

## 9 • The Reception of Ptolemy's *Geography* (End of the Fourteenth to Beginning of the Sixteenth Century)

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The translation of Ptolemy's *Geography* in Florence at the end of the fourteenth and the beginning of the fifteenth century is often presented as an exceptional event that would radically transform the ways in which geographical space was depicted. Characteristic of a view that sees intellectual history as describing a gradual accumulative progress, this interpretation talks in terms of *before* and *after* the "rediscovery of Ptolemy." Before, *mappaemundi* were built on concepts that are described as "mythical," "non-scientific," or "influenced by Christian dogma"; after, there came a "modern" concept of space, of homogeneous and isotropic extension that did not vary according to location and could be enclosed within a network of meridians and parallels that made it possible to locate any specific place with scientifically calculated coordinates.<sup>1</sup> However, this positive view of the whole matter has not gone unchallenged. Certain historians of geographical discoveries have, in effect, claimed that the influential "errors" in Ptolemy actually prevented progress in the knowledge of the world. The ideas propounded by the *Geography*—most notably, the claim that all the earth's oceans were enclosed within a circuit of landmasses or that the Indian Ocean was landlocked—would, this argument goes, hinder rather than help the expansion of the West.

It is difficult to reconcile these two conflicting opinions. Indeed, the truth is that they are both false. The former focuses in a sole moment a process that in fact took place over an entire century and comprised various conflicting tendencies. It is often the case that this so-called Ptolemaic Revolution is seen as being generated in a single place—humanist Florence—and "progress" thereafter is identified with the gradual improvement in Ptolemaic maps.<sup>2</sup> Such a reading of the history of cartography is of only limited interest. It forgets that, rather than being a single incident in the history of mapmaking, the translation of Ptolemy and the diffusion of his work took place in an intellectual and cultural context within which complex and varied motivations were at play. The reception of the *Geography*, therefore, can be properly understood only by examining the numerous writings of various types in which it is echoed. Moreover, that ancient work comprised not only a collection of maps—with indications as

to how they were to be drawn—but also a text, most of which is in the form of a list of place-names.<sup>3</sup> The development of modern cartography has led us to overlook the importance of such lists in the constitution of geographical knowledge, to forget that they are a fundamental means of ordering facts. The reading of Ptolemy's text and the study of his maps worked together in forming a determinate conception of the structure of terrestrial space. So if one is to study the reception of the *Geography*, one cannot limit oneself to the maps, to listing the ways in which they were improved and identifying the progress made in the theory of "projection."<sup>4</sup> The work as a whole must be considered within the wider context of the intellectual trends at work in the fifteenth and sixteenth centuries.

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Abbreviations used in this chapter include: *America* for Hans Wolff, ed., *America: Das frühe Bild der Neuen Welt* (Munich: Prestel, 1992); *Cristoforo Colombo* for Guglielmo Cavallo, ed., *Cristoforo Colombo e l'apertura degli spazi: Mostra storico-cartografica*, 2 vols. (Rome: Istituto Poligrafico e Zecca dello Stato, Libreria dello Stato, 1992); *Guillaume Fillastre* for Didier Marcotte, ed., *Humanisme et culture géographique à l'époque du Concile de Constance: Autour de Guillaume Fillastre* (Turnhout: Brepols, 2002); *Regiomontanus-Studien* for Günther Hamann, ed., *Regiomontanus-Studien* (Vienna: Verlag der Österreichischen Akademie der Wissenschaften, 1980); BAV for Biblioteca Apostolica Vaticana, Vatican City; and ÖNB for Österreichische Nationalbibliothek, Vienna.

1. A recent example is Alfred W. Crosby, *The Measure of Reality: Quantification and Western Society, 1250–1600* (Cambridge: Cambridge University Press, 1997), 97–98. Many histories of cartography repeat this cliché without examining its relevance; a comprehensive list would take up several pages.

2. This thesis was first put forward in an article by Roberto Almagià, "Il primato di Firenze negli studi geografici durante i secoli XV e XVI," *Atti della Società Italiana per il Progresso delle Scienze* 18 (1929): 60–80.

3. Concerning the issue of the presence of maps in the original work by Ptolemy, see O. A. W. Dilke and eds., "The Culmination of Greek Cartography in Ptolemy," in *HC* 1:177–200, esp. 189–90.

4. Ptolemy did not give a theoretical exposé of projection; he provided empirical descriptions of how to transcribe a sphere onto a plane surface. What is more, he never spoke in terms of projection onto a cone; see Johannes Keuning, "The History of Geographical Map Projections until 1600," *Imago Mundi* 12 (1955): 1–24, esp. 10. Hence, it is doubly anachronistic to talk about his "conical projection." See J. L. Berggren, "Ptolemy's Maps of Earth and the Heavens: A New Interpretation," *Archive for History of Exact Sciences* 43 (1991–92): 133–44.

There is a similar anachronism at the basis of both the positive and the negative evaluations of the supposedly revolutionary effect of the “rediscovery” of Ptolemy. This anachronism can be found in Jacob Burckhardt’s claim that the “discovery of the world” was one of the leitmotifs of the Renaissance,<sup>5</sup> a reading backed up by an assumption found in some schools in the history of science that emphasize the primacy of “experience and experiment” over “recognized authority” and “the bookish.” Again, it should be stressed that historians of cartographic representation should not be engaged in a discussion of progress; indeed, the very notion of progress hampers them in understanding the true course of events. They should not really be interested in whether scholars of the Renaissance “discovered” the world through experience or through books. They have a more humble and more interesting task: to describe what was going through the minds of these scholars as they read the work of the Alexandrine geographer; to articulate what they saw as the purpose behind the study of such texts and maps; and finally, to judge whether the results measured up to their expectations.

A study of extant source material reveals that the history of Ptolemy’s reception during the fifteenth and sixteenth centuries was much more complex than the previously mentioned discussions lead us to imagine. The translation of the *Geography* was a major intellectual event, but it was an event with a mixed history, involving different intellectual milieus and different cultural contexts ranging over all the intellectual centers of Europe. In effect, the history of this event has yet to be written: not all the relevant information has come to light, and detailed monographs on many important aspects (for example, the varied range of interests that emerges from extant working manuscripts) have yet to become available. Indeed, such indispensable tools as critical editions of the Latin translations, as well as studies of the translations themselves, seem to be some way off. True, there is no shortage of repetitive work, but original and well-informed studies dealing with the question as a whole are rare.<sup>6</sup> As often happens when dealing with massive subjects, what we have is imposing descriptive work on the manuscripts—primarily the luxury manuscripts—whose very bulk makes it pass for some insuperable monument, an unchallenged authority whose opinions and contents are repeated ad infinitum. Indeed, scholars have never tackled the reception of Ptolemy’s *Geography* except through a discussion of luxury manuscripts or printed editions.<sup>7</sup>

Nevertheless, in recent years some scholars have approached the documents in a more original and informed way, offering subtle solutions to old problems. Milanese, for example, has focused on the question of the representation of space at the end of the Middle Ages and the beginning of the Renaissance. In work that has received

too little attention, she offers a broad outline of the reception of Ptolemy, from the humanist “discovery” of the work—motivated by purely philological interests—to the relegation of the *Geography* to a position as mere documentation of a distant world.<sup>8</sup> Milanese’s arguments are at the basis of the present study, which focuses on the early days of the reception of the *Geography*, up to the period of the new translation produced by the German humanist Willibald Pirckheimer, which was published in Strasbourg in 1525, an important date in the history of the text. This discussion neither reviews the facts presented by Fischer (which should nonetheless be brought up to date) nor explores studies of printed editions, which are now better known thanks to the works of Codazzi and Lindgren.<sup>9</sup> Moreover, words and phrases such as “tradition,” “innovation,” “knowledge inherited from the Ancients,” “medieval knowledge,” “myths,” “legends,” “fables,” “inconsistency,” “experience,” and “em-

5. Jacob Burckhardt, *The Civilization of the Renaissance in Italy*, trans. S. G. C. Middlemore, intro. Peter Gay (New York: Modern Library, 2002), 195–246.

6. The main aim of the introductions to facsimile editions of manuscripts of the *Geography* does not seem to be the advancement of scholarship; they are generally full of second-hand ideas and factual errors. Other works of this kind do not go beyond the results achieved by historians in the first half of the twentieth century. See, for example, the following four articles by Germaine Aujac: “Continuità delle teorie tolemaiche nel medioevo e nel rinascimento,” in *Cristoforo Colombo*, 1:35–64; *Claude Ptolémée, astronome, astrologue, géographe: Connaissance et représentation du monde habité* (Paris: C.T.H.S., 1993), 173–78; “La Géographie de Ptolémée: Tradition et novation,” in *La Géographie de Ptolémée*, ed. François Robichon (Arcueil: Anthèse, 1998), 8–20, esp. 16–18; and “La redécouverte de Ptolémée et de la géographie grecque au XV<sup>e</sup> siècle,” in *Terre à découvrir, terres à parcourir: Exploration et connaissance du monde XII<sup>e</sup>–XIX<sup>e</sup> siècles*, ed. Danielle Lecoq and Antoine Chambard (Paris: L’Harmattan, 1998), 54–73. See also Józef Babicz, “La Résurgence de Ptolémée,” in *Gérard Mercator cosmographe: Le temps et l’espace*, ed. Marcel Watelet (Antwerp: Fonds Mercator Paribas, 1994), 50–69.

7. Joseph Fischer, ed., *Claudii Ptolemaei Geographiae, Codex Urbinas Graecus* 82, 2 vols. in 4 (Leiden: E. J. Brill; Leipzig: O. Harrassowitz, 1932). The bulk of the work is dedicated to the description of some fifty or so manuscripts. Out of almost five hundred pages, only three (1:488–90) are dedicated to a discussion of how Ptolemy’s work was received. There are, in fact, more extant manuscripts of the *Geography*; a full census and review is yet to be drawn up.

8. Marica Milanese, *Tolomeo sostituito: Studi di storia delle conoscenze geografiche nel XVI secolo* (Milan: Unicopli, 1984), 9–21; idem, “La rinascita della geografia dell’Europa, 1350–1480,” in *Europa e Mediterraneo tra medioevo e prima età moderna: L’osservatorio italiano*, ed. Sergio Gensini (Pisa: Pacini, 1992), 35–59. No serious study of the reception of Ptolemy—or of the humanists’ approach to geography in general—can afford to ignore the work of Sebastiano Gentile, especially his edited volume *Firenze e la scoperta dell’America: Umanesimo e geografia nel ’400 Fiorentino* (Florence: Olschki, 1992), which gives a rigorous analysis of most of the extant documents. See also João Daniel L. M. Lourenço, “A descoberta dos antigos no Renascimento: O caso particular da Geografia de Ptolemeu,” *Euphrosyne* 27 (1999): 339–50.

9. Angela Codazzi, *Le edizioni quattrocentesche e cinquecentesche della “Geografia” di Tolomeo* (Milan: Goliardica, 1950), and Uta Lind-

pirical knowledge” are eschewed. It has yet to be shown that there even was such a thing as a “medieval way of describing and representing the world”; a Weberian ideal-type of this sort (the sole tenable view, in principle) has never been produced by any historian. Finally, it is clear that any history of the reception of a text offering a particular method for the representation of space cannot set out to describe all the extant maps or to examine all the problems raised by cartography in the fifteenth century and at the beginning of the sixteenth century. Rather, my aim is to use existing knowledge of those times and to lay the basis for a more in-depth study. I am not concerned with describing the contents of maps or of picking up on the “progress of rationalization”; my aim is to identify and distinguish milieus, to define modes of reading, comprehension, and interpretation. What concerns me here is a problem of cultural history.<sup>10</sup>

FROM THE TRANSLATION TO THE  
CONSTRUCTION OF A MODEL (END OF  
THE FOURTEENTH TO MIDDLE OF  
THE FIFTEENTH CENTURY)

THE ARRIVAL OF PTOLEMY'S *GEOGRAPHY*  
IN FLORENCE

When Manuel Chrysoloras arrived in Florence to teach Greek in 1397—invited there by Coluccio Salutati's circle of enthusiastic scholars of classical antiquity—Ptolemy's *Geography* was not unknown in the West.<sup>11</sup> It had been mentioned uninterruptedly from the sixth century onward, first in the works of such widely read historians as Jordanes, author of the *Getica*; then in the Carolingian commentaries on the *Marriage of Philology and Mercury*; and finally, beginning in the twelfth century, in astronomical treatises translated from Arabic. In the thirteenth and fourteenth centuries, treatises on astrology mentioned and sometimes described the book “that is titled *mappa mundi*,” and there were other, equally clear, references. Due to these mentions in dozens of manuscripts, the *Geography* was very well known by word of mouth, and the work's contents were already partially identified as comprising lists of place-names, coordinates, and maps. All that was missing in the literature was a reference to the method used in drawing the sphere on a flat surface—a method that had been of practically no interest to the Arab “intermediaries.” The reputation Ptolemy, author of the *Almagest*, enjoyed as the prince of astronomers could not have failed to underline the value of a work employing the same learned methods.

Bringing the *Geography* to Florence

There was a certain climate of expectation when Manuel Chrysoloras set to work on his translation of the *Geog-*

*raphy* in Florence sometime before 1400. Though the actual circumstances of the manuscript's arrival in Florence are unclear, two people besides Manuel Chrysoloras might have been responsible.<sup>12</sup> The first candidate is Jacopo Angeli, a young pupil of Coluccio Salutati born in the village of Scarperia near Florence.<sup>13</sup> In 1395, while in Constantinople studying Greek, Angeli made the acquaintance of Chrysoloras and, hoping to entice him to Florence as a Greek teacher, sang the praises of Salutati and the intellectual circle gathered around him. As a result of these invitations and enticements, Chrysoloras arrived in Florence at the beginning of 1397 and stayed there until 1400, when he left the city for Pavia,<sup>14</sup> accompanied on his journey westward by Angeli, who brought back with him some Greek manuscripts. After his return, Angeli continued to work on piecing together extant Greek texts; so it is possible that Angeli had a manuscript copy of the *Geography* before 1400.

Several other Florentine sources, however, name another humanist as the person who brought Ptolemy's work to the city. In two passages in his collection of biographies, the librarian Vespasiano da Bisticci credited Palla Strozzi with the deed. Vespasiano identifies Palla

gren, “Die *Geographie* des Claudius Ptolemaeus in München: Beschreibung der gedruckten Exemplare in der Bayerischen Staatsbibliothek,” *Archives Internationales d'Histoire des Sciences* 35 (1985): 148–239. On the other hand, Henry Newton Stevens, *Ptolemy's Geography: A Brief Account of All the Printed Editions Down to 1730*, 2d ed. (1908; reprinted Amsterdam: Theatrum Orbis Terrarum, 1973), and Carlos Sanz, *La Geographia de Ptolomeo, ampliada con los primeros mapas impresos de América (desde 1507): Estudio bibliográfico y crítico* (Madrid: Librería General V. Suárez, 1959), do not meet even the minimal standards of bibliographic description, nor does Remedios Contreras, “Diversas ediciones de la Cosmografía de Ptolomeo en la biblioteca de la Real Academia de la Historia,” *Boletín de la Real Academia de la Historia* 180 (1983): 245–323.

10. The bibliography on a subject that goes well beyond the history of geography and cartography to embrace many aspects of the history of ideas in the fifteenth and sixteenth centuries is obviously going to be vast and rather repetitive. What is more, some points are treated in a somewhat unquestioning manner. With regard to certain issues, I limit myself here to giving the most recent works, wherein one can find extensive bibliographies of previous publications.

11. Patrick Gautier Dalché, “Le souvenir de la *Géographie* de Ptolémée dans le monde latin médiéval (VI<sup>e</sup>–XIV<sup>e</sup> siècles),” *Euphrosyne* 27 (1999): 79–106.

12. Sebastiano Gentile submits the existing bibliography to a searching analysis in “Emanuele Crisolora e la ‘Geografia’ di Tolomeo,” in *Dotti bizantini e libri greci nell'Italia del secolo XV*, ed. Mariarosa Cortesi and Enrico V. Maltese (Naples: M. d'Avria, 1992), 291–308, esp. 293.

13. The name of this humanist occurs in various erroneous forms: Angelo, d'Angiolo, d'Angeli. For his biography, see Roberto Weiss, “Jacopo Angeli da Scarperia (c. 1360–1410–11),” in *Medioevo e Rinascimento: Studi in onore di Bruno Nardi*, 2 vols. (Florence: G. C. Sansoni, 1955), 2:801–27; reprinted in *Medieval and Humanist Greek: Collected Essays*, by Roberto Weiss (Padua: Antenore, 1977), 255–77.

14. Remigio Sabbadini, “L'ultimo ventennio della vita di Manuele Crisolora (1396–1415),” *Giornale Ligustico di Archeologia, Storia e Letteratura* 17 (1890): 321–36.

Strozzi, a scion of an illustrious patrician family, as the man who succeeded in luring the Byzantine master Chrysoloras to Italy and then brought in a number of manuscripts, thus stimulating the development of Greek studies:

There being in Florence a fine knowledge of Latin letters but not of Greek, he [Strozzi] determined that he would have more Greek [writings]; and to this end he did everything he could so that Manuel Chrysoloras, a Greek, came to Italy, paying a large part of his costs. Manuello having arrived in Italy in the above-mentioned manner thanks to Messer Palla [Strozzi], there was a lack of books; and without books one could do nothing. Messer Palla sent to Greece for infinite volumes of books, all at his own expense. He even had Ptolemy's *Cosmography* [*Geography*] with the illustrations sent from Constantinople, along with the Lives of Plutarch, the works of Plato, and an infinite number of books of other authors.<sup>15</sup>

In his biography of Alessandra de' Bardi, Vespasiano provides further details: "It was Messer Palla who was the reason that Greek Letters came to Italy, and the books with Manuele Grisolora [*sic*]; he bore most of the cost; and it was he who encouraged the production of many Greek books; at his own expense he had the Greek *Cosmography* come from Constantinople; he had the first copy done in Constantinople, with the writing and the pictures."<sup>16</sup>

So if Vespasiano is to be believed, Palla Strozzi was responsible for the arrival of Manuel Chrysoloras, and he had a complete copy of the text and maps of Ptolemy's *Geography* made in Constantinople. That the *Geography* is the first mentioned among the books Strozzi ordered should perhaps be seen as revealing the personal interests of Vespasiano himself, a librarian who was responsible for the production of a number of deluxe manuscripts sold to important personages, though the order in which the books were described may also reveal the importance Florentine humanists attached to the work.

