

Traduttore-traditore: Thomas Digges as translator and interpreter of Copernicus' cosmology in *De revolutionibus*¹

Michel-Pierre Lerner

In his opuscle published at London in 1576 under the title *A Perfit Description of the Cælestiall Orbes according to the most aunciente doctrine of the Pythagoreans, lately revived by Copernicus and by Geometricall Demonstrations approved*,² Thomas Digges (ca 1546-1595) confirms his allegiance to the Copernican doctrine of *De revolutionibus*, already proclaimed in his *Alae seu scalae mathematicae* (London, 1573).³ But here he makes a noteworthy step beyond, since he now declares that the heliocentric thesis is *philosophically* founded.⁴ According to Thomas Digges, the doctrine that Copernicus proposes in the *De revolutionibus* evades the infinite absurdities pertaining to the Ptolemaic system resting on the authority of Aristotle and accepted in the universities. By setting the Earth in motion upon itself and around the Sun, which is situated immobile at the middle of the universe, he lays a solid and true foundation from which consequences follow that are themselves true too, whereas the traditional theory, which rests on a false principle—namely having the Earth immobile at the center of the universe—cannot produce anything but errors and absurdities.⁵

1 The present essay is an enlarged version of a chapter written for the vol. I (Introduction) of Nicolas Copernic, *De revolutionibus orbium cælestium/Des révolutions des orbes célestes*, Édition critique, traduction et notes par M.-P. Lerner, A.-Ph. Segonds et J.-P. Verdet, avec la collaboration de C. Luna, I. Pantin, D. Savoie et M. Toulmonde, 3 vol., Paris, 2015. I thank Alexander Jones for the English version of my text. For the cited passages of Copernicus' *De revolutionibus*, references are given to the folios in the Nuremberg edition (1543) and to pages and lines in the vol. II (Texte et Traduction) of the French edition.

2 *A Perfit Description* by Thomas Digges was printed in the form of an *Addition* following the meteorological and astrological writing of Leonard Digges (first edition in 1555) entitled *A Prognostication everlastinge of righte good effecte [...]. Lately corrected and augmented by Thomas Digges his sonne*, London, 1576. The text of Digges father and son had seven editions between 1576 and 1605 (see J. L. Russell, "The Copernican System in Great Britain," in *Études sur l'audience de la théorie héliocentrique* [Studia Copernicana, vol. V], Wrocław, 1972, 189-239, esp. 194). A critical edition of *A Perfit Description* was published by F. R. Johnson and S. V. Larkey, "Thomas Digges, the Copernican System and the Idea of the Infinity of the Universe in 1576," *The Huntington Library Bulletin*, 5 (1934), 69-117, esp. 78-95. We refer to the 1576 London edition (reprinted 1987) and to the Johnson-Larkey edition.

3 *Alae seu scalae Mathematicae, quibus visibilibus remotissima Cælorum Theatra conscendi, et planetarum omnia itinera novis et inauditis methodis explorari [...]. Deique stupendum ostentum, Terricolis expositum, cognosci liquidissime possit*: see f. A4^v, 2A3^r, L2^v, L3^r. See S. Pumfrey, "'Your astronomers and ours differ exceedingly': the controversy over the 'new star' of 1572 in the light of a newly discovered text by Thomas Digges," *The British Journal for the History of Science*, 44 (2011), 29-60.

4 To the works of Johnson-Larkey, A. Koyré and M. A. Granada on Digges's Copernicanism cited *infra*, 000, n. 26 and 35, one may add L. Holt, "Rational Magic : Thomas Digges' Sixteenth-Century Defense of Copernicanism," *The Modern Schoolman*, 79 (2001), 23-40 ; R. S. Westman, *The Copernican Question. Prognostication, Skepticism and Celestial Order*, Berkeley-Los Angeles-London, 2011, 264-268.

5 *A Perfit Description*, f. M1^v ; 80 Johnson-Larkey. Digges directly echoes the passage of the *Praefatio authoris* (*De rev.*, f. iij^v; vol. II, 7.23-28), where Copernicus evokes the fallacious character of the hypotheses on which his predecessors relied and which can only result in erroneous consequences. Here there is a direct critique of the *regula falsi*

There is no doubt but of a true grounde truer effects may be produced then of principles that are false, and of true principles falshod or absurdities cannot be inferred. If therefore the Earth be situate immoueable in the Center of the worlde, why finde we not Theorickes uppon that grounde to produce effects as true and certaine as these of Copernicus?

