

Zaccaria Lilio and the shape of the earth: A brief response to Allegro's "Flat earth science"

Abstract

This is a response to James J. Allegro's article "The bottom of the universe: Flat earth science in the Age of Encounter," published in Volume 55, Number 1, of this journal. Against the solid consensus of modern scholars, Allegro contends that the decades around 1500 saw a resurgence of popular and learned doubts about the existence of a southern hemisphere and the concept of a spherical earth more generally. It can be shown that a substantial part of Allegro's argument rests on an erroneous reading of his main textual witness, Zaccaria Lilio's *Contra Antipodes* (1496), and on a failure adequately to place this source in the context of the cosmographical debate of the late-fifteenth and early-sixteenth centuries. Once this context is taken into account, the notion that Lilio was a flat-earthier falls flat.

Keywords

Antipodes, cosmography, flat earth, Age of Discovery, Columbus, 1492, Zaccaria Lilio

European texts on cosmography, cartography, astronomy, and natural philosophy from the late-fifteenth and early-sixteenth century bear witness to a quiet cosmographical revolution, which involved the exchange of one dominant view of the overall shape and distribution of earth and water in the sub-lunar sphere with another. The view that came to be abandoned had been developed by scholastic writers of the thirteenth and fourteenth centuries in an effort to reconcile Aristotelian cosmology with observable reality. It drew a sharp distinction between the sphere of earth and the larger sphere of water, which in its original state had completely encased the former. The existence of dry land was possible only because the position of the earth-sphere was eccentric relative to the water-sphere, enabling one side of the earth-sphere to emerge, while the opposite side was necessarily covered by water. As the exploration of more remote regions of the globe progressed during the decades around 1500, the newly gained insights as to the extent and distribution of dry land moved scholars to abandon the two-sphere model in favor of a combined sphere of earth and water – the terraqueous globe –, which had already been a minority position for most of the 1400s and underpinned Columbus’s attempt to reach India by sailing West. This process of theory change at the dawn of the ‘Age of Discovery’ has been described in some detail by scholars such as Pierre Duhem, William G. L. Randles, and especially by Klaus A. Vogel, whose 1995-dissertation *Sphaera terrae* remains an invaluable guide to the cosmographical opinions expressed in medieval and Renaissance sources.¹

A failure to engage with this body of literature is among the more visible flaws of a recent essay by James J. Allegro, who seeks to convince us of a very different story from the one just outlined.² According to Allegro, sources from the decades around 1500 reveal that the notion of a spherical earth was subject to serious doubts that had been fostered by biblical and patristic authority as well as by rigidly empiricist or ‘antirealist’ attitudes to

cosmographic theory-building. His principal witness for this claim is a brief treatise by the Italian cathedral canon Zaccaria Lilio, entitled *Contra Antipodes*. In Allegro's portrayal, Lilio's obscure work played a relatively important role in the cosmographical debate of his time, at least in so far as it offered "a lettered version of a form of spherical earth criticism in poetry, drama, and other texts that cut across social barriers to inform popular and educated readers alike" (p. 84). The present article is meant to offer a brief critique of the key premise behind this far-reaching conclusion, namely that Zaccaria Lilio opposed the spherical-earth model. As I shall argue in what follows, this premise suggests itself only if central passages in Lilio's text are misconstrued and read outside their proper cosmographical context.

The first thing to note about Lilio's *Contra Antipodes* is that its chief purpose was not to discuss the physical configuration of the earth, but the existence of a specific group or race of people whose existence had been postulated in antiquity. The *Antipodes* mentioned in the title of Lilio's little work were thus named because they supposedly lived in the southern hemisphere, in a quadrant opposite to the known *orbis terrarum* (comprising Europe, Asia, and Africa), such that their feet were positioned against those inhabiting the latter. From late Roman sources such as Macrobius and Martianus Capella, it was known that some had argued for the existence of the Antipodes based on their assumption that land and water were distributed symmetrically across the earth's four quadrants. Hence, each quadrant was endowed with a major inhabited landmass akin to the *orbis terrarum*. Since communication between these four large landmasses was held to be practically impossible, the seemingly innocuous concept of the Antipodes posed a challenge to Christian theology, in particular the belief that mankind was united in stemming from the seed of Adam, being subjected to original sin, and destined to receive the good news of the Gospels before the end of days. While the ancient Christian writer Lactantius (*Divine Institutes* 3.24) went as far as denying the earth's sphericity, which eliminated the Antipodes in one fell swoop, St Augustine (*On*

the City of God 16.9) took a more nuanced approach and argued that even if the earth was completely spherical and there were both a northern and a southern hemisphere, it did not follow that the southern hemisphere was inhabited like the northern one.³