Fischer believed that the manuscript acquired by Palla Strozzi was Urbinas Graecus 82 in the Vatican library, a work that dates from the twelfth or thirteenth century. His argument is based on a later copy of the Latin translation, a Parisian manuscript containing the text of the *Geography* presented to René d'Anjou by the Venetian nobleman Jacopo Antonio Marcello. In a letter of dedication dated 1457, Marcello outlines the circumstances behind his gift. Having learned that d'Anjou desired a "mappamundus," he discussed the matter with Nofri, son of Palla Strozzi, who was about to complete such a "mappamundus." Marcello then decided to complete the map and send it to d'Anjou with the text of the *Geography*.<sup>17</sup> According to Marcello, the "mappamundus" had been copied from "another *mappamundus*, a very ancient

one, with inscriptions in Greek letters, as if 800 years had gone by since its creation, to such an extent that certain people think it dates from the time of Ptolemy, the inventor of this technique."<sup>18</sup> Fischer argues the Greek model was Urbinas Graecus 82, and that the Latin copy thereof sent to René d'Anjou is Vat. Lat. 5698, which consists of only the maps (fig. 9.1).<sup>19</sup> Indeed, this latter manuscript is argued to be the oldest manuscript of the Latin maps copied from the *vetustissimus* Greek codex.

The components of this argument are not all equally convincing. It is probable, but not certain, that Urbinas Graecus 82 belonged to Palla Strozzi. In fact, fol. 111v bears the following note: "Seen by me, Francescho da Lucha," which can also be found, written in the same hand, on other manuscripts (of which one definitely belonged to Palla Strozzi). Having discovered this detail, Giovanni Mercati was led to conclude that all these manuscripts came from Strozzi's library and were annotated in this matter during the course of inventory taking on some occasion unknown to us.<sup>20</sup> This attribution of ownership was confirmed by Diller on the basis of an inventory of Palla Strozzi's library drawn up in 1431, and was taken to prove Fischer's claim.<sup>21</sup> Further, apparently conclusive, confirmation came from the publication of the complete will and testament of Palla Strozzi, written in his own hand. This contains the following passage:

The *Cosmographia* in Greek—that is, the picture in a map on large parchment with the sheath in black leather—I also leave to my sons, that is, Nofri and Giovanfrancesco, together with Bardo and Lorenzo my grandsons. This they must keep and not sell off for any reason because it was the very one that Manuello

15. Vespasiano da Bisticci, *Le vite*, 2 vols., ed. Aulo Greco (Florence: Nella sede dell' Istituto Nazionale di Studi sul Rinascimento, 1970–76), 2:140, and Paolo Viti, "Le vite degli Strozzi di Vespasiano da Bisticci: Introduzione e testo critico," *Atti e Memorie dell'Accademia Toscana di Scienze e Lettere la Colombaria* 49 (1984): 75–177, esp. 99–100.

16. Vespasiano, *Le vite*, 2:476.

17. BNF, Latin 17452, fol. 1v (letter of dedication); reproduction and commentary in Gentile, *Firenze*, 85–88. The complete text of the letter can be found in Henry Martin, "Sur un portrait de Jacques-Antoine Marcelle, sénateur vénitien (1453)," *Mémoires de la Société Nationale des Antiquaires de France* 59 (1900): 229–67, esp. 264–66, and see also Sebastiano Gentile, "Umanesimo e cartografia: Tolomeo nel secolo XV," in *La cartografia europea tra primo Rinascimento e fine dell'Illuminismo*, ed. Diogo Ramada Curto, Angelo Cattaneo, and André Ferland Almeida (Florence: Leo S. Olschki, 2003), 3–18, esp. 7–8.

18. Jacopo Antonio Marcello, quoted in Gentile, "Emanuele Crisolora," 293 n. 6.

19. Fischer, *Codex Urbinas Graecus* 82, 1:180–83, 213, 290–301, and 547. Fischer's analyses are often vitiated by factual errors and flighty reasoning, only a few examples of which are discussed here.

20. Fischer, *Codex Urbinas Graecus* 82, 1:195–201 and 537.

21. Aubrey Diller, "The Greek Codices of Palla Strozzi and Guarino Veronese," *Journal of the Warburg and Courtauld Institutes* 24 (1961): 313–21; reprinted in *Studies in Greek Manuscript Tradition*, by Aubrey Diller (Amsterdam: Adolf M. Hakkert, 1983), 405–13.

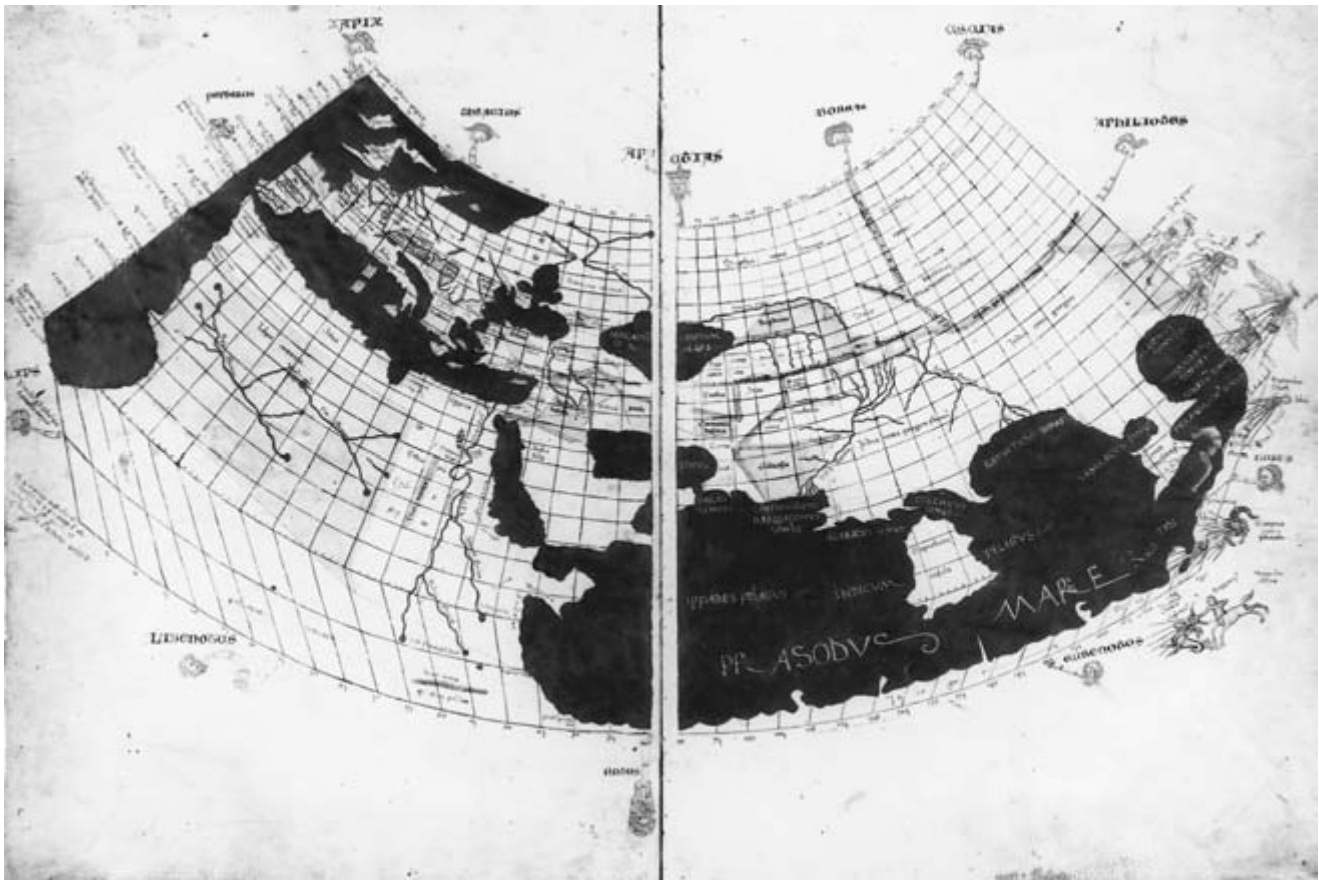


FIG. 9.1. WORLD MAP FROM A FIFTEENTH-CENTURY LATIN EDITION OF PTOLEMY'S GEOGRAPHY.

Size of the original: 57 × 84 cm. Photography © BAV (Vat. Lat. 5698, fols. 1v-2r).

Crisolora [*sic*], a Greek of Constantinople, brought with him when he was first brought to Florence in 1397 to teach Greek. This was the first in these regions, and he left this to me, and so I kept this. It was from this that came initially all those other similar maps to be found in Italy. And some of them have also gone outside Italy.<sup>22</sup>

However, the phrase Palla Strozzi uses to describe this *cosmographia* (“the picture in a map on large parchment with the sheath in black leather”) suggests that he is talking about a map rather than a codex (which it is rather difficult to imagine fitting into a leather sheath).<sup>23</sup> This doubt is strengthened when we learn that Manuel Chrysoloras did not limit himself to bringing one object from Constantinople, but also copied for Palla Strozzi something that sounds very like a map when described in Strozzi's will: “Another there is done like that from the hand of the above-mentioned Messer Manuel, the Greek. Which I again leave to my two sons and two grandsons. And it would be good—and is my wish—that it be not sold but kept. There are on it, in the hand of the above-mentioned Messer Manuel, numerous words [covering] a good part, which he took pains to do for me. It seems to

me that it should not be sold off by my sons and grandsons, but kept in the house in memory of who made it.”<sup>24</sup> If this was a codex, it would be difficult to understand what Palla Strozzi meant by “numerous words”—an expression that calls to mind the place-names on a map rather than the text of a manuscript.<sup>25</sup> What is more, the text of Marcello's own dedication, using the words “mappamundo . . . litteris grecis inscripto” (*mappamundi* . . . with Greek letters), can be read as referring only to a map of the world and not a codex. The maps that make up Vat. Lat. 5698 cannot therefore be the complement to the

22. The autograph text is reproduced and commented on in Gentile, *Firenze*, 88–90, as well as in Gentile's “Emanuele Crisolora,” 302–4. The most recent edition is that by Giuseppe Fiocco, “La biblioteca di Palla Strozzi,” in *Studi di bibliografia e di storia in onore di Tammaro de Marinis*, 4 vols. (Verona: Stamperia Valdonega, 1964), 2:289–310, esp. 306–10.

23. Weiss concludes that these are references to a map, not a book. See Roberto Weiss, “Gli inizi dello studio del greco a Firenze,” in *Medieval and Humanist Greek: Collected Essays*, by Roberto Weiss (Padua: Antenore, 1977), 227–54, esp. 248 n. 147.

24. Gentile, “Emanuele Crisolora,” 303.

25. Gentile points out these facts, but does not draw any conclusion one way or the other (“Emanuele Crisolora,” 304–5).

text of the *Geography* Marcello presented to René d'Anjou. What is more, Vat. Lat. 5698 has been dated to various periods—from the first to the second half of the fifteenth century—and its direct link with Urbinas Graecus 82 remains unclear.<sup>26</sup>

Thus Palla Strozzi's will might be referring to two different objects: either manuscripts containing texts and maps or two maps (the one brought by Manuel Chrysoloras, the other copied by him)—and perhaps left unfinished, if that is how one is to interpret the “numerous words [covering] a good part” comment in the will. The second interpretation generally fits better with the extant documents.<sup>27</sup>

Quite apart from the friendship between Manuel Chrysoloras and Palla Strozzi, the way in which Strozzi expresses himself in his will reveals the importance he attached to the first work, which, according to him, was the origin of all the copies that then spread throughout Europe. So from the very beginning, the prestige already attached to the work might well have led Vespasiano to exaggerate the role played by the aristocrat Strozzi. Such an explanation would, however, not rule out that it was Jacopo Angeli who played the important role in bringing the maps and text from Constantinople. A hard worker more than a man of brilliance, Angeli never enjoyed a particularly flattering reputation among the humanist circles of Florence. Hence it would not be surprising to discover that there were few scruples against transferring the credit he deserved to a figure whose social rank made him a much more fitting champion for the work of a king, for Ptolemy was in fact mistaken for Hellenistic Egyptian sovereigns of the same name.

### The Translation

The circumstances of the actual translation itself are no clearer.<sup>28</sup> According to Angeli's letter of dedication, Chrysoloras started out doing a translation *ad verbum*—that is, conserving the literal meaning—and maintaining the original title, *Geographia*.<sup>29</sup> There is still some indirect evidence of the creation of this work. In a 1405 letter from Viterbo to Niccolò Niccoli, Leonardo Bruni asked for a copy of the Greek text with the part already translated by Chrysoloras, because Bruni intended to carry on with the work.<sup>30</sup> Note that the request suggests that at this date the Greek text in the Roman curia—of which Bruni was the *scriptor*—did not exist. What is more, we have two early traces of the use of the Greek text (or perhaps Chrysoloras's translation) of the *Geography*. In a 1403 letter to Domenico Bandini, Coluccio Salutati answered a question his correspondent had raised with regard to the ancient name of Città di Castello, a name that—for all the renown of the city—is not mentioned by the classical authors. Salutati gives the

example of Florence, a most renowned city, which is mentioned solely by Ptolemy “in the book of his *Geography*.” He then goes on to name the maritime cities of Tuscany as they appear in a list in book 4 of the *Geography*.<sup>31</sup> The place-names as listed correspond, more or less, to those in Angeli's translation. However, that fact is not of great significance; much more important is the title that Salutati gives of the work he quotes—it is the exact translation of the Greek title, which, unlike Jacopo Angeli, Manuel Chrysoloras maintained.<sup>32</sup> This, the first direct quote from the *Geography* in the West, was followed two or three years later by another. In his “De laboribus Herculis”—a work left unfinished at his death in 1406—Salutati makes a passing reference to the correct spelling of the name of a people (the Mariandyni) to be found in

26. According to Giovanni Mercati, Vat. Lat. 5698 dates from before the middle of the fifteenth century; however, scholars of manuscript illumination claim that certain features in the decoration put the work in the second half of the century (see Gentile, “Emanuele Crisolora,” 295–97, and idem, *Firenze*, 83–84). Gentile also makes another point in favor of Fischer's theory: the dedication written by Marcello says that the text of the *Geography* was drawn up and corrected “from those copies that are found to be few among us,” which he reads as suggesting a collation of the Latin translation with the Urbinate manuscript, the origin of other copies of the work. The Paris manuscript, for its part, has marginal annotations made on the basis of a Greek text (see Gentile, *Firenze*, 86–88).

27. This is the view of Weiss in “Gli inizi,” 248.

28. The Greek codex used for the translation of the *Geography* into Latin does not derive—or just partially derives—from Urb. Gr. 82. It contains several manuscript annotations by Chrysoloras in the margins of books 1, 2, and 7, in reference to the theoretical and geometrical procedures of Ptolemy's work. See Aubrey Diller, “De Ptolemaei Geographiae codicibus editionibusque,” in *Claudii Ptolemaei Geographia edidit*, ed. C. F. A. Nobbe, reprinted with intro. by Aubrey Diller (Hildesheim: Olms, 1966), X–XV; reprinted in Aubrey Diller, *Studies in Greek Manuscript Tradition* (Amsterdam: Adolf M. Hakkert, 1983), 125–35, and Gentile, “Umanesimo e cartografia,” 11–14.

29. Jacopo Angeli, quoted in James Hankins, “Ptolemy's *Geography* in the Renaissance,” in *The Marks in the Fields: Essays in the Use of Manuscripts*, ed. Rodney G. Dennis and Elizabeth Falsey (Cambridge, Mass.: Houghton Library, distributed by Harvard University Press, 1992), 119–27, esp. 126–27, and Gentile, *Firenze*, 96–97.

30. Hans Baron, ed., *Leonardo Bruni Aretino: Humanistisch-philosophische Schriften* (Leipzig: B. G. Teubner, 1928), 104–5. Bruni would repeat his request twice in August 1406. *Leonardo Bruni Arretini epistolarum libri VIII*, 2 pts. (Florence, 1741), pt. 2, 190, and Ludwig Bertalot, “Forschungen über Leonardo Bruni Aretino,” *Archivum Romanicum* 15 (1931): 284–323; reprinted in Ludwig Bertalot, *Studien zum italienischen und deutschen Humanismus*, 2 vols., ed. Paul Oskar Kristeller (Rome: Edizioni di Storia e Letteratura, 1975), 2:375–420, esp. 415.

31. Coluccio Salutati, *Epistolario di Coluccio Salutati*, 4 vols. in 5, ed. Francesco Novati (Rome, 1891–1911), 2:624.

32. The same conclusion is reached by B. L. Ullman, “Observations on Novati's Edition of Salutati's Letters,” in *Studies in the Italian Renaissance*, by B. L. Ullman, 2d ed. (Rome: Edizioni di Storia e Letteratura, 1973), 197–237, esp. 231–32. Note that Ullman takes as reliable Vespasiano da Bisticci's claims about the role of Palla Strozzi.

Pontus Euxine, citing Ptolemy's book 5 as his source.<sup>33</sup> It could be, therefore, that Chrysoloras took his translation further than Jacopo Angeli and Leonardo Bruni would have us believe—at least as far as book 5.<sup>34</sup> However, a single place-name is far too scant a piece of evidence to decide matters one way or the other. Salutati could well have gotten the place-names he mentions from a copy of the Greek text.

The latest date for Angeli's translation can be deduced from the dedication to Pope Alexander V, who reigned from June 1409 to May 1410.<sup>35</sup> However, there are some manuscripts of the *Geography* bearing a dedication to that pope's predecessor, Gregory XII.<sup>36</sup> Fischer has argued that the translation was in fact completed in 1406, on the basis not only of this latter dedication, but also of the evidence to be gleaned from a work by Cardinal Guillaume Fillastre, who would play a key role in introducing the *Geography* into France. In his commentary on Pomponius Mela's *De situ orbis* or *De chorographia*, Fillastre compares the image of the world provided by the Roman with that found in the *Geography*, referring to what had been done by "Ptolemy in his *Cosmography* translated into Latin from Greek in Florence 1406."<sup>37</sup> But the two manuscripts of the *Geography* in Fillastre's possession—one of which is in his own hand—both bear the date 1409. Thus the date given in the commentary on Pomponius Mela was either in error or misread by a copyist.<sup>38</sup>

What we do know is that Jacopo Angeli produced his translation while he was *scriptor* at the Roman curia—perhaps at the same time as Leonardo Bruni (discussed later), who came to Rome in 1405 hoping for a post as papal secretary (a position for which he and Angeli were, in fact, rivals). Although Angeli stresses the difference between his own work and Chrysoloras's word-by-word translation, his text reveals that he was no exceptional master of Greek; there are numerous basic errors relating to theoretical matters. This fact would emerge quite quickly during the course of the fifteenth century, but a systematic critique of the translation would not come until the 1470s in the work of a German scholar, Johannes Regiomontanus. Strangely, given the (perhaps excessive) bibliography on things Ptolemaic, there has yet to be any comparative study of Angeli's translation and Regiomontanus's comments,<sup>39</sup> even though a detailed comparison of the Greek text with the various fifteenth- and sixteenth-century translations is essential for gauging how the *Geography* was understood at the time.

