Galileo's Misstatements about Copernicus

By Edward Rosen *

A RECENT English translation [1] of selections from the writings of Galileo (1564–1642) will doubtless bring to the attention of many readers the statements about Copernicus (1473–1543) in the great Italian scientist's *Letter to the Grand Duchess Christina*. These statements by Galileo contain five serious historical errors. To impede their further spread is the aim of the present article.

The first of the five errors occurs in Galileo's remark that "Nicholas Copernicus . . . was not only a Catholic, but a priest and a canon." [2] In a preliminary formulation [3] he had said: "Nicholas Copernicus was not only a Catholic, but a member of the regular clergy and a canon." [4] In both these versions,

* Massachusetts Institute of Technology. This paper was read on 16 July 1957 to Professor Willy Hartner's Seminar, Institut für Geschichte der Naturwissenschaften, Johann-Wolfgang-Goethe Universität, Frankfurt-am-Main.

[1] *Discoveries and opinions of Galileo*, translated by Stillman Drake (New York: Doubleday, 1957); reviewed in the *Journal of the History of Ideas*, 1957, *18*: 439–448, by Edward Rosen, and in *Isis*, 1957, *48*: 378–379, by Giorgio de Santillana.

[2] Drake, p. 178; *Le opere di Galileo Galilei*, national edition (Florence, 1890–1909; reprinted 1929–1939; cited hereafter as "NE"), V, 312.4–6: "Niccolò Copernico fu . . . uomo non solamente cattolico, ma sacerdote e canonico."

[3] Galileo's letter of 16 February 1615 to his good friend Piero Dini, who was then an official at the papal court, and a few years later became an archbishop. Demetrio Marzi (1862–1920), La questione della riforma del calendario nel quinto concilio lateranense (1512–1517), *Pubblicazioni del r. istituto di studi superiori in Firenze*, sez. di filosofia, 1896, *27*: 218, said that in Galileo's *Letter to the Grand Duchess* and in his letter to Dini there were "some minor errors" (qualche piccola inesattezza), without specifying what these minor errors were. Marzi himself (p. 217) committed the minor error of misdating Galileo's letter to Dini "6 February 1614," even though he cited NE, which gives the date of the letter correctly as 16 February 1615. The minor error of the date led Marzi into a major error concerning the chronological relationship between the letter to Dini and the *Letter to the Grand Duchess*; according to Marzi (pp. 217–218), Galileo wrote the *Letter to the Grand Duchess* the year following ("l'anno seguente") his letter to Dini. Yet in the letter to Dini Galileo explained "what a pernicious thing it would be to proclaim as doctrine settled by Holy Scripture any propositions whose contrary may some day be demonstrated; with regard to these matters I have written a very extensive discussion, which is not yet in good enough condition for me to send you a copy, although I shall do so as soon as possible" (NE, V, 292.20–24). Hence, despite Marzi, Galileo did not write the *Letter to the Grand Duchess* in the year following his letter to Dini. In that letter Galileo described the *Letter to the Grand Duchess* as already written, lacking only the final touches ("l'ultima mano"; NE, XII, 181.8). Evidently Marzi forgot that "Di Firenze, li 16 Febbraio 1614" (NE, V, 294.18), the close of Galileo's letter to Dini, followed "the Florentine style which, as is known, from January to 24 March was a year behind the present modern style" (Marzi, p. 30, n. 2). Marzi himself (p. 124, n. 4) pointed out that a book dated 10 January 1514 by its Florentine publisher was actually issued, according to the modern style, in 1515 (cf. Marzi, p. 142, n. 1).

[4] NE, V, 293.9–10: "Niccolò Copernico fu uomo non pur cattolico, ma religioso e canonico." If the word "e" is omitted from this sentence, "religioso" is transformed from a substantive into an adjective. As a substantive, "religioso" refers to a member of a monastic order, but as an adjective it merely means "pious." Hence the omission of "e" would cancel Galileo's description of Copernicus as a member of the regular clergy. This description is indeed missing in Emil Wohlwill (1835–1912), *Galilei und sein Kampf für die Copernicanische Lehre* (Hamburg and Leipzig, 1909–1926), I, 522, where Wohlwill's paraphrase of Galileo's letter to Dini has Galileo say: "Copernicus was not only a Catholic, but also a pious canon" (ein frommer Kanonikus), without any mention of his belonging to a religious order. Although Wohlwill always cited NE in the published version of his book, he may actually have read Galileo's letter to Dini in an earlier edition which omitted the "e" (*Le opere di Galileo Galilei*, Florence, 1842–1856, ed. Eugenio Albèri, II, 15). Albèri took the text of the letter (with "e" omitted) from Giambatista Venturi, *Memorie e lettere inedite finora o disperse di Galileo Galilei* (Modena, 1818–1821, I, 209). Venturi in turn had obtained the text from Jacopo Morelli, who printed the letter for the first time (*I codici manoscritti volgari della libreria Naniana*, Venice, 1776, p. 193). Morelli had found a copy of the letter (the original in Galileo's own handwriting has not survived) in the collection of manuscripts he was describing for publication; twenty years later the

as the attentive reader will have noticed, Galileo characterized Copernicus as a Catholic and a canon. His preliminary description of Copernicus as a member of the regular clergy, however, was not repeated by Galileo in his *Letter to the Grand Duchess*. Does not his failure to reiterate the claim that Copernicus belonged to a religious order signify a realization on Galileo's part that he could not substantiate this claim? Nor is the situation any better with regard to Galileo's assertion that Copernicus was a priest. No evidence that Copernicus entered the priesthood was known to Galileo. In fact, it was more than three centuries after he composed his *Letter to the Grand Duchess* before any document allegedly designating Copernicus as a priest was published.[5] Although this alleged designation has been accepted by scholars too numerous to be listed here, it is nevertheless historically worthless, as I shall undertake to demonstrate on another occasion.[6] The simple truth of the matter is that Copernicus was neither a monk nor a friar nor a priest.

