed stars; it is not the center of heavy bodies, which fall toward the center of our world, namely of the earth; nor is it the center of the planetary system because it does not lie in the middle, or center, but to one side at one of the foci of the elliptical orbits that all planets trace. Still less does he teach that the sun is motionless; on the contrary, it has a rotational motion around itself and also a translational motion which it performs while carrying along the outfit of all its planets.<sup>33</sup>

As we noted in volume I of *Galileo Was Wrong: The Church Was Right*, based on what we now know from modern mathematics, geometry and cosmology, Olivieri’s attempt to justify heliocentric cosmology using Kepler’s ellipses is specious. As stated in the subtitle section, “The Real Truth about Kepler’s Solar System,” we write:

Contrary to popular opinion, Kepler’s geometrical modification didn’t prove Copernicus’ sun-centered system was right. It merely

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<sup>33</sup> *Ibid.*, ¶30.

revealed Kepler's preferences, since he knew that, if the same elliptical modifications were made to the reigning geocentric model of Tycho Brahe, or even to Ptolemy's model, they would have shown heliocentrism to be merely an alternative system, not a superior one. As one physics course put it: "However, one could also construct a 'Tychoean' model with elliptical orbits."<sup>34</sup> In fact, it is well known among historians that although Kepler claimed the discovery of elliptical orbits was supported by independent computations of planetary positions, in actuality, he employed the elliptical theory in order to derive his "observations."<sup>35</sup> Be that as it may, the ellipses merely helped both the heliocentric and geocentric models to resolve that planetary orbits were not necessarily perfect circles, although some are very close to perfect circles.<sup>36</sup> The only other difference in the two main theses of Copernicus and Kepler was that Kepler, since he believed the sun pushed the planets in their orbits by a magnetic sweeping motion, sought to make the sun the actual center of the solar system to replace Copernicus' 'mean sun' – the common point of intersection for all the orbits of the planets.<sup>37</sup>

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<sup>34</sup> University of Illinois, Physics 319, Spring 2004, Lecture 03, p. 11.

<sup>35</sup> Knowing this fact, historian Owen Gingerich says that Kepler's ploy "may simply have been a legitimate flourish meant to persuade recalcitrant colleagues of the correctness of his insight" (As cited in the *Bulletin of the Tychonian Society*, No. 53, 1990, p. 32). Gingerich also suggests that elliptical orbits may not have been the brainchild of Kepler, but of Jerome Schreiber. He writes: "On folio 143 [of Kepler's copy of *De revolutionibus*] there appears the single Greek word  $\epsilon\lambda\lambda\epsilon\iota\psi\iota\varsigma$  – that is, ellipse – together with the same sort of emphasis marks that Schreiber used to highlight the passage on folio 96. When I first saw that book in Leipzig, I assumed that it was Kepler who had written  $\epsilon\lambda\lambda\epsilon\iota\psi\iota\varsigma$  in the margin, and I hadn't made a color slide of it. Later, when I had discovered more information about that double layer of annotations and the evidence that it was likely Schreiber's handiwork, I had to worry about which one wrote it... Eventually I obtained excellent transparencies, which left no doubt that it was indeed Schreiber's ink in the book Kepler had inherited" (*The Book that Nobody Read*, p. 165).

<sup>36</sup> Not only may Schreiber have pre-dated Kepler in regards to inventing elliptical orbits, it seems that neither Schreiber nor Kepler were the first to introduce the phenomenon. That honor apparently belongs to the Greeks. As Koestler notes: "There exist some fragmentary remains, dating from the first century AD, of a small-sized *Greek* planetarium – a mechanical model designed to reproduce the motions of sun, moon, and perhaps also of the planets. But its wheels, or at least some of them, are not circular – they are egg-shaped [footnote: Ernst Zinner, *Entstehung und Ausbreitung der Copernicanischen Lehre* (Erlangen, 1943), p. 48]. Gingerich adds: "The equant got Ptolemy into a lot of trouble as far as many of his successors were concerned. It wasn't that his model didn't predict the angular positions satisfactorily. Rather, the equant forced the epicycle to move nonuniformly around the deferent circle, and that was somehow seen as a deviation from the pure principle of uniform circular motion. Ptolemy himself was apologetic about it, but he used it because it generated the motion that was observed in the heavens. Altogether his system was admirably simple considering the apparent complexity and variety of the retrograde loops" (*The Book that Nobody Read*, p. 53).

<sup>37</sup> Kepler, following the lead of William Gilbert who proposed that the Earth is a

Even after Kepler's modifications, anomalies regarding the motions of the heavenly bodies remained, and stubbornly so. Although geometrically speaking the orbits are not perfect circles, they are not perfect ellipses either, but precess at different rates and contain various eccentricities. Quoting Hoyle again:

The planetary orbits are not strictly ellipses, as we have so far taken them to be, because one planet disturbs the order of another through the gravitational force that it exerts....In all cases the orbits are nearly circles....It is curious that although the actual orbits do not differ in shape much from circles the errors of a circular model can nevertheless be quite large. Indeed, errors as large as this were quite unacceptable to Greek astronomers of the stature of Hipparchus and Ptolemy. It was this, rather than prejudice, which caused them to reject the simply heliocentric theory of Aristarchus....The Hipparchus theory grapples with the facts whereas the circular picture of Aristarchus fails to do so....The theory of Ptolemy, a few minor imperfections apart, worked correctly to the first order in explaining the planetary eccentricities. Copernicus with his heliocentric theory had to do at least as well as this, which meant that he had to produce something much better than the simple heliocentric picture of Aristarchus....Kepler achieved improvements, but not complete success, and always at the expense of increasing complexity. Kepler and his successors might well have gone on in this style for generations without arriving at a satisfactory final solution, for a reason we now understand clearly. There is no simple mathematical expression for the way in which the direction of a planet – its heliocentric longitude – changes with time. Even today we must express the longitude as an infinite series of terms when we use time as the free variable. What Ptolemy, Copernicus, and Kepler, in his early long calculations, were trying to do was to discover by trial and error the terms of this series. Since the terms become more complicated as one goes to higher orders in the eccentricity, the task became successively harder and harder...<sup>38</sup>

Professor of celestial mechanics at Columbia University, Charles Lane Poor, says much the same:

From the time of Newton, it has been known that Kepler's laws are mere approximations, computer's fictions, handy mathematical devices for finding the approximate place of a planet in the heavens.

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giant magnet, enhanced the idea and envisioned the sun and all the planets as being magnetically bound. The precise orientation of the polarities of the sun and the planets would then determine the ellipticity of the latter's orbits.

<sup>38</sup> Fred Hoyle, Nicolaus Copernicus: An Essay on his Life and Work, pp. 73, 8, 9, 53, 11-12, 13-14, in the order of ellipses.