Palla Strozzi's will, Salutati's comments, and the hopes expressed by Leonardo Bruni all give us some measure of the interest the *Geography* aroused in Florentine humanist circles. This picture of interest fills out when we look at the reasons for the translation given in Angeli's dedication—comments that have not been given the attention they deserve. Angeli begins by recalling that certain peri-

ods of history have been graced with numerous famous scholars and philosophers, and that the age of the emperor Antoninus produced the most knowledgeable of all mathematicians, Ptolemy, who, among other things, presented the layout of the world ("orbis situm . . . exhibuit"). This point is important: Angeli immediately underscores the work's links with mathematics. He then continues with a comparison with the Latins, giving four reasons for the importance of the *Geography*. First of all, the (textual) descriptions of the Latins do not teach how to construct a figurative representation (*pictura*) that conserves the relation between each part and the whole. Here the notion of scale seems to be raised, and Angeli reveals not that such a notion was unknown in his day, but that Latin geographers did not explain how maps could be drawn to scale.<sup>40</sup> Second, these geographers explained in only the most rudimentary fashion how to locate places according to their orientation, with no indication of longitude or even of latitude.<sup>41</sup> Third, they did not show how

33. Coluccio Salutati, *De laboribus Herculis*, 2 vols., ed. B. L. Ullman (Zurich: Artemis, 1951), 2:475. In the *Geography*, the Mariandyni are mentioned in 5.1.11.

34. Gentile, "Emanuele Crisolora," 306. Gentile gives three possible theories for the origin of the Salutati quotes: the "particula" translated by Chrysoloras, the first works of Jacopo Angeli, or a partial translation requested of a student (Gentile, *Firenze*, 98).

35. As Gentile points out, the oldest dated manuscripts are dedicated to Alexander V (*Firenze*, 97).

36. Milan, Biblioteca Ambrosiana, F. 148 sup., and Florence, Biblioteca Medicea Laurenziana, Ashburnham 1021. On the latter, see Gentile, *Firenze*, 98–99.

37. Fischer read this text in the Vatican manuscript, Arch. di San Pietro H 31. Fischer, *Codex Urbinas Graecus* 82, 1:185–86. Edition by Patrick Gautier Dalché, "L'œuvre géographique du cardinal Fillastre († 1428): Représentation du monde et perception de la carte à l'aube des découvertes," *Archives d'Histoire Doctrinale et Littéraire du Moyen Âge* 59 (1992): 319–83, esp. 357; reprinted in *Guillaume Fillastre*, 293–355, esp. 330 (in the following notes, pages of the reprint are given in parentheses). As is often the case, Fischer's logic leaves a lot to be desired. In fact, the H 31 manuscript brings together two parts drawn from different origins: an undated commentary on Pomponius Mela and texts dated 1414. As the compilation belonged to Cardinal Giordano Orsini, Fischer deduces that the part containing the commentary on Pomponius Mela was copied sometime between 1405 and 1414 (Orsini having been raised to the purple on 11 June 1405).

38. Gentile, *Firenze*, 97. Giovanni Mercati had already cast some doubt on Fischer's conclusions, pointing out that in 1406 the curia was not resident in Florence; according to Mercati, the remark in the commentary to Pomponius Mela is taken from a reading of the letter of dedication, in which Jacopo speaks of reviving scholarship in Florence.

39. If one excludes the necessarily sketchy comments in Niklas Holzberg, *Willibald Pirckheimer: Griechischer Humanismus in Deutschland* (Munich: W. Fink, 1981), 323–25.

40. Or should one see this comment as revealing concern that regional maps be compatible with a world map? In 1992, this seemed a possible interpretation, but now it should probably be discarded. Gautier Dalché, "L'œuvre géographique," 324 (reprint, 298).

41. Angeli is aware of the particular difficulty involved in determining longitude—"which is an extraordinary discovery"—and aware that

to construct regional maps with proportions always in relation to the map of the world as a whole. And finally, they did not develop any technique for the transposition of a sphere onto a flat image.<sup>42</sup> It should be pointed out here that Angeli, in listing these specific characteristics, is speaking of the Latin geographers of the classical world, not those of the Middle Ages, and that he does not simply dismiss the work of such geographers. His point is to contrast different approaches: the Latins worked *more historicorum*, while Ptolemy followed mathematical procedures. The recognition of Ptolemy's scientific superiority was not the same as a claim for its absolute superiority; the Latin geographers offered information that Ptolemy did not provide.

Angeli's translation set itself the specific and explicit purpose of providing the public with the means necessary for the creation of a complete and exact image of the world.<sup>43</sup> The discussion of the difficulties raised by the translation provides us with some clues as to how Angeli actually viewed the text. There are, he says, some rather obscure comments that fall rather short of the requirements of fine style; and the subject dealt with primarily concerns celestial circles. This brings out two points that are essential if we are to correctly understand how the work was received: first, the translator sees the *Geography* as a collection of practical instructions, and second, the *Geography's* subject concerns celestial matters. This approach reveals how we should read the famous justification of the change in title from *Geographia* to *Cosmographia*. The latter term was clearly not chosen because, for all its Greek origin, it would have been more familiar to a Latin-reading public; we can see this from the fact that Bruni, Salutati, Niccoli, Poggio Bracciolini, and Cyriacus d'Ancona all continued to use the term *Geographia* even after the translation had become widespread. The more likely reason for the change lies in the way the translator—and humanist circles in general—viewed the book. Whether one focused on the similarity of content or the differences in method between the works of Latin geographers and Ptolemy's text, there is one thing that, according to Angeli, readers must not forget: Ptolemy's claims may regard terrestrial bodies (the *terrae situs*), but they are based on the celestial. The heavens provide the foundation of the work.<sup>44</sup> Here the translator's comments highlight how the reception of the *Geography* fit into a specifically Western tradition in the investigation and representation of the surface of the earth. The *Geography* was to be read by applying the concept of geographical coordinates that had been predominant in the twelfth and thirteenth centuries, in the work of Roger Bacon and his contemporaries, astronomers and astrologers: coordinates rigorously projected the influence of heavenly bodies upon the sublunary world. This approach corresponds to that in the treatises of astrology and astronomy of the previous centuries, in which the appearance and nature of

the terrestrial surface depended on astrological influences. In fact, it was principally thanks to such ideas that Ptolemy's *Geography* had first become known—albeit indirectly—long before its translation.

### The Translation of Latin Maps

Jacopo Angeli translated only the text of the *Geography*. We do not know why he did not translate more. Were the maps judged less interesting than the text? Was their translation considered more difficult? It is certainly true that it was some time before maps were produced with Latin place-names. At an unspecified time—possibly in 1412—Guarino da Verona wrote that he would make a concerted effort to get the *Geography* copied for an unidentified great lord, even if it was very difficult to find scribes for the task.<sup>45</sup> It does not seem that this copy—which must have been based on one in the pedagogue's possession—contained maps.

The only information we have on the translation of the maps comes, once again, from Vespasiano, and unfortunately without any mention of dates. In his biographies of two members of the Florentine aristocracy, the librarian underlines the essential (but not exclusive) role these figures played in bringing about a translation. Francesco di Lapacino was “among the first . . . to produce the *pittura*

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this might explain the silence of the Latins on the matter. However, he points out that they do not even give the latitudes. From the first point one definitely cannot deduce that the theory of longitudes was unknown: medieval astronomers did calculate them. See Patrick Gautier Dalché, “Connaissance et usages géographiques des coordonnées dans le Moyen Âge latin (du Vénérable Bède à Roger Bacon),” in *Science antique, science médiévale (Autour d'Avranches 235)*, ed. Louis Callebaut and O. Desbordes (Hildesheim: Olms-Weidmann, 2000), 401–36. Angeli was aware of this, as is proved by his qualification “except in a rather rough way.”

42. Hankins, “Ptolemy's *Geography*,” 125–26.

43. However, a correction should be made: Ptolemy's work is twice described as in some way having divine input: “divinitus edidit,” “divino quodam ingenio” (he edited divinely, as with divine spirit).

44. Along with Pliny—whom he defines as a *cosmographus* because of the second book of the *Natural History*—Jacopo Angeli was undoubtedly thinking of Seneca (*Quaestiones naturales*), Macrobius, Martianus Capella, and the *philosophi naturales* of medieval universities.

45. “And if for transcribing Ptolemy's Chorography or, as some call it, Cosmography, there will be a need for labor or effort, I shall devote so much concern, painstaking attention, and diligence that you will be able to understand readily that your letter in my opinion has no small authority and the aforementioned master is cherished by me with the most fervent affection and that he is loved with no ordinary love. There are also in my possession certain distinguished works, by historians and others, which I will take care to have transcribed for him if he should desire it, however scarce and expensive the services of scribes, that is copyists, are here.” The year of the letter is not given. The editor suggests 1412, on the basis of Guarino's comment about his heavy workload; the date certainly cannot be later than 1429. See Guarino Veronese, *Epistolario di Guarino Veronese*, 3 vols., ed. Remigio Sabbadini (Venice, 1915–18), 1:25 and 3:17–18. The title used clearly reflects either criticism of—or indifference to—the title chosen by Angeli.



in his own hand. He did it in Greek, with the names in Greek, and in Latin, with the names in Latin, which had not been done before in this way . . . and before him no one had managed to put it in order in the way he did."<sup>46</sup> Vespasiano adds that this "ordering" of the maps resulted in the diffusion of a large number of manuscripts. He himself, having produced a number of deluxe manuscripts, was in a good position to judge the commercial success of this undertaking. The librarian then makes almost the same comments about the second figure involved in this cartographic work: Domenico Buoninsegni, who is again credited with being one of the first to copy both the text and the maps of the *Geography*. Vespasiano emphasizes the difficulty he encountered in "setting the *pittura* in order in Latin, as they can be seen nowadays."<sup>47</sup> These passages reveal that there must already have been complete copies of the Greek manuscripts brought from Constantinople, but that the work of both Buoninsegni and di Lapacino was essential to the completion of Latin manuscripts. It would therefore be useful to identify the manuscripts that bear witness to their work and to understand the circumstances—and intentions—of undertaking the translation of the maps. This would require study of the Latin translation manuscripts at a rather more detailed level than that achieved by existing analyses.

It would seem that few of the Latin manuscripts were copied from Urbinas Graecus 82. However, one of its Greek apographs, which undoubtedly belonged to Antonio Corbelli, had much more plentiful progeny and can undoubtedly be tied in with the work of the two translators.<sup>48</sup> Certain details would also seem to show that a more or less early group of *Geography* manuscripts is very close to this model; for example, this group omits the name Cetius Mons between Noricum and Pannonia in Europe IV (fig. 9.2) (although this appears in Urbinas Graecus 82 and its possible Latin copy, Vat. Lat. 5698).<sup>49</sup> Clearly a careful comparison of the maps in these manuscripts would make it possible to draw more precise conclusions on the matter.

The description of the milieu within which the maps were translated is an easier matter. We know that the two men responsible were the associates of a figure who played a very important role in the development of humanist studies in Florence: Niccolò Niccoli. Buoninsegni and di Lapacino are also to be found in the company of other figures who played a role in the reception of the *Geography*—for example, Cosimo de' Medici (the elder), Carlo Marsuppini, Leonardo Bruni, Poggio Bracciolini, and Paolo dal Pozzo Toscanelli, to name but a few.<sup>50</sup> It was this group of humanists that gathered around Niccoli at the Santa Maria degli Angeli monastery—a place frequented by the two translators. In this context, the figure of Niccoli merits detailed study. Unlike most of the humanists of the day, he set for himself the task not of imitating the authors of classical antiquity but of providing

himself with the means to understand them; hence his interests were more those of an antiquarian with a passion for ancient inscriptions, coins, and objets d'art.<sup>51</sup> That geography might have appealed to him is clear from the coherent picture of the man that emerges from the orations pronounced at his funeral by Poggio Bracciolini and Antonio Manetti and from the biography written by Vespasiano. All three emphasize his precision of knowledge by using the same commonplace: whatever the geographical region discussed, Niccoli could talk about it better than someone who had lived there.<sup>52</sup> Vespasiano tells us that Niccoli possessed various works of cartography: a "universal" map and maps of Italy and Spain, which his biographer mentions not as an illustration of his knowledge but as adornments, along with his antiques, of his home.<sup>53</sup> Poggio praises Niccoli's taste in Greek and Roman letters, emphasizing that he knew all the *historiae* of classical antiquity by heart, as if he had lived through them himself. A similar emphasis is put on his mastery of geography: the world he knew was that of classical antiquity, that gleaned from a reading of Latin and Greek authors.<sup>54</sup> So for Niccoli, geography was a means to a better understanding of the authors admired by the humanists. It was in this spirit that he approached Ammianus Marcellinus, one of the only classical writers to cite the *Geography*, in a manuscript copy of some of his work that Poggio had unearthed at the Saxon monastery of Fulda.<sup>55</sup>

Niccoli, therefore, one of the promoters of geographical studies in Florence, was probably responsible for the

46. Vespasiano, *Le vite*, 2:375–76.

47. Vespasiano, *Le vite*, 2:406–7. He adds that, in need of money, Buoninsegni made copies of the *Geography*, which he had no difficulty in selling. Vespasiano's claims—and di Lapacino's role as a bookseller—are borne out by documents discovered by Gentile and mentioned in *Firenze*, 204.

48. Florence, Biblioteca Medicea Laurenziana, Conv. Soppr. 626.

49. BL, Harley 7182 and 7195; Milan, Biblioteca Ambrosiana, B 52 inf.; Naples, Biblioteca Oratoriana, Pil. IX, 2; Naples, Biblioteca Nazionale, V F 33; BNF, Lat. 4803 and Lat. 15184. Fischer, *Codex Urbinas Graecus 82*, 1:316–31. Harley 7182 and the Biblioteca Ambrosiana manuscript are by the same hand. On all this, see Gentile, *Firenze*, 82 and 205.

50. Gentile, *Firenze*, 100.

51. Philip A. Stadter, "Niccolò Niccoli: Winning Back the Knowledge of the Ancients," in *Vestigia: Studi in onore di Giuseppe Billanovich*, 2 vols., ed. Rino Avesani et al. (Rome: Edizioni di Storia e Letteratura, 1984), 2:747–64.

52. Gentile, *Firenze*, 102.

53. The "universale," therefore, seems more likely to have been a map of the world than a manuscript by Ptolemy: "He had a beautiful *universale*, which had all the places in the world; it had Italy, Spain—all in painting" (Vespasiano, *Le vite*, 2:240).

54. Poggio Bracciolini, *Poggii Florentini oratoris et philosophi Opera* (Basel, 1538), 273.

55. Rita Capelletto, "Niccolò Niccoli e il codice di Ammiano Vat. lat. 1873," *Bollettino del Comitato per la Preparazione dell'Edizione Nazionale dei Classici Greci e Latini*, n.s. 26 (1978): 57–84, esp. 62–69.



FIG. 9.2. EUROPA IV IN A LATIN EDITION OF THE *GEOGRAPHY*.

Size of the page: ca. 37.5 × 31.6 cm. Photography courtesy of the BL (Harley MS. 7182, fol. 65).

idea of translating the maps in the *Geography*. This is borne out by various sources. In 1423, when the library that had belonged to Lorenzo de' Medici, brother of Cosimo, went up for sale, Poggio wrote to Niccoli, asking him to buy for him "some maps from Ptolemy's

*Geography*."<sup>56</sup> In a letter of the same year, Ambrogio Traversari informed Niccoli that a certain "Pietro" had

56. Poggio to Niccoli, 6 November 1423, in Poggio Bracciolini, *Lettere a Niccolò Niccoli*, ed. Helene Harth (Florence: L. S. Olschki, 1984), 72.

told him that he had spent a lot of time correcting errors in the *Geography*. Unable to confute the claims made by this Pietro, Traversari regretted that Niccoli had not been present.<sup>57</sup> In 1431 Traversari again wrote Niccoli from Rome, telling him that he had just seen Cardinal Orsini's Greek manuscript, which was not as ancient as he had thought.<sup>58</sup> And in the opening scene of his *De infelicitate principium* Poggio described Niccoli in his library, examining a copy of the *Geography* in the company of Cosimo de' Medici and Carlo Marsupini.<sup>59</sup> All of this seems to show that the humanists of his circle considered Niccoli an expert on this subject, and that he played a role in channeling the interest in Ptolemy in the direction of philology and historical research (what we might call historical geography today) rather than toward an analysis and critique of different modes of representation.<sup>60</sup> However, a distinction between the philologists and the cartographers should not be made too sharply, given that it was Niccoli, with his concern for assistance in understanding Greek and Latin historians, who actually promoted the translation of the maps. The need to resort to the map might seem to us self-explanatory, but was actually justified as aiding comprehension of the ancients. Niccoli and his circle clearly exemplified that tradition of humanism described and practiced by Petrarch and Giovanni Boccaccio.<sup>61</sup>

#### THE CIRCLE OF NICCOLÒ NICCOLI

Ptolemy's translated work had an immediate and considerable effect in the Roman curia as well as in the more advanced humanist circles of Florence. At first glance, the comments made by Salutati and his associates seem to be inspired simply by the desire to know and understand the geography of the Roman Empire. As Cassiodorus had commented as early as the sixth century, the superiority of Ptolemy's work was due to its completeness and abundance of information, with no corner of the world omitted from its lists.<sup>62</sup> Hence the work could hardly fail to attract the humanists, who were anxious to provide themselves with a detailed reconstruction of the world as described in the classical texts they so admired.

This type of general interest was clear throughout the first half of the fifteenth century, and the mention of just a few examples will help us to understand what Italian humanists were looking for in the work. In both training and career, Giovanni Gherardi da Prato is an unusual example of someone with both scholarly and technical interests. He studied in Padua under Biagio Pelacani of Parma, receiving scientific training focused on astronomy. After studying jurisprudence, he became a judge and notary in Florence. In 1417 he played a role in the reform of the Florentine *studio* with his *Lectura Dantis*, and in 1429 also played a part in the construction of the cupola

of the city's cathedral. Having retired to Prato in 1426, he compiled "Il Paradiso degli Alberti," a collection of dialogues in which Salutati makes an appearance and where book 5 is dedicated to a discussion of the origins of Florence, the essential question being whether the Florentines were descended from the Romans. In response to a question raised by the author's teacher, Pelacani, regarding the origin of the name of the city, the text mentions that in Pliny's *Natural History* "Florentia" is written as "Fluentia," a spelling Pelacani thought was a mistake by copyists. At this point, Pelacani uses Ptolemy to confirm that this is indeed the case: "And what makes me think and judge this is so is that after him, Ptolemy, most diligent in all his works among the Greeks and Romans and singularly careful in the names and locations of his *Geoglofia* [*sic*], called it Florenza and not Fluentia. Ptolemy, having discovered that Pliny calls it Fluentia, and being that author most famous among the Latins, he would then have called it Fluentia."<sup>63</sup> This critical analysis, based on the

57. "I proceeded further to inquire what during so long a time, when he had been away from us, that fellow Pietro had done, and I learned from the man himself, who told me that by emending the visible errors of Ptolemy, which were found to be numerous in his description of the earth, the work was outstanding. I laughed silently to myself, and I wished that you had been present. For I was not well enough equipped to refute him. Nevertheless I advised him friendly to act cautiously, [observing] that he had undertaken a great and difficult task." *Epistolarum Lib. 8, Epist. 6. Ambrogio Traversari, Ambrosii Traversarii . . . Latinae epistolae . . . in libros XXV tributae*, ed. Petro Cannelto (Florence: Caesaro, 1759), col. 365; text discussed in Sebastiano Gentile, "Toscanelli, Traversari, Niccoli e la geografia," *Rivista Geografica Italiana* 100 (1993): 113–31, esp. 115. Giovanni Mercati identified this "Pietro" with the Venetian humanist and physician Pietro de Thomasiis (d. 1456), who had traveled widely in the East, which perhaps gave him the knowledge necessary to correct the text (Fischer, *Codex Urbinas Graecus* 82, 1:543–44).