One has to know, in this subject, how to spurn the testimony of the deceiving senses, to follow Copernicus, guided by the pure light of reason that God has given man to lead him towards the truth in the midst of the forest of errors.⁶ And, making a clear allusion to the thesis upheld in the *Ad lectorem*, Digges writes that one should not trust a certain author who, in his desire to protect Copernicus, pretends that he conceived the hypothesis of the Earth's mobility "onely as Mathematicall principles, fayned & not as Philosophicall truly auerred."⁷

In order that philosophers and mathematicians of the English universities can treat of so noble a question, not with "childish Inuectiues," but "with graue reasons Philosophicall and irreprouable Demonstrations Mathematicall,"⁸ Digges chooses to set before their eyes the very text of Copernicus, without however specifying that he is giving chapters 10, 7, and 8 (and a short fragment of chapter 9) of the first book of *De Revolutionibus*, nor even citing the title of the book that he is presenting to the reader,⁹ contenting himself with alluding to it by the name "new Theorick or model of the World."

One should note at the outset a peculiarity of the Diggesian presentation of Copernican heliocentrism. Whereas in *De Revolutionibus* Copernicus begins by establishing the probability of the diurnal motion of the Earth (while presenting, and then refuting, the arguments put forward by the philosophers against this thesis), and then he deals with the annual revolution, Digges chooses the inverse order of presentation for the arguments, which is the same order that Copernicus adopted in the *Commentariolus*. He begins with the description of the heliocentric order of the celestial orbs (the topic of chapter 10), and presents in second place the arguments of the philosophers against the possibility of the Earth's rotation (chapter 7) and their refutation by Copernicus (chapter 8).¹⁰

To give offhand an idea of the way in which Digges transposes the text of Copernicus while embellishing it with personal additions, a good example is offered by the English version of the

that philosophers and astronomers often privileged, and that was critiqued by Kepler with a special demonstrative vigor in his *Contra Ursum*: see N. Jardine & A.-Ph. Segonds, *La guerre des astronomes. La querelle au sujet de l'origine du système géo-héliocentrique à la fin du XVIe siècle*, 2 vol. in 3 parts, Paris, 2008: vol. II/2, 265-267 and 418-419 (note).

6 A *Perfit Description*, f. M1^v; 80 Johnson-Larkey.

7 A *Perfit Description*, f. M1^r; 79 Johnson-Larkey.

8 F. Yates, "Giordano Bruno's Conflict with Oxford," *Journal of the Warburg Institute*, II, 1938-1939, (reprinted in *Lull & Bruno. Collected Essays*, vol. I, London, Boston and Henley, 1982, 134-150, esp. 142-144), qualifies this attack by Digges upon the academic circles for being closed to Copernican cosmological innovation as characteristic of what she calls a "Freelance Elisabethan philosopher." Falling in the same category, according to F. Yates, were such pro-Copernican authors as John Dee and Thomas Harriot.

9 The reader finds this title, in abbreviated form, in a passage where Digges writes that the heliocentric order of the planets will be established demonstratively "in the residue of *Copernicus Reuolutions*" (f. N2^r; 85 Johnson-Larkey). In his copy of the *De rev.* (ed. 1566) preserved today in the Bibliothèque Publique et Universitaire de Genève (see O. Gingerich, *An Annotated Census of Copernicus' De revolutionibus (Nuremberg, 1543 and Basel, 1566)*, Leiden-Boston-Köln, 2002, 215 (Geneva 1), Digges has not underlined or annotated any of the passages that he translated in A *Perfit Description*.

10 This inversion of order does not imply that Digges knew the *Commentariolus* (a hypothesis that nothing allows one to justify from a documentary basis in any event).

first sentence of chapter 10. Where Copernicus soberly writes, “Altissimum uisibillum omnium, cælum fixarum stellarum esse, neminem uideo dubitare,” Digges introduces this idea and comments on it in the following way:¹¹

Althoughe in this most excellent and dyfficile parte of Philosophie in all times haue bin sondry opinions touching the situation and mouing of the bodies Celestiall, yet in certaine principles all Philosophers of any accompte, of al ages haue agreed and consented. First that the Orbe of the fixed starres is of al other the moste high, the fardest distante, and comprehendeth all the other spheres of wandrringe starres.