In order to perceive Galileo's second error, let us resume reading his *Letter to the Grand Duchess* at the point where our quotation from it stopped. Galileo continues: Copernicus was "so esteemed by the church that when the Lateran Council under Leo X took up the correction of the church calendar, Copernicus was called to Rome from the most remote parts of Germany to undertake its reform."[7] But Copernicus does not say that he was called to Rome. He does say that

> . . . not so long ago under Leo X the Lateran Council considered the question of reforming the ecclesiastical calendar. The problem remained unresolved then only because it was felt that the lengths of the year and month and the motions of the sun and moon had not yet been adequately measured. From that time on I have directed my attention to a closer study of these topics, at the instigation of that most distinguished man, Paul, bishop of Fossombrone, who was then in charge of this matter.[8]

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collection was willed by its owner, Jacopo Nani, to the Biblioteca Marciana in Venice, where the letter is now catalogued as no. 5547 (formerly It. IV, 59–60; see Carlo Frati and Arnaldo Segarizzi, *Catalogo dei codici marciani italiani*, Modena, 1909–1911, II, 45). In Nani's MS (and Morelli's edition) Galileo's letter to Dini contained the "e." Venturi dropped the "e," not by the exercise of superior editorial judgment, but by sheer inadvertence. Venturi's careless omission of the "e" was uncritically followed by Albèri, who was followed equally uncritically by Wohlwill. Although the latter cited NE, in this instance he did not consult it. For after comparing five MSS (NE, V, 270–271), NE restored the correct reading of the first editor, Morelli, and of the second editor, who utilized a Florentine MS and likewise printed the "e" (Giovanni Targioni Tozzetti, *Notizie degli aggrandimenti delle scienze fisiche accaduti in Toscana nel corso di anni LX del secolo XVII = Atti e memorie inedite dell' Accademia del Cimento,* Florence, 1780, II, 28).

[5] Lino Sighinolfi, Domenico Maria Novara e Nicolò Copernico, *Studi e memorie per la storia dell' Università di Bologna*, 1920, *5*: 216, 232.

[6] Edward Rosen, Copernicus was not a priest (forthcoming). This article will document the remark made by the present writer in an address delivered at the Copernicus Quadricentennial Celebration in Carnegie Hall on 24 May 1943 and published in *Nicholas Copernicus, a tribute of nations*, ed. Stephen P. Mizwa (New York: Kosciuszko Foundation, 1945), p. 30: "It is sometimes erroneously stated that Copernicus became a priest or a monk; but as a matter of fact he never took holy orders and he never joined any of the regular monastic brotherhoods."

[7] Drake, p. 178; NE, V, 312.6–9: "tanto stimato, che, trattandosi nel concilio Lateranense, sotto Leon X, della emendazion del calendario ecclesiastico, egli fu chiamato a Roma sin dall' ultime parti di Germania per questa riforma." If we compare this Italian text with Drake's translation, we see that the words "by the church," which have no counterpart in Galileo, were inserted by Drake, who himself labeled (p. vii) his own translations free, rather than precise. Does not his interpolation of the three words "by the church" significantly alter Galileo's meaning? By calling Copernicus "tanto stimato," surely Galileo meant that Copernicus was held in high esteem generally, and not merely by the church.

[8] *De revolutionibus orbium coelestium* (Nuremberg, 1543, fol. 4v), Dedication, near the end: "non ita multo ante sub Leone X. cum in Concilio Lateranensi vertabatur quaestio de emendando Calendario Ecclesiastico, quae tum indecisa hanc solummodo ob causam mansit, quod annorum et mensium magnitudines, atque Solis et Lunae motus nondum satis dimensi haberentur. Ex quo equidem tempore, his accuratius observandis, animum intendi, admonitus a praeclarissimo viro D. Paulo episcopo Semproniensi, qui tum isti negotio praeerat." The last five words do not mean "who had been present at those deliberations," despite Charles Glenn Wallis, in *Great books of the western*

While the Fifth Lateran Council (1512–1517) was in session, Pope Leo X announced that he had "consulted the greatest experts in theology and astronomy," [9] whom he had "advised and encouraged to think about remedying and suitably correcting" [10] the calendar. He added that "they have conscientiously heeded me and my instructions, some of them in writing, others orally." [11] But when these written and oral discussions produced no suitable correction, Leo X issued a general appeal. To the Holy Roman Emperor, for example, he dispatched a message urging that "of all the theologians and astronomers whom you have in your empire and domains, you should order . . . every single one of high renown . . . to come to this sacred Lateran Council. . . . But if there be any who for a legitimate reason cannot come to the Council, Your Majesty will please instruct them . . . to send me their opinions carefully written." [12] A similar notice was distributed in printed form to the heads of other governments and of all universities.[13] Apart from this general invitation, which was twice repeated,[14] Copernicus received no special call to Rome, despite Galileo's misstatement to that effect.

The experts originally consulted by Leo X replied, it will be remembered, "some of them in writing, others orally." In like manner, those for whom the later appeal was intended were ordered either to go to Rome or to transmit "their opinions carefully written." Which of these two courses of conduct did Copernicus adopt? The answer to this question is furnished by "that most distinguished man, Paul, bishop of Fossombrone, who was then in charge of this matter." [15] Paul of Middelburg (1445–1533), bishop of Fossombrone, in a published report to Leo X about the outcome of that pope's efforts to stimulate projected corrections of the defects in the current calendar, listed Copernicus among those who wrote, not among those who traveled to the Eternal City.[16] On this occasion, then, Copernicus did not go to Rome, nor was he in any special way "called to Rome."

While saying that "Copernicus was called to Rome," was Galileo perhaps thinking of Regiomontanus (1436–1476)? According to a popular historian's account, of which seven editions (four in Latin and three in Italian) were in circulation in Galileo's younger days, Regiomontanus "was made bishop of

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world (Chicago: Encyclopaedia Britannica, 1952), XVI, 509. In mistranslating Copernicus' five simple Latin words, Wallis committed four blunders: he omitted "tum"; he mistook the tense of "praeerat"; and he misunderstood its meaning, as well as that of "negotio."

[9] Marzi (cited in n. 3, above), p. 78.

[10] Marzi, p. 79.

[11] *Loc. cit.*

[12] *Loc. cit.* (21 July 1514).

[13] Marzi, pp. 80–81 (24 July 1514).

[14] 1 June 1515 (Marzi, pp. 167–168); 8 July 1516 (Marzi, pp. 185–186).

[15] Drake (p. 178) transforms Galileo's "Vescovo Semproniense, allora soprintendente a quest' impresa" (NE, V, 312.11–12) into the "Bishop of Culm, then superintendent of this matter." Paul of Middelburg, bishop of Fossombrone, published several treatises on the calendar, whereas no such interest was shown by the bishop of Kulm. Drake's error is all the more surprising because he says (pp. vii–viii) that he based his translation upon the earlier English version "corrected and modernized." Yet according to the previous translator, Thomas Salusbury, *Mathematical collections and translations*, tome I (London, 1661), part I, p. 430, "the Bishop of *Sempronia*" was "at that time Super-intendent in that Affair." Dorothy Stimson, having failed to recognize that Copernicus' "Semproniensi" was merely a shortened form of "Foro Semproniensi," turned the bishop of Fossombrone into "a bishop from Rome" (*The gradual acceptance of the Copernican theory of the universe*; New York; also Hanover, New Hampshire; 1917, p. 115). Giorgio de Santillana mistakenly made "Cardinal Schönberg, then president of the Commission on the Calendar" instead of Paul of Middelburg (*The crime of Galileo*, University of Chicago Press, 1955, p. 22). For Paul of Middelburg, see Dirk Jan Struik, Paulus van Middelburg, *Mededeelingen van het nederlandsch historisch Instituut te Rome*, 1925, *5*: 79–118; *idem*, Paolo di Middelburg e il suo posto nella storia delle scienze esatte, *Period. Mat.*, 1925, series 4, *5*: 337–347; *idem*, Sull' opera matematica di Paolo di Middelburg, *R. C. Accad. Lincei*, 1925, series 6, *1*: 305–308.