They apply with greater accuracy to some planets than to others. Jupiter and Saturn show the greatest deviations from strictly elliptical motion. The latter body is often nearly a degree away from the place it would have been had its motion about the sun been strictly in accord with Kepler's laws. This is such a large discrepancy that it can be detected by the unaided eye. The moon is approximately half a degree in diameter, so that the discrepancy in the motion of Saturn is about twice the **apparent** diameter of the moon. In a single year, during the course of one revolution about the sun, the Earth may depart from the theoretical ellipse by an amount sufficient to appreciably change the apparent place of the sun in the heavens.<sup>39</sup>

Olivieri's intent to promote the Keplerian system and to dismiss or severely minimize the magisterium's condemnations in 1616 and 1633 is even clearer in a subsequent paragraph:

I hope the Most Rev. Father [Anfossi] can quietly accept that that system was not declared "heretical" or "erroneous in the Faith"; that due to their ignorance, Copernicus and Galileo were unable to remove the "serious difficulties" affecting our globe, and so their system was infected with a devastating motion; that therefore the condemnation was based on the philosophical absurdities on account of which the system had consequences implying that the doctrine (I mean their doctrine) could be called contrary to Sacred Scripture; and that all this does not harm in the least the respect due to the decrees of the Sacred Congregations.<sup>40</sup>

In a nutshell, Olivieri's argument is that it was not heliocentrism, *per se*, that was condemned by the Church, but only Copernicus' and Galileo's version of it. This, of course, was an outright falsehood. As far as the Church was concerned, there were two choices – either the Earth moved or it did not. It made no difference to Paul V, Urban VIII, or even Benedict XIV who kept Copernicus, *et al.*, on the Index in 1758, whether it was Galileo's model, Kepler's model, Newton's model or anyone else's. All of them were rejected and/or condemned because they made the Earth move, contrary to the literal

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<sup>39</sup> Charles Lane Poor, *Gravitation versus Relativity*, p. 129. Owen Gingerich adds: "Naturally astronomy textbooks don't show it this way, because they can't make the point about ellipses unless they enormously exaggerate the eccentricity of the ellipse. So for centuries, beginning with Kepler himself, a false impression has been created about the elliptical shape of planetary orbits. The eccentricity of planetary orbits (that is, their off-centeredness) is quite noticeable – even Ptolemy had to cope with that – but the ellipticity (the degree the figure bows in at the sides) is very subtle indeed. Observations of Mars must be accurate to a few minutes of arc for this tiny ellipticity to reveal itself" (*The Book that Nobody Read*, p. 166).

<sup>40</sup> Olivieri's November 1820 Summation, "Ristretto di Ragione, e di Fatto," ¶42, as cited by Finocchiaro in *Retrying Galileo*, p. 209. Olivieri does much the same in ¶46, accusing Anfossi of not knowing what the 1616-1633 Sacred Congregations meant by the Earth's mobility.

reading of Scripture and the interpretation of it according to the unanimous consensus of the Church Fathers.

Olivieri, of course, had his prepared explanation for why Copernicus, *et al.*, were kept on the 1758 Index. As he sees it:

It is true that it contains some books, namely the particular books by Copernicus, Zúñiga, Foscarini, Kepler, and Galileo, the last of which was inserted in 1634; but it is not true that it contains other books (at least as far as I have been able to determine) and still less books in general that teach it. And there is a reason for leaving those books there, for they belong to the age in which the earth's motion had not been free from its implication of devastating mobility.<sup>41</sup>

But the smoking gun that denies Olivieri his rationalization is that the “devastating mobility” (which he earlier defined as “the axial rotation and orbital revolution which [Copernicus and Galileo] ascribed to the earth”<sup>42</sup> because they did not base it on Kepler’s concept that the sun lies “to one side at one of the foci of the elliptical orbits that all planets trace” and “has a rotational motion around itself and also a translational motion which it performs while carrying along the outfit of all its planets”<sup>43</sup>), which was supposedly solved by Kepler, is not regarded by the magisterium to be an exonerating distinction between Galileo’s heliocentrism and Kepler’s heliocentrism for the simple fact that Kepler’s works were condemned and put on the Index just as Galileo’s were, but apparently Olivieri succeeded in slipping this contradiction past the noses of his colleagues! We noted earlier that Kepler’s *magnum opus* was published in 1630, the *Epitome astronomiae Copernicanae*, written for the express purpose of redoing Copernicus’ spheres with elliptical orbits, was already condemned and placed on Pope Alexander’s 1664 Index and continued on the Indices of 1741 and 1758. Although the 1616 and 1633 magisterium did not formally condemn Kepler, the fact is that Kepler was not under their canonical jurisdiction because Kepler was a Lutheran.<sup>44</sup> The four other heliocentrists that were formally condemned by the magisterium were all Catholics (Copernicus, Foscarini, Zúñiga and Galileo). But after the 1633 trial of Galileo, Protestants began touting Kepler’s *Epitome* as a means of protesting the Catholic Church’s censorship of heliocentrism,

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<sup>41</sup> *Ibid.*, ¶58.

<sup>42</sup> *Ibid.*, ¶41. Olivieri states: “Such was the case of the devastating motion from which Copernicus and Galileo had been unable to free the motions of axial rotation and orbital revolution which they ascribed to the earth; such devastating motion was certainly contrary to Sacred Scripture.”

<sup>43</sup> *Ibid.*, ¶30.

<sup>44</sup> In 1584, Kepler attended the Protestant seminary at Adelberg. In 1589 he began studies at the Protestant university of Tübingen. In 1594, he became professor of mathematics at the Protestant seminary in Graz, where he remained until 1600 until the Counter-Reformation forced all Protestants to leave the province.

and thus the Church decided to condemn Kepler's book in its next Index of 1664. Hence, in regards to Olivieri, the only "devastating" features of his Summation are the historical facts against his attempt to twist and distort the truth.

As regards the interpretation of Scripture, Olivieri did precisely what Galileo tried with Bellarmine, and what avowed heliocentrists have always attempted in order to justify changing Scripture's language into figures and metaphors when up against its literal truth that they do not wish to accept. They claim: (1) that Scripture was meant to be interpreted in less than literal fashion because either it did not intend to give any specific information on the particular subject at hand, or the people were too inept to understand the actual workings of the subject, and (2) there is scientific proof of the Earth's movement, and thus Scripture's words cannot be interpreted literally. Below is Olivieri's rather unique explanation. It begins by making the preposterous claim that the order in which the 1616 and 1633 magisteriums listed their condemnations (i.e., first "philosophy," second "Scripture") meant that they were not really concerned about the second. (NB: "devastating mobility" refers to nonelliptical planetary revolutions):

You will certainly find in Scripture and in the Church Fathers assertions of terrestrial immobility that is opposed to the devastating mobility; but to properly understand the latter with its problematic characteristics, you will have to focus on what you perceive in experience and apprehend by reason, for here one is not dealing with a supernatural mystery but with something accessible to experience and observation; that is, you will need philosophy to make you perceive the falsity and absurdity, so that based on these you can understand the language of Scripture and of the Church Fathers, which uses experimental notions. This is the way it must be; and this is in fact shown by those theologians and by the Sacred Congregation, both of whom pronounced the doctrine false before calling it contrary to Sacred Scripture; by doing so they warned us to fix our attention on the philosophical falsity, and thus to not go astray in thinking of contrariety to Sacred Scripture, for mobility and immobility are not things which God has chosen to reveal to us; rather he has inspired the Sacred Writers to express to us what our senses perceive in the way they perceive it. Recall the statement of our Holy Teacher [Aquinas]: "Moses describes what is obvious to sense, out of condescension to the ignorance of the people"<sup>45</sup>

It appears that Olivieri is the "ignorant" one in this case, for Aquinas was a devoted geocentrist who based his belief on the literal interpretation of Scripture's cosmological passages, in addition to his firm commitment to the interpretation of Scripture according to the consensus of the Church Fathers. Second, the sentence from Aquinas that Olivieri chooses to support his argument is not only taken out of context, it is in a passage where Aquinas

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<sup>45</sup> *Ibid.*, ¶41, *Retrying Galileo*, p. 209.