58. Gentile, "Toscanelli," 114–15.

59. "As is my habit, once the pontiff Eugenius had withdrawn at the start of the summer from the city to Florence, at midday I went to Niccolò Niccoli, a well-known man, whose house was a common inn for the most learned men, and there I met a man learned in Latin and Greek literature, Carlo Aretinus, and likewise Cosimo de' Medici. . . . As soon as I had greeted them (as is customary) while they were looking at Ptolemy's *Geography*, I took a seat with them in Niccoli's library" (Poggio, *Opera*, 392). The choice of scene is linked to the subject that will be dealt with: Poggio complains of being always on the move, something that clearly contradicts the image of an "armchair traveler" contemplating maps.

60. These aspects of Niccoli's role as the promoter of studies of the *Geography* within the Angeli circle have been underlined by Gentile in "Toscanelli," 113–31.

61. Gentile, "Toscanelli," 117–18.

62. Cassiodorus, *Cassiodori Senatoris Institutiones*, ed. R. A. B. Mynors (Oxford: Clarendon, 1937), 66.

63. Giovanni Gherardi, "Il Paradiso degli Alberti," 5.35; see Giovanni Gherardi, *Il Paradiso degli Alberti*, ed. Antonio Lanza (Rome: Salerno, 1975), 314. Compare Ptolemy's *Geography* 3.1.43; see Karl Müller, ed., *Claudii Ptolemaei Geographia*, 2 vols. (Paris: A. Firmin Didot, 1883–1901), 2:348.

knowledge of the respective dates of the two classical writers, therefore sees no essential difference between Ptolemy and Pliny, except that the former scholar is recognized as having taken particular care over names and places.<sup>64</sup> The attitude found here is essentially the same as that found in Jacopo Angeli's dedicatory letter.

A generation younger than these pioneers in the field, Sozomeno (Zomino) da Pistoia was a Poggio protégé and accompanied him on his trips to Germany in search of classical manuscripts; he would later become tutor to the sons of Palla Strozzi. An inventory of Sozomeno's library drawn up in 1460 contains two references to Ptolemy. One is in a partial copy of the Latin text of the *Geography* (in Sozomeno's own hand)<sup>65</sup> and a manuscript—or map—in Greek; this latter—“*Mappamundus*, in membranis, licteris Grecis, carta magna”—appears at the end of the list, after two maps of Italy and the Holy Land.<sup>66</sup> Sozomeno was also the author of a chronicle that begins with a description of the world, the explicit intention of which is to provide better knowledge of the sites of the *res gestae*. The author adds that he leaves the details to “Ptolemy, Pliny, Pomponius Mela, and the other cosmographers now available in Latin.”<sup>67</sup> Here again we see the same association, in which Ptolemy figures simply as the *primus inter pares*. This description of the world—“abbreviatio de situ orbis,” to use the title given in the Modena manuscript of his chronicle<sup>68</sup>—is essentially based on an abridgement of Pomponius Mela's *De chorographia*, to which—for each part of the *orbis terrarum*—are added the lists of regions taken from the *Geography* and (in Italy alone) the list of cities from the same source.

The work of Francesco Filelfo, who taught in Florence, Siena, Bologna, and then in Milan, is undoubtedly more characteristic of the philological or antiquarian interest in such texts. He has been accused of reproducing quotations from the *Geography* taken from second- or third-hand sources—something that does not seem very likely. In 1440 he resorted to Ptolemy to settle a doubt regarding spelling,<sup>69</sup> in 1445 he had a copyist provide him with a manuscript of the Greek text,<sup>70</sup> and in 1461 he criticized the ignorance and presumption of Pier Candido Decembrio (who in his eulogy of Lucia Sforza had called the Duke of Milan *dux Ligurum*) and cited as his authorities “that most learned man, Claudius Ptolemy the cosmographer,” “our dear Pliny,” and Polybius, to whom he added the recently translated Strabo.<sup>71</sup> Giacomo Bracelli mentioned in a letter of 1440 how rare the *Geography* was outside Florence; the only copy in Genoa was his own.<sup>72</sup> Some years later, in writing to a correspondent in Asti, he settled a question of grammar by appeal to Pliny and Ptolemy, “whose authority I do not see how one can resist.”<sup>73</sup> His “*Descriptio orae ligusticae*” is perhaps the first chorographical treatise (in the Ptolemaic sense); however, it draws almost entirely on Pliny, Pomponius Mela,

Trogus, and Livy. Ptolemy is cited only for minor details: the ancient spelling of Monachus Portus (Monaco) and the identification of a place named Segestum.<sup>74</sup>

We are a long way from cartography as reflecting a “modern” concept of space, and the observations already made make it clear that the reappearance of Ptolemy the geographer was not seen as marking a step toward greater scientific objectivity. Such an interpretation, still to be seen underlying a number of discussions of Ptolemy's work, is predicated on our own conception of cartography, a conception that—as Harley has argued so well—is very partial and deeply conditioned by ideology.<sup>75</sup> Philological and topographical curiosity lay at the root of the Florentine humanists' initial interest in the *Geography*; they were not looking at the work as a scientific treatise on cartography and geometry/optics.<sup>76</sup> From this

64. In his *Philomena*, Gherardi calls Ptolemy a “geomètra verace” (1.6.33); see Gherardi, *Il Paradiso*, 314 n. 5.

65. BL, Harley 6855.11; Albinia Catherine de la Mare, *The Handwriting of Italian Humanists* (Oxford: Association Internationale de Bibliophilie, 1973–), 91–105 and pl. XXIe.

66. Giancarlo Savino, “La libreria di Sozomeno da Pistoia,” *Rinascimento*, 2d ser. 16 (1976): 159–72, esp. 171–72; compare Gentile, *Firenze*, 106–7, and idem, “Emanuele Crisolora,” 304 n. 4.

67. BAV, Vat. Lat. 1969 (dated 1456), fols. Iv–Iir (manuscript of Sozomeno's chronicle).

68. Modena, Biblioteca Estense, Lat. 437, fol. 140r.

69. Aristide Calderini, “Ricerche intorno alla biblioteca e alla cultura greca di Francesco Filelfo,” *Studi Italiani di Filologia Classica* 20 (1913): 204–424, esp. 385.

70. Francesco Filelfo, *Cent-dix lettres grecques*, trans., notes, and commentary Émile Legrand (Paris: Ernest Leroux, 1892), 172.

71. Francesco Filelfo, letter to Cicchus Calabrus, 5 March 1461, in *Epistole Francisci Philelphi*, by Francesco Filelfo (Paris, 1505), fol. 217r.

72. “Your Ptolemy is finished: to be sure neither is it without error, nor at this time can it be corrected; for I would not want you to think that another exemplar could be found in this city, except that which is within my possession. Indeed the book, recently translated into our language, has not yet been disseminated; use that one, such as it is.” Giacomo Bracelli, letter to Andreolo Giustiniani, 2 June 1440, in *L'epistolario di Iacopo Bracelli*, by Giacomo [Jacopo] Bracelli, ed. Giovanna Balbi (Genoa: Bozzi, 1969), 30; the recipient of the letter had clearly given Bracelli a manuscript brought from the East (for him to evaluate), or else wanted a copy of his own manuscript.

73. Pliny and Ptolemy are described as “very learned men”; Ptolemy is said to have followed “the authority of the Ancients.” Giacomo Bracelli, letter to Edoardo Bergognini, 21 February 1448, in *L'epistolario*, 67.

74. Giuseppe Andriani, “Giacomo Bracelli: Nella storia della geografia,” *Atti della Società Ligure di Storia Patria* 52 (1924): 129–248, esp. 234, 236. In this latter case, the identification is based on “those who follow Ptolemy's measurements.”

75. J. B. Harley, “Silences and Secrecy: The Hidden Agenda of Cartography in Early Modern Europe,” *Imago Mundi* 40 (1988): 57–76.

76. Paul Lawrence Rose, “Humanist Culture and Renaissance Mathematics: The Italian Libraries of the *Quattrocento*,” *Studies in the Renaissance* 20 (1973): 46–105, esp. 56. However, it is reductive to claim that the humanists simply served to circulate the *Geography*, mathematical study of which came at a later date.

point of view, one must take Jacopo Angeli's comments on the comparison between Pliny and Ptolemy at face value. One too often forgets that, at the same time as they were rediscovering the *Geography*, Italian humanists were viewing Pliny's *Natural History* in such a new way that one might well use the term "rediscovery" here as well. Once seen as a collection of facts and anecdotes, Pliny's encyclopedia came to be seen as a geographical description of the Roman empire, a history of classical art, and a model of scientific inquiry.<sup>77</sup>

So the *Geography* itself did not exercise a decisive influence; what was decisive was the way in which geography and cartography were viewed by a culture that was changing the relation between man and the world. However, one should also be wary of anachronistically accentuating the antiquarian nature of the previously described historical geography, which gave such care and attention to the exact spelling of classical place-names and the exact location of the places they referred to. While it is important to point out that the initial reception of Ptolemy does not fit the schema propounded by a certain type of history, one should not overcompensate in the opposite direction by arguing that the humanists were totally uninterested in the maps or that the *Geography* circulated solely in restricted circles of people whose main concerns were grammar and exact spellings.

As we have seen from the cases of Niccoli, Poggio, and then Sozomeno da Pistoia, maps were from the beginning viewed as documents of historical-philological research. And the case of Giacomo Bracelli gives us a more exact picture of the role they played in the initial reception of the *Geography*. In fact, Bracelli's work on Ptolemy arose from his astonishment at the difference between the modern and ancient delineation of the boundaries of his own region (Liguria).<sup>78</sup> Historical geography led to a comparison with the contemporary delineation of space, and thus antiquarian concern asked the researcher to acknowledge, at some level, his own notions of space. Overall, one should not maintain a sharp separation between a return to classical antiquity and an awareness of the present. As Garin and Rico have pointed out, such a return might stimulate a comparison of the moderns and the ancients.<sup>79</sup>

Moreover, a rather unexpected case reveals that, from the very beginning, Ptolemy's maps were being put to use by a rather larger public than that comprised by Florentine humanist circles. At the end of the fourteenth and in the first few decades of the fifteenth century, the people of Florence could hear the works of poets writing in local idiom recited and declaimed on the banks of the Arno. One such poet was Andrea da Barberino, who wrote verses, based on *chansons de geste* and romances of chivalry, that were full of references to places that were part of a shared imaginative tradition. In effect, the imagined voyage or

journey that had been a leitmotif of the romances of chivalry led, in the work of Andrea da Barberino, to what might be called veritable treatises of literary geography.<sup>80</sup> There was a profusion of place-names, above all in his "Guerino Meschino" (end of 1410s / beginning of 1420s). Two scholars claimed that Andrea borrowed widely from the maps in the *Geography*, which would make him one of the first people to have used them. However, in the absence of more detailed studies, it is difficult to settle this point with any certainty. In Andrea's first romances ("Rolandino" and "Ugone d'Alvernia"), there are no Ptolemaic place-names. Then in such works as "I reali di Francia," "Storie Narbonesi," "Aiolfo del Barbicone," and "Rinaldino da Montalbano," they appear but are fewer in number than has been claimed. Hawickhorst counted forty-odd, which in several thousand lines of poetry is hardly a significant ratio.<sup>81</sup> And some of the supposed links with Ptolemy strike one as forced and unconvincing, even if it is possible that in some cases the *Geography* provided direct source material (certainly no other such material has been identified). It would seem, however, that the names were taken from the text rather than from the maps (names that occur together in the text occur together in the poems).<sup>82</sup>

This changes when we come to "Guerino," which recounts the wanderings of a son of the king of Albania who was sold to a merchant in Constantinople. His suit to the daughter of the emperor rejected because of his unknown origin, the young man decides to find out his parentage and travels all over the known world. The Ptolemaic place-names here are much more numerous—above all, in those regions farthest from Europe—and are drawn from passages that do not occur alongside each other in the text of the *Geography*. For example, one recognizes "Monte Sagopella e queste città cioè Taloba" ("Guerino," chap. 177) as a reference to Sagopola Mons and Talubath, named in distinct parts of the same chap-

77. Charles G. Nauert, "Humanists, Scientists, and Pliny: Changing Approaches to a Classical Author," *American Historical Review* 84 (1979): 72–85, esp. 75.

78. With perhaps slight exaggeration, it has been argued that this text contains the first expression of the notion of a "natural region" as understood in physical geography (Andriani, "Giacomo Bracelli," 163–64). This overlooks the fact that Bracelli takes the limits of Liguria to be those established by the administrative divisions of antiquity—in this case, the Var and the Magra.

79. Eugenio Garin, *La cultura del Rinascimento: Profilo storico*, 3d ed. (Bari: Laterza, 1973), 46, and Francisco Rico, *El sueño del humanismo: De Petrarca a Erasmo* (Madrid: Alianza Editorial, 1993), 69.

80. Leonardo Olschki, "I 'Cantari dell'India' di Giuliano Dati," *Bibliofilia* 40 (1938): 289–316, esp. 299.

81. See Heinrich Hawickhorst, "Über die Geographie bei Andrea de' Magnabotti," *Romanische Forschungen* 13 (1902): 689–784, especially the index.

82. Hawickhorst, "Geographie bei Andrea de' Magnabotti," 723–24 and 751.

ter in the text but shown near each other in the plate (*tabula*). Besides juxtapositions that could have been observed only on the maps, one also finds mistakes that can be explained only by use of the *tabulae*. Moreover, the description of hydrography and orography are based on Ptolemy.<sup>83</sup> However, a detailed examination of these indications still does not prove that Andrea da Barberino used the regional maps in the Latin version of Ptolemy. The juxtaposition of place-names located far apart in the text might well be due to the use of extracts or to the fact that the original text was merely flicked through. Some of the place-names that are mentioned as being near each other are, in fact, not easily read together on the maps,<sup>84</sup> and certain names that appear in “Guerino” do not seem to be on the maps at all.<sup>85</sup> Nevertheless, there does seem to be one place where one can prove that Andrea was looking at a Ptolemaic world map. In chapter 86 of “Guerino,” he mentions a sea called Tropicico Paralicon—a name that can be explained by the fact that, on the world map, the tropic passes through a gulf named Paragon Sinus (mentioned in *Geography* 6.8.7). This confusion of the name of a gulf and the identification of the tropic can be explained only by assuming that the writer was actually looking at a map.

In the absence of more in-depth studies of “Guerino,”<sup>86</sup> it would be rash to totally rule out either alternative. Andrea also borrowed coastal place-names from marine charts, and it is not impossible that he had at his disposal not only Ptolemy’s text but also a large world map similar to that brought over by Manuel Chrysoloras, and even regional maps that were the result of the first attempts at such works in the earliest years of the fifteenth century.<sup>87</sup> Whatever the explanation, there is something ironic in the thought that the work considered as initiating a scientific revolution in the way people thought about and represented space was used first as a compendium of exotic names that might attract the attention of the crowds who gathered at crossroads to hear local poets recite their own work. It does not seem very pertinent here to ask whether Andrea’s use of this material reflected the old medieval delight in encyclopedias or reflected a real awareness of the new culture of humanism.<sup>88</sup> And this is because, contrary to what might be supposed from the sharp verdicts handed down by old schools of criticism, the public for these chivalric romances comprised all levels of Florentine society—from members of the Medici family through city merchants to the craftsmen of city guilds.<sup>89</sup> Nevertheless, it is true that, unlike what is found to be the case in the previous work of Andrea da Barberino, the geography of “Guerino” is extremely precise; the succession of place-names reflects the reality described in Ptolemy’s maps. The resort to Ptolemy, therefore, seems to have been motivated by a desire to give a luster of truth and realism to these adventures of fictional characters set in

an indeterminate historical period, supplying ancient names—above all, in Asia and Africa, remote worlds in which relatively few contemporary place-names were known—that are used in conjunction with names more familiar to the poet’s audience.<sup>90</sup> This claim presupposes that the audience was capable of understanding the author’s intentions, and thus leads us to three important conclusions with regard to the reception of Ptolemy’s work. First, the place-names were authenticated by their source—that is, by Ptolemy’s reputation—and this means that his reputation was recognized not solely by a restricted group of humanists. Second, for this public—as for the humanists—Ptolemaic cartography and geography ultimately comprised a stock of place-names. Third, the ancient origin of these place-names did not contradict contemporary geography, but might well have served to complement it.

This interest in place-names and toponymy is the explanation for the numerous manuscripts of the *Geography* in most of the major libraries of the world, which contain only the text of books 2 to 7, with no explanations of cartographic projection, no coordinates, and no maps—in effect, none of what we identify as the distinc-

83. Rudolf Peters, “Über die Geographie im Guerino Meschino des Andrea de’ Magnabotti,” *Romanische Forschungen* 22 (1908): 426–505, esp. 430–39.

84. For example: “Walking for the space of five days alongside the mountains called Consoron, at the end of these mountains we came to a large and great river, which is called Aris, and which rises from the great alps called Sarip, which are next to Monte Coronante” (chap. 43, quoted in Peters, “Geographie im Guerino Meschino des Andrea de’ Magnabotti,” 433). One recognizes here Coronus Mons (*Geography* 6.9.3–5), the river Arius (6.17.2), and the Sariphi Montes (6.10.1 and 4). The regional maps (Asia VII and IX) do not show these features together.

85. For example, in chap. 86: “The city called Saba . . . , this city is rich and one day’s walk from the sea and in the midst of three hillocks. . . . The other side is towards the sea called Possidon.” Quoted in Peters, “Geographie im Guerino Meschino des Andrea de’ Magnabotti,” 433. The Posidium Promontorium is in 6.7, but is not shown on Asia VI.

86. Such studies should be carried out to investigate the ways in which the *Geography* was used by Andrea as time went by.

87. It is not very likely that the maps also bore modern geographical names, as claimed by Hawickhorst in “Geographie bei Andrea de’ Magnabotti,” 724.

88. Franco Cardini gives this interpretation of the recourse to Ptolemaic geography in “Orizzonti geografici e orizzonti mitici nel ‘Guerrino Meschino,’” in *Imago mundi: La conoscenza scientifica nel pensiero bassomedioevale* (Todi: L’Accademia Tudertina, 1983), 183–221, esp. 193–94, in criticizing the view put forward by Reto R. Bezzola in “L’Oriente nel poema cavalleresco del primo Rinascimento,” in *Venezia e l’Oriente fra tardo Medioevo e Rinascimento*, ed. Agostino Pertusi (Florence: Sansoni, 1966), 495–510, esp. 507–9.

89. The traditional view was corrected by Gloria Allaire in “A Fifteenth-Century Florentine Community of Readers and the Romance of Chivalry,” *Essays in Medieval Studies* 15 (1998): 1–8.

90. Bezzola, “L’Oriente nel poema cavalleresco,” 508.

tive core of the text. It would be useful to study these working manuscripts, far more interesting than studying the prestigious books that, for the most part, would end up stuck on the shelves of some princely or aristocratic library.