[16] Paul of Middelburg, *Secundum compendium correctionis calendarii* (Rome, 1516), fol. biir.

Regensburg by Sixtus IV [17] and was called to Rome" [18] for the purpose of correcting the calendar. In like manner Leo X wrote to Paul of Middelburg on 16 February 1514 as follows:

> I have great need of your ability and erudition in computing and investigating chronological matters related to the Roman calendar as well as in the items on the agenda of the sacred Lateran Council. I therefore urge you to come to Rome at the very earliest time convenient to you, for your presence here is of importance to me.[19]

Whether confusion with Regiomontanus or Paul of Middelburg or somebody else be the explanation of Galileo's second error, he committed the third by saying about Copernicus that "Having reduced his system into six books, he published these at the instance of the Cardinal of Capua and the Bishop of Culm. And since he had assumed his laborious enterprise by order of the supreme pontiff, he dedicated this book *On the celestial revolutions* to Pope Paul III." [20] By injudiciously omitting the Italian words, "al suo successore, ciò è," Drake's new translation may give a false impression to the general reader, whom he has "principally in mind" (p. vii). Even students may be inclined to infer that, according to Galileo, Copernicus dedicated his *Revolutions* to the same supreme pontiff by whose order he had assumed his laborious enterprise. Actually Galileo says that the order emanated from a supreme pontiff, and "to his successor, that is, to Paul III," Copernicus dedicated the *Revolutions*.[21] In Galileo's time no Italian needed to be reminded that Paul III was the successor, twice removed, of Leo X. The latter was the supreme pontiff by whose order Copernicus had assumed his laborious enterprise. At any rate, that is what Galileo says (or implies) in the *Letter to the Grand Duchess*. But he makes no such statement in his preliminary formulation (the letter to Dini of 16 February 1615).[22] Like Galileo's description of Copernicus as a priest, his contention that Copernicus wrote the *Revolutions* by order of the pope emerges for the first time in the *Letter to the Grand Duchess*.

Let us try to trace the development of Galileo's fanciful notion about the origin of the *Revolutions*. Copernicus had said, as we saw above, that the only

[17] Actually Regiomontanus was not made a bishop by Pope Sixtus IV. The astronomer's alleged elevation to the episcopacy occurred only in the sympathetic imagination of this historian, Paolo Giovio (1483–1552), who was himself bishop of Nocera. In thus generously but gratuitously granting Regiomontanus a diocese, Giovio was operating in the realm of legend, not history; see Ernst Zinner, *Leben und Wirken des Johannes Müller von Königsberg, genannt Regiomontanus* (*Schriftenreihe zur bayerischen Landesgeschichte, 31*; Munich, 1938), p. 178. Yet in a chapter explicitly devoted to demolishing the legend of Regiomontanus, Lynn Thorndike repeated the legend that "he was made bishop of Regensburg" (*Science and thought in the fifteenth century*, New York: Columbia University Press, 1929, p. 146).

[18] Giovio, *Elogia veris clarorum virorum imaginibus apposita* (Venice, 1546), fol. 75r; *Elogia doctorum virorum*, ed. Antwerp, 1557, p. 271; ed. Basel, 1571, p. 287; *Elogia virorum literis illustrium*, Basel, 1577, p. 218: "creatus est a Xysto Quarto Ratisponensis Episcopus, accitusque Romam"; *Le iscrittioni poste sotto le vere imagini de gli huomini famosi*, tr. by Hippolito Orio (Florence, 1552), p. 228; edd. Venice, 1558, 1559, p. 263; cf. *An Italian portrait gallery*, tr. by Florence Alden Gragg (Boston: Chapman and Grimes, 1935), p. 163.

[19] Pietro Bembo, *Epistolarum Leonis decimi pontificis max. nomine scriptarum libri xvi* (Venice, 1535), book 7, no. 18; ed. Lyon, 1538, p. 157; ed. Basel, 1539, p. 272; ed. Lyon, 1540, pp. 166–167; ed. Basel, 1566, pp. 260–261; ed. Cologne, 1584, p. 167; ed. Strasbourg, 1611, pp. 147–148; in *Epistolarum familiarium libri vi*, ed. Venice, 1552, II, 204.

[20] Drake, p. 178; NE, V, 312.19–24: "avendo egli ridotta tal dottrina in sei libri, la pubblicò al mondo a i preghi del Cardinal Capuano e del Vescovo Culmense; e come quello che si era rimesso con tante fatiche a questa impresa d'ordine del Sommo Pontefice, al suo successore, ciò è a Paolo III, dedicò il suo libro delle Revoluzioni Celesti."

[21] No misunderstanding can possibly result from Salusbury's translation (cited in n. 15, above): Copernicus assumed "this so laborious an enterprize by the order of the Pope; he dedicated his book *De Revolutionibus Coelestibus* to His Successour, namely Paul III."

[22] Misdated "1614" by Guido Horn D'Arturo in his article on Copernicus in the *Enciclopedia italiana*, XI (1931), 318.

reason why the calendar was not reformed by the Fifth Lateran Council was that

> . . . the lengths of the year and month and the motions of the sun and moon had not yet been adequately measured. From that time on I have directed my attention to a closer study of these topics, at the instigation of that most distinguished man, Paul, bishop of Fossombrone, who was then in charge of this matter.

This instigation or admonition ("admonitus") by Paul of Middelburg becomes an order ("ordine") in Galileo's letter to Dini. But there the order is not yet a papal order, and it is still confined, as in Copernicus' own statement, "to the investigation of these periodic times." [23] In the *Letter to the Grand Duchess*, however, the task of ascertaining these times is given ("dato il carico") to Copernicus by Paul of Middelburg, whose power to issue orders is now transferred to the pope; and the papal order now embraces Copernicus' entire work in six books, not merely the portion dealing with the periodic times.