confirms his belief in geocentrism. In the passage, Aquinas' only concern is whether the whole firmament itself revolves around the Earth or the stars revolve around the Earth, the same question that Chrysostom had at one time. Aquinas writes:

Reply OBJ 3: According to Ptolemy the heavenly luminaries are not fixed in the spheres, but have their own movement distinct from the movement of the spheres. Wherefore Chrysostom says (Hom. 6 in *Genesi*) that He is said to have set them in the firmament, not because He fixed them there immovably, but because He bade them to be there, even as He placed man in Paradise, to be there. In the opinion of Aristotle, however, the stars are fixed in their orbits, and in reality have no other movement but that of the spheres; and yet our senses perceive the movement of the luminaries and not that of the spheres (*De Coelo* ii, 43). But Moses describes what is obvious to sense, out of condescension to popular ignorance, as we have already said (Q67, A4; Q68, A3). The objection, however, falls to the ground if we regard the firmament made on the second day as having a natural distinction from that in which the stars are placed, even though the distinction is not apparent to the senses, the testimony of which Moses follows, as stated above (*De Coelo* ii, 43). For although to the senses there appears but one firmament; if we admit a higher and a lower firmament, the lower will be that which was made on the second day, and on the fourth the stars were fixed in the higher firmament.<sup>46</sup>

Olivieri then tries the same argument Galileo foisted on Bellarmine, stating:

The "arm of God" is an expression that sounds absurd if understood literally; thus it is interpreted in a figurative sense, as a figure of speech...it is enough to reflect that Catholics learn from the Church and study in its theological schools when one should regard as absurd the meaning of scriptural words variously labeled literal, material, natural, etc. and adopt a meaning variously called translated, improper, and what not.<sup>47</sup>

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<sup>46</sup> *Summa Theologica*, Part 1, Question 70, Article 1, Reply to Objection 3. The second reference to Moses' accommodation to the ignorance of the people noted above (Question 68, Article 3) shows us what Aquinas' intent really was. He writes: "Moses, then, while he expressly mentions water and earth, makes no express mention of air by name, to avoid setting before ignorant persons something beyond their knowledge. In order, however, to express the truth to those capable of understanding it, he implies in the words: 'Darkness was upon the face of the deep,' the existence of air as attendant, so to say, upon the water. For it may be understood from these words that over the face of the water a transparent body was extended, the subject of light and darkness, which, in fact, is the air."

<sup>47</sup> Summation ¶45.

What Olivieri does not admit, however, is that the Catholic “theological schools” for the 1800 years prior to Olivieri’s ascendancy to his post had always taught that the “arm of God” was not to be interpreted literally, for in the hierarchy of exegetical truths, the fact that God was a spirit overrode any temptation to assign human body parts to Him. By the same token, however, the Church also taught that Scripture’s cosmological passages were not prohibited by the hierarchy of biblical truths to be interpreted literally. Of course, Olivieri was probably aware of these historical principles in Catholic exegesis but he ignored them, believing he had a trump card, as it were, with his alleged scientific proofs for Kepler’s solar system. So strong were these proofs, he believed, that science itself would now serve as the ‘hierarchy of truth’ to make scriptural exegesis bend away from a literal interpretation of cosmology. Thus, he boasts:

But what difficulty is there if by subsequent discoveries men correct what they thought was contrary to the Sacred Scriptures? Of if those who are more knowledgeable in the sciences are in a better position to correctly understand what the Scriptures say about them?<sup>48</sup>

Obviously, Olivieri’s next line of attack against Anfossi was to list the popular proofs for heliocentrism that were being popularized during this time, and he ridicules Anfossi for not succumbing to these alleged proofs. Similar to Lazzari’s attempt to persuade the 1741 Inquisition, so Olivieri does the same:

The Most Rev. Fr. [Anfossi] must be joking when he says that “these gentlemen...try to tell us that what is stated many times by the Holy Spirit is false, but that what their stellar parallax and aberration tell them is true.” Then he calls as a witness Fr. Jamin, to persuade them of the incomprehensibility of God’s works. He also dares say that “the best astronomers and philosophers do not agree among themselves in regard to these discoveries.” But he does not mention anyone. However, the fact is, as I hear from those who are well informed, that although there is no universal consensus among the experts in the field about the annual parallax of fixed stars, the aberration of fixed stars and of the planets has been verified for at least a century and is regarded by all astronomers as a true physical demonstration of the earth’s annual motion....Thus, it is not surprising that the Most Rev. Fr. [Anfossi] who has not had the patience of mastering these astronomical matters, should appear to be incredulous, and that so does the Monsignor Majordomo, who in his memorandum claims to be “convinced of the uncertainty and the great deceptiveness of astronomical science.”<sup>49</sup>

Olivieri goes on for many more paragraphs saying much the same, at one point declaring:

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<sup>48</sup> *Ibid.*, ¶47.

<sup>49</sup> *Ibid.*, ¶49.

Does the Most Rev. Fr. [Anfossi] think that today Tycho [Brahe] would declare himself against the earth's motion, against the universal persuasion acquired by astronomers more than two centuries after him, now that they believe the system of the earth's motion has been "proved as much as anything physical can be," as Lalande says.<sup>50</sup>

Later he adds:

Most Rev. Fr. [Anfossi]...let us note that some of the most cogent proofs, such as nutation and the annual aberration of heavenly bodies, had not been discovered at the time of Gassendi...whereas the discovery of aberration and nutation is assigned to 1727....Before stopping this modest writing of mine, I must not be silent about the Msgr. Majordomo's assertion that "one can maintain as a thesis only what is true or what is believed to be incontrovertibly true"....But the fact is that nowadays astronomers really seem to be so convinced of the earth's motion that they "believe it to be incontrovertibly true."...it is certain that nutation, annual aberration, and other data that require more subtlety to be detected are believed to provide a new irresistible argument.<sup>51</sup>

As the history shows, Olivieri is referring to the stellar aberration discoveries of James Bradley in 1727. A close examination of Bradley's and other astronomers' work on this phenomenon reveals that Fr. Anfossi was actually right in saying that Olivieri's alleged evidence was a scientific canard being used to "tell us that what is stated many times by the Holy Spirit is false, but that what their stellar parallax and aberration tell them is true" and that "the best astronomers...do not agree among themselves in regard to these discoveries."<sup>52</sup> Although Olivieri then accuses Fr. Anfossi of "not mentioning anyone" who disagrees with these findings, from our modern perspective the record exonerating Fr. Anfossi is very clear. In volume I of *Galileo Was Wrong: The Church Was Right*, we show the reasons Fr. Anfossi and the Vatican majordomo refused to put the Holy Spirit on trial. Below are the relevant paragraphs.

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<sup>50</sup> *Ibid.*, ¶53.

<sup>51</sup> *Ibid.*, ¶¶55, 66

<sup>52</sup> *Ibid.*, ¶49.

## **The Experiments of George Airy and James Bradley**

Twenty years after Fizeau's experiment, George Biddell Airy would perform his own water-tube experiment, which, to his utter surprise, would confirm Arago's results – that Earth was standing still in space. Although Fresnel temporarily saved the world from having to scuttle the Copernican theory, we will see that the nature of Airy's experiment left Einstein with no choice but the fantastic postulations of Relativity theory to answer Airy's results.