Augustine's denial of Antipodes had defined Christian orthodoxy for most of the Latin Middle Ages, but by the second half of the fifteenth century the increasing geographic radius swept out by Portuguese explorers along the African coastline had urged a re-evaluation of these traditional questions. Enter Zaccaria Lilio, who explicitly based his polemic against the Antipodes on the precedent set by Lactantius and Augustine. Following in the footsteps of these patristic authors, Lilio's *Contra Antipodes* affirmed that there were many arguments that could show "that there are no Antipodes and that no part of the earth is inhabited except for the one that we inhabit between the north [regions] and the equatorial circle."⁴ Lilio's strategy in supporting this conclusion was historical in orientation and compilatory in nature. Most of his treatise consists in long lists, drawn from classical sources and made up of famous voyagers and voyages as well as the monstrous nations and islands found in the remote parts of the *orbis terrarum*. Allegro claims that Lilio sifted this material "for conclusive evidence of the earth's shape" (p. 67), but this is not how the author himself framed his intellectual task. What was at stake according to Lilio was not the shape of the earth, but the types of people that could be found on its surface. His reading of the Bible and the Latin and (translated) Greek classics had convinced him that the world was certainly full of wonders, yet no one had ever credibly seen Antipodes. Hence, their existence could be safely denied. The gist of this argument is contained in the following passage:

This is the extent to which we have moved across the *orbis terrarum* and the islands surrounding it. We have sailed the Ocean, written about the wondrous shapes of the [monstrous] races and the different customs, appearances, and abilities of men, and yet nowhere did we hit upon the region of the Antipodes. On the authority of

Macrobius, however, [we know that] the inhabitants of the downward-sloping southern region are not Antipodes, as some wanted to have it, but stand obliquely to us.⁵

Lilio here makes an important distinction. Drawing on Macrobius's *Commentary on the Dream of Scipio* (2.5.31–36), he admits that there may be people at or even south of the equator, but they do not count as Antipodes, who by definition must inhabit a point diametrically opposed to the *orbis terrarum*—not just south, but in the opposite quadrant of the globe.⁶ Allegro, instead of acknowledging this point, tries to argue that the passage just cited was in some way directed against Christopher Columbus. The only internal evidence he can provide for this contention is Lilio's brief remark that the Spanish Crown was nowadays sending out ships on a daily basis "to explore new shores."⁷ If Allegro is correct, Lilio included this reference in order "to reject Columbus's claim of having reached the Indies on his 1492 voyage by tracing a southerly course along the equatorial belt" (p. 69). There are reasons to remain skeptical of this interpretation, not just because Columbus's name does not make a single appearance in *Contra Antipodes*, but also because the Genoese mariner made no assertions about "a southerly course along the equatorial belt" in any known text that Lilio may plausibly have had access to in 1496.⁸ Allegro nonetheless argues that the notion of Columbus sailing along the equator conflicted with Lilio's denial of a spherical earth, which is why he instead

offered another possible location for Columbus's landfall. He explained that, "those who dwell in parts inclining toward the south are not Antipodes," but, rather, as the fifth-century CE Roman commentator (and spherical earth advocate) Macrobius Theodosius observed, they are "sideways to us," that is, at a parallel longitudinal position to Afro-Eurasia. Lilio thus appropriated Theodosius to situate Columbus's

encounter in an Atlantic position roughly similar to [Peter] Martyr's western island chain.⁹