We have watched the actual admonition becoming improperly enlarged, first, into an "order," and then into a "papal order," whose subject matter expanded at the same time without any warrant from a part to the whole of the volume. But the bulk of the *Revolutions* was written long before the Fifth Lateran Council abandoned its unsuccessful effort at calendar reform; and it was this abandonment which induced Paul of Middelburg to admonish Copernicus to make "a closer study of these topics." In short, Galileo committed a grave blunder in saying that Copernicus "assumed his laborious enterprise by order of the supreme pontiff."

Not every work composed by Copernicus' contemporaries was the spontaneous creation of their own genius. For example, on the titlepage [24] of a plan for correcting the Roman calendar two Viennese astronomers prominently displayed the assertion that their joint effort had been written and published "at the request" of the pope and the Holy Roman Emperor; in the dedication these astronomers said that they wrote "by order" of the pope and emperor.[25] In like manner an Italian astronomer declared that he had computed his new ecclesiastical calendar "by order of popes Julius II, Leo X, Clement VII, and Paul III." [26] Copernicus said no such thing about his *Revolutions*.

That work is the subject of Galileo's fourth error, according to which, "When printed, the book was accepted by the holy Church, and it has been read and studied by everyone without the faintest hint of any objection ever being conceived against its doctrines." [27] Yet on 4 June 1539 in the home of Martin Luther (1483–1546), the initiator of German Protestantism, "mention was made of a certain new astronomer who proved that the earth moves, not the heavens, sun and moon,[28] just as anybody riding in a wagon or a boat would suppose that he is still and that the earth and trees are moving." Although

[23] NE, V, 293.17: "all' investigazione di tali periodi."

[24] Andreae Stiborii . . . et Georgii Tannstetter . . . super requisitione sanctissimi Leonis papae X et divi Maximiliani imperatoris . . . *De romani calendarii correctione* consilium . . . conscriptum et editum (Vienna, 1514).

[25] "Lucubrationes nostras quas . . . summi Pontificis et Caesareae Maiestatis iussi conscripsimus. . . ."

[26] Luca Gaurico (1475–1558), *Calendarium ecclesiasticum novum* . . . iussu summorum pontificum Iulii II, Leonis X, Clementis VII et Pauli III . . . supputatum (Venice, 1552). For a later example of a calendaric work executed in obedience to a papal command, see n. 71, below.

[27] Drake, pp. 178–179; NE, V, 312.23–26.

[28] This misrepresentation of Copernicus as denying the moon's motion proves that Luther and his interlocutors lacked even the most rudimentary information about the astronomer whom they were discussing. But their conversation took place some four years before the publication of the *Revolutions* (for the date of the conversation, see *D. Martin Luthers Werke*, Weimar edition, *Tischreden*, IV, p. XIV, no. 4638).

the new astronomer was not mentioned by name, the reference was unmistakably to Copernicus, about whom Luther at once proceeded to say: "But that is how things go nowadays. Anyone who wants to be clever must not let himself like what others do. He must produce his own product, as this man [29] does, who wishes to turn the whole of astronomy upside down. But I believe in Holy Scripture, since Joshua ordered the sun, not the earth, to stand still." [30]

Luther's principal assistant, Philipp Melanchthon (1497–1560), on 16 October 1541 addressed a letter to the physician and mathematician Burkard Mithobius (Mithoff, 1501–1564) in which Melanchthon, the preceptor of Germany, as his admirers styled him, declared that "certain people believe it is a marvelous achievement to extol so crazy a thing, like that Polish astronomer who makes the earth move and the sun stand still. Really, wise governments ought to repress impudence of mind." [31] In a textbook first published in 1549 Melanchthon wrote:

> Out of love for novelty or in order to make a show of their cleverness, some people have argued that the earth moves. They maintain that neither the eighth sphere nor the sun moves, whereas they attribute motion to the other celestial spheres, and also place the earth among the heavenly bodies. Nor were these jokes invented recently. There is still extant Archimedes' book on *The sand-reckoner* in which he reports that Aristarchus of Samos propounded the paradox that the sun stands still and the earth revolves around the sun.[32]
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> Even though subtle experts institute many investigations for the sake of exercising their ingenuity, nevertheless public proclamation of absurd opinions is indecent and sets a harmful example.

After citing some Biblical passages, Melanchthon continued:

> Encouraged by this divine evidence, let us cherish the truth and let us not permit ourselves to be alienated from it by the tricks of those who deem it an intellectual honor to introduce confusion into the arts.[33]

Melanchthon's son-in-law and editor, Kaspar Peucer (1525–1602), professor of mathematics at the university of Wittenberg, followed his father-in-law's advice by omitting from a primer all discussion of Copernicus "lest beginners be offended or disturbed by the novelty of his hypotheses." [34] Later,

[29] According to the first edition (Eisleben, 1566) of the *Tischreden*, Luther called Copernicus a fool ("Narr," fol. 580r; cf. Weimar ed., *Tischreden*, I, 419). An utterly unconvincing attempt to get rid of "Narr" as an interpolation was made by Wilhelm Norlind (Copernicus and Luther: a critical study, *Isis*, 1953, *44*: 273–276), and decisively refuted by Heinrich Meyer (*Isis*, 1954, *45*: 99).

[30] *Luthers Werke*, Weimar ed., *Tischreden*, IV (1916), pp. 412–413, no. 4638.

[31] *Alter libellus epistolarum Philippi Melanthonis* (Wittenberg, 1570; reprinted 1574), pp. 334–335. Since Galileo's time, Melanchthon's letter to Mithobius has been made more readily accessible in *Corpus reformatorum*, IV (Halle, 1837), 679.

[32] Thomas L. Heath, *The works of Archimedes* (Cambridge, England, 1897; reprinted, New York: Dover Publications, 1953), pp. 221–222.

[33] Melanchthon, *Initia doctrinae physicae* (Wittenberg, 1549), fol. 47v–48v, reprinted in *Corpus reformatorum*, XIII (Halle, 1846), 216–217. In the second (1550) and subsequent editions of his *Initia* Melanchthon modified his condemnation of Copernicus; see Wohlwill, Melanchthon und Copernicus, *Mitt. Gesch. Med. Naturw.*, 1904, *3*: 260–276. Like Melanchthon, Jean-Pierre de Mesmes, *Les institutions astronomiques* (Paris, 1557), p. 56, bk. I, ch. 19, linked Copernicus with Aristarchus, and rejected their "absurd opinion" and "false hypothesis or proposition." A pupil of Melanchthon, Michael Stanhuf, *De meteoris* (Wittenberg, 1562; reprinted, 1578), fol. C6v–7r, labeled the belief in the earth's motion a "silly and absurd opinion," held by "utterly crazy and insane" people such as Aristarchus and certain unnamed modern writers.