George Airy belonged to the exclusive Astronomer Royal of England. He was a well-respected scientist and had quite a reputation and audience for his endeavors. But Airy was an avowed heliocentrist just as Einstein, so it is not Airy's position as an esteemed scientist for which we make reference to his work, but precisely because of his failure to prove his cherished view of cosmology. Airy was quite certain, at least before he did his experiment, that his water-filled telescope would prove that the Earth revolved around the sun. Hence, he was quite surprised at his "failure."

Here's how "Airy's failure" transpired. Airy knew from Arago that: (1) light's speed was slower in a solid transparent medium than in air; (2) that any movement ascribed to the Earth did not affect the speed of light, and (3) that Fresnel's explanation of Arago's experiment was the glass plate "dragged" the ether and acted independently of ether in the air. Airy, by merely enhancing the procedures of those before him, had the idea of using a source of light outside Earth, namely starlight, and directing it through different mediums to see if the light was affected.

### **James Bradley and *Gamma Draconis***

Before we see what Airy's experiment did in the battle for whether the Earth was fixed in space, it would be beneficial to know a little of the history about the nature of starlight. As early as 1640 the astronomer Giovanni Pieroni observed that various stars shifted their position in the sky during the year. As we noted earlier, Francesco Rinuccini brought this evidence to Galileo's attention in 1641, but Galileo was unimpressed. Robert Hooke, three decades later, in 1669, noticed the same kind of shifting for one star in particular, named *Gamma Draconis*. Since everyone from the time of Copernicus had been looking for physical evidence of a moving Earth, Hooke actually thought he had discovered the first parallax as proof. Almost another thirty years later (1694), John Flamsteed observed the same kind of shifting in the star Polaris.

Another thirty years later, **James Bradley** (d. 1762) set out to determine whether Hooke's observations were, indeed, a parallax of *Gamma Draconis*. During the years of 1725-1728 he noticed that during the course of a year the star inscribed a small ellipse in its path, almost the same as a parallax would make. In the heliocentric system, parallax is understood as a one-to-one correspondence between Earth's annual revolution and the star's annual ellipse, but

Bradley noticed that the star's ellipse was not following this particular pattern.<sup>53</sup>

At this point, astronomical science was still waiting for a confirmed parallax of any star, since no one had ever measured one. A confirmed measurement of parallax would not be made until more than a century later by Friedrich Bessel in 1838. So Bradley, reasoning that Gamma Draconis was too far away to register a parallax, found another explanation, and it was rather an ingenious

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<sup>53</sup> Parallax, as measured from Earth, is understood as the measure of the apparent movement of a star against more distant stars that do not move. There are about 700 stars in our sky that are close enough to Earth and far enough from background stars in order to form a parallax. In the heliocentric system, which Bradley was using, a star's parallax is measured by using the Earth's orbit. At each point on the Earth's path, a star with parallax will appear on the opposite side of the Earth's orbit in the star's ellipse. For example, in the heliocentric system, if the Earth is at twelve o'clock in its orbit the star will be at six o'clock in its ellipse; if Earth is at three o'clock, the star will be at nine o'clock. In stellar aberration, the Earth and the star will not be on opposite sides of their respective ellipses. So, if the Earth is at twelve o'clock in its orbit, the star will also be at twelve o'clock in its ellipse. Bradley noticed that *Gamma Draconis* was following the stellar aberration pattern, not the parallax pattern, since it was behind the parallax pattern by at least three months. Bradley found a 20.47° angle of aberration. As we will see later, stellar aberration can also be explained by the geocentric model, since in that model the stars are centered on the sun and partake of the sun's annual movement around Earth, and thus stellar aberration will occur in exactly the same proportions as in the heliocentric system. Incidentally, Bradley also discovered that *Gamma Draconis* traced out an additional smaller ellipse in the course of 18.6 years. The heliocentric explanation for this ellipse is that the moon, since its orbital precession rotates around Earth once every 18.6 years, is altering the Earth's axial spin (otherwise known as nutation). This explanation fails, however, since it would require each star to have the same 18.6 year ellipse as *Gamma Draconis*. The geocentric explanation for the 18.6 year ellipse is that, as the universe rotates around Earth, a slight uneven mass distribution causes a small precession of the universe of 18.6 years, which is part of a larger precession of 25,800 years (the heliocentric system has a 25,800-year precession of the Earth's axial rotation). These dual precessions, in conjunction with the stars that move within those precessions in a specified elliptical path depending on their distance from Earth, distance from the North Star (Polaris), and their mass, will create a specified ellipse for each star, as seen from Earth.

one. He theorized that the star's annual ellipse was being formed because the speed of light was finite.<sup>54</sup> That is, the star wasn't actually moving in the sky; rather, its light, moving at a finite speed, was hitting a moving Earth, an Earth that for six months was moving toward the star, and in the next six months was moving away from the star. While the Earth moved toward the star, the star's light would hit the Earth sooner, but while the Earth moved away, the light would hit it later. Bradley reasoned that, if light's speed was infinite, there would be no such effect, but since it is finite, these back-and-forth movements of the Earth would translate into seeing the star move in an ellipse in the sky over the course of a year. This explanation was a welcome relief for the heliocentric view, since until Bradley, no one, including Galileo who died in 1642, had supplied any real evidence that the Earth could be revolving around the sun.<sup>55</sup> The only "evidence" Galileo's contemporaries provided was that of analogy, that is, because he saw moons revolving around Jupiter through his telescope he conjectured that smaller bodies (such as the Earth) had to revolve around larger bodies (such as the sun). As one author put it, in Galileo's day, "the telescope did not prove the validity of Copernicus' conceptual scheme. But it did provide an immensely effective weapon for the battle. It was not proof, but it was propaganda."<sup>56</sup> Thus, the Arago, Fresnel, Fizeau affair was more or less an interlude until someone would come along and either prove or disprove Bradley's hypothesis.

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<sup>54</sup> Up until this time, the only one who had suggested that light had a finite speed was Ole Rømer in 1670 as he was observing the variations between two successive eclipses of Io, one of Jupiter's moons. The eclipse is the shortest in duration when, in the heliocentric system, Earth is moving toward Jupiter, and longest in duration when Earth is moving away. As we will see later, this same phenomena can be explained by the geocentric model since in that model, Jupiter, revolving around the sun, is moving toward and away from a fixed Earth in the same proportions as in the heliocentric system.

<sup>55</sup> As one modern astronomer presumptuously concluded: "The discovery of this aberration was the first experimental proof that the earth has a yearly motion and that Copernicus was right" (A. Pannekoek, *A History of Astronomy*, 1961; originally published in 1951 under the Dutch title: *De Groei van ons Wereld*, cited in *The Biblical Astronomer*, Vol. 3, No. 84, 1993).

<sup>56</sup> Thomas Kuhn, *The Copernican Revolution*, 1959, p. 224. Kuhn adds: "The opposition took varied forms. A few of Galileo's more fanatical opponents refused even to look through the new instrument... Others...claimed...they were apparitions caused by the telescope itself. Most of Galileo's opponents behaved more rationally. Like Bellarmine, they agreed that the phenomena were in the sky but denied that they proved Galileo's contentions. In this, of course, they were quite right. Though the telescope argued much, it proved nothing" (*ibid.*, p. 226).