On the subject of the periods of the planets, where Copernicus writes:

Errantium uero seriem penes reuolutionum suarum magnitudinem accipere uoluisse priscos Philosophos uidemus, assumpta ratione, quod æquali celeritate delatorum quæ longius distant, tardius ferri uidentur, ut apud Euclidem in Opticis demonstratur,

Digges is more succinct in his translation, omitting the important reference to Euclid:¹²

And of these strayinge bodyes called *Planets* the old philosophers thought it a good grounde in reason that the nighest to the center shoulde swyftlyest mooue, because the circle was least and thereby the sooner ouerpassed and the farther distant the more slowelye.

In the remainder of chapter 10, which he translates on the whole quite faithfully, Digges departs from his source on certain minor points, but in a more significant way in three more specific passages.

As regards the minor points, one notes that Digges (a) gives in rounded form the values of the Ptolemaic planetary distances that Copernicus took from Proclus’s *Hypotyposis of astronomical hypotheses*; (b) omits the name *Machometus Arcensis* [= Albategnius], perhaps because he was unable to identify him; and (c) adds, in the description of the position of the Sun at the center of the universe, two verses with slight variants from the *Urania sive de stellis* of Giovanni Pontano (I 240-241).¹³ The more noteworthy divergences from the text of Copernicus are the following.

The first concerns the passage regarding the order of the orbs, which Copernicus describes beginning with the highest of all (“Prima & suprema omnium, est stellarum fixarum sphaera [...] in deductione motus terrestris assignabimus causam”). In his transposition, Digges seeks to clarify the Copernican thought while stressing the economy of supernumerary spheres that it makes possible:¹⁴

11 *De rev.* I 10, f. 7^V; vol. II, 33.5-6; *A Perfit Description*, f. N1^r; 83 Johnson-Larkey.

12 *De rev.* I 10, f. 7^V; vol. II, 33.6-10; *A Perfit Description*, f. N1^r; 83 Johnson-Larkey.

13 *A Perfit Description*, f. N3^r; 87 Johnson-Larkey; see Ioannis Ioviani Pontani, *Urania (sive De stellis)*, Florence, 1514, f. 7^r: “Ad cuius numeros et Di moueantur, et orbis / Accipiat [orbis — iant Digges] leges, præscriptaque fœdera seruet [ent — Digges]” [According to its rhythm [*scil.* the Sun’s] the gods move, and the orb of the universe receives from it its laws, and obeys the prescribed rules]. These verses are already cited by Rheticus with reference to the description of the order of the Copernican orbs; see Georgii Joachimi Rhetici *Narratio prima*, Gedani, 1540; critical edition, French translation, and commentary by H. Hugonnard-Roche and J.-P. Verdet with the collaboration of M.-P. Lerner and A. Segonds (*Studia Copernicana XX*), Wrocław-Warszawa, etc., 1982, 59. It cannot be excluded that Digges was here indebted to Rheticus.

14 *De rev.* I 10, f. 9^r; vol. II, 37.13-18; *A Perfit Description*, f. N3^r; 86-87 Johnson-Larkey. The mention of Copernicus’s name in this passage is a “confession” of Digges’s intervention with respect to the text that he is translating.

The first and highest of all is the immouable sphere of fixed starres conteininge it self and all the Rest, and therefore fyxed: as the place uniuersal of Rest, whereunto the motions and positions of all inferiour spheres are to be compared. For albeit sundry Astrologians findinge alteration in the declination and Longitude of starres, haue thought that the same also shoulde haue his motion peculiare : Yet *Copernicus* by the motions of the earth salueth al, and vtterly cutteth of the ninth and tenth spheres, whyche contrarye to all sence the maynteyners of the earthes stability haue bin compelled to imagine.

The second divergence consists of adding something concerning time that is missing from the text of Copernicus. After the passage where Copernicus evokes the “*admirandam mundi symmetriam, ac certum harmoniæ nexum motus & magnitudinis orbium*” (words that he translates faithfully), Digges adds on his own initiative the following consideration respecting time:¹⁵

The times whereby we the Inhabitauntes of the earth are directed, are constituted by the reuolutions of the earth, y^e circulation of her Centre causeth the yeare, the conuersion of her circumference maketh the naturall day, and the reuolution of the Moon produceth the monethe.