[34] Peucer, *Elementa doctrinae de circulis coelestibus et primo motu* (Wittenberg, 1551), fol. G1v; Peucer's *Elementa* with its dread of Copernicanism was reprinted at Wittenberg in 1553, 1558, 1563, 1569, 1576 and 1587. Copernicus' name was not mentioned by Cornelius Valerius, a highly influential professor who declared in his textbook on natural philosophy: "There have been those who thought that the heavens were motionless while the earth moved; their false opinion needs no special refutation" (*Physicae . . . institutio*, ed. Lyon, 1568, p. 18; edd. Antwerp, 1574, 1575, p. 17; ed. Marburg, 1591, p. 30; ed. Antwerp, 1593, pp. 15–16; ed. Marburg, 1593, p. 32). In like manner Copernicus, although not named, was compared

in a more advanced work, Peucer denounced Copernicanism as absurd, far from the truth, offensive and not fit to be taught in the schools.[35]

An imaginary dialogue between a schoolmaster and his scholar contained the earliest discussion of Copernicanism in an English book. Its author, Robert Recorde (*c.* 1510–1558), had the scholar describe Copernicus' essential ideas as "such vaine phantasies, so farre againste common reason, and repugnante to the consente of all the learned multitude of Wryters."[36] This attitude toward Copernicanism was expressed in the work which remained the standard introduction to astronomy in England throughout the latter half of the sixteenth century. Shortly before its second edition appeared in 1596, a successful English popularizer of science, Thomas Blundeville (fl. 1560–1602), referred to Copernicus' "false supposition."[37]

The eminent scholar Julius Caesar Scaliger (1484–1558), "that violent and passionate man,"[38] put the name of Copernicus in the margin as a sidenote alongside the recommendation that certain "writings should be expunged or their authors whipped."[39] With equal severity the Sicilian mathematician Francesco Maurolico (1494–1575) said: "Nicholas Copernicus, who maintained that the sun is still and the earth has a circular motion, deserves a whip or a scourge rather than a refutation."[40]

In a didactic poem on astronomy the Scottish humanist and historian George Buchanan (1506–1582) unquestionably aimed the following verses at Copernicus:

> Buried in opaque darkness, ignorance has not yet ceased to bark out loud, rashly condemning the heavens to motionlessness and whirling the sluggish earth in a swift motion.[41]

Jean Bodin (1530–1596), the French philosopher, charged Copernicus with supposing "two absurd things." One of these alleged absurdities was that "the earth undergoes the movements which all the astronomers have always assigned to the heavens. . . . It is even more strange to put the sun in the center of the universe, and the earth fifty thousand leagues away from the center." Bodin argued further that "since the earth is one of the simple bodies, like the heaven and the four elements, we must conclude that it can have only a

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with "phrenetic spirits" by the French poet Du Bartas (1544–1590) in *La Sepmaine* (Paris, 1578), fourth day, lines 121–164. More than three dozen editions of this extremely popular cosmographical poem were published before Galileo wrote the *Letter to the Grand Duchess*; see *The Works of Guillaume de Salluste, Sieur du Bartas* (Chapel Hill, 1935–1940), I, 70–77.

[35] Peucer, *Hypotheses astronomicae* (Wittenberg, 1571), Dedication, fol.)(3r, 5v. In similar fashion Thomas Hill (fl. 1553–1575), author of a posthumously published textbook on astronomy, *The Schoole of Skil* (London, 1599), decided that Copernicus' reasoning would "offend and trouble the young students in the Art" (quoted by E. G. R. Taylor, *The Mathematical Practitioners of Tudor and Stuart England*, Cambridge, 1954, p. 336).

[36] Recorde, *The Castle of Knowledge* (London, 1556), p. 165.

[37] Blundeville, *Exercises* (London, 1594), fol. 181r; 4th ed., London, 1613, p. 380; later edd. were published after Galileo's *Letter to the Grand Duchess*. According to Thomas S. Kuhn, *The Copernican Revolution* (Cambridge: Harvard University Press, 1957), p. 186, Blundeville made this remark "in the preface of an astronomy text." Actually it appears in Book 2, Chapter 5, of "A plaine treatise of the first principles of cosmographie, and specially of the spheare," which has no preface.

[38] Vernon Hall, Jr., Life of Julius Caesar Scaliger, *Trans. Amer. phil. Soc.*, 1950, *40* (part 2): 85.

[39] J. C. Scaliger, *Exotericarum exercitationum liber quintus decimus*, Exercitatio XCIX, part 2 (Paris, 1557, fol. 142v).

[40] Maurolico, *Opuscula mathematica* (Venice, 1575), p. 26. A mistaken attempt to alter the traditional understanding of this passage is refuted by Edward Rosen, Maurolico's attitude toward Copernicus, *Proc. Amer. phil. Soc.*, 1957, *101*: 177–194.

[41] Buchanan, *De sphera*, book II, lines 143–146 (in Buchanan's *Franciscanus et fratres*, Heidelberg, 1609, p. 220). Six other editions of Buchanan's *De sphera* were printed before Galileo wrote the *Letter to the Grand Duchess*. Buchanan's reaction to Copernicus was discussed by James R. Naiden, *The Sphera of George Buchanan*, 1952 (procurable from W. H. Allen, 2031 Walnut Street, Philadelphia 3, Pennsylvania), pp. 52–54.

single motion which is proper to it. Yet Copernicus assigns it three different motions, of which it can have only one proper to it. The others would be violent, but this is impossible." [42] In a subsequent treatise, written while "all of France was aflame in civil war," [43] Bodin declared that the belief in a motionless sun and moving earth "was revived in our time by Copernicus, but it can easily be refuted by its own vacuity. . . . Copernicus' opinion gives rise to very grave absurdities." If he is right about the earth's motion, "all the foundations of physics must crumble. . . . No one who is in his right mind or who has had the slightest training in the physical sciences will ever believe that the dense and solid earth with its heaviness and weight simultaneously moves up and down, about its own center, and around the sun, while performing a libration." [44]

Tycho Brahe (1546–1601), the great Danish astronomer, asked:

> What need is there without any justification to imagine the earth, a dark, dense and inert mass, to be a heavenly body undergoing even more numerous revolutions than the others,[45] that is to say, subject to a triple motion, in violation not only of all physical truth but also of the authority of Holy Scripture, which ought to be paramount? [46]

According to Brahe, when Copernicus

> . . . stated that the earth's dense and inert mass, which is unsuitable for movement, is active in a course of motion (indeed, a threefold course) no less regular than the luminaries of the aether, he opposed . . . not only the principles of physics but also the authority of Holy Scripture, which several times confirms the immobility of the earth.[47]