## George Airy

Enter George Airy. As ingenious as Bradley's answer was to the ellipse formed by Gamma Draconis, so was Airy's experiment to prove it right or wrong. Accepting that light's speed was finite, Airy had to figure out some way of determining whether the light from a star was affected by Earth's supposed motion. Whereas Bradley used only one kind of telescope, Airy had the ingenious idea of using a second telescope filled with water. Since Arago/Fresnel/Fizeau had already shown that light's speed was slowed by glass or water, Airy assumed that if a telescope was filled with water then the starlight coming through the water should be slower than it would be in air, and thus bend the starlight outward toward the upper side of the telescope and away from the eyepiece (just as we see light bent when we put a pencil in water). In order to compensate for the outward bending of the starlight, Airy assumed he would have to tilt his water-filled telescope just a little more toward the lower end of the star so that its light would hit his eyepiece directly rather than hitting the side of the telescope.

We would do the same thing, for example, if we were carrying a drinking glass while we were running through a rainstorm. In order to catch the raindrops so that they hit the bottom and not the side of the drinking glass, we must tilt the drinking glass forward a bit in order to compensate for our running speed.

Another example that illustrates this principle rather well is the task of dropping a drop of water into a test tube from an eye-dropper. If the test tube is mounted so that it stands straight up on a rotating disc, and one tries to drop a drop of water into the test tube as it comes around, the drop will invariably hit the inside of the test tube. One must tilt the test tube slightly in the direction of the rotation in order to allow the drop to hit the bottom of the test tube. Light, because it reacts as if it were a substance, moves in a similar fashion to the drop of water (only it moves much faster than rain and eye droppers, and thus the effects are much more subtle).

Although Airy had suspected the outcome prior to the actual experiment, indeed, he soon discovered that he was not required to tilt his water-filled telescope toward the star to any greater degree than his air-filled telescope. These results indicated that Earth wasn't moving, since if there is no additional adjustment necessary for a water-filled telescope toward the direction of the starlight, it means the starlight is coming into both telescopes at the same angle and speed, that is, directly overhead. If Earth were moving, then a water-

filled telescope would have to be tilted toward the starlight a little more acutely than an air-filled telescope. This is so for two related reasons: (1) in the heliocentric model, the Earth is moving sufficiently against the incidence of distant starlight upon it, and thus the water-filled telescope would not be able to catch all of the starlight in the slower medium of water. It would have to be tilted slightly ahead of the air-filled telescope to make up for light's slower speed in water; and (2) since the starlight is coming from outside Earth's ether environment, then one cannot readily explain Airy's failure by saying that the denser medium (i.e., water as opposed to air) carried a higher or lower amount of ether, as Fresnel had claimed. Starlight seemed to be unaffected by the ether, or any medium, since Airy proved that its light was coming to Earth at one specified angle and speed.<sup>57</sup>

At this juncture we should also mention the fact that Bradley's appeal to a 20.5" arc in the star's movement as being due to a 30 km/sec revolution of the Earth around the sun assumes that the sun is a fixed object. Without taking the sun as fixed, Bradley would not be able to detect any aberration in Gamma Draconis. But according to modern cosmology, no object in the sky is fixed, and thus Bradley's theory is nullified on that count alone. Otherwise, the sun is at rest or Relativity is wrong.

As we noted earlier, Arago had already postulated in theory what Airy found by experiment, and he wrote a paper about it in 1839, and

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<sup>57</sup> George B. Airy, "On a supposed alteration in the amount of astronomical aberration of light produced by the passage of light through a considerable thickness of refracting medium" (Proceedings of the Royal Society, London, 1871, pp. 35-39). As Arthur Miller describes it by means of a diagram: "Consider, in the geocentric system, a water-filled telescope whose line of sight to a star is normal to the direction of the star's velocity relative to the Earth which is  $-v/N_2$  (according to Fresnel's hypothesis). The law of sines yields  $\sin \delta' = v/cN$ . Since the starlight is refracted on entering the water then  $\delta'$  is not the aberration angle. Using Snel's law to relate  $v$  and  $\delta'$ , i.e.,  $\sin \delta = N \sin \delta'$ , we obtain  $\sin \delta = v/c$ . This derivation is based on the ones of Veltmann (1873), Lorentz (1886) and Drude (1900). The notion of seeking deviations from stellar aberration in air by using a water-filled telescope had been suggested by Boscovich in 1766, and was mentioned by Fresnel (1818), who predicted no change because this experiment was equivalent to Arago's. Airy (1871) carried out the experiment and found no change in the aberration angle" (*Albert Einstein's Special Theory of Relativity*, p. 19).

thus the science establishment should have anticipated Airy's results.<sup>58</sup> Moreover, Giuseppe Boscovich (1766) and Augustin Fresnel (1818) had already suggested testing Arago's hypothesis by a water-filled telescope. In Airy's experiment, the water-filled telescope would be analogous to Arago's glass plate (or the glass-filled telescope example we offered earlier), since both would make light travel at a slower speed than in air. Fresnel, being a firm believer that the Earth revolved around the sun in an ether medium, explained Arago's results by claiming that the glass plate trapped the ether and thus dragged it and the light, giving the appearance of the bending of light in the glass plate. In fact, it could be said that the plate dragged the ether equal to the Earth's supposed movement around the sun.<sup>59</sup> But it was not easy for Fresnel to explain Airy's failure, because Airy found that, with respect to two different telescopic mediums, there is no additional drag of starlight by the ether surrounding Earth. In other words, if Earth were moving, it would be moving against the ether, and thus the ether wind, as it were, would be expected to push the starlight past the telescope. Airy showed that the ether was not pushing the starlight faster through one medium than the other since both of his telescopes could view the star from the same angle. Fresnel would also not be able to explain Airy's failure if he claimed that the ether is moving with the Earth instead of against the Earth, otherwise he would have no more explanation why, in Arago's case, light is diffracted more in a glass

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<sup>58</sup> *Comptes Rendus de l' Académie des Sciences*, 8, 326, 1839.

<sup>59</sup> In other words, the angle of refraction in the glass plate will equal the arc seconds Earth moves in its angular journey around the sun, since both are formed by Earth's movement through the ether. Incidentally, although we emphasize that Fresnel was a "heliocentrist," Arago and Airy were also heliocentrists, and thus "Airy's failure" is a failure for heliocentrism.

plate than in air. Science was in a bind once again. Unless Airy's experiment could be answered, the world was about to stand still in space, both literally and figuratively.<sup>60</sup>

In Volume I, we then proceed to discuss the Michelson-Morley experiment of 1887, which demonstrated that the Earth was not moving in space, and the subsequent efforts of Albert Einstein to suppress that conclusion by inventing an entirely new physics, Special Relativity. We also discuss stellar parallax and the efforts of various scientists to use it as proof for heliocentrism, the same that Lazzari and Olivieri attempted to do with their respective popes and Sacred Congregations. Hence, as we did against the claims of stellar aberration, we will now quote from Volume I to demonstrate that stellar parallax also provides no proof for heliocentrism.