“Sideways to us” is Allegro’s translation of Lilio’s *obliquos nobis*, which together with the phrase *Illos vero qui australis regionis devexa sortiti sunt* was inspired by a passage in Macrobius’s *Commentary on the Dream of Scipio*.¹⁰ In the context of Macrobius’s *Commentary* the expression *obliquos* is used unambiguously to describe the Antioeci, who are separated from the inhabitants of the known *orbis terrarum* by the torrid equatorial zone. Unlike the Antipodes, the Antioeci thus inhabit the same hemisphere as those on the *orbis terrarum*, albeit south of the equator. Instead of getting distracted by Columbus or Peter Martyr d’Anghiera, neither of whom is ever alluded to in *Contra Antipodes*, it is important to notice the key argument Lilio sought to put forward in the passage under discussion. It goes as follows: in order for those living further south than Europeans to count as Antipodes, rather than just as Antioeci, the angle between the respective latitudes has to approach 180° (as opposed to just being ‘oblique’).¹¹ In denying that there were people living at or near this particular angle, in a zone diametrical to the known parts of the *orbis terrarum*, Lilio was squarely within the mainstream of learned opinion in the fifteenth century, which stated that the sphere of water covered the entire opposite hemisphere. Lilio affirms this theory by citing ancient writers such as Cicero, Strabo, Pliny, and Pomponius Mela, who all appeared to support the widely held view that the habitable earth was no more than *quaedam insula* in a vast ocean.¹² While the Mosaic account of the separation of earth and water on the third day (Genesis 1:9–10) was compatible with a flat earth, Lilio clearly signals his adherence to the scholastic understanding of this act of creation by citing the following passage, supposedly found in a *Treatise on the Sphere* by Albertus Magnus:

The water is spherical all around [*in omni sui parte rotunditatem habet*] and would envelop the surface of the earth, had it not been set in order by the authority of the one who says: “Let the waters be gathered together into one place: and let the dry land appear in their midst so that all living beings may be preserved on it.”¹³

Although it seems difficult to locate this sequence of words among Albertus Magnus’s known works, the passage neatly encapsulates the theological interpretation of the two-sphere model, as championed by late medieval expositors of Genesis such as Paul of Burgos.¹⁴ It essentially held that God had first created earth and water as two concentric spheres, but then made the water rise up and expose one part of the earth-sphere. This conception gave Lilio all the resources he needed to deny the existence of Antipodes on cosmographical grounds: if the earth protruded from the watery sphere on one side, it followed that the other, opposing side must be completely submerged. To assert the existence of Antipodes was on this account tantamount to conceiving of them as “fish in water,” as Lilio indicates with the following passage:

For given that according to the consensus of nearly all mortals the earth [*tellus*] is balanced by being suspended in the middle of the element of water, is it not close to childish delusions to imagine or believe that humans live in the waters in the manner of fish? For all Greek, Latin, and barbarian authors are in agreement that the earth is overflowed from all sides by water, except for the part that God [...] has reserved for the use of living beings.¹⁵

Allegro refers to this statement by Lilio, but instead of pointing his readers to the two-sphere model and its influence on late-fifteenth century cosmographical thought, he asserts that Lilio’s “list of authorities intimated that the earthly plane was a lonely terrestrial circle

encircled by a watery void that engulfed the universe” (p. 73). It appears that Allegro was in part misled by the seemingly provocative heading of one brief section near the beginning of Lilio’s treatise: *Quod terra non sit rotunda* – “That the earth is not round.” To a modern reader, this may indeed seem like the author is here espousing the notion of a flat earth, which in the context of the fifteenth century would have amounted to a spectacular refusal to accept established cosmographical doctrine. Yet Allegro’s discussion of this section fails to notify readers of the objections that previous scholars have voiced against such an interpretation. Jeffrey Burton Russell, in his well-known monograph *Inventing the Flat Earth*, affirmed that Lilio “does not deny the sphericity of the globe but that of the known world (he confuses *terra* as globe with *terra* as oikumene and further muddles the argument with the question of the antipodeans).”¹⁶ Allegro, despite being aware of Russell’s book,¹⁷ never addresses this argument, which, if sound, would completely undermine his own reading of *Contra Antipodes*. And it is not exclusive to Russell. The same stance is taken in the detailed discussion of Lilio’s treatise included in Klaus Vogel’s dissertation *Sphaera terrae*, which Allegro never mentions even though it speaks to many of the historical-cosmographical issues his article seeks to address.¹⁸

A closer look at Lilio’s text leaves no doubt that Russell and Vogel are correct as far as the meaning of the headline *Quod terra non sit rotunda* is concerned. The discussion that follows the headline shows that Lilio here, as elsewhere, uses the term *terra* to denote the habitable landmass,¹⁹ arguing that its recorded extent in longitude and latitude does not bear out the claim that its shape is anything resembling a full circle or sphere. He begins with Ptolemy, whose *Geography* gave the extent in longitude as 90,000 stades, but the extent in latitude only as 40,000 stades.²⁰ The other authority he cites is Pliny (*Natural history* 2.242, 245), who made “our part of the world” (*pars nostra terrarum*) 85,068 stades from east to west and 54,062 stades from north to south.²¹ Allegro misinterprets these numbers as