OUTSIDE ITALY: THE INTEREST IN THE "SCIENTIFIC"  
ASPECTS OF THE *GEOGRAPHY*

Pierre d'Ailly, Guillaume Fillastre,  
and Jean Fusoris in France

Astonishingly, therefore, the figures initially involved in the "rediscovery" of the *Geography* seem not to have been interested in any content of the text that contradicted certain features of the then-dominant *imago mundi*, which was essentially based on a fusion of Roman geography and medieval travel writing. These contradictions would ultimately be tackled outside Italy.

The *Geography* made its appearance in France very early, and its reception was very distinct in character. Evidence for this comes from three more or less well-known works: Pierre d'Ailly's "Compendium cosmographiae" (1410/15), which was intended to provide guidance and assistance to the reader of the *Geography*; Cardinal Guillaume Fillastre's commentary on Pomponius Mela (probably 1417), which compares the views of the Greek cartographer and Roman geographer; and Jean Fusoris's treatise on the sphere (1432), a work by an actual producer of astronomical instruments.

The *Geography* was in all probability known in Paris only very shortly after its arrival in Florence, and it was certainly known there before 1415. The Burgundians were then in control of the capital, and in that year Jean Fusoris was tried as a spy by the English. During his trial, he admitted to having made the acquaintance of the bishop of Norwich, English ambassador to Paris, and to having on that occasion met Pietro da Verona, a relative of the bishop and himself subject to interrogation. Fusoris would declare that he had visited the bishop to show him "a book called Mappemonde and other books."<sup>91</sup> It is very probable that the book thus singled out was a copy of the *Geography*.<sup>92</sup> That was the title under which it had long been mentioned in Arab-Latin translations of treatises on astrology.<sup>93</sup> The figure who wished to whet the appetite of the bibliophile bishop is not unknown to us. His full name was Pietro Sacchi of Verona. A bookseller and miniaturist in Paris up to 1421, Sacchi was also the librarian of Jean, duc de Berry—and a cartographer. In a 1425 letter, Niccolò Niccoli told his correspondent (probably Cosimo de' Medici) that he had rediscovered the name of the man who had painted *un sito di Gallia* (a map of Gaul) in Paris. This was Maestro Pietro of Verona, not of Florence as he had at first thought.<sup>94</sup>

If this hypothesis about the identity of the book in Paris is correct, we can also explain the early date of the work that Pierre d'Ailly carried out on the *Geography*. D'Ailly, the bishop of Cambrai, likely had a manuscript in Paris even before the Council of Constance, where French prelates met their Italian counterparts. The precision of his analysis of the text suggests that he studied it at length. We know that d'Ailly's "Imago mundi" (completed around 1410) is a sort of summary of all the geographical knowledge then available. There is no exact date for his "Compendium cosmographiae";<sup>95</sup> but as that work is undoubtedly the result of the author's desire to measure his "Imago mundi" against the new text from Italy, the "Compendium" must be later. We are told that the work was produced "as an explication and supplement to previous treatises"—that is, to the "Imago mundi" and the seven other treatises by d'Ailly that dealt with the relation between theology and astrology and with the concordance of opinion on mathematical truths.<sup>96</sup> Hence, the discussion here again reveals an interest in things celestial.

The "Compendium" appears to be a simple summary of the *Geography*, but it is not exactly an objective one. The choice of subjects and the way the author develops them reveal how he envisaged the work of the Alexan-

91. A. de Champeaux and P. Gauchery, *Les travaux d'art exécutés pour Jean de France, duc de Berry: Avec une étude biographique sur les artistes employés par ce prince* (Paris: H. Champion, 1894), 130, and Léon Mirot, "Le procès de Maître Jean Fusoris, chanoine de Notre-Dame de Paris (1415–1416): Épisode des négociations franco-anglaises durant la guerre de Cent ans," *Mémoires de la Société de l'Histoire de Paris et de l'Île-de-France* 27 (1900): 137–287, esp. 192.

92. Those who have mentioned this fact speak incorrectly of a "mappemonde" rather than of a book. Millard Meiss, *French Painting in the Time of Jean de Berry: The Late Fourteenth Century and the Patronage of the Duke*, 2d ed., 2 vols. (London: Phaidon, 1969), 1:65, and Gentile, *Firenze*, 105.

93. Gautier Dalché, "Le souvenir de la *Géographie*," 99–102.

94. T. Foffano, "Niccoli, Cosimo e le ricerche di Poggio nelle biblioteche francesi," *Italie Medioevale ed Umanistica* 12 (1969): 115–17. Stadter suggests that the letter should be dated 1431 ("Niccolò Niccoli," 749–55). Gentile argues that one can probably take this letter as the origin of those "modern" maps of France later attached to manuscripts of the *Geography*. But we do not know anything about the appearance of this particular map (Gentile, *Firenze*, 103–5).

95. In his catalog of the works of the bishop of Cambrai, Salembier dates no. 108, "Compendium cosmographiae," as "probably" 1398–1411; in error, he then repeats this text in no. 110, "Cosmographiae tractatus duo": Louis Salembier, *Petrus de Alliaco* (Insulis: J. Lefort, 1886), xvii and xxiii. Buron dates the text 1412–14 without giving any evidence for this: Pierre d'Ailly, *Ymago mundi de Pierre d'Ailly Cardinal de Cambrai et Chancelier de l'Université de Paris (1350–1420)*, 3 vols., ed. and trans. Edmond Buron (Paris: Maisonneuve Frères, 1930), 1:111. Thorndike points out the date 1409 in the erroneously transcribed *explicit* of the BL manuscript, Harley 637: Lynn Thorndike, "Four Manuscripts of Scientific Works by Pierre d'Ailly," *Imago Mundi* 16 (1962): 157–60. However, this date simply reproduces that of the dedication of the translation.

96. D'Ailly, *Ymago mundi*, 3:556.

drine cartographer. Three features of d'Ailly's work are clear: an aim to assist an actual reading of the text, an examination of questions raised by Ptolemy's statements on matters that were still open to debate, and a discussion of problems associated with the representation of a sphere on a flat surface.

It is clear that d'Ailly had read the text and studied the maps with great care. In effect, the "Compendium" is a reworking of well-mastered material. The first fifteen chapters of the first treatise are a summary of the topographical contents of the *Geography*, listing the coordinates of the places sited along the twelve parallels—from around the limit of the inhabited world or *oikoumene* (16°S) to Thule (63°N). Along with the coordinates are bits of descriptive geography taken from Isidore of Seville's *Etymologies*, so Pierre d'Ailly turns the list into a text that enables the reader to form a mental picture within which the different coordinates can be organized. This section ends with a summary of book 8 describing the twenty-six regional maps, giving the coordinates of some of the places they cover. The author adds a table that gives the number of the map together with the reference to the book in which the place is mentioned.

The second treatise focuses more on the construction of a cartographic representation and thus develops some of what is to be found in the *Geography*. After having recopied chapters 24 and 23 of book 1—in which Ptolemy describes the meridians and the parallels in the map of the world—d'Ailly fills this list of twenty-three parallels and thirty-seven meridians (the latter chosen by him) with the names of various places, complete with coordinates. He perhaps produced this table through very careful collation of the text, through which he obtained a list of those places that had the same longitude or the same latitude. However, d'Ailly also used a Ptolemaic world map, which he may have had ready to hand<sup>97</sup> or else produced himself (this cannot be ruled out, given that the "Compendium" deals with the production of a map). Whatever the truth, these sections can have been the result only of very painstaking work on the text as a whole—revealing the respect with which the *Geography* was held from the very beginning.

The second aspect of the *Geography* raised in this work by d'Ailly concerns the notions of the sphere and the earth. D'Ailly was particularly interested in the question of whether the equatorial zone and the temperate southern zone were inhabitable—a question first raised at the Faculté des Arts at the University of Paris in the thirteenth century (in relation to commentaries on Aristotle). Here, d'Ailly used the traditional presentation of the *quaestio* and drew on the usual authorities and arguments. The extension of the inhabitable area of the earth became the object of a long discussion that compares what can be gleaned from descriptive geography, from philosophers

(that is, Aristotle and his commentators), and from Pliny (chaps. 19–21). Without going into the detail of the argument put forward, it is important to note that d'Ailly is concerned about the compatibility of the image put forward by Ptolemy with the one that emerges from other authors. In effect, these other authors are interpreted in light of Roger Bacon's "Opus maius," which d'Ailly follows over Ptolemy: the *oikoumene* extends over more than 180 degrees of longitude. This section ends with an attempt to reconcile the parallels as described in Pliny's *Natural History* (6.211–20), in the *Almagest* (2.6), and in the *Geography* by means of a table of the shadows.

Finally, d'Ailly concentrates on that which distinguishes the *Geography*: procedures for representing a sphere *in plano*. This is the subject matter of chapter 17 of the first treatise and of the whole of the second. In essence, this is a reworking of the content of the original work, giving a logical description of the steps one has to go through to realize a *figura*, without, however, dwelling on the choice of mode of representation and the geometrical procedures that make it possible. On the other hand, in chapter 17 d'Ailly proposes "to draw the site and the general appearance of the inhabitable world in as brief a fashion as possible on a plane surface, with the inscription of the seven *climata*, but without exactly following the procedure taught by Ptolemy."<sup>98</sup> The aim is to depict the *climata* and the *civitates famosae*, which were the objects of astronomical study and judicial astrology.<sup>99</sup> Given these aims, d'Ailly's map of the world would, in fact, be different from the map described by Ptolemy. The parallels would be straight and the meridians curved. Overall, this development echoes the procedure followed by Bacon in the map he sent to Clement IV along with the "Opus maius" in 1267–68.<sup>100</sup> D'Ailly's conclusion casts a clear light on his vision of Ptolemy's text. The procedure d'Ailly himself has followed is "better and easier, and is sufficient for a consideration of the places of the world."<sup>101</sup> In effect, the *climata* will thus be wider, and it will be easier to locate places.

All in all, Pierre d'Ailly carried out very important work on the *Geography*. He understood its distinguishing characteristics, in spite of the mistakes in Jacopo Angeli's translation, contrasting Ptolemy's use of "the geo-

97. With no supporting evidence for any of these statements, Buron supposes that the manuscript Guillaume Fillastre sent to d'Ailly from Italy must have been accompanied by a map (D'Ailly, *Ymago mundi*, 3: 698 n. 681).

98. D'Ailly, *Ymago mundi*, 3:650.

99. Compare Ernst Honigmann, *Die Sieben Klimata und die πόλεις ἐπίσημοι: Eine Untersuchung zur Geschichte der Geographie und Astrologie im Altertum und Mittelalter* (Heidelberg: C. Winter, 1929).

100. With, perhaps, some modifications due to the reading given by Pierre d'Ailly.

101. D'Ailly, *Ymago mundi*, 3:650.



metrical calculations of mathematicians” with what he describes as the methods of *historiographi*.<sup>102</sup> And d’Ailly himself attempted to understand these geometric methods through a careful reading of the text. However, his primary concern was not cartographic representation. What struck him most were the contradictions arising from Ptolemy’s text with regard to the question of the inhabitable area of the globe as discussed at the Faculté des Arts. And this interest itself arose from astrological considerations—as one can see from his focus on the question of *climata*. The surface of the earth is seen as subject to celestial influences whose manifestation depends on geographical coordinates.<sup>103</sup> Thus, the final stage in the production of the *figura* is the “noting of certain places *under* their parallel and meridian.”<sup>104</sup> For all d’Ailly’s interest in what *we* see as the core of Ptolemy’s *Geography*, it would be as anachronistic to describe his view of the text as “modern” as it would be to dismiss that of the Italian humanists as “archaic.” His notion of global coordinates was the same as that propounded by Roger Bacon: the surface of the earth had no existence independent of the spheres of the heavens.

Guillaume Fillastre studied with Pierre d’Ailly at the college of Navarre, and was made a cardinal the same year, 1411. No doubt they largely shared the same worldview,<sup>105</sup> even though Fillastre shows that he was more interested in basic questions of principle. A canon at Reims from 1393, Fillastre played an important political role and came into contact with important French humanists such as Simon de Cramaud and Jean de Montreuil. Apart from politics, however, Fillastre was also a bibliophile and a lover of geographical texts and works of cartography,<sup>106</sup> and he was called to organize the chapter library, which was also completed in 1411. A large number of Fillastre’s books are still preserved at Reims.

In 1407, Fillastre was part of the embassy Charles VI and the University of Paris sent to the courts of Benedict XIII and Gregory XII in an attempt to heal the schism between the Papacy and France. On that occasion Fillastre probably traveled to Rome, where some members of the embassy were housed by Cardinal Orsini; so he might well have heard talk of the translation of Ptolemy at this early date. Nonetheless, in 1418, after taking part in the Council of Constance since 1414, he sent a copy of the *Geography* (without maps) to his cathedral chapter, inscribed with a very significant *ex dono*: “I, Guillaume, Cardinal of Saint Mark, give to the Library of the Church of Reims this book for which I searched for numerous years and of which I had a copy made after obtaining a copy in Florence. I beseech that it be taken care of, because I think it is the first copy in France. Written by my hand in Constance, the fourth year of the Council and of our lord Pope Martin V, in the month of January the Year of Our Lord 1418.”<sup>107</sup> This implies that at this date

copies continued to be rare in Italy, and the maps were still not easy to get hold of.

In the years to come, there would be no lessening of Fillastre’s interest in the work, and he would have another copy of the *Geography* made for himself (now in Nancy), a copy mentioned in various studies because of its map of northern Europe (discussed later). However, this latter copy has yet to be examined as a whole for the role it played in the reception of Ptolemy’s work.<sup>108</sup> Remarkable for its relatively small size (21.7 × 15 cm)—which clearly means it was a working text, not a prestige possession—the manuscript is also noteworthy for its contents. The text of the *Geography* is followed by some maps added subsequently; that they were a later addition is clear from the fact that they are on different parchment and from this comment made by Fillastre with regard to Africa IV: “Two ambassadors of this Prester John . . . in this Year of Our Lord 1427 when these maps were copied, came to the King of Aragon Alfonso, in the presence of the Lord Cardinal of Fuxo, Legate of the Apostolic See. . . . And this Legate reported this to the pope in my presence, I who had those maps copied, from the Greek model.”<sup>109</sup> These maps were thus copied, at the latest, by 1427—a date when it was still difficult to obtain copies of the translated maps (if such translated maps even existed at that time, which is yet to be proven).<sup>110</sup> Each map is ac-

102. D’Ailly, *Ymago mundi*, 3:627 (chap. 21).

103. Compare Gautier Dalché, “Connaissance et usages géographiques,” 401–36.

104. D’Ailly, *Ymago mundi*, 3:650.

105. On the figure of Guillaume Fillastre, see Gautier Dalché, “L’œuvre géographique,” 319–21 (reprint, 293–96).

106. The world map that decorates the initial of his commentary on Pomponius Mela’s “De chorographia” (Reims, Bibliothèque Municipale, 1321, fol. 13r; Gautier Dalché, “L’œuvre géographique,” [reprint, 309]) has often been reproduced and—erroneously—taken as an example of a “medieval” image of the world. In fact, it was drawn up with the clear intention of comparing the received model with the Ptolemaic world image.

107. Reims, Bibliothèque Municipale, 1320, fol. 1r, erroneously dated 1417 in Gautier Dalché, “L’œuvre géographique,” 326 (reprint, 299).

108. Nancy, Bibliothèque Municipale, MS. 441. Gautier Dalché, “L’œuvre géographique,” 326–29 and 372–83 (reprint, 299–304 and 345–55). Fischer makes the unfounded claim that the Reims manuscript was copied from that in Nancy (*Codex Urbinas Graecus* 82, 1:302).

109. Fol. 190r. Latin text in Jean Blau, “Supplément du mémoire sur deux monuments géographiques conservés à la Bibliothèque Publique de Nancy,” *Mémoires de la Société Royale des Sciences, Lettres et Arts de Nancy*, 1835, 67–105, esp. 75; Axel Anthon Bjørnbo and Carl S. Petersen, *Der Däne Claudius Clausson Swart (Claudius Clavus): Der älteste Kartograph des Nordens, der erste Ptolemäus-Epigon der Renaissance* (Innsbruck: Wagner, 1909), 104; Fischer, *Codex Urbinas Graecus* 82, 1:302; and Gautier Dalché, “L’œuvre géographique,” 376 (reprint, 347).

110. Strictly speaking, 1427 is only the *annus praesens* of the remark concerning the Ethiopian ambassadors—and of the *copy* of the maps, not their original production.

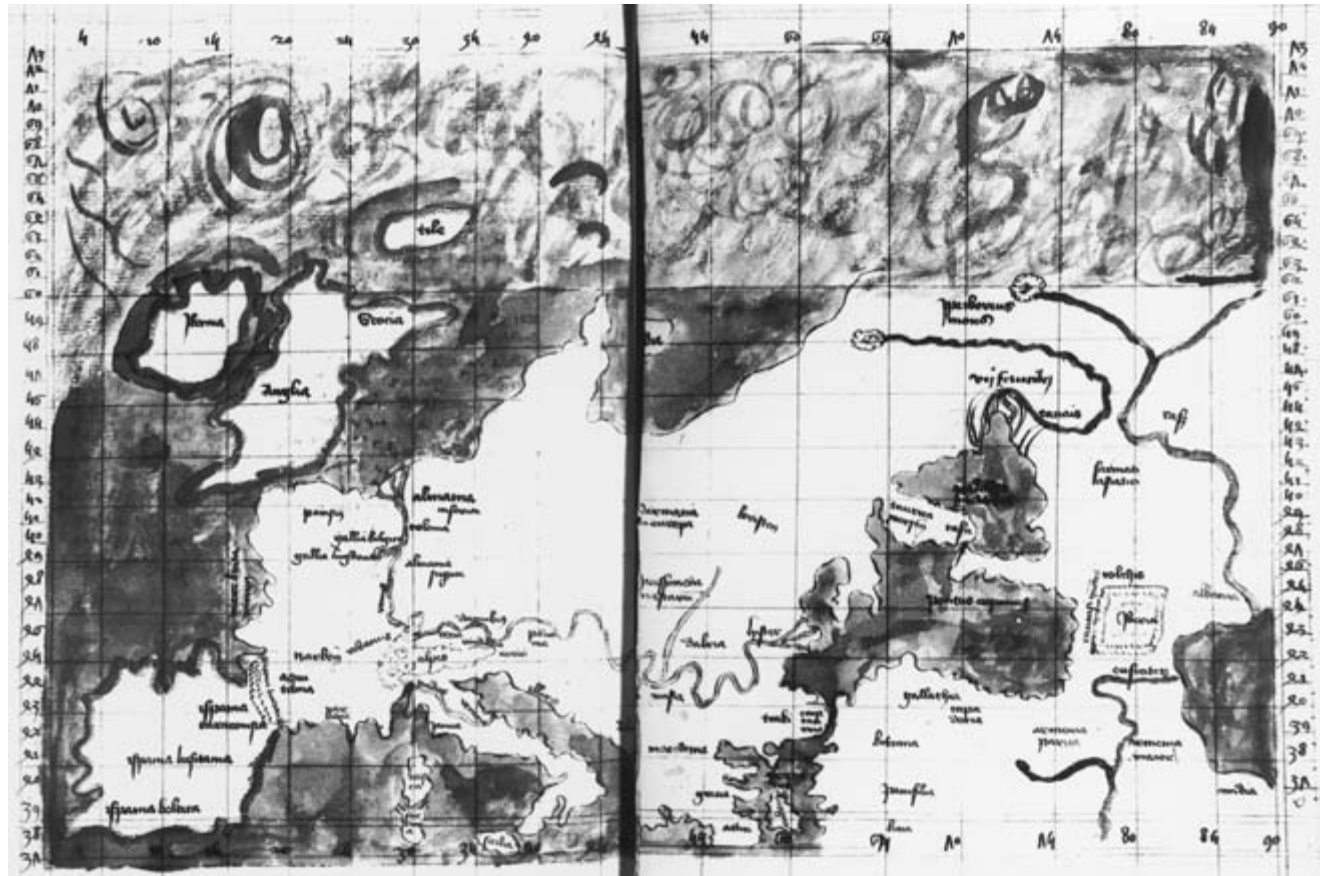


FIG. 9.3. EUROPE AND PART OF ASIA FROM A GERMAN MANUSCRIPT, FIRST HALF OF THE FIFTEENTH CENTURY.