### **The Use & Abuse of Stellar Parallax**

Regarding the size and limits of the universe, if there is one cosmological phenomenon that has been consistently advocated as the vindicator of heliocentrism, it is stellar parallax. Science books

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<sup>60</sup> Galileo Was Wrong: The Church Was Right, vol. I, pp. 129-133. Aware of the acute dilemma for heliocentrism that Airy's experiment presents, an example of how modern science seeks to rationalize its results is noted in the explanation of S. Tolansky on the art of telescope viewing: "If the Fresnel drag coefficient be introduced into the calculation of the aberration, there emerges the fact that the aberration is the same with or without water in the telescope. Thus, conversely, Airy's negative result confirms the validity of the Fresnel coefficient" (*An Introduction to Interferometry*, 1973, p. 98, cited in *De Labore Solis*, p. 35). What Tolansky didn't tell his students is that if the Fresnel coefficient is NOT used for both telescopes, they would both still produce the same aberration, and thus the Fresnel drag becomes superfluous, except for those trying to save the appearances for heliocentrism. As van der Kamp notes, "...the drag coefficient cannot be dragged into court to vindicate Copernicus" (*ibid.*, p. 36). Another objection comes from Wolfgang Pauli. With his typical pungency, Pauli wrote in 1958: "The Airy experiment, as seen from the rest system of the observer (Earth), therefore only demonstrates the (relativistically) trivial fact that for a zero angle of incidence (normal incidence) the angle of refraction is zero, too" (Wolfgang Pauli, *Theory of Relativity*, translated by G. Field, 1958, p. 114). Apparently, Einstein did not share the same casualness about Airy that Pauli did. Pauli seems to have both forgotten that neither the "observer" nor the "Earth" are "at rest" in the Copernican system, and that a "zero" value to both incidence and refraction is precisely the reason Airy's experiment is so important, since, given the same incidence of starlight in both telescopes, only the velocity of the Earth would have made the starlight hit the side of the telescope. Moreover, it would be rather difficult for Relativity to explain stellar aberration on the basis of the limited speed of light, since without ether, Relativity must understand light as a scalar phenomenon (*i.e.*, it has a speed but no definite direction, and thus the speed is everywhere the same), not a vector (*i.e.*, a definite speed in a definite direction). As such, Relativity will see the star rotate rather than exhibit an aberration.

by the hundreds have declared that Frederick Bessel finally discovered heliocentrism's long-awaited proof when, in 1838, he observed a slight shift in the position of a nearby star (Cygnus 61) against the background of a more distant star. Copernican astronomers continue to praise Bessel, but invariably they do so without either the slightest indication that parallax does not prove heliocentrism or any admission that there is a perfectly good alternative which allows one to interpret parallax from a geocentric perspective. For example, Alan Hirshfeld, writing one of the more recent books on parallax, attempts to convince his reader that parallax is the last word of the heliocentric-geocentric debate:

In Newton's day, the Ptolemaic system and the Keplerian version of the Copernican system were taught side by side in the universities of the world. But the pendulum of belief had swung irreversibly to the Copernican side. In the minds of most scientists, the heliocentric universe had become fact...Yet there remained a crucial missing element in what was otherwise a complete and compelling picture of the universe: *Not one shred of indisputable observational proof existed that the Earth moved through space.* Here then was the holy grail of many an astronomer. To prove that the Earth in fact revolved in a wide orbit around the Sun, the parallax of just one star – any star – had to be detected. The hunt for stellar parallax was on.<sup>61</sup>

Before we get into Hirshfeld's analysis of parallax, we pause to note his revelation concerning how heliocentrism was accepted. Hirshfeld admits that even prior to the discovery of what he deems as "indisputable observational proof," modern science had already accepted heliocentrism as a "fact." One wonders why this glaring anachronism that puts "fact" before "indisputable observational proof" doesn't cause Hirshfeld any concern, but there it is nonetheless. Of course, Hirshfeld's attempt to put fact before proof will become even more egregious when we show that not even parallax offers the "indisputable observational proof" that he is seeking. If Hirshfeld is ignorant of the inability of parallax to prove heliocentrism, then it shows how badly he and the modern scientific community he represents are out of touch with reality. In effect, Hirshfeld's anachronism gives us a clear example of the underlying bias in the Copernican establishment, for it demonstrates quite handily that it was not by any fact of science that heliocentrism reached acceptance, but only because "most scientists" had already made up their minds based on little more than their philosophical preferences.

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<sup>61</sup> Alan Hirshfeld, *The Race to Measure the Cosmos*, 2001, p. 47.

## How Parallax Measures Distance

First, we will investigate a little history about parallax measurements. Parallaxes have been measured for thousands of stars. For only about 700 stars, however, are the parallaxes large enough to be measured with a precision of 10 percent or better. Of those 700 stars, most of the ones within 20 parsecs from Earth are invisible to the unaided eye and are intrinsically less luminous than our sun. The vast majority of all known stars are too distant for their parallaxes to be measured, so that scientists must resort to non-empirical methods. Most of these methods are either statistical or indirect.<sup>62</sup>

With the advent of the Hipparcos satellite launched in 1989 by the European Space Agency, its telescopes gathered 3.5 years worth of data on stellar positions and magnitudes, which were eventually published in 1997. Viewing the stars through two telescopes 58 degrees apart, Hipparcos measured the parallax of 118,000 selected stars within an accuracy of 0.001 seconds of arc. This accuracy is comparable to viewing a baseball in Los Angeles from a telescope in New York. Another mission, named Tycho (after Tycho de Brahe) measured the parallax of a million stars, but only to an accuracy of 0.01 seconds of arc.

As accurate as these measurements appear to be, the reality is, beyond 100 light years, it is hardly possible to measure an accurate parallax. Even within 20 light-years, parallax measurements are accurate only to within one light-year. At 50 light-years from Earth the error could be as high as 5-10 lightyears in distance. All in all, within a 10% margin of error, Hipparcos measured the parallaxes of about 28,000 stars of up to 300 light-years from Earth. For any star beyond 300 light years, scientists are forced to estimate its distance from Earth by other means, none of which are proven methods of measurement (e.g., redshift).<sup>63</sup>

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<sup>62</sup> George Abell, *Exploration of the Universe*, 1969, pp. 377-378.

<sup>63</sup> Other methods of determining parallax include: Photometric parallaxes, which are found by estimating a star's absolute magnitude (M) based on a spectral classification, and comparing that with its apparent magnitude (m). Statistical parallaxes could perhaps extend to 500 parsecs, but this only applies to groups of stars, not individual stars. Overall, of the half dozen or so methods employed today to measure astral distances, none of them are indisputable (including distances measured by red shift, Cepheid variables, luminosity, color of stars, etc.). There is only one purely empirical method, parallax (and its attendant modifications such as Spectroscopic, Moving Cluster Method, and Statistical Method), but it is quite limited in its applicability, since it can accurately measure only a thousand or so stars. In effect, modern science is left without an irrefutable means to measure cosmological distances, and thus all the literature espousing that stars, galaxies or quasars are billions of light years away from Earth is an unproven scientific assertion. Using Cepheid variables, for example, is certainly a question-begging venture, since Cepheids are too far away to be measured by parallax and, thus, depends on an unproven statistical method to

To understand how parallax is formed, in front of your face, place your finger from your right hand at arms length and align it with a finger from your left hand at half an arm's length. Observe your fingers first with your right eye open and then with your left eye open. As you switch your vision from one eye to the other, the nearer finger will appear to shift to the right.

In the heliocentric system, parallax is said to occur when, on one side of the Earth's orbit, say January 1, two stars are viewed at the same time in a telescope, one star near us and the other star far away (at least by conventional means to measure star distances). Let's say that the two stars we view on January 1 are aligned vertically in the same plane, that is, one star is at a higher position in our telescope lens than the other but both are on the same vertical line. Six months pass and we look at the same two stars on July 1. If parallax is demonstrated, we will see that the stars are not in a vertical alignment any longer. Assuming the Earth has orbited in a counterclockwise direction, the nearer star appears to have shifted to the right. This is due to the fact that, in the interval of six months, one has looked at the two stars from two separate locations that are 185 million miles apart (the diameter of the Earth's orbit). Since astronomers can now detect stellar parallax among a select few stars, they are predisposed to allowing the Copernican worldview to interpret the phenomenon as proof for the Earth's movement around the sun.