Brahe maintained that

> . . . the earth, which we inhabit, occupies the center of the universe and does not perform any annual motion such as Copernicus supposed. These propositions must be upheld without any doubt; so I believe, together with the ancient astronomers and the accepted opinions of the physicists, supported by Holy Scripture.[48]

The earth's annual revolution "does not occur at all," such ideas being "not only dubious but obviously false and absurd." [49] Brahe insisted on the "absurdity of this Copernican arrangement of the revolutions in the universe." [50] Copernicus' "arrangement of the apparent orbits in the bodies of the universe does not in fact correspond with the truth." [51] From Copernicus' ascription to the earth of an annual revolution around a motionless sun "some absurdity

[42] Bodin, *Les six livres de la republique*, book 4, chapter 2 (Paris, 1576, p. 442); of this work there were, before Galileo wrote his *Letter to the Grand Duchess,* some eleven editions in the original French, besides versions in Italian, Spanish and English. When Bodin translated his *Republic* into Latin (Lyon, 1586, followed by four other editions), he modified the wording of his anti-Copernicus passage, but not the reasoning.

[43] Bodin, *Universae naturae theatrum* (Lyon, 1596; Frankfurt, 1597; Hanau, 1605), p. 633.

[44] *Op. cit.*, pp. 580–582. In the French translation by François de Fougerolles (Lyon, 1597) the quoted passages occur at pp. 837–840.

[45] Lynn Thorndike, *A history of magic and experimental science* (New York: Columbia University Press, 1923–1958), VI, 52, paraphrased Tycho's question as follows: "Why make our . . . earth a star and more revolved than the others?" But "multiplicius quam caetera revolutum" means "undergoing more revolutions than the others," not "more revolved than the others," if indeed this expression of Thorndike's may be said to have any meaning at all.

[46] *Astronomiae instauratae progymnasmata* (Prague, 1602; Frankfurt, 1610), p. 661; more readily accessible, since Galileo's time, in *Tychonis Brahe dani opera omnia*, ed. J. L. E. Dreyer (Copenhagen, 1913–29), III, 175.13–17.

[47] Brahe, *De mundi aetherei recentioribus phaenomenis* (Uraniborg, 1588; Prague, 1603; Frankfurt, 1610), pp. 186–187; more readily accessible, since Galileo's time, in *Tychonis opera*, ed. Dreyer, IV, 156.16–21.

[48] *Op. cit.*, edd. 1588, 1603, 1610, p. 187; *Opera*, IV, 156.34–37.

[49] *Astronomiae instauratae progymnasmata*, edd. 1602, 1610, p. 548; *Opera,* III, 63.9–11.

[50] *Op. cit.*, edd. 1602, 1610, p. 549; *Opera,* III, 63.40–41.

[51] *Op. cit.*, edd. 1602, 1610, p. 11 ; *Opera,* II, 14.24–25.

arises, only for physicists, but not for mathematicians." [52] "By ordaining a triple motion of the earth, Copernicus introduced no trivial physical absurdities." [53] Brahe emphatically denied that the "physical absurdities which accompany the Copernican hypothesis were adequately refuted by him." [54]

A letter in which Brahe, the foremost astronomer of the second half of the sixteenth century, referred to the "absurdities introduced by Copernicus" was published by the recipient, Giovanni Antonio Magini (1555–1617).[55] Long before receiving Brahe's letter, Magini himself had publicly referred to "absurd hypotheses, such as Copernicus imagined." [56] "It seems to Copernicus, against all truth and philosophy, that the earth moves, while the sun and the eighth sphere are motionless. . . . Copernicus' opinion about the motion of the earth is erroneous." [57] His hypotheses "are attacked by nearly everybody for being too far away from the truth and absurd." [58] These condemnations of Copernicus came from Magini's pen shortly after he was appointed to fill the vacant professorship of mathematics at the university of Bologna. An unsuccessful rival for the same appointment had been none other than Galileo himself.[59]

Between Maurolico's attack on Copernicus in 1575 and Magini's in 1589, a third Italian scientist, Francesco Barozzi, in 1585 declared that Copernicus "followed the false opinion of Aristarchus"; [60] when Barozzi referred to the idea of the earth's motion, he labeled it in a sidenote "the false opinion of Aristarchus and Copernicus." [61]

Among Galileo's contemporaries in Italy the most renowned for his knowledge of astronomy was Christopher Clavius (1538–1612), to whom Galileo, like Maurolico, turned for help. In the first edition of a work which passed through half a dozen editions (plus a dozen re-impressions) Clavius said that Copernicus' "idea conflicts with many aspects of experience and the common opinion of all philosophers and astronomers." [62] In the second edition Clavius inserted the additional condemnation that "many absurdities and errors are contained in Copernicus' position." [63] Finally, in the fourth edition, Clavius supplemented his previous criticisms by asserting that Copernicus

> . . . assumes hypotheses which are quite unsound, absurd and out of line with the common sense of mankind, not to say foolish, when he deprives the sun of all motion and stations it in the center of the universe, but endows the earth with a multiple motion and places it, together with the other elements and the sphere of the moon in the third heaven, between Venus and Mars.[64]

This opinion of Copernicus that the earth moves was declared by Giulio Cesare LaGalla (1571–1624), professor of logic at the university of Rome,

[52] *Apologetica responsio ad Craigum scotum de cometis* (Uraniborg, 1591); *Opera,* IV, 446.22–23. Similar mathematical approval of Copernicus had been coupled with physical disapproval in Brahe's *De disciplinis mathematicis oratio,* a lecture delivered at the University of Copenhagen in 1574 and published in 1610 (*Opera,* I, 149.30–33).

[53] *Opera,* IV, 473.38–39.

[54] *Epistolarum astronomicarum libri* (Uraniborg, 1596; Nuremberg, 1601; Frankfurt, 1610), p. 147; *Opera,* VI, 177.7–8.

[55] Magini, *Tabulae primi mobilis* (Venice, 1604), fol. 8ov; reprinted in Brahe's *Opera,* ed. Dreyer, VII, 293.22, and in Antonio Favaro, *Carteggio inedito di T. Brahe . . . con G. A. Magini* (Bologna, 1886), p. 399.

[56] Magini, *Novae coelestium orbium theoricae* (Venice, 1589), address to the reader, fol. b2v; ed. Mainz, 1608, fol. B1v.

[57] *Op. cit.,* ed. 1589, fol. b4v; ed. 1608, fol. B4r.

[58] *Op. cit.,* preface, ed. 1589, fol. c5v; ed. 1608, fol. C1r.