But it is chiefly the developments of the end of this chapter that introduce significant distortions in the presentation of Copernicus’s thought, a reflection of Digges’s wholly personal conception regarding the status of the Earth inhabited by mankind—which he characterizes systematically as *mortall world or Globe of Mortalitie, because it is the peculiare Empire of Death*¹⁶—and the nature of the supreme heavens, which are to contain both the stars and the angelic creatures. Thus, after having noted the tininess of the great orb relative to the immensity of the universe which man cannot ever sufficiently admire—an echo of the conclusion of Copernicus’s chapter 10 (“*Tanta nimirum est diuina hæc Optimi Maximi fabrica*”)—, Digges adds in his own right the following long elaboration:¹⁷

we may easily consider what litle portion of gods frame, our Elementare corruptible worlde is, but neuer sufficiently be able to admire the immensity of the Rest. Especially of that fixed Orbe garnished with lightes innumerable and reachinge vp in *Sphæricall altitude* without ende. Of whiche lightes Celestiall it is to bee thoughte that we onely behoulde sutch as are in the inferioure partes of the same Orbe, and as they are hygher, so seeme they of lesse and lesser quantity, euen tyll our sighte beinge not able farder to reache or conceyue, the greatest part rest by reason of their wonderfull distance inuisible unto vs. And this may wel be thought of vs to be the gloriouse court of y^e great god, whose vnsercheable worcks iuuisable we may partly by these his visible coniecture, to whose infinit power and maiesty such an infinit place surmountinge all other both in quantity and quality only is conueniente.

Where does the thesis come from according to which the orb of the fixed stars extends infinitely “in *Sphæricall altitude*”?¹⁸ It did not escape Digges that, in chapter 8 of the first book, of which he gives a partial translation further down, Copernicus advances the hypothesis that the heavens

15 *De rev.* I 10, f. 10^r; vol. II, 39.1-2; *A Perfit Description*, N3^v; 87 Johnson-Larkey.

16 *A Perfit Description*, f. M1^r, M2^r, N3^r; 79, 80, 87 Johnson-Larkey.

17 *De rev.* I 10, f. 10^r; vol. II, 39.23; *A Perfit Description*, f. N4^r; 88-89 Johnson-Larkey.

18 This assertion is explicitly formulated in the caption, cited below, that accompanies the heliocentric diagram placed at the front of *A Perfit Description* (f. 43).

could be infinite and limited only by its interior concavity.¹⁹ But whereas Copernicus holds back from making a formal settlement of the sense in which the universe is finite or infinite, saying that he is leaving this debate to the philosophers, Digges takes a stand in favor of infinity as a philosopher, but also as a theologian, as the caption of the diagram that portrays the higher region of the universe suggests:²⁰

This orbe of starres fixed infinitely up extendeth hit self in altitude sphericallye, and therefore immovable. The pallace of foelicitye garnished with perpetuall shininge glorious lightes innumerable farr excellenge our sonne both in quantitye and qualitye,

and he declares that this same heavens in which are scattered stars larger and more luminous than the Sun that lights the Earth is also:²¹

The very court of coelestiall angelles devoyd of greefe and replenished with perfite endlesse joye. The habitacle for the elect.²²

It follows from this curious description of the “content” of the orb of fixed stars that the latter is, for Thomas Digges, at once the astronomical heavens of the fixed stars and the empyrean heaven (though the term is not used) endowed by the theologians to the angels and the elect. This conception came close to that of Marcellus Palingenius (ca 1500-ca 1543), author of the famous *Zodiacus vitae*²³ whom Digges cites in the *Perfit Description* by the name of “Stellified Poet,” and also “Christian Poet.”²⁴ But Digges’s conception is more complex than that of Palingenius. For the latter, only the empyrean heaven, being of “spiritual” nature, is infinite in extent, thus expressing the all powerfulness of God who could not limit himself to producing a finite universe.²⁵ For Digges, by way of contrast, the infinity is recognizable in the heavens of the fixed stars, the astronomical heavens, though without belonging uniquely to it as such, inasmuch as this infinity is also, inseparably, an attribute of the “spiritual” heaven where the saints and angels of God also dwell. In this sense, though for Digges the sphere of fixed stars vanishes in its classical configuration—whereas it is preserved in Palingenius—the infinite “orb” in which it loses itself remains fundamentally heterogeneous in relation to the universe where the planets have their

19 *De rev.* I 8, f. 5^v; vol. II, 28.24-25: “si cælum fuerit infinitum, & interiori tantummodo finitum concauitate [...]” Digges translates this as follows: “if [...] the Haeuen were indeede infinite vpwarde, and only fynyte downwarde in respecte of his spericall concauitye” (*A Perfit Description*, f. 01^v; 91 Johnson-Larkey).