Photography courtesy of the BNF (Lat. 3123, fols. 169v–170r).

accompanied by a description of the regions concerned, using modern designations wherever possible. Finally, there is an analytic summary giving the ancient names of the provinces, the modern names of the regions they comprise, their geographical coordinates, and the languages spoken therein.<sup>111</sup>

So Fillastre's main aim was to use the *Geography* to understand the contemporary, not solely the ancient, world. And work on the maps reveals that it was driven by the same order of concerns. We have other evidence of this attempt to bring the Ptolemaic maps "up to date." A German manuscript of the first half of the fifteenth century<sup>112</sup>—which contains, among other things, the geographical works of Pierre d'Ailly—also comprises extracts from book 8 of the *Geography* and a previously unknown Ptolemaic map showing Europe and part of Asia (fig. 9.3).<sup>113</sup> Fragments of this manuscript can very probably be associated with Fillastre's work because they bear the same date, 1427.<sup>114</sup> Far more famous are the lists of coordinates and the map of the northern regions of Europe added to the previously mentioned Nancy atlas.<sup>115</sup> In essence the first *tabula moderna* appended to a Ptolemy manuscript, this map has two distinctive charac-

teristics: the Scandinavian peninsula is shown extending east-west, and to the west lies Greenland, joined to the north of Europe by a stretch of land that closes off the *Congelatum Mare* and is shown to be occupied by "Griffones," "Pigmei maritimi," "Vnipedes maritimi," and the heathen inhabitants of Karelia. With unflinching imagination, Fischer proclaims this the first map of America,<sup>116</sup>

111. Texts published in Gautier Dalché, "L'œuvre géographique," 372–83 (reprint, 345–59).

112. See Patrick Gautier Dalché, "Décrire le monde et situer les lieux au XII<sup>e</sup> siècle: L'*Expositio mappe mundi* et la généalogie de la mappemonde de Hereford," *Mélanges de l'Ecole Française de Rome: Moyen Âge* 113 (2001): 343–77, esp. 345.

113. I owe my knowledge of this map to my colleagues Jean-Patrice Boudet and Jacques Paviot.

114. "Here ends the extract from the cosmography in order to understand the position of important states, some kinds of rivers and satrapies, [and] certain mountains and inhabitable islands of the earth. 1427, 8 June Rome" (fol. 170r).

115. Nancy, Bibliothèque Municipale, MS. 441, fol. 184v–185r. Compare Gentile, *Firenze*, 116–19.

116. Joseph Fischer, *Claudius Clavus, the First Cartographer of America* (New York, 1911), and R. A. Skelton, Thomas E. Marston, and George Duncan Painter, *The Vinland Map and Tartar Relation* (New Haven: Yale University Press, 1965), 176–77.

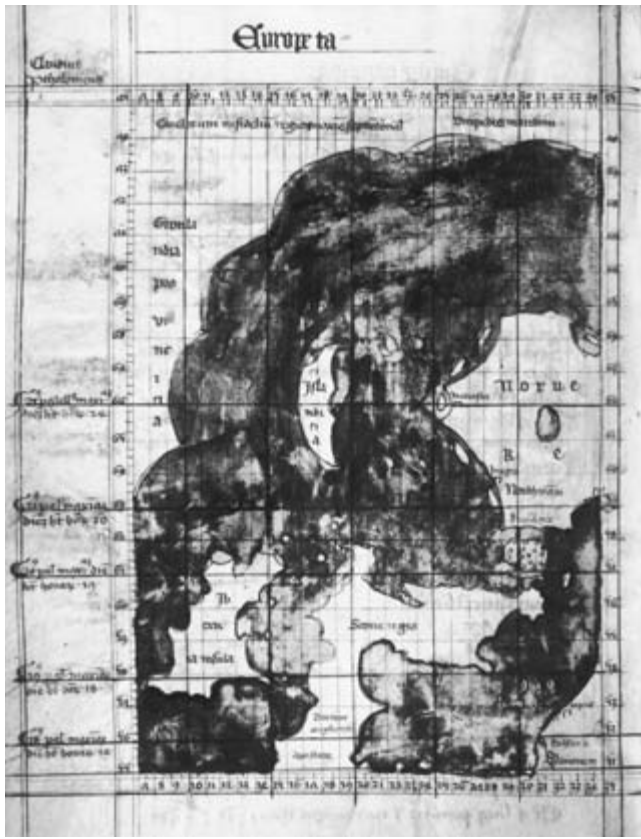


FIG. 9.4. HALF OF THE MAP OF NORTHERN EUROPE BY GUILLAUME FILLASTRE AFTER CLAUDIUS CLAVUS. See also figure 60.3.

Size of this detail: ca. 14.8 × 11 cm. Photograph courtesy of the Bibliothèque Municipale de Nancy (MS. 441 [354], fol. 184v).

although it seems beyond doubt that the map exerted great influence on later cartographic depictions of northern Europe.<sup>117</sup>

In the margin alongside a passage on Germania (2.11) in the same manuscript, in a different hand to that of the copyist, is a comment to the effect that Ptolemy had omitted various regions of northern Europe: the large Sinus Codanus, which extended from Prussia to directly opposite the British Isles, and the Mare Congelatum, between Norway and Greenland.<sup>118</sup> These two seas (the Baltic and the North Atlantic) had, in fact, first made their appearance in the descriptive geography of the Romans (both are mentioned by Pliny and Pomponius Mela).<sup>119</sup> The descriptive text accompanying the eighth map of Europe reiterates this point and concludes: “For this reason, this eighth map should be drawn in a much more ample fashion; this is why a certain Claudius [Claudius Clavus], a native of the land of the Cimbres [i.e., Denmark], described these regions and made a map of them that is joined to Europe, and thus there will be eleven in all,”<sup>120</sup> with the eleventh map accompanied by a list of place-

names and coordinates. However, although this composite should come after the tenth map of Europe, it in fact occupies two double sheets at the center of the quire and comes between the first two maps of Africa. As the initial text describing the atlas mentions only ten *tabulae Europae*, it is clear that Fillastre added this eleventh map once he learned of “Claudius,” but after compiling the volume (fig. 9.4).<sup>121</sup>

Certain information regarding this “quidam Claudius” has come down to us through the humanists present in Rome.<sup>122</sup> A certain Nicolaus Gothus (Claudius Clavus) is mentioned in a 1424 letter from Poggio to Niccoli, in terms destined to excite the interest of the entourage of Cosimo de’ Medici. He was said to be a man who traveled a large part of the world and saw in the Cistercian monastery of Soro near Roskilde (Denmark) a complete copy of Livy’s *Decades* (these amazing claims were made in the presence of Cardinal Orsini).<sup>123</sup> The Dane’s map was examined during the Council of Florence (around 1439); a copy was then in the possession of Paolo dal Pozzo Toscanelli and was described by George Gemistus Plethon (discussed later).

117. Bjørnbo and Petersen, *Claudius Clausson Swart*, 71–72; the coordinates are known in another—apparently slightly later (post-1425)—recension found in two sixteenth-century Austrian manuscripts, ÖNB, 3227 and 5277 (Bjørnbo and Petersen, *Claudius Clausson Swart*, 98ff., 168ff.).

118. Nancy, Bibliothèque Municipale, MS. 441, fol. 35v; text quoted in Bjørnbo and Petersen, *Claudius Clausson Swart*, 104; Fischer, *Codex Urbinas Graecus* 82, 1:303; and Gautier Dalché, “L’œuvre géographique,” 327 (reprint, 300).

119. Fillastre explains this omission in Ptolemy by pointing out that he lived in the southern half of the world—something that in the Frenchman’s mind clearly distinguished him from Roman geographers.

120. Fol. 174r. Gautier Dalché, “L’œuvre géographique,” 374 (reprint, 346).

121. Bjørnbo and Petersen, *Claudius Clausson Swart*, 106.

122. Claudius himself says something about his origins in the list of coordinates. He was born on the island of Fyn (Fünen), to the east of Jutland (Nancy recension; see Bjørnbo and Petersen, *Claudius Clausson Swart*, 112): “In the middle of this island is the town of Salingh, in which the author was born on 14 September 1388 two hours before sunrise” (Vienna text; see Bjørnbo and Petersen, *Claudius Clausson Swart*, 149).

123. Poggio Bracciolini, *Poggii epistolae*, 3 vols., ed. Tommaso Tonelli (Florence: L. Marchini, 1832–61), 1:104. He recalls the fact ten years later in a letter to Lionello d’Este (2:58–59). The first to have made this identification appears to have been Gustav Storm, “Den danske Geograf Claudius Clavus eller Nicolaus Niger,” *Ymer* 9 (1889): 129–46 and 11 (1891): 13–38. The existence of a complete copy of Livy—counterfeit—is mentioned in histories of the rediscovery of classical texts: Paul Lehmann, “Auf der Suche nach alten Texten in nordischen Bibliotheken,” in *Erforschung des Mittelalters: Ausgewählte Abhandlungen und Aufsätze*, 5 vols. (Leipzig: K. W. Hiersemann, 1941–62), 1:280–306, esp. 282–84, and B. L. Ullman, “The Post-Mortem Adventures of Livy,” in *Studies in the Italian Renaissance*, by B. L. Ullman, 2d ed. (Rome: Edizioni di Storia e Letteratura, 1973), 53–77, esp. 62.

Our interest in this map and the coordinates it gives lies solely in determining the significance of Claudius Clavius's work and the nature of Fillastre's interest in it. Undoubtedly, the model for the presentation of Clavius's coordinates was Ptolemy's work.<sup>124</sup> The way in which the places are listed and the descriptive vocabulary used are similar to those one finds in the translation of the *Geography*. The map also serves to demonstrate that the modern cartographer is the equal of his ancient counterpart, and so his name, Claudius Clavius, appears to the right of the work, above the column of parallels, symmetrically opposite the name of Ptolemy (Claudius Ptholomeus) above the left column. Nevertheless, the complementary geographical information provided appears to be less original than was thought. In spite of comments by Clavius that seem to suggest that he had actually been to Greenland,<sup>125</sup> it is taken from various travel books and from one or more marine charts (hence the characteristic orientation of the Scandinavian peninsula).<sup>126</sup> It is very unlikely that the coordinates were established on the ground; most probably they were drawn from the map.<sup>127</sup> These points bring out an essential characteristic of cartographic work during most of the fifteenth century. Concerned mainly with supplementing the Ptolemaic picture using information gleaned from maps based on different principles, this work was not really aiming to update the ancient cartographer on the basis of the criteria he himself laid down.

Fillastre's introduction to a reading of the Latin geography of Pomponius Mela has come down to us in two versions. The first of these is found, along with other works, in a manuscript that was part of the library of Cardinal Giordano Orsini; the other, intended for the canons of Reims, is contained in a manuscript copied at Constance in 1417.<sup>128</sup> Fillastre's introduction is important for various reasons, most notably for the use made of the *Geography*, for the way in which Fillastre views and uses maps, and for the conclusions that he reaches. His goal was to explain two types of contradiction that could be resolved only by resort to maps: the contradictions within the text of the Latin geographer and those that emerged from a comparison with the *Geography*. Pomponius Mela made use of the theory of climatic zones, three of which are considered uninhabitable. However, the world map accompanying the text in the copy sent to Reims shows the entire earth as habitable from one pole to the other.<sup>129</sup> Then there is the fact that the ancient authors claim that the earth is enclosed by the ocean, while Ptolemy argues that all the waters of the globe are enclosed by a sole continental mass. The Ptolemaic view of the world is used in different ways according to the problem being considered. Using not only the *Geography*, but also a circular medieval *mappamundi*, Fillastre corrects the *imago* presented by Latin geographers and shows that

the earth as a whole is inhabitable, including both the torrid zone where the Ethiopians live<sup>130</sup> and the temperate austral zone and the glacial zones that Ptolemy defines as *terrae incognitae*.<sup>131</sup>

Fillastre's support for Ptolemy's view of the oceans is less clear-cut, undoubtedly because it raises the question of the antipodes. Fillastre claims that the ocean is contin-

124. The list of place-names has been published in several stages: G. Waitz, "Des Claudius Clavius Beschreibung des Skandinavischen Nordens," *Nordalbingische Studien* 1 (1884): 175–90, esp. 183–90, and Storm, "Der danske Geograf Claudius Clavius," 24–34. Bjørnbo and Petersen are the only ones to give a correct edition of the two recensions, plus a full commentary (*Claudius Clausson Swart*, 107–52). The map in the Nancy manuscript has often been reproduced: in addition to figure 60.3 in this volume there is an engraving in Waitz and in Blau, "Supplément du mémoire," pl. III; a black and white photograph in d'Ailly, *Ymago Mundi*, vol. 3, pl. XXX; and a color photograph in Gentile, *Firenze*, pl. XVIII, and Gautier Dalché, "L'œuvre géographique" (reprint, 302–3).

125. Bjørnbo and Petersen, *Claudius Clausson Swart*, 144 and 146.

126. Storm mentions the Itinerary of Bruges in "Claudius Clavius," 19. With respect to the Scandinavian peninsula, Nansen has also pointed out the strong resemblance between certain outlines and those given in the Medici Atlas. Fridtjof Nansen, *In Northern Mists: Arctic Exploration in Early Times*, 2 vols., trans. Arthur G. Chater (London: Heinemann, 1911), 2:256–76; see also Joseph Fischer, *Die Entdeckungen der Normannen in Amerika: Unter besonderer Berücksichtigung der kartographischen Darstellungen* (Freiburg: Herder, 1902), 67–70.

127. Sometimes Claudius Clavius is even defined, rather excessively, as a "mathematician." For example, he is called "the Danish mathematician" by Carl Enckell in "Aegidius Tschudi Hand-drawn Map of Northern Europe," *Imago Mundi* 10 (1953): 61–64.

128. Commentary and edition in Gautier Dalché, "L'œuvre géographique."

129. In the version sent to the Reims canons, Fillastre makes reference to three world maps, one of which is the world map accompanying the text, painted within the initial "O" of "De chorographia" (Reims, Biblioteca Municipale, 1321, fol. 13r; Gautier Dalché, "L'œuvre géographique" [reprint, 309]); the other two were in Reims—one at Fillastre's home, the other in the Chapter Library (Gautier Dalché, "L'œuvre géographique," 356 [reprint, 329]). This last, painted on the skin of a "sea horse" and bearing the coat of arms of the cardinal, was still extant in the seventeenth century; see Guillaume Marlot, *Metropolis Remensis historia: A Frodoardo primum arctius digesta, nunc demum aliunde accersitis plurimum aucta . . .*, 2 vols. (Reims: P. Leloirain, 1666–79), 2:694. There is no evidence to support Fischer's claim that this map was sent to the chapter along with the *Geography* of Ptolemy; see Joseph Fischer, "Fillastre [Philastrus], Guillaume," in *The Catholic Encyclopedia*, 15 vols., ed. Charles G. Herbermann (New York: Robert Appleton, 1907–12), 6:74–75. Of the other manuscripts of the "Introductio," only that which belonged to Cardinal Orsini has maintained its *figura*. Located at the end—before the "De chorographia"—it is a summary of the ideas developed; it is rectangular and based on a Ptolemaic model (BAV, Arch. di San Pietro H 31, fol. 8v, and David Woodward, "Medieval *Mappaemundi*," in *HC* 1:286–370, esp. 310 and 316).

130. Cf. Fillastre's introduction, 8–13, 42; see Gautier Dalché, "L'œuvre géographique," 357–59 and 364 (reprint, 331–32 and 337). In particular, this takes up the arguments on the transit of the sun that Pierre d'Ailly had developed in his "Compendium"—proof that this passage in the *Geography* had made a particular impression on them.

131. Fillastre's introduction, 10 and 44; see Gautier Dalché, "L'œuvre géographique," 358 and 365 (reprint, 331 and 337).

uous and denies the existence of an equatorial ocean (“in modum zone”) that would have interposed an insuperable barrier to the spread of Adam’s descendants throughout the globe (a criticism first put forward by Saint Augustine). Like Roger Bacon and Pierre d’Ailly, Fillastre proposes that the ocean is navigable from west to east, from Europe to Asia.<sup>132</sup> However, following Pliny and Pomponius Mela, he also claims that the ocean is navigable southward, from the Red Sea around to the Strait of Gades (Gibraltar).<sup>133</sup> This circumnavigation of Africa contradicts the picture of the world given in Ptolemy’s world map. It is possible, however, that this is only an apparent contradiction, and that Fillastre had reflected on the doubts raised by the Ptolemaic picture. In Fillastre’s copy of the *Geography*, now in Nancy, there is a marginal note underlining the possibility expressed in the translation, that at one point the ocean does extend beyond the enclosing landmasses—evidence that such an idea had struck the reader (perhaps Fillastre himself).<sup>134</sup>

Adopting the same approach as Pierre d’Ailly, therefore, Fillastre uses the *Geography* to complete or modify the image of the world that emerges from Latin authors, not to replace it as obsolete. However, the comparison also gives rise to important methodological and epistemological considerations. This is particularly clear at the end of his introduction to Pomponius Mela, where the conclusions regarding the navigability and inhabitability of the globe come after a series of comments on the non-realistic way in which the round *mappamundi* depicts the ocean. This, it is pointed out, is not always close to known lands and peoples; it might in places make deep indentations into landmasses, and the circular form is due only to the scale (“loci paruitatem”).<sup>135</sup>

So Fillastre’s introduction to a reading of the Latin geography of Pomponius Mela is not a critique of the circular representation of the inhabited earth; if Fillastre had rejected this, one could not explain why he used such a map for demonstrative purposes, completing it with mentions of *terrae incognitae*. Rather, his introduction is an analysis of the fact that a cartographic representation is necessarily arbitrary and based on convention. A confirmation of this comes from the instructions for use of the regional maps in the Nancy manuscript of the *Geography*, which offers an explanation of the relation between regional maps and world maps (and of the possibility of variations in scale) and a technical remark on the constraints imposed by the use of parchment and the codex format when drawing the maps.<sup>136</sup>

One can see common ground between d’Ailly and Fillastre in their use of the *Geography*. Both are primarily concerned with the compatibility of Ptolemy’s world image with that which they have learned from Latin geographers and from their study of circular *mappaemundi*. Both are aware of the conventional character of all car-

tographic representations. It is probable that the two men actually discussed their opinions of the work of the Alexandrine. And yet there is a difference between them. Although astrological considerations seem to be paramount to d’Ailly, Fillastre engages in a purely geographical discussion of the text, considering the content and the form of the representation. Fillastre’s reflections on Ptolemy are a remarkable anticipation of things to come. However, the problems relating to cartographic projection seem to have interested the two men no more than they did the Florentine humanists. It was a third man, a man who probably knew Fillastre, who would first mention the questions raised by plane-surface cartography.