[59] Favaro, Galileo ed il Magini aspiranti ad una lettura di matematica nello Studio di Bologna, *Atti Ist. veneto,* 1922–1923, *82* (part 2): 148–155.

[60] Barozzi, *Cosmographia* (Venice, 1585), preface, fol. b4r.

[61] *Op. cit.,* p. 35.

[62] Clavius, *In sphaeram Ioannis de Sacro Bosco commentarius* (Rome, 1570), p. 87.

[63] *Op. cit.,* 2d ed. (Rome, 1581), p. 437.

[64] *Op. cit.,* 4th ed. (Lyon, 1593), p. 68; for a later condemnation of Copernicus by Clavius, see n. 77, below.

to be "obviously absurd, in opposition to and in conflict with the common sense of all men, educated and uneducated." [65] LaGalla was convinced that he had shown "Copernicus' opinion to be false and impossible." [66]

The foregoing array of published pronouncements by such leading luminaries of the sixteenth century as the religious reformers Luther, Melanchthon and Peucer, the critic J. C. Scaliger, the poet Buchanan, the philosopher Bodin, the mathematicians Maurolico and Barozzi, the astronomers Brahe, Magini and Clavius, and the peripatetic LaGalla, shows how utterly mistaken was Galileo's statement that Copernicus' *Revolutions* "has been read and studied by everyone without the faintest hint of any objection ever being conceived against its doctrines." [67]

The fifth and last error of Galileo with which we shall be concerned occurs in the assertion: "Since that time not only has the calendar been regulated by his [Copernicus'] teachings, but tables of all the motions of the planets have been calculated as well." [68] In referring to the regulation of the calendar, Galileo had in mind the reform of the calendar promulgated in antiquity by Julius Caesar. This so-called Julian calendar had been transformed into the Gregorian calendar by order of Pope Gregory XIII in 1582. Was the Gregorian calendar regulated "in conformity with Copernicus' doctrine" ("conforme alla sua dottrina"), as Galileo claimed?

In the bull announcing the new calendar Gregory XIII said:

> Antonio Giglio, doctor of arts and medicine . . . brought me a book written some time ago by his brother Aloisio. In this book Aloisio shows that by means of a certain new cycle of epacts devised by him . . . all the defects in the calendar can be remedied in accordance with a fixed rule that will endure throughout all the ages so that the calendar apparently will never require any change hereafter.[69]

Hence the Gregorian calendar was regulated in conformity with the doctrine of Aloisio Giglio, not Nicholas Copernicus.

Giglio's "new method of restoring the calendar," the pope went on to say, "is contained in the thin volume which I sent a few years ago to the Catholic rulers and more famous universities." [70] This thin volume or *Compendium* [71]

[65] LaGalla, *De phoenomenis in orbe lunae* (Venice, 1612), p. 14; reprinted in NE, III, 337.18–20. LaGalla and his book were discussed by Edward Rosen, *The naming of the telescope* (New York, 1947), pp. 54–59. In NE, XX, 465, Favaro gave the year of LaGalla's birth as 1576, and the day of his death as 15 March 1624. Perhaps he took these dates from Gerolamo Boccardo, *Nuova enciclopedia italiana*, 6th ed., XII (Turin, 1881), 71, which cites the biography of LaGalla by his pupil Leone Allacci (*Iulii Caesaris LaGallae philosophi romani vita*, Paris, 1644). But Allacci says (p. 1) that LaGalla was born in 1571, not 1576. The earlier date is no misprint, for Allacci states that LaGalla wrote his *De immortalitate animorum* (Rome, 1621) when he was fifty years old ("annum agens quinquagesimum," p. 9). Moreover, LaGalla composed an epitaph for himself in 1623, the fifty-second year of his life ("anno suae aetatis LII; MDCXXIII," Allacci, p. 23), and his death in 1624 occurred in his fifty-third year ("eius vitae fuerat quinquagesimus tertius," Allacci, p. 22). The latter records the day of LaGalla's demise as "16. Cal. Martii," which is the fifteenth day of February, not March.

[66] LaGalla, p. 21; NE, III, 347.28. Galileo's handwritten comments in his copy of LaGalla's book were printed in NE, III, at the foot of pp. 323–387 passim, and on pp. 393–399. Galileo wrote to a friend about LaGalla's book prior to 17 March 1612, more than three years before he finished his *Letter to the Grand Duchess* (NE, XI, 283.55).

[67] Galileo's assertion in the *Letter to the Grand Duchess* that there were no objections to Copernicanism may be regarded as a negative and diluted version of the statement in his preliminary formulation that Copernicus' "doctrine was later followed by everybody" (NE, V, 293.20). Both versions are equally unhistorical.

[68] Drake, p. 178; NE, V, 312.17–19.

[69] *Bullarum diplomatum et privilegiorum s. romanorum pontificum taurinensis editio* (Turin, 1857–72), VIII, 386–387.

[70] *Op. cit.*, VIII, 387.

[71] *Compendium novae rationis restituendi calendarium*, reproduced in Clavius, *Romani calendarii a Gregorio XIII. P.M. restituti explicatio* (Rome, 1603), pp. 3–12, and in Clavius, *Opera mathematica* (Mainz, 1611–12), V, 3–12. Clavius' *Explicatio*, which was "published by order of Pope Clement VIII," may be grouped with the command performances discussed in nn. 24–26, above.

pointed out that Giglio accepted the length of the year given by the Alfonsine Tables. According to these Tables, which had been sponsored by King Alfonso X of Castile in the thirteenth century, the length of the (tropical) year was constant. But Copernicus knew that this length varied.[72] Giglio decided against Copernicus and in favor of the medieval Tables, on the ground that the Alfonsine length "is an average of the various measurements and therefore less subject to error." [73] In this basic matter of the length of the year, then, Giglio, the principal author of the reform, maintained that the calendar should not be regulated in conformity with Copernicus' doctrine.

The writers of the *Compendium* added that

> . . . if anyone thinks the Alfonsine calculations too uncertain to be trusted and prefers adhering to more recent authorities, he will surely understand that this ingenious cycle and table of epacts devised by Giglio are so arranged and disposed that they can be adapted without any trouble to the calculations of Copernicus or anybody else if the set of equations recently prepared is substituted for the one which we wrote in the margin.[74]

Like Giglio and the *Compendium*, the Gregorian calendar decided against Copernicus. Adopting the Alfonsine length of the year, it promulgated a rule requiring the omission of three leap days in four centuries. Clavius, a member of the papal commission which recommended the reform of 1582,[75] was delegated to defend the new calendar against its critics. With regard to the rejection of Copernicus, Clavius explained that "in celebrating Easter, the church ought to follow something . . . not far from the truth rather than the precise calculation of the astronomers." [76] After all, the task confronting the church in undertaking to reform the calendar was not so much the solution of a theoretical scientific question as the elimination of a pressing practical problem: the time was out of joint. And of all the astronomers, surely the last to be followed was Copernicus, whose hypotheses, said Clavius, were "uncertain, not to say absurd, conflicting with the common opinion of mankind, and rejected by all students of nature." [77] Clavius agreed, then, with Giglio and the *Compendium* that the calendar should not be regulated in conformity with Copernicus' doctrine. And in fact, despite Galileo's misstatement, the Gregorian calendar was not regulated in conformity with Copernicus' doctrine.