20 *A Perfit Description*, f. 43.

21 *Ibid.*

22 In the *Prognostication everlastingue*, Leonard Digges (*supra*, n. 1) proposes in two passages of his text (f. 4^v et 16^r) the geocentric *systema mundi* involving ten astronomical heavens, surrounded in the classical way by the empyrean heaven, labeled thus: “Here the learned do appoynte the abitacle of God and all the electe.” According to Digges *père*, the elect do not share their realm with the stars, which remain confined to the *Sterrie firmament* that revolves below the starless crystalline heaven.

23 See the critical edition of the *Zodiacus vitae*, edited, translated, and annotated by J. Chomarat, Genève, 1996. On Marcellus Palingenius, see the notice “Manzoli, Pier Angelo,” in *Dizionario Biografico degli Italiani*, Roma, 1960 —, vol. 69 (2007), 293-297 [M. Palumbo].

24 *A Perfit Description*, f. M1^v-M2^r; 80 Johnson-Larkey.

25 See J. Chomarat, “La création du monde selon le poète Palingène,” *Bulletin de l’Association Guillaume Budé*, 4 (1988), 352-363; see also F. Bacchelli, “Palingenio e la crisi dell’aristotelismo,” in *Sciences et religions. De Copernic à Galilée (1540-1610)* [Actes du Colloque international organisé par l’École française de Rome, 12-14 décembre 1996], Rome, 1999, 357-374.

motions, and still more in relation to the “globe of mortality” that is our Earth.²⁶ As one can see, one is truly very far from the spirit of Copernicus—though his disciple Rheticus, in the writing (unpublished during his lifetime) in which he defends heliocentrism *more theologico*, could “justify” the immobility of the heavens of the fixed stars (but not its infinity) by the fact that Scripture and certain theologians placed there the abode of God:²⁷

[...] since Scripture [*Isaiah*, 66, 1] calls the heaven God’s seat, and the earth His footstool, we may conceive the heaven as being immobile and subject to no disquiet, as the noblest part of created nature.

With the English adaptation of chapters 7 and 8 of Book 1, devoted to defending the possibility of the proper rotation of the terrestrial globe, Digges returns to a greater faithfulness to the text of Copernicus. His declared purpose is to give his reader:²⁸

a taste of the reasons philosophicall alleged for the earthes stabilitye, and their solutions, that sutch as are not able with *Geometricall* eyes to beehoulde the secrete perfection of *Copernicus Theoricke*, maye yet by these familiar, naturall reasons be induced to serche farther, and not rashly to condempne for phantasticall, so auncient doctrine reuiued, and by *Copernicus* so demonstratiuely approued.

The title of chapter 7 develops somewhat Copernicus’s briefer title (“Cur antiqui arbitrati sint terram in medio mundi quiescere tanquam centrum”) in the following way: “What reasons moued Aristotle and others that folluued him to thincke the earth to rest immoueable as a Centre to the whole world.”²⁹ If, as has been said, the English author is here closely following the Latin text, nevertheless a point of translation deserves to be brought out: it concerns the passage where Copernicus borrows from Ptolemy the critique according to which the extreme speed of the Earth’s proper rotation would have the effect of breaking it up and making it fall out of the heavens (“& iam dudum, inquit [*scil.* Ptolemaeus], dissipata terra caelum ipsum (quod admodum ridiculum est) excidisset”). The verb *excidisset* has manifestly posed a problem of understanding for Digges—others after him have met with the same difficulty—who has translated the passage in question thus: “And longe ere this the Earthe beinge dissolued in peeces should haue been scattered through y^e heauens, which were a mockery to thincke of.”³⁰ Here, the idea of “departure” from the heavens that is present in Ptolemy—which should result in a rectilinear fall towards the bottom of the terrestrial globe, and not, as Copernicus makes him say, a violent

26 On the conceptions of Palingenius and of Digges, see A. Koyré, *Du monde clos à l’univers infini*, cit., 23-29 and 39-43, and M. A. Granada, “Bruno, Digges, Palingenio: omogeneità ed eterogeneità nella concezione dell’universo infinito,” *Rivista di storia della filosofia*, 47 (1992), 47-73.