referring to the earth's "equatorial diameter" and "polar diameter," which on this account would have been unequal, implying a non-spherical shape of the earth. Allegro in fact claims that Lilio's "statement falsely depicted Pliny and Ptolemy as describing the earth as a rounded disk with a bulging equatorial region and deflated polar regions" (p. 73). A sober reading of the Latin text shows that it is Allegro who misrepresents Lilio, who nowhere indicates that Pliny's and Ptolemy's numbers refer to "diameters." That the numbers instead refer to the extent of the known landmass, the so-called *orbis terrarum*, is clear from the way Lilio goes on to cite Pliny's value for the complete circumference (*universum circuitum*), which was 252,000 stades (*Naturalis historia* 2.247)—a number that is conspicuously absent from Allegro's summary. This juxtaposition between *pars nostra terrarum* and *universum circuitum* in Lilio's reference to Pliny makes sense only if his intention was to argue that the *orbis terrarum*, i.e. the known habitable landmass, was neither as "circular" nor as large as to cover the entire globe. His remarks on the earth's dimensions have to be understood in light of the introductory portion of *Contra Antipodes*, where Lilio characterizes the belief in the existence of Antipodes as being predicated on the premise that the habitable earth, *terra*, is "round in the manner of a ball" (*terram in modum pilae rotundam asserant*), from which it follows that dry land can be found in all four quadrants of the globe.²² The section entitled *Quod terra non sit rotunda* was written as a reaction to this premise, showing that the habitable landmass only covered a fraction of the whole. It should hence be clear that the argument Lilio sought to refute merely concerned the distribution of dry land and water, making it unnecessary for him to deny the overall sphericity of the sub-lunar realm. His use of the heading *Quod terra non sit rotunda* cannot suffice to support Allegro's conclusion that Lilio wanted to argue against the very existence of a southern hemisphere (p. 66).

Once the correct interpretation of Lilio's text is reinstated, the evidence Allegro presents for his overall thesis that "the spherical earth was very much a theory in need of

defending during the fifteenth century” (p. 77) looks less than compelling. As he admits himself (p. 76), sources such as the Egerton version of Mandeville’s *Travels*, whose scribe demonstrated the earth’s sphericity against “symple men of cunnyng,” may have invoked flat-earthers for simple pedagogical reasons. It is particularly difficult to follow Allegro in his interpretation of the famous miniature in MS Nantes, Bibliothèque municipale, fr. 8, fol. 163v, which accompanies a French translation of Augustine’s *City of God*. The miniature shows the position of the Antipodes on the underside of the terrestrial globe, where it is night while those on the upside experience day. Instead of acknowledging that we are dealing with a simple night-and-day contrast, Allegro asserts that the artist’s depiction of the lower hemisphere “as a small and shadowy recess obscured by a larger and brighter upper half resonated with [Lilio’s] semi-spherical earth postulate” (pp. 77–78). *Pace* Allegro, the starry night sky in the Nantes miniature should rather be taken as a subtle reminder that cosmography in Lilio’s time was not independent from astronomy and that the latter discipline relied completely on a spherical account of the universe in order to explain phenomena such as the change of day and night, the changing elevation of the north celestial pole in dependence on local latitude, or the occurrence of solar and lunar eclipses. From the vantage point of the medieval astronomer, the spherical earth was not just “a hypothesis” (p. 63), but the only model that successfully accounted for all the relevant empirical facts. The astronomical reasons why the earth, just like the surrounding water, *had* to be accepted as spherical were taught in a great number of late medieval sources, but most famously at the beginning of John of Sacrobosco’s *Liber de sphaera*, which may well be the most influential academic textbook in European history. Apart from hundreds of manuscript copies, the text is extant in more than 220 printed editions, issued between 1472 and 1650, which attest to its enduring relevance as a basic teaching tool for spherical astronomy and cosmography.²³

What was in doubt at the end of the fifteenth century was not the spherical composition of the cosmos, as expounded by Sacrobosco and many others, but the way the two lowermost spheres, of earth and water, were positioned in relation to each other. In the context of this debate, Zacharia Lilio was a traditionalist, who upheld the two-sphere conception against recent attempts to reinstate Ptolemy's notion of a combined sphere of earth and water, also known as the terraqueous globe. His stance was still tenable in the year 1496 in so far as the exploratory voyages organized by European maritime powers had not yet brought back news of a large landmass in the 'opposite' part of the world. The incipient exploration of the coastline of South America in the years 1498–1504, which is associated with names such as Christopher Columbus, Amerigo Vespucci, Pedro Alvarez Cabral, and Gonçalo Coelho, was about to change this. Allegro is hence right that Lilio adhered to a conception of the earth's physical configuration that was eventually proven wrong as a result of new empirical data (pp. 81–84). The nature of Lilio's error, however, is very different from what Allegro's essay would have us believe.