Born in the diocese of Reims toward the middle of the fourteenth century, Jean Fusoris was the son of a pewter-smith. He qualified as a doctor in 1398 and thereafter worked at the Faculté des Arts in Rue du Fouarre, commenting on Johannes de Sacrobosco’s *Tractatus de sphaera*. In 1404 Fusoris was appointed to a canonry at Reims, undoubtedly implying that he would have heard of the geographical interests of his fellow canon Guillaume Fillastre. The thing that distinguishes Fusoris from his two illustrious contemporaries discussed earlier is that, in addition to being a scholar, he was a technician who produced and sold astronomical instruments, attracting a distinguished clientele for his astrolabes, sun-

132. “So it is that they say that [the ocean] indeed can be navigated from west to east through the area opposite us and conversely, a thing which is believable, although we know that it is not at all tested.” Gautier Dalché, “L’œuvre géographique,” 359 (reprint, 332).

133. Fillastre’s introduction, 13 and 46; see Gautier Dalché, “L’œuvre géographique,” 359 and 365 (reprint, 332 and 337).

134. Jacopo Angeli’s text reads: “The known part of that land has a position so that the ocean itself indeed does not, to any extent, flow around [the land] except only in the parts described [or drawn] in the land of the Raptum promontory from part of Africa and Europe similar to the traditions of the ancients” (7.7); and the note reads: “Note that the ocean does not flow around [the] inhabitable land *but [Ptolemy] doesn’t reject [negat] that [i.e., the fact that the ocean doesn’t flow around the known world] in all parts [of the known world]”* (Reims, Biblioteca Municipale, 1320, fol. 213v). Both are written in the same hand.

135. Fillastre’s introduction, 40–43; see Gautier Dalché, “L’œuvre géographique,” 364–65 (reprint, 336–37).

136. “And, if you wish, you will be able to compare those maps with the entire map placed above [in this book], which is divided into twenty-six maps, so that any region may be inspected more fully in great rather than limited detail. For any of those maps can become as large as the entire map.” And later: “Also note that when a map has two pages, it must be held as if the picture were joined together. Thus does an empty space between two leaves make no difference. In addition, there should be painting on only one side, because the parchment was not able to hold a picture of the sea on each side, there being too much moisture in the picture. For this reason the picture was on only one part, on thick parchment, which later was erased and made thin.” Nancy, Bibliothèque Municipale, MS. 441, fol. 162r; see Gautier Dalché, “L’œuvre géographique,” 372–73 (reprint, 345).

dials, clocks, and (one) equatorial.<sup>137</sup> This rather unusual combination of scholarship and technical skill resulted in his drawing up various texts relating to such instruments.

For example, Fusoris was the author of a treatise on the sphere that was delivered to the canons of Metz in 1432.<sup>138</sup> The text itself is nothing but a commonplace commentary on Sacrobosco, complete with thoughts on free will, celestial influences, and the ascension of souls to heaven through the spheres. However, two striking details emerge: Fusoris knew the *Geography*, which he described at the end of a chapter on the spherical form of the earth, and he knew that the time of an eclipse varies according to meridian. He wrote:

And this technique amongst others the wise Ptolemy used in compiling a table of the longitudes and latitudes of cities, and in making his book of the mappemonde which is in the library of Notre Dame de Reims, and also in making the book of marine chart, because he sent several learned astrologists east and west to different cities, who, through the above-mentioned technique took first the longitude of the cities—that is, which city was more to the east or to the west, and by how much and to what degree. And also by using the astrolabe and other instruments of astrology, they took the elevation of the North Star or of another fixed star, and so they had the latitudes of the cities too . . . and thus they had their exact situation on the earth. And the same for the islands of the sea in order to make the true marine chart.<sup>139</sup>

Fusoris saw the book given by Fillastre, mentioning it as “the book of the mappemonde”—the same expression used in the account of the interrogation of Pietro Sacchi of Verona. It is not certain, however, that he was able to inspect Ptolemy’s maps, because he mentions that the Alexandrine scholar produced a “marine chart.” At first one might think he is giving voice to a rather archaic view of Ptolemy as the organizer of a team of astronomers. However, the expression “the true marine chart” seems, rather, to evoke a visual image designed to convey an idea of extreme exactitude rather than to refer to an actual object that he would have naively assumed that Ptolemy had produced.

Fusoris’s treatise continues with a discussion of the rendition of a sphere on a plane surface—that is, the technique of “projection”: “It should be known to those who want to produce an accurate and precise mappemonde or marine chart, that this is something that can be very well done on a instrument that is round, like a ball. But [to] those who want to do it properly on a plane surface like a sheet of parchment, then it must done using the instrument of the *saphea* [universal astrolabe]. Because in this way one can correctly render the round on the flat.”<sup>140</sup> “Render the round on the flat” is the first registered reaction to one of the essential aspects of the *Geography*. It presupposes that Fusoris read the *Geography* with suffi-

cient care to work out that stereographic projection of the heavens on a universal astrolabe (the *saphea*), in which the meridians intersect at the pole and the parallels are rounded, can be seen as analogous to Ptolemy’s second “projection.”

Fusoris seems to have been certain that spherical representation was the best form of representation. This, besides his technical skill, distinguished him. He stated that he had produced “a round ball” to illustrate “the thought experiments” proposed to the canons in order to show the way time varies with longitude.<sup>141</sup> Complete with meridians, parallels, the limits of the *climata*, and various images whose precise nature is not clear, this sphere was intended to show the outline of the continents in opposition to the seas; the city of Arin, the earthly paradise; and the eastern and western extremities of the known world. In this, Jean Fusoris had produced the oldest known non-classical version of a terrestrial globe (1432).<sup>142</sup>

#### In Germany (ca. 1420–ca. 1450)

According to a so-far-unchallenged version of events, consideration of Ptolemy in German-speaking countries

137. On the career and works of Jean Fusoris, see Emmanuel Poulle, *Un constructeur d'instruments astronomiques au XV<sup>e</sup> siècle Jean Fusoris* (Paris: Librairie H. Champion, 1963), and idem, “Un atelier parisien de construction d'instruments scientifiques au XV<sup>e</sup> siècle,” in *Hommes et travail du métal dans les villes médiévales: Actes de la Table ronde La métallurgie urbaine dans la France médiévale*, ed. Paul Benoit and Denis Cailleaux (Paris: A.E.D.E.H., 1988), 61–68. On the aspects of his work discussed here, see Patrick Gautier Dalché, “Un astronome, auteur d'un globe terrestre: Jean Fusoris à la découverte de la *Géographie* de Ptolémée,” in *Guillaume Fillastre*, 161–75.

138. The treatise has been published: Jean Fusoris, *Traité de cosmographie: Edition préliminaire*, ed. Lars Otto Grundt (Bergen: Université de Bergen, 1973). My quotes are from the single Paris manuscript, BNF, français 9558.

139. BNF, français 9558, fol. 9v.

140. BNF, français 9558, fol. 9v–10r.

141. BNF, français 9558, fols. 12v and 13v.

142. Up to the present, the oldest globe has been considered that produced by the astronomer Guillaume Hobit for Philip the Good, duke of Burgundy, between 1440 and 1444. Jacques Paviot, “La mappemonde attribuée à Jean Van Eyck par Fàcio: Une pièce à retirer du catalogue de son œuvre,” *Revue des Archéologues et Historiens d'Art de Louvain* 24 (1991): 57–62, and idem, “Ung mapmonde rond, en guise de Pom(m): Ein Erdglobus von 1440–44, hergestellt für Philipp den Guten, Herzog von Burgund,” *Der Globusfreund* 43–44 (1995): 19–29. For comments that contradict this, see Marina Belozerskaya, “Jan van Eyck’s Lost *Mappamundi*—A Token of Fifteenth-Century Power Politics,” *Journal of Early Modern History* 4 (2000): 45–84. There is a known link between Fusoris and the Burgundy court: his pupil, Henri Arnaut de Zwolle, became cartographer to the duke. Poulle, *Un constructeur d'instruments astronomiques*, 27; H. Omont, “Maître Arnaut, astrologue de Charles VI et des ducs de Bourgogne,” *Bibliothèque de l'École des Chartes* 112 (1954): 127–28; and Jean Richard, “Aux origines de l'École de Médecine de Dijon (XIV<sup>e</sup>–XV<sup>e</sup> siècles),” *Annales de Bourgogne* 19 (1947): 260–62.

would very quickly lead to the emergence of a movement that has been called, since Durand wrote his book on the subject, the “school” of the University of Vienna and the nearby monastery of Klosterneuburg. This movement became famous for the scientific studies that flourished in and around Vienna in the second quarter of the fifteenth century, thanks largely to the input of two figures: Johannes von Gmunden, a teacher at the university, and Georg Müstinger, a prior at the monastery.

Durand's book is to be read bearing in mind the author's explicit intention of casting light on one early aspect of the reception of Ptolemy's *Geography* and thence highlighting the role “northerners” played in that reception.<sup>143</sup> Durand outlines three stages in the development of this particular “school of cartography,” which covered a period from the early 1420s to the death of the prior of Klosterneuburg in 1442.<sup>144</sup> The first stage was characterized by the production of cartographic works without the aid of the *Geography*; according to Durand, the school, using the maps available (*mappaemundi* and marine charts), produced a sort of azimuthal projection modeled on that used in celestial cartography. Then, from 1430 onward, Durand claims that the study of Ptolemy stimulated the accumulation of coordinates and the measurement of distances, together with an analysis of the problems relating to projection and the production of original maps. Finally, in the third stage, “the first map of central Europe” would be produced. Things were actually much more complex than is suggested by Durand's interpretation, which is based on the conjectural dating and attribution of manuscripts and hypothetical links between authors and manuscripts that have not been confirmed by factual evidence.<sup>145</sup>

We know very little of the supposed cartographic activities at Klosterneuburg. The monastery accounts do include various entries in 1422 and 1423 for a *mappa*,<sup>146</sup> and Müstinger is also said to have had books bought in Padua in 1421, but the claim that one of those books was the *Geography* is nothing more than a supposition.<sup>147</sup> The first certain date we have for the presence of Ptolemy's work at Klosterneuburg is 1437, the date of the manuscript copy in Vienna.<sup>148</sup> In that manuscript, the *Geography* appears without maps and is associated with various astrological texts, such as works by Pierre d'Ailly on the relation between astronomy and theology, the “*Almagestum parvum*” (that is, the Arab-Latin translation of Geminus's *Introduction to Phaenomena*), and the “*Theorica planetarum*.”<sup>149</sup> There is also another extant manuscript of the *Geography* that was produced at the monastery in 1442 by Conrad Roesner.<sup>150</sup> Starting from this realistic outline of the situation, a revised picture emerges. While there were some original aspects to the reception of Ptolemy's work in German-speaking countries, one cannot identify these as characteristic of a specific “school.”

Evidence for the initial reception of the *Geography* comes from three manuscripts that, to all intents and purposes, contain the same material (in Wolfenbüttel, Brussels, and Munich). The first is post-1422 but of unknown date or provenance, the second originated in Cologne but is of unknown date, and the third was written between 1447 and 1451 by a certain Fridericus, a monk at St. Emmeran in Ratisbon. All in all, it would seem that these Ptolemaic texts and tables can be dated to between about 1420 and the middle of the fifteenth century.<sup>151</sup>

The Wolfenbüttel manuscript is the most complete and seems closest to the original work. At the beginning of the text of the *Geography* there are a number of marginal glosses, some of which refer back to the *Almagest*.<sup>152</sup> The most extensive of these notes develop into fully fledged commentaries occupying the entire margin. In the first quire, three double sheets have been added containing

143. Dana Bennett Durand, *The Vienna-Klosterneuburg Map Corpus of the Fifteenth Century: A Study in the Transition from Medieval to Modern Science* (Leiden: E. J. Brill, 1952), 28–29. Résumé by Woodward in “Medieval *Mappaemundi*,” 316–17. See also chapter 10 in this volume, p. 378.

144. See the summary in Durand, *Vienna-Klosterneuburg Map Corpus*, 123–27.

145. I am presently preparing a critical assessment of Durand's work.

146. Berthold Černík, “Das Schrift- und Buchwesen im Stifte Klosterneuburg während des 15. Jahrhunderts,” *Jahrbuch des Stiftes Klosterneuburg* 5 (1913): 97–176, esp. 110 and 144.

147. See, for example, Helmuth Grössing, *Humanistische Naturwissenschaft: Zur Geschichte der Wiener mathematischen Schulen des 15. und 16. Jahrhunderts* (Baden-Baden: V. Koerner, 1983), 77.

148. ÖNB, 5266.

149. Description in Otto Mazal, Eva Irblich, and István Németh, *Wissenschaft im Mittelalter: Ausstellung von Handschriften und Inkunabeln der Österreichischen Nationalbibliothek Prunksaal, 1975*, 2d ed. (Graz: Akademische Druck, 1980), 220–21. According to Grössing, the manuscript includes glosses by Regiomontanus on fols. 147r, 149v, and 161v (Grössing, *Humanistische Naturwissenschaft*, 138). In effect, the handwriting on fols. 147r and 149v is similar to his; this is less clear with that on fol. 161v. Another note on fol. 133v is by the same hand, as are the legends for the schema of the second “projection” on fol. 92r. As for the “Trier and Koblenz” fragments, which Durand argued were part of this codex, see pp. 1179–80 in this volume.

150. ÖNB, 3162. Durand, *Vienna-Klosterneuburg Map Corpus*, 58 and 126; Grössing, *Humanistische Naturwissenschaft*, 77; and compare Fritz Saxl, *Verzeichnis astrologischer und mythologischer illustrierter Handschriften des lateinischen Mittelalters*, vol. 2, *Die Handschriften der National-Bibliothek in Wien* (Heidelberg: C. Winter, 1927), 126.

151. These three manuscripts of Ptolemy's *Geography* are identified as follows: Wolfenbüttel, Herzog August Bibliothek, Cod. 354 Helmstedt (fols. 2v–18v); Brussels, Royal Library of Belgium, 1041 (fols. 205r–206v); and Munich, Bayerische Staatsbibliothek, Clm 14583 (fols. 128v–30r and 131v–132v). Other manuscripts perhaps contain parts of this ensemble of material: Munich, Universitätsbibliothek, 4° 746, and Sankt Paul im Lavantthal, Stiftsbibliothek, 27.3.16. Clm 14783 is in Fridericus's hand and gives only tables. ÖNB, 3505, and BAV, Pal. Lat. 1375, are later and do the same.

152. There are glosses on 1.3 (fol. 6v); 1.6.3 (fol. 7r); 1.10 and 12 (fol. 10r); 1.20.6 (fol. 13r); 1.21 and 22 (fol. 13v); 1.23 (fol. 14r); and 1.24 (fol. 14v–15v).

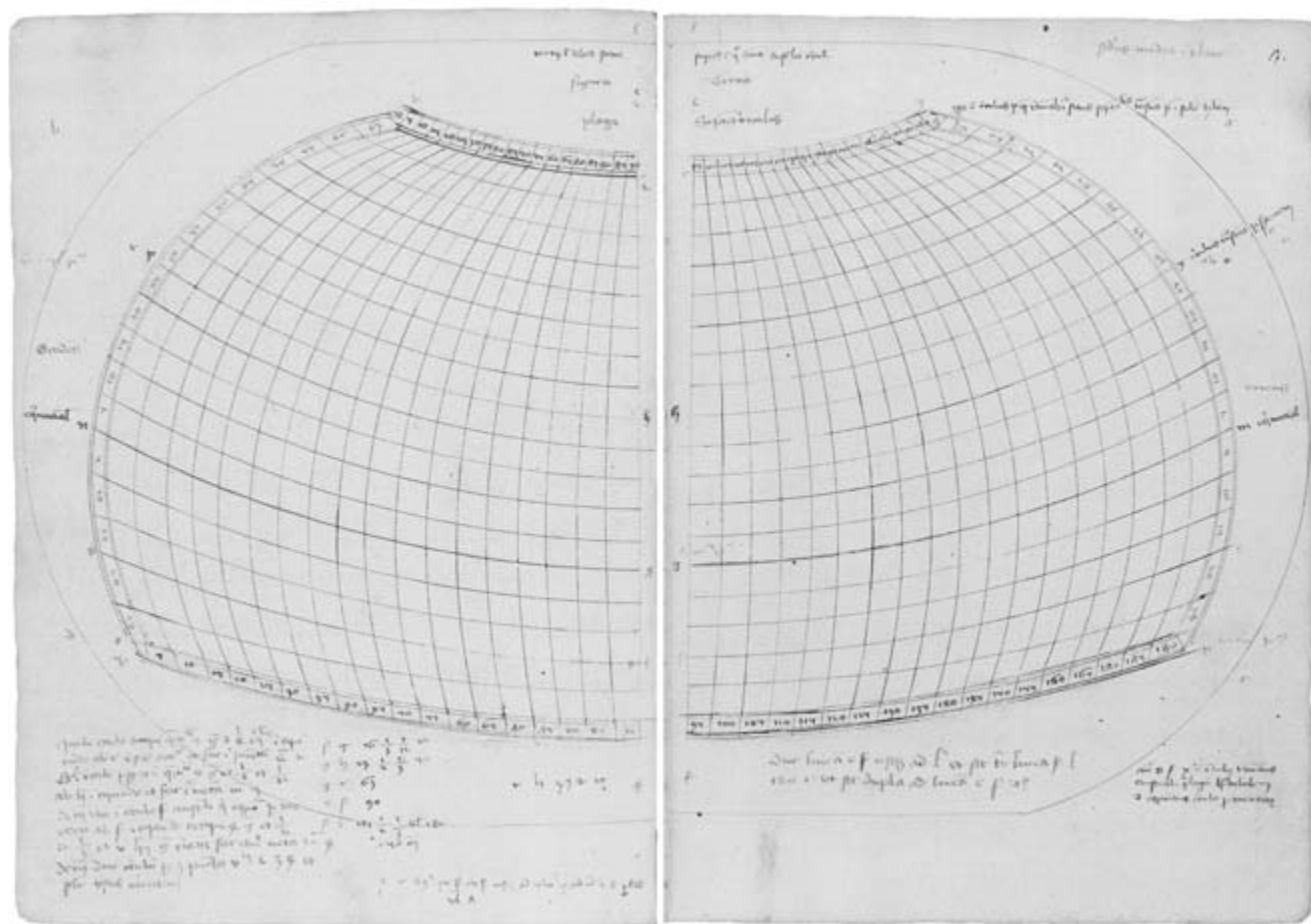


FIG. 9.5. PTOLEMY'S SECOND PROJECTION WITH ANNOTATIONS. An example of precocious scientific work about modes of projection in Germany, early fifteenth century.