27 See *Cujusdam anonymi Epistola de terrae motu*, Ultrajecti, 1651. This anonymous writing, published in 1651 by Johannes van Waesberge, printer at Utrecht, was attributed to Rheticus by R. Hooykaas in 1984 and published with an English translation in *Georg Joachim Rheticus’ treatise on Holy Scripture and the motion of the earth, with translation, annotations, commentary and additional chapters on Ramus-Rheticus and the development of the problem before 1650*, Amsterdam, 1984; for the cited passage, see 17: “Cum igitur Scriptura vocet coelum, sedem DEI et terram scabellum pedum suorum [*Is.* 66, 1], poterimus coelum intelligere immobile, et nulli inquietudini subjectum, tanquam nobilissimam naturae conditae partem” (English transl., *ibid.*, 73).

28 *A Perfit Description*, f. N4^r; 89 Johnson-Larkey.

29 *De rev.* I 7, f. 5^r; vol. II, 26.15-16; *A Perfit Description*, f. N4^r; 89 Johnson-Larkey.

30 *De rev.* I 7, f. 5^{r-v}; vol. II, 27.18-19; *A Perfit Description*, f. N4^v; 90 Johnson-Larkey.

circular motion—is missing.³¹

The translation of chapter 8 too is faithful in general, starting with its title: “The Solution of these Reasons with their insufficiencye.”³² Digges does not abstain, nevertheless, where he judges it necessary, from clarifying Copernicus’s thought, or from outright adding an argument to reinforce the latter’s reasoning. We will cite two significant instances. The important passage where Copernicus declares: “Siue igitur finitus sit mundus, siue infinitus, disputationi physiologorum dimittamus: hoc certum habentes, quod terra uerticibus conclusa superficie globosa terminatur,” is elucidated in the following manner by Digges:³³

But whether the worlde haue his boundes or bee in deede infinite and without boundes, let vs leaue that to be discussed of Philosophers, sure we are y^t the Earthe is not infinite but hath a circumference lymitted, seinge therefore all Philosophers consent that lymitted bodyes maye haue Motion, and infinyte cannot haue anye.

Digges’s other notable intervention consists in the addition to Copernicus’s text of an “experience” designed to reinforce his argument, according to which, down here, there is no pure rectilinear movement, but one is always dealing with a mixture of rectilinear and circular. Thus the sentence: “Cadentium uero & ascendentium duplicem esse motum fateamur oportet mundi comparatione, & omnino compositum ex recto & circulari,” faithfully translated as: “And for thinges ascendinge and descendinge in respect of the worlde we must confesse them to haue a mixt motion of right & circular,” is accompanied by a brief commentary concerning the experience of the senses which deceive us on this point (“albeit it seeme to vs right & streight”), and followed by an example intended to confirm, by reasoning, the truth of the thesis:³⁴

No otherwise then if in a shippe vnder sayle a man should softly let a plummet downe from the toppe alonge by the maste euen to the decke: This plummet passing alwayes by the streight maste, seemeth also too fall in a righte line, but beinge by discours of reason wayed his Motion is found mixt of right and circular.

This addition of Digges’s deserves to be highlighted in two respects. First, because it extends in a certain manner the Virgilian comparison of the boat leaving the port that Copernicus cites,³⁵ adding to it the experience of a mass of lead falling in a straight line from the top of the mast to its foot on a ship in motion. Second, because this experience (here presented as imaginary: “if ... a man should let”) will recur in 1584 in the *Cena de le Ceneri* of Giordano Bruno, whose direct source very likely was Digges, as Johnson and Larkey first suggested, and as A. Koyré also thinks.³⁶

A final significant intervention by Digges before the end of chapter 8 should be mentioned. Where Copernicus soberly shows that, since the planets approach and recede from the Earth,

31 For analysis of this passage of the *De rev.* I 7, f. 5^r; vol. II, 27.12-21, see Nicolas Copernic, *De revolutionibus orbium caelestium* (cit n. 1), vol. III, 98-101.