¹ Klaus A. Vogel, *Sphaera terrae—das mittelalterliche Bild der Erde und die kosmographische Revolution* (PhD thesis, University of Göttingen, 1995), <<http://webdoc.sub.gwdg.de/diss/2000/vogel/index.htm>> (last accessed 10 May 2017); Pierre Duhem, *Le système du monde: histoire des doctrines cosmologiques de Platon à Copernic*, vol. 9 (Paris: Hermann, 1958), pp. 79–323; William G. L. Randles, "Classical Models of World Geography and Their Transformation Following the Discovery of America," in Wolfgang Haase and Meyer Reinhold (eds.) *The Classical Tradition and the Americas*, vol. 1, pt. 1 (Berlin: de Gruyter, 1994), pp. 5–76. See also the recent account in David Wootton, *The Invention of Science: A New History of the Scientific Revolution* (London: Allen Lane, 2015), pp. 110–43, 610–14 (with references to further literature).

² James J. Allegro, "The Bottom of the Universe: Flat Earth Science in the Age of Encounter," *History of Science* 55 (2017): 61–85. In what follows, I shall reference passages in this article by providing the page-numbers in brackets in the main text.

³ For literature on the idea of the Antipodes and its reception, see, for example, Valerie I. J. Flint, "Monsters and the Antipodes in the Early Middle Ages and Enlightenment," *Viator* 15 (1984): 65–80; Gabriella Moretti, "The

Other World and the ‘Antipodes’: The Myth of the Unknown Countries between Antiquity and the Renaissance,” in Wolfgang Haase and Meyer Reinhold (eds.) *The Classical Tradition and the Americas*, vol. 1, pt. 1 (Berlin: de Gruyter, 1994), pp. 241–84; Alfred Hiatt, *Terra Incognita: Mapping the Antipodes before 1600* (London: British Library, 2008); Matthew Boyd Goldie, *The Idea of the Antipodes: Place, People, and Voices* (New York: Routledge, 2010); Alfred Hiatt, “Terra Australis and the Idea of the Antipodes,” in Anne M. Scott, Alfred Hiatt, Claire McIlroy, and Christopher Wortham (eds.) *European Perceptions of ‘Terra Australis’* (London: Routledge, 2011), pp. 9–43; Patrick Gautier Dalché, “Guillaume de Conches, le modèle macrobien de la sphère et les antipodes: antécédents et influence immédiate,” in Barbara Obrist and Irène Caiazza (eds.) *Guillaume de Conches: philosophie et science au XII^e siècle* (Florence: SISMEL, 2011), pp. 219–51; Pablo de Felipe, “The Antipodes and Science-Faith Relations: The Rise, Fall and Vindication of Augustine,” in Karla Pollmann and Meredith J. Gill (eds.) *Augustine beyond the Book: Intermediality, Transmediality, and Reception* (Leiden: Brill, 2012), pp. 281–311.

⁴ Zaccaria Lilio, *Contra Antipodes*, in *In hoc volumine continentur hi libri. Primus liber De origine & laudibus scientiarum* [etc.] (Florence: Francesco Buonaccorsi and Piero Pacini, 1496), sig. e3r: “Atqui non esse Antipodes: nullamque portionem terrae habitari praeter hanc quam incolimus inter septemtrionem & aequinoctialem circulum / multis argumentis probari potest.”

⁵ *Ibid.*, sig. f3r: “Hactenus orbem terrarum lustravimus / insulasque circa terram. Oceanum navigavimus: mirabiles gentium figuras descripsimus: variosque hominum mores / habitusque virosque: nec ullo loco Antipodum regionem offendimus. Illos vero qui australis regionis devexa sortiti sunt: non Antipodes / ut quidam voluerunt: sed obliquos nobis esse Macrobius auctor est.”

⁶ This was already recognized by Martin Lehmann, “Amerigo Vespucci and His Alleged Awareness of America as a Separate Land Mass,” *Imago Mundi* 65 (2013): 15–24, 20. See also Vogel, *Sphaera terrae*, p. 412.