What most people do not know (and what most scientists keep from them) is that in the geocentric system the same optical phenomenon can be demonstrated. In the geocentric system, the stars are centered on the sun, (which is also true in the heliocentric system). The only difference, of course, is that in the geocentric system the Earth is fixed in space while the sun and stars revolve counterclockwise around the Earth. On January 1 we will notice that the two stars from our above example are in vertical alignment. When we look at these same two stars again on July 1 as the sun and stars have traveled halfway across the sky, the nearer star will appear to have shifted to the right of the farther star, at the same precise angle as in the heliocentric model. (To see animation of parallax from both a

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measure distance. Other methods such as Secular Parallax, Expansion Parallax, Kinematic Distance, Light Echo Distance, Baade-Wesselink Method, Expanding Photosphere Method, Main Sequence Fitting, RR Lyrae Distance and about a dozen or so other methods have been proposed for measuring star distances, each with their own problems and uncertainties, and all of which makes one reflect on the veracity of Jeremiah 31:37: "Thus says the Lord: "If the heavens above can be measured, and the foundations of the earth below can be explored, **then I will cast off all the descendants of Israel for all that they have done, says the Lord.**"

heliocentric and geocentric system, go to the menu button on the compact disc).

This equivalence of the geocentric parallax to the heliocentric parallax is nothing out of the ordinary. Based on geometrical reciprocity, the two systems must be equal on all counts. The only difference is that in the heliocentric model the Earth is moving and the stars are fixed, while in the geocentric model the Earth is fixed and the stars are moving. What is out of the ordinary, however, is that the natural equivalence between the two systems has been systematically suppressed out of almost every science book written since the days of Newton, yet it is as simple and natural as the symmetry between one's right hand and left hand. By the mere fact of the equivalence, parallax does not prove heliocentrism. It only proves that there is an annual shift between the Earth and the stars. Rather, history shows that the phenomenon of parallax only proves there has been a rush to judgment in favor of heliocentrism that was based on nothing more than preference, not scientific fact.

### **More Detail on the 1820-1822 Decisions**

In light of these scientific facts, and the overriding concern expressed by Fr. Anfossi that "these gentlemen...try to tell us that what is stated many times by the Holy Spirit is false, but that what their stellar parallax and aberration tell them is true," we need to examine more closely the precise wording that was employed by the 1820 and 1822 decisions. There were two decisions because Fr. Anfossi protested the first issued on August 16, 1820, and thus a second one was issued in 1822 to which Fr. Anfossi acceded. The first states:

Concerning the request of the Professor Giacomo Settele...for permission to print his work on the doctrine of the mobility of the earth, denied to him by the Master of the Sacred Apostolic Palace...it is ordered that someone of the consultors write on the posture to be taken in this matter so as to safeguard the good name of the Holy See decreed according to the opinion of the Father Consultor [Antonio Maria Grandi] who had written: "There is nothing contrary to the fact that one might defend the opinion of Copernicus on the motion of the earth in the manner in which today it is usually defended by Catholic authors; and as to the meaning [of this decision]: it means that it be suggested to the Most Reverend Master of the Sacred Apostolic Palace [Fr. Anfossi] that he not prevent the printing of the *Elements [of Astronomy]* of the canon Giuseppe Settele; and then that it be suggested to Settele to insert in the said work some things whereby he shows that the Copernican opinion, as it is presently defended, is no longer subject to those difficulties to which it was liable in

times gone by, before the observations which were subsequently completed.<sup>64</sup>

The second, issued on September 11, 1822, states:

The most excellent [cardinals] have decreed that there must be no denial, by the present or by future Masters of the Sacred Apostolic Palace, of permission to print and to publish works which treat of the mobility of the earth and of the immobility of the sun, according to the common opinion of modern astronomers, as long as there are no other contrary indications, on the basis of the decrees of the Sacred Congregation of the Index of 1757 and of this Supreme [Holy Office] of 1820; and that those who would show themselves to be reluctant or would disobey, should be forced under punishments at the choice of [this] Sacred Congregation, with derogation of [their] claimed privileges, where necessary.<sup>65</sup>

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<sup>64</sup> *Le Opere di Galileo Galilei*, vol. 19, p. 420, as translated by Fantoli's *Galileo: For Copernicanism and for the Church*, pp. 520, 498. Latin is: "Feria IV. Die 16 Augusti 1820. Circa petitionem Professoris Iacobi Settele, a SS.mo remissam huic S. Congregationi, pro permissione impressionis sui operis super doctrina mobilitatis terrae, sibi denegata a P. M. S. Palatii Apostolici. . . rescriptum fuit quod scribat aliquis ex DD. Consultoribus circa temperamentum hac in re sumendum ad tuendam decentiam S. Sedis, lecto voto R. P. M. Antonii Mariae Grandi, E.mi DD. Decreverunt iuxta votum P. Consultoris qui scripsit, nempe: « Nihil obstare, quominus defendi posit sentential Copernici de motu telluris eo modo quo nun cab auctoribus Catholicis defendi solet; et ad mentem: Et mens est, ut insinuetur R.mo P. Magistro Sacri Palatii Apostolici ne impediatur editionem Elementorum Canonici Iosephi Settele; Canonico autem Settele insinuetur ut ipso in opere nonnulla inserat, quibus ostendat, sententiam Copernicanam, ut modo defenditur, non amplius iis difficultatibus esse obnoxiam, quibus, ante posteriora observata, antiquis temporibus implicabatur »" (*Galileo E L'Inquisizione*, pp. 30-31).

<sup>65</sup> *Le Opere di Galileo Galilei*, vol. 19, p. 421, as translated by Fantoli's *Galileo: For Copernicanism and for the Church*, p. 498. Latin is: "Feria IV. Die 11 Septembris 1822. E.mi DD. Decreverunt, non esse a praesenti et futuris pro tempore Magistris Sacri Palatii Apostolici recusandam licentiam pro impressione et publicatione operum tractantium de mobilitate terrae et immobilitate solis iuxta communem modernorum astronomorum opinionem, dummodo nihil aliud obstet, ad formam Decretorum Sacrae Congregationis Indicis anni 1757, et huius Supremae anni 1820; reluctantes et inobedientes, praevia, quatenus opus sit, derogatione praetensorum privilegiorum, coercendos esse poenis arbitrio S. Congregationis. Et Praesens Decretum communicetur tum E.mo Urbis Vicario, tum E.mo Praefecto S. Congregationis Indicis, tum P. M.ro Sacri Palatii Apostolici. F. Turriozzi Ass." (*Galileo E L'Inquisizione*, p. 31).

In analyzing the 1820 and 1822 decrees more closely, we will see many interesting twists and turns. Note the following:

1) Although the Settele affair began with the assertion from Settele that his book spoke of heliocentrism as a thesis and not as a hypothesis, there is no specific recognition of that fact from the Congregation of the Index. The Congregation refers only to “his work on the doctrine of the mobility of the earth.” Neither is there a statement from the Congregation that future books which present heliocentrism as a thesis or fact can be published. The first decree refers only to “the manner in which today it is usually defended by Catholic authors,” but does not specify that these authors were treating heliocentrism as a thesis or fact. Since, as we have noted previously by the disclaimer of Le Seur and Jacquier against Newton’s heliocentrism as late as 1833, at this time in history there obviously existed official defenders of the Earth’s immobility. The second decree refers to future publications as “works which treat<sup>66</sup> of the mobility of the earth,” not those which will regard the mobility of the Earth as a thesis or fact.