32 *De rev.* I 8, f. 5^v; vol. II, 27.25; *A Perfit Description*, f. O1^r; 89 Johnson-Larkey.

33 *De rev.* I 8, f. 6^r; vol. II, 29.3-5; *A Perfit Description*, f. O1^v; 91 Johnson-Larkey.

34 *De rev.* I 8, f. 6^r; vol. II, 30.5-6; *A Perfit Description*, f. O2^r; 92-93 Johnson-Larkey.

35 *De rev.* I 8, f. 6^r; vol. II, 29.10-11: “Prouehimur portu, terræque urbesque recedunt” (see Virgil, *Aeneid*, III 72).

36 G. Bruno, *La Cena de le Ceneri* (s. l., 1584), third dialogue, ed. G. Aquilecchia, French translation Y. Hersant, Paris 1994 (OC II), 182-184 and n. 73; *The Ash Wednesday Supper: La cena de le ceneri*, transl. and ed. E. A. Gosselin-L. Lerner, New York, 1977, 162-164. See F. R. Johnson-S. V. Larkey, “Thomas Digges, the Copernican System,” cit., 99; A. Koyré, *Études d’histoire de la pensée scientifique*, Paris, 1973, 327-328.

they cannot have the latter as the unique center of their movements, Digges introduces considerations concerning gravity, which he borrows from the beginning of chapter 9, before resuming the final lines of the preceding chapter:³⁷

Seinge therefore that these Orbes haue seuerall Centres, it may be doubted whether the Centre of this earthly Grauity be also the Centre of the worlde. For Grauity is nothinge els but a certaine procliuitie or naturall couetinge of partes to be coupled with the whole, whiche by diuine prouidence of the Creator of al is giuen & impressed into the parts, y^t they should restore themselues onto their vnity and integritie concurringe in sphericall fourme, which kinde of propriety or affection it is likelie also that the Moone and other glorious bodyes wante not to knit & combine their partes together, and to mainteyne them in their round shape, which bodies notwithstandinge are by sundrye motions, sundrye wayes conueighed.

After having faithfully repeated Copernicus's conclusion at the end of chapter 8 on the "probable" character of the Earth's mobility, Digges again adds on his own initiative the following commentary:³⁸

So if it bee Mathematically considered and wyth Geometricall Mensurations euery part of euery *Theoricke* examined : the discreet Student shall fynde that *Copernicus* not without greate reason did propone this gronde of the Earthes Mobility.

After his exposition of the Copernican ideas relating to the mobility of the Earth, Digges maintains that, for anyone who engages in a "technical" comparative examination of the models of the geocentric and heliocentric universes concurrently, the choice can only fall upon Copernicus, whose superiority he believes he has demonstrated from the point of view of natural philosophy. However, he seems to have had the goal of strengthening his pro-Copernican argumentation in a work specially consecrated to *De Revolutionibus*, which would have had the title: *Commentaries upon the Reuolutions of Copernicus, by euidente Demonstrations grounded upon late Obseruations, to ratifye and confirme hys Theorikes and Hypothesis, wherein also Demonstratiuelie shall be discussed, whether it bee possible upon the vulgare Thesis of the Earthes Stabilitie, to delyuer any true Theoricke voyde of such irregular Motions, and other absurdities, as repugne the whole Principles of Philosophie naturall, and apparant grounds of common Reason.*³⁹ But this work would never see the light of day.

Conclusion

Consisting essentially of an English paraphrase of certain passages of Book 1 of Copernicus, *A Perfit Description of the Cælestiall Orbes* has the interest of presenting for the first time in public in a vernacular language the major outlines of the new cosmology.⁴⁰ As we have seen, Digges in

37 *A Perfit Description*, f. 03^r ; 94 Johnson-Larkey. For the passage concerning gravity in Copernicus see *De rev.* I 9, f. 7^r; vol. II, 32.10-18, and commentary, vol. III, 117-119.

38 *De rev.* I 8, f. 7^r; vol. II, 31.26-32.1 : "Vides ergo quod ex his omnibus probabilior sit mobilitas terræ, quam eius quies"; *A Perfit Description*, f. 03^r ; 94-95 Johnson-Larkey.