⁷ Lilio, *Contra Antipodes*, sig. f2v: “Sed res postulare videtur: ut quo tempore navigatus sit oceanus / paucis exponam: ne quisquam novum aut inusitatum credat / quod Rex hispaniae / ut ferunt / indies ad explorandam nova littora naves mittat.”

⁸ Allegro justifies his statement by referencing Nicolás Wey Gómez, *The Tropics of Empire: Why Columbus Sailed South to the Indies* (Cambridge, MA: MIT Press, 2008), pp. 1–58, 107–58. As far as I am aware, Wey Gómez’s account makes no suggestion that Columbus actually took a “course along the equatorial belt” on his first voyage (1492–93) or that Columbus himself ever claimed to have done so.

⁹ Allegro, “The Bottom of the Universe,” p. 69.

¹⁰ See Macrobius, *Commentarii in Somnium Scipionis* 2.5.36, ed. James Willis, 2nd ed. (Stuttgart: Teubner, 1970), p. 116: “[R]estat inquirere quos transversos et quos obliquos nobis stare memoraverit, sed nec de ipsis potest esse dubitatio quin transversos nobis stare dixerit inferiorem zonae nostrae partem tenentes, *obliquos vero eos qui australis cinguli devexa sortiti sunt*” [emphasis mine]. See n. 5 above for the corresponding passage in *Contra Antipodes*.

¹¹ Lilio alludes to the necessary distinction between Antioeci and Antipodes in an earlier passage. See Lilio, *Contra Antipodes*, sig. e4r: “Quidam vero non contrariam partem terrae / sed superioris zonae devexa versus meridiem Antipodes incolere voluerunt.” Since Portuguese navigators had reached the southern tip of Africa by the late 1480s, the existence of Macrobius’s Antioeci had become an empirically verifiable fact by the time Lilio wrote *Contra Antipodes*, although it is possible that he was unaware of this.

¹² *Ibid.*, sig. f3r–v.

¹³ *Ibid.*, sig. f4r: “Albertus magnus in tractatu Sphaerae. Aqua vero in omni sui parte rotunditatem habet: & superficiem terrae velaret / nisi suo imperio ordinasset qui dixit: Congregentur aquae in locum suum / & in medio earum appereat arida: ut cuncta in ea salventur animantia.”

¹⁴ Vogel, *Sphaera terrae*, pp. 264–80.

¹⁵ Lilio, *Contra Antipodes*, sig. f3r: “Cum vero omnium fere mortalium consensu / in medio aquarum elemento suspensa tellus librari dicatur / nonne puerilium prope deliramentorum est / id opinari aut credere: ut instar piscium homines degant in aquis? Nam terram circumfusam undique aquis inter omnes convenit auctores / graecos / latinos & barbaros: praeter eam partem quam princeps ille Deus qui hunc mundum regit / ad usum animantium reservavit.”

¹⁶ Jeffrey Burton Russell, *Inventing the Flat Earth: Columbus and Modern Historians* (New York: Praeger, 1991), p. 14. See also *ibid.*, p. 83 (n. 33).

¹⁷ See Allegro, “The Bottom of the Universe,” pp. 62–63 (nn. 4, 7), 65 (n. 11).

¹⁸ Vogel, *Sphaera terrae*, pp. 406–15.

¹⁹ The use of a *terra* as shorthand for the *orbis terrarum* is also clearly indicated in Lilio, *Contra Antipodes*, sig. f3r, cited in n. 5 above, where he speaks of “islands surrounding the earth” (*insulasque circa terram*).

²⁰ Ptolemy, *Geography* (bk. 7), trans. into English by J. Lennart Berggren and Alexander Jones (Princeton, NJ: Princeton University Press, 2000), p. 110.

²¹ Lilio, *Contra Antipodes*, sigs. e3v–4r.

²² *Ibid.*, sig. e2v.

²³ See most recently Jürgen Hamel, *Studien zur "Sphaera" des Johannes de Sacrobosco* (Leipzig: Akademische Verlagsanstalt, 2014); Kathleen Crowther, Ashley Nicole McCray, Leila McNeill, Amy Rodgers, and Blair Stein, "The Book Everybody Read: Vernacular Translations of Sacrobosco's *Sphere* in the Sixteenth Century," *Journal for the History of Astronomy* 46 (2015): 4–28.