We have now examined one by one Galileo's five misstatements about Copernicus in the *Letter to the Grand Duchess*. Let us put them side by side to see whether they have any feature in common. According to Galileo, (1) Copernicus was a priest; (2) he was called to Rome; (3) he wrote the

[72] Michael Maestlin, *Alterum examen novi pontificialis gregoriani kalendarii* (Tübingen, 1586), p. 5: "The Prussian Tables make a distinction between the true tropical year and the mean tropical year. They maintain that the true tropical year is sometimes longer and sometimes shorter . . . as Copernicus exhaustively proves. This variation is absolutely unknown to the Alfonsine Tables." One of the chapters in Copernicus' *Commentariolus* is entitled "Equal Motion Should Be Measured Not by the Equinoxes but by the Fixed Stars"; see Edward Rosen, *Three Copernican treatises* (New York, 1939), p. 65; at pp. 114–117 and 127–131 will be found a summary of Copernicus' position by his disciple George Joachim Rheticus. Wallis' translation of the *Revolutions* (cited in n. 8, above), XVI, 622–674, may serve to remind us how wise Roger Bacon was in insisting that a translator should understand not only the language but also the content of the document he is trying to translate.

[73] *Compendium*, in Clavius, *Explicatio*, p. 4, or *Opera*, V, 3.

[74] *Compendium*, in Clavius, *Explicatio*, p. 11, or *Opera*, V, 11.

[75] Ferdinand Kaltenbrunner, Beiträge zur Geschichte der Gregorianischen Kalenderreform, *Sitzungsberichte der k. Akademie der Wissenschaften*, phil.-hist. Classe. Vienna, 1881, 97: 54.

[76] Clavius, *Novi calendarii romani apologia* (Rome, 1588), p. 38; p. 20 of the reprint in Clavius, *Opera*, V.

[77] *Op. cit.*, ed. 1588, p. 29; ed. *Opera*, p. 16. This condemnation of Copernicus by Clavius should be added to the passages cited in nn. 62–64, above.

Revolutions by order of the pope; (4) his book was never adversely criticized; (5) it was the basis of the Gregorian calendar. Actually, Copernicus was not a priest; he was not called to Rome; [78] he did not write the *Revolutions* by order of the pope; the book received much adverse criticism, particularly on the ground that it contradicted the Bible; it was not the basis of the Gregorian calendar. If we compare Galileo's five misstatements with the truth, we see that each of them tended to bind Copernicus more closely to the Roman Catholic church.

Galileo made these five misstatements at a time when he was fighting hard to prevent his church from denouncing Copernicanism as heretical. This far-seeing and loyal purpose dominates his entire *Letter to the Grand Duchess*, an eloquent (albeit unavailing) effort to save the Roman Catholic church from committing a grievous error. For, by placing Copernican treatises on the Index of Prohibited Books in Galileo's lifetime, the Roman Catholic church made a mistake, as it implicitly acknowledged when it subsequently removed those same treatises from the Index.[79]

It was not any deliberate desire to distort the facts, but rather the intensity of his struggle against bigoted and narrow-minded coreligionists that, in my opinion, led Galileo astray into these five misstatements.[80] In only one instance (LaGalla's criticism of Copernicus) have we seen any evidence that Galileo should have been conscious of making a misstatement.

Consider, for example, Copernicus' dedication of his *Revolutions* to the pope. This unilateral action by Copernicus was interpreted by Tommaso Campanella (1568–1639), the Dominican defender of Galileo, to mean that "Pope Paul III . . . to whom Copernicus dedicated the book . . . approved it" [81] and gave his "permission that the book should be printed." [82] Galileo and Campanella both knew that it was customary for Italian authors to seek prior permission for a dedication. That Copernicus did likewise was an (unhistorical) assumption made by Campanella and perhaps by Galileo too. Similar considerations probably underlie his other misstatements, which should be considered honest mistakes rather than conscious falsehoods.

[78] Galileo's misstatement that Copernicus was called to Rome for the purpose of reforming the calendar was later transformed into the equally mistaken assertion that he was called to Rome to teach mathematics there. Of the numerous repetitions of this error, only one need be cited here: Belisario Ruiz Wilches, "La obra de Nicolas Copernico," in *Nicolas Copernico* (Bogota, 1943), p. 15. For a demolition of the legend that Copernicus was a professor at the University of Rome, see Ryszard Gansiniec, "Rzymska profesura Kopernika," in *Kwartalnik historii nauki i techniki*, 1957, *2*: 471–484, with a summary in English at pp. 482–484.

[79] In the opinion of Antonio Favaro (1847–1922), unquestionably the greatest Galileo scholar of all time, the condemnation of Galileo is "if not the greatest, one of the greatest errors of the Roman Curia" (*Galileo e l'inquisizione*, Florence, 1907, p. 9).

[80] The reason for his misstatement of an astronomical constant was analyzed by Edward Rosen, Galileo on the distance between the earth and the moon, *Isis*, 1952, *43*: 344–348.

[81] Campanella, *Apologia pro Galileo* (Frankfurt, 1622), p. 9; English tr. by Grant McColley, *Smith College studies in history*, 1936–1937, *22*: 10; for the quality of McColley's translation, see Edward Rosen, *Journal of the History of Ideas*, 1957, *18*: 440–443.

[82] Campanella, p. 54; McColley, p. 71. In this context Campanella's expression "a tot theologis approbata" was (mis)translated by McColley as "the approval of all theologians." Here the familiar Latin adjective "tot" ("so many") was evidently confused by McColley with the French word "tout" ("all"). What was approved by the theologians in question? According to Campanella, "the opinion of Copernicus and Galileo was approved by so many theologians." According to McColley, Campanella's reply to certain arguments "has the approval of all theologians." Yet a few lines further on, McColley himself had Campanella say that Copernicus was "supported by the authority of concurring theologians." Obviously McColley has not "even comprehended the text he is editing," as an eminent reviewer has justly said (*Journal of Philosophy*, 1939, *36*: 157).