39 The work was announced in *An Arithmeticall Militare Treatise, named Stratiticos* [...], London, 1579, f. aii[i]j^r, in a list of books "to be published."

40 Nicolas Raimier Ursus (1551-1600) was responsible for the first quasi-complete German translation of the *De revolutionibus*. Completed in 1586-1587, this version in "frühhochneudeutsch" of Copernicus's book remained unpublished until the beginning of the 21st century: see *Die erste deutsche Überstetzung in der Grazer Handschrift. Kritische Edition*, bearbeitet von A. Kühne und J. Hamel, unter Mitarbeit von U. Lück, Berlin, 2007 [= Nicolaus

places translates Copernicus's Latin with fidelity, but he often indulges in paraphrase, adding not only words but also ideas of his own invention, without making it clear that a personal intervention is involved, so that his reader has at his disposal a Copernican doctrine that is in part faithful, and in part "interpreted" in a sense that is sometimes quite special.

Was this *sui generis* version of Copernicanism capable of contributing to the making of favorable conditions for the adoption of heliocentrism by the mathematicians and philosophers of the English universities? Contrary to what F. Yates believes,⁴¹ the significant number of reeditions of the *Perfit Description* between 1576 and 1605 cannot stand as a cogent index of the success of the new astronomy presented by Thomas Digges, inasmuch as his opusculum and the *Prognostication everlasting* of his father Leonard contain diverse elements of practical mathematics that could have held the interest of a public more diverse than that of the astronomers and philosophers of nature. In fact, we do not seem to find a contemporary reaction from the English academic circles to the Diggesian version of the Copernican cosmology.⁴² But this silence is perhaps itself a response to the question that we are asking. For if the advantages of Copernicus's system as they are presented in *A Perfit Description* could at a pinch be discerned, even if not accepted, by a specialist in the science of the stars, it is clearly more doubtful whether a philosopher⁴³—and *a fortiori* a theologian, whether Protestant or Catholic⁴⁴—would have accepted the "heterodox" vision presented by Thomas Digges of a stellar universe of infinite extent where stars and angels cohabit in a kingdom washed in light and beatitude.⁴⁵

Copernicus Gesamtausgabe im Auftrag der Kommission für die Copernicus-Gesamtausgabe herausgegeben von H. M. Nobis und M. Folkerts, vol. III/3]. For an analysis of some particularities of Ursus' translation in German, see Nicolas Copernic, *De revolutionibus orbium cælestium* (cit. n. 1), vol. I, 618-637.

41 "Giordano Bruno's Conflict with Oxford" (cit. n. 7), 143.

42 M. Feingold, *The Mathematicians' Apprenticeship. Science, universities and society in England, 1560-1640*, Cambridge, 1984, is silent on this point.

43 Some historians have asked whether the conception of an infinite universe defended by Nicholas Hill in the *Philosophia Epicurea, Democritiana, Theophrastica proposita simpliciter, non edocta*, Paris, 1601 (2^d ed. Geneva, 1619) could have been influenced by the Diggesian conception, but the prevailing view is that Giordano Bruno and/or William Gilbert would be the best candidates: see S. Ricci, *La fortuna del pensiero di Giordano Bruno 1600-1750*, Florence, 1980, 56-63.

44 One among the ideas that earned the "Stellified Poet" Marcellus Palingenius condemnation by the Roman Inquisition as a heretic after his death was certainly the conception of an infinite universe: see C. Moreschini, "La perfidia di Marcello Palingenio Stellato," *Bruniana & Campanelliana*, XIX (2013), 103-118.

45 K. A. Tredwell's attempt to connect Thomas Digges' defence of the Copernican heliocentrism with his approval of Melancthon's providential view of the heavens, and not to his supposed Calvinist tendencies, is unconvincing (see "The Melancthon Circle's English Epicycle," *Centaurus*, 48 (2006), 23-31, part. 27-29). Furthermore, nothing is more adverse to the rejection of the Empyrean by the majority of the Protestants than Digges' conception of an infinite stellar heaven being also "the habitacle for the elect": see W. G. L. Randles, *The Unmaking of the Medieval Christian Cosmos, 1500-1760*, Ashgate, 1999, 34-39, 133-136.