2) Copernicanism is never referred to as a fact or thesis but only as an “opinion” (e.g., “the opinion of Copernicus,” and “the Copernican opinion,” cited in the first decree). Additionally, in the second decree, the heliocentric cosmology then advocated by various scientists is never referred to as a fact or thesis, but only as an “opinion” (e.g., “the common opinion of modern astronomers”). An opinion is not a fact or thesis. It is closer to a hypothesis or a theory. As such, the Congregation of the Index seems to be saying that, as an official institution of the Catholic Church, it is not, and will not, advocate heliocentrism as a scientific fact, but if a Catholic author desires to formulate arguments to the contrary he may do so, and, of course, he does so at his own risk. As such, the permission to print Settele’s book is never said to be granted on the basis that the Index recognizes it as a fact or thesis, but only as the “Copernican opinion, as it is presently defended...” Since both Copernicus’ and “modern astronomers’” treatment of heliocentrism is nothing more than their respective opinions, then obviously Settele’s advocacy of heliocentrism cannot be considered any more than an opinion, regardless of whether he, himself, believes it to be a thesis or fact.

3) Amazingly enough, the first decree relies on Olivieri’s dubious argument that the 1616-1633 decrees against heliocentrism are now obsolete because Copernicus and Galileo claimed the sun was motionless and did not use elliptical orbits for the planets. Yet the second decree fails to recognize that distinction since it mistakenly refers to the “common opinion of modern astronomers” as holding to the “immobility of the sun.” It appears in this case that the left hand does not know what the right hand is doing. Be that as it may, we noted earlier that neither a moving sun nor elliptical orbits prove heliocentrism. Hence, the fact that the Congregation of the Index, being led by Olivieri as its Commissary General, was persuaded to base its decision on

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<sup>66</sup> Latin: *tractantium*, meaning treat, discuss, handle, or manage.

Olivieri's concocted analysis of the 1616 and 1633 decrees, exposes the dubious nature of the whole proceeding.

4) From the first decree it is apparent that one of the primary concerns of the "Holy See" is that its "good name" is "safeguarded." Although it is admirable for the accused to preserve its good reputation in the face of unproven allegations, it seems that the pressure from the world to accept heliocentrism may have unduly forced the Congregation of the Index to accept Olivieri's specious argumentation in order to dismiss the 1616-1633 decrees. To borrow a contemporary phrase, it was the 'politically correct' way of dealing with the problem.<sup>67</sup>

5) The first decree excuses Settele based on the assumption that science has demonstrated heliocentrism by "observations which were subsequently completed" (*e.g.*, the observations of stellar aberration and stellar parallax). As we noted, however, modern astronomy, long after the limited knowledge of Settele, Olivieri, Newton and Kepler, reveals that neither stellar aberration nor stellar parallax proves heliocentric cosmology, since both phenomena can be explained quite adequately from the geocentric system. Fortunately, the conditional basis for providing imprimaturs to books which advocate the heliocentric system was added to the Congregation's Index when it said in the 1822 decree that it recognized the possibility that among "modern astronomers" there may be "contrary indications" which would forestall the permission to publish heliocentric works. Since modern science has since shown that the cosmological presumptions of Olivieri were wrong, the Church possesses the "contrary indications" upon which to rescind any imprimatur previously given to a book advocating heliocentrism.

### **Conclusion from the Settele Affair**

All in all, we can posit that, with the fallacious arguments that Olivieri submitted in his Summation, the Congregation of the Index was grossly ill-advised when it came time to deciding whether to grant an imprimatur to Canon Settele. Under such duress and false information, the whole affair is tainted from start to finish. Olivieri may have been successful in obtaining an imprimatur for Settele, still, this did not mean that the Church's condemnation of heliocentrism had been rescinded. Imprimaturs given to private books have no authority in overturning Congregational decrees approved by supreme pontiffs and/or facilitated by a canonical trial, as was the case in 1633. In face

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<sup>67</sup> Some Galileo historians, who are themselves heliocentrists, applaud Olivieri's invented arguments as "the definitive solution to the Galileo case," as is advanced by Walter Brandmüller in *Galileo e la Chiesa ossia il diritto ad errare*, 1992, p. 184. Fantoli disagrees, saying, "I am not able to share in any way his [Brandmüller's] final judgment...." (*Galileo: For Copernicanism and for the Church*, p. 521). Finocchiaro makes a noteworthy point that Olivieri was forced to this *ad hoc* solution because both he and Anfossi understood the 1616 and 1633 "decrees were unrevisable, since the earth's motion had been condemned once, there could not be another decree withdrawing or revising the first" (*Retrying Galileo*, p. 220).

of the fact that the permission initially given to Galileo's *Dialogo* was later rescinded by the 1633 magisterium because it found the imprimatur was issued under false pretenses, makes the Settele imprimatur more an anomaly than a precedent. In addition, Copernicus, Zúñiga, Foscarini, Kepler, and Galileo remained on the Index and not even a motion was entertained in 1820-22 to remove them. Hence, the Settele affair proved only one thing, namely, that a high-placed cleric could convince his peers with pretentious scientific claims that neither he nor they could prove since the science of cosmology was still in its infancy. As we noted in the case of Bradley versus Airy, the science would not mature nearly enough to shed sufficient light on Olivieri's claims until long after he and his contemporaries had died. And when it shed its light, it would show that Olivieri's claims were fallacious.

As for Pius VII's role in the Settele affair, although there are various accounts that, after receiving Olivieri's report, he helped smooth the pathway for Settele to obtain the imprimatur, there is no document existing containing a quote directly from Pius VII endorsing either Settele or heliocentrism.<sup>68</sup>




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<sup>68</sup> After giving the history of the evidence submitted by both Settele and Olivieri to Pius VII in favor of Settele; and the evidence against Settele submitted by Anfossi and the Vatican majordomo, the best Finocchiaro can conclude is: "On December 14 [1820], the Inquisition cardinals agreed that the imprimatur would be given by the vicar apostolic, and the pope approved the decision" (*Retrying Galileo*, p. 197, citing "Brandmüller and Greipl 1992, pp. 93-93, 396" as his source but without a direct quote from them), and "On September 25 [1822], Pope Pius VII ratified the Inquisition's decision to permit works teaching the earth's motion" (*Retrying Galileo*, pp. 197-198, citing Favaro's, *Le Opere di Galileo Galilei*, vol. 19, p. 421 and Brandmüller and Greipl 1992, p. 429, but again without a direct quote from Pius VII from either source). Fantoli states: "This decree [of Sept. 11, 1822] was approved two weeks later by Pope Pius VII" (*Galileo: For Copernicanism and for the Church*, p. 499). Favaro's citation of the "approval" has one short sentence signed not by Pius VII but by the Assessor, monsignor F. Turriozzi: "SS.mus D. N. D. Pius divina providential PP. Septimus, in solita audientia mihi infrascripto Assessori S. Officii impertita, supradictum Decretum approbavit, et exequi mandavit. F. Turriozzi Ass.," which translates: "During the accustomed audience granted to me [F. Turriozzi], the undersigned Assessor of the Holy Office, Our Most Holy Lord Pius the Seventh, by divine Providence pope, approved the above decree and ordered it to be executed" (*Galileo E L'Inquisizione*, p. 31). There is no document, however, that contains an exact quote of Pius VII's approval, nor has a signature of Pius VII been produced for decisions that are said to be "ratified" by him.