Photograph courtesy of the Herzog August Bibliothek, Wolfenbüttel (Helmstedt 354, fols. 16v–17r).

notes in the same hand as the marginal glosses, together with diagrams of the first two types of “projection”<sup>153</sup> and calculations of the relation between parallels and the equator (fig. 9.5). The author tries to explain Ptolemy’s geometrical calculations in this chapter in order to help the reader understand the ways in which the maps have been constructed. Moreover, the preliminary sheets contain definitions of units of measure; geographical terms, and the names of populations (fol. 2r), mostly drawn from the Greek; and two lists of coordinates relating to the modern cities and sites of western and central Europe, these not taken directly from Ptolemy (fols. 2r–3v).<sup>154</sup> The place-names in the two tables are classified in sections according to geographical area. According to Durand, the coordinates all come from the same map, whose construction he pieces together in a confusing fashion, arguing that “Ptolemy’s map of Europe”<sup>155</sup> was filled in using points whose coordinates were established using various procedures (astronomical observation and triangulation).<sup>156</sup> In fact, in each of the tables the same city can appear two or

153. On fol. 1v there is an outline of the first mode of “projection” covering ninety degrees of longitude and ranging from forty to sixty-three degrees of latitude.

154. Edition by Durand, *Vienna-Klosterneuburg Map Corpus*, 346–61.

155. The resemblance to a Ptolemaic map is obviously enhanced by the fact that Durand’s reconstruction uses a network similar to that used in the first mode of Ptolemaic “projection,” but with widely separated parallels (pl. IV). In an earlier reconstruction, Durand used a network similar to that in the so-called Marinus projection; see Dana Bennett Durand, “The Earliest Modern Maps of Germany and Central Europe,” *Isis* 19 (1933): 486–502. The northeast shift in the Baltic—which is one of the arguments in favor of a Ptolemaic origin for the work—thus appears in the second reconstruction but not in the first. It is legitimate to wonder about the reasons for this change in the second reconstruction, which so conveniently bears out his argument. Moreover, Durand does not explain why he has chosen such a version of the table for his reconstruction, even if the coordinates are different from those in other versions.

156. According to Durand, the Brussels manuscript, Royal Library of Belgium, 1041, fol. 104v, contains “a kind of triangulation” that he claims was used in working out coordinates (Durand, *Vienna-Klosterneuburg Map Corpus*, 363). However, all it does is give the distances between various cities.



even three times with different coordinates, and there are no truly Ptolemaic coordinates as such.<sup>157</sup> All that one can say for certain is that marine charts may have been used to calculate certain coordinates—most notably, those of the British Isles.<sup>158</sup> But the important fact is that these lists of place-names are offered as aids to the reading of the *Geography*, to the clear understanding of its content. Certain evidence would seem to suggest that each of the three manuscripts, in slightly different forms, reproduces a veritable commentary on the *Geography*,<sup>159</sup> and accompanying each are additional works that complete Ptolemy's exposition. The Brussels manuscript may even refer to the construction of a real map.<sup>160</sup> However, none of the three seems to contain the original text of this commentary, just as none of them seems to have been copied from one of the others. In these circumstances, it would take some temerity to give a definite name to the author.<sup>161</sup>

And so, unlike France and Italy, Germany was even at this early date showing an interest in the “mathematical” aspects of the *Geography*, although these considerations have come down to us only in fragments. Nevertheless, it remains a fact that interest in the *Geography* was still dominated by astronomical/astrological considerations, as one can see from the very distinctive copy in the Munich manuscript, which ends with these words: “Here ends the eighth book of the Cosmography according to astronomical longitude and latitude.”

#### THE COUNCIL OF FLORENCE AND THE QUESTION OF THE INHABITABLE AREAS OF THE GLOBE (1439–41)

The Frenchmen d'Ailly and Fillastre, whose work was previously analyzed, have two things in common that distinguish them from their Italian contemporaries. These similarities explain why it was not the milieu that had initially promoted the translation that became the center of the discussion concerning the “scientific” aspects of Ptolemy's work. In effect, the Frenchmen had all passed through the Faculté des Arts, where they had acquired some knowledge of astronomy and astrology thanks to the study of Johannes de Sacrobosco's treatise on the sphere, Aristotle's *Meteorologica*, Ptolemy's *Almagest*, and those parts of the *Quadripartitum* that dealt with astrological geography and the commentaries thereon that were translated from the Arabic. Hence, the French would undoubtedly have been more aware of questions relating to cosmography in the widest sense, and more attentive to the precise problems raised by the comparison of Ptolemy's world image with the one that emerged from the teachings of Latin writers.

However, the Florentines very quickly made up for lost ground in this area. As Gentile has shown, Niccolò Niccoli may be considered the driving force behind the first period of the *Geography*'s reception, a reception largely

predicated on antiquarian and philological concerns. After Niccoli's death in 1437, however, things seemed to have changed noticeably. This can be seen from the discussions relating to the distant regions of the world—most notably, Ethiopia—that involved some of the delegates to the Council of Florence.

In his “Historiarum ab inclinatione Romanorum imperii Decades” (1453), Flavio Biondo gives an account of the mission of Alberto da Sarteano, a Franciscan monk who had been a pupil of Guarino da Verona<sup>162</sup> and in 1439 was commissioned by Pope Eugene IV to carry a letter to the Ethiopians in hopes of bringing back to the bosom of the Church those African and Asian peoples who had strayed. The Franciscan returned in 1441, in the company of eight monks—four of whom were Copts from Cairo, four Ethiopians from Jerusalem. One of these latter four informed the pope that Ethiopia “was situated almost outside the world,”<sup>163</sup> and as a result of this dec-

157. Contrary to what is claimed by Durand, who gives only two examples: Cologne and Albenga (whose coordinates do not correspond exactly with those in Ptolemy).

158. Durand, *Vienna-Klosterneuburg Map Corpus*, 143.

159. Fol. 206v of the Wolfenbüttel manuscript has the usual layout of a commentary, with the lemma from the text on fol. 206v (“Et diuidatur etc.,” 1.24.1) followed by explanations regarding this point in the construction of the network to be used in the first mode of “projection.”

160. In fact, on fol. 205v is a passage that reads: “Likewise, once the cloth has been divided into four [parts], divide the whole width of the cloth into 9 and the whole length into 12, of which parts leave 1/9th in the north of the quadrant and 2/9ths below at the south of the quadrant, and so it is, with the presumption that the divisions are equal everywhere.”

161. Because in the Munich manuscript the same tables are preceded by a title that Durand transcribes thus: “Illas latitudines . . . rescriptas per Magistrum Reinhardum,” he can attribute the whole of the Wolfenbüttel manuscript to this Reinhardus, whom he identifies with Reinhard Gensfelder of Nuremberg (Durand, *Vienna-Klosterneuburg Map Corpus*, 44–48) and the “magister Reinhardus” to whom Georg Müstinger allocated paper in 1442. However, the attribution to this figure of one or the other parts of the Wolfenbüttel manuscript is impossible: no copyist's name is given, and it is written in various hands. The hand that copied the tables of coordinates is different from that of the notes on projections and from that of the copyist of the *Geography*; compare this with the claims made in Durand, *Vienna-Klosterneuburg Map Corpus*, 125 and 155. What is more, the title of the Munich manuscript is actually “Illas longitudines et latitudines ciuitatum et insularum inueni extra viii librum et illas rescriptas per magistrum Reynhardum.” The words that Durand omits make it clear that the two tables recopied are not the coordinates of *magister* Reinhardus. Here again, it is legitimate to wonder precisely why the quotation was abridged. Finally, there is no evidence for the claim that “Reinhard” Gensfelder introduced the *Geography* to Klosterneuburg (Durand, *Vienna-Klosterneuburg Map Corpus*, 125, and Grössing, *Humanistische Naturwissenschaft*, 130).

162. Bartolomeo Nogara, ed., *Scritti inediti e rari di Biondo Flavio* (Rome: Poliglotta Vaticana, 1927), 19–27. See also Gentile, *Firenze*, 168–70.308

163. This phrase may be due to the erudition of the Latin interpreter, who thus attempts to make up for the scanty linguistic abilities mentioned by Biondo (Nogara, *Scritti inediti*, 22).

laration, a group of three cardinals (an Italian, a Frenchman, and a Castilian) were appointed to question the new arrivals through rather inept translators. Flavio Biondo gave a significant summary of their questions: they wanted to know “the appearance of the sky in their region, the climate it belonged to, [the position] of the equator, the difference in days and nights, the conditions of the ocean and their ancient history.” Thus they were concerned with the very position of Ethiopia in the *imago mundi*, a concern arising not only from considerations of astronomy and cosmography but also from the country’s appearance in the world of classical antiquity as described by the *auctores*. When the Ethiopians answered that their country was immense and stretched as far as India, they were met with a reference to the fact that Ptolemy, “a most skilled measurer of lands and heavens, who enjoyed great authority among the Greeks and us ourselves,” had separated Ethiopia and India by two gulfs, one sea, and various regions of land. His map was at the basis of this opinion, and the objection raised by the cardinals reflects not only the verdict of “Romanae et Graecae historiae peritiores” but also the fact that Ptolemy was considered a sovereign authority. If what the Ethiopians said was true, how was one to explain classical antiquity’s ignorance? Before having the Ethiopians answer, Biondo outlined the basis for this opinion of the ancients by saying that everything to the south of Meroë, which Ptolemy identifies as “terra Aethiopiae incognita,” had to be uninhabited.<sup>164</sup>

A large number of humanists seem to have shared such a concept of world geography and cartography, seeing Ptolemy as a sovereign authority. Biondo begs to differ, bringing forward the arguments Fillastre had raised a dozen or so years before: “We know very well,” wrote Biondo, “that Ptolemy was ignorant of many things in the North, most notably the fifty islands beyond the British ocean and the gulf similar to the Adriatic, whose shores are inhabited by Christian peoples.” Were those “islands” intended as a reference to Greenland? Whatever the answer, we know that the gulf Biondo was referring to was undoubtedly the Baltic. It is possible that he was familiar with the Claudius Clavus map (a copy is known to have been present in Florence during the time of the council). The conclusion he draws from these observations is that “this Ptolemy, who only knew the smallest initial part of Ethiopia—that contained within Egypt—could not but be ignorant of the regions and kingdoms that lie beyond.”<sup>165</sup>

Biondo was not the only one whose curiosity about the contemporary world was stimulated by a reading of the ancients. Poggio, who had just received Niccolò de’ Conti’s account, also interrogated the Ethiopians about the source of the Nile. His questions reveal a clear attempt to update Ptolemy and classical geography on the basis of contemporary source material, and to use his own work

in order to increase knowledge of the world.<sup>166</sup> However, it was Ciriaco d’Ancona who most clearly showed a determination to follow in Ptolemy’s footsteps, thus revealing how the encounter between antiquarian interest and Ptolemy’s *Geography* could result in geographical research. Ciriaco is a particularly interesting figure because his background and intellectual training were rather different than those of his other humanist friends.<sup>167</sup> In fact, he had received the education of a merchant and was self-taught in the *studia humanitatis*, never mastering Greek and Latin perfectly. In the winter of 1429–30, during one of his numerous voyages to the Aegean, he visited Andrinople, where he purchased a number of Greek manuscripts that were part of the booty the Turks had seized at Salonica.<sup>168</sup> One of these was a copy of the *Geography*, a work to which he referred as a source of coordinates (thus revealing a noteworthy “mathematical” interest, which was rare at the time).<sup>169</sup> A number of Ciriaco’s contemporaries commented on his geographical knowledge. In a letter in the form of a *laudatio* dating from 1442, Jacopo Zeno, bishop of Padua, listed the works produced by Ciriaco, stressing his research into the layout of terrestrial

164. Quotations in Nogara, *Scritti inediti*, 22–24.

165. Quotations in Nogara, *Scritti inediti*, 24.

166. Poggio Bracciolini, *De varietate fortunae*, ed. Outi Merisalo (Helsinki: Suomalainen Tiedekatemia, 1993), 174.

167. See Jean Colin, *Cyriaque d’Ancone: Le voyageur, le marchand, l’humaniste* (Paris: Maloine, 1981), and Roberto Weiss, “Ciriaco d’Ancona in Oriente,” in *Venezia e l’Oriente fra tardo Medioevo e Rinascimento*, ed. Agostino Pertusi (Florence: Sansoni, 1966), 323–37; reprinted in Roberto Weiss, *Medieval and Humanist Greek: Collected Essays* (Padua: Antenore, 1977), 284–99. There is a long discussion of Ciriaco’s role in the developing interest in geography among the humanists in Giuseppe Ragone, “Umanesimo e ‘filologia geografica’: Ciriaco d’Ancona sulle orme di Pomponio Mela,” *Geographia Antiqua* 3–4 (1994–95): 109–85.

168. Francesco Scalamonti, *Vita viri clarissimi et famosissimi Kyriaci Anconitani*, ed. and trans. Charles Mitchell and Edward W. Bodnar (Philadelphia: American Philosophical Society, 1996), 57, 124–25, and 153 n. 101. Harflinger says the writing on the maps in the Vienna manuscript, ÖNB, Hist. Gr. 1, and that on the (Latin) maps in the Florence manuscript, Biblioteca Medicea Laurenziana, Edili 175, is Ciriaco’s; see Dieter Harflinger, “Ptolemaios-Karten des Cyriacus von Ancona,” in *ΦΙΛΟΦΡΟΝΗΜΑ: Festschrift für Martin Sichel zum 75. Geburtstag: Von Textkritik bis Humanismusforschung*, ed. Dieter Harflinger (Paderborn: Schöningh, 1990), 225–36. Gentile has shown that the maps in the former are the work of Giovanni Scutariote, who also copied out the text; as to the latter, it is in the hand of Giorgio Antonio Vespucci (Gentile, *Firenze*, 80–82 and 193–95, and idem, “Emanuele Crisolora,” 295).

169. In 1440, in the letter of dedication (to Marino de Resti of Ragusa) accompanying the treaty between Ancona and Ragusa, Ciriaco mentions the coordinates of Epidaurus and Ancona (Ragone, “Umanesimo e ‘filologia geografica,’” 126); those for Ancona are also given in his “Itinerarium,” where he recalls that Ptolemy—defined as “mathematicus clarissimus”—mentions the place three times in the *Geography* (3.1.18; 40; 8); see Ciriaco d’Ancona, *Kyriaci Anconitani Itinerarium*, ed. Lorenzo Mehus (Florence: Joannis Pauli Giovannelli, 1742), 41–42.

space based on a knowledge of astronomy.<sup>170</sup> Another significant comment comes from Antonio Leonardi, a Venetian cartographer (who is discussed in greater detail later). In a letter of 1457, Leonardi says of Ciriaco's voyages, "He wandered through nearly all the world."<sup>171</sup> And Ciriaco's biographer not only listed his voyages but also emphasized the thirst for knowledge of a person "who, alone in the world, after the distinguished geographer Claudius Ptolemy the Alexandrine . . . dared to travel, see and explore this world . . . and, as I have often heard from his own lips, everything that is in this world that lies toward the most distant promontories of the ocean, and even as far as the island of Thule and the other withdrawn parts of the world, he had set himself to see and to examine."<sup>172</sup>

In effect, allowing for all rhetorical exaggeration, what we have here is a new Ptolemy; and with the arrival of the Ethiopian emissaries, Ciriaco attempted to fulfill part of the task to which he had set himself. Less than two months later, he wrote Pope Eugene IV to inform him of a planned expedition into Africa, during the course of which he would meet King Constantine, the monarch who had sent the ambassadors. Although Ciriaco had been unable to reach the pyramids in a previous visit (in 1435 or 1436), this time he hoped to push much further south, to Syene, Meroë, and the sources of the Nile. He was planning a route that would take him by the Temple of Amun and enable him to reach Atlas and the Atlantic seaboard, where he would take ship again for Italy. From the place-names mentioned, it is clear that this journey was planned using a Ptolemaic map.<sup>173</sup> What was Ciriaco's goal in all this? Undoubtedly, one purpose was to inspect the monuments and inscriptions of antiquity (Ciriaco was a fervent collector). Another was to find the realm of Prester John, whose help might be sought against the Muslims. But there was also a further consideration: the desire to follow in Ptolemy's footsteps, literally, and through practical experience to complete and improve his work.<sup>174</sup>

Another figure who played an important role in this discussion of Ptolemy's world image was the teacher George Gemistus Plethon, whom Ciriaco had met in Greece and with whom he had studied Strabo's *Geography* while in Mistra, the Peloponnesian city where Plethon taught (we have a description of the Peloponnesus that the Greek drew on the basis of the *Geography*).<sup>175</sup> What is of most interest to us here, however, is a text from an autograph manuscript that was published by Diller in which Plethon uses Ptolemy to correct Strabo's errors with regard to the shape of the *oikoumene*.<sup>176</sup> We do not know the date of these extracts (the second chapter of which appears under the Greek title Διόρθωσις), but we know that they were drawn up after the Council of Florence. In fact, Plethon tells us that Paul the Florentine (Toscanelli) showed him a map from a man of Dateia,

which showed Hibernia and the British Isles, Thule and the coasts of Germany and Wenden, Scandinavia and Greenland—a description that enables us to recognize the copy of Claudius Clavus's map that was then in Florence.<sup>177</sup> More important, this map became the starting point for consideration of the extent of the inhabited earth. Plethon, in effect, continues with remarks on Russia, the Far East, and the western limit of the *oikoumene*, all drawn largely from Ptolemy.

The Council of Florence saw the arrival of Greeks, Armenians, the "Ruthenian" cardinal (Isidore of Kiev), Niccolò de' Conti, the Ethiopians, and emissaries from other far-flung regions—all of whom would stimulate discussion of the extent of the *oikoumene* and the boundaries enclosing it, with Ptolemy's *Geography* making an important contribution. While the Council of Constance had been concerned solely with the world of Catholic Christianity, this encounter with distant worlds opened up a second phase in the reception of Ptolemy's work. Let us return here to the debate that arose over the account of their land given by the Ethiopian ambassadors. The "Romanae et Graecae historiae peritiores," mentioned in

170. Ludwig Bertalot and Augusto Campana, "Gli scritti di Iacopo Zeno e il suo elogio di Ciriaco d'Ancona," *Bibliofilia* 41 (1939): 370–71.

171. Antonio Leonardi, letter to Felice Feliciano, a pupil of Ciriaco, 5 October 1457, in Scalamonti, *Vita*, 196. The editors do not identify Leonardi.

172. Scalamonti, *Vita*, 26–27.

173. The text of the autograph Florence manuscript, Biblioteca Medicea Laurenziana, XC inf. 55, was published partially and inexactly in C. C. van Essen, "Cyriaque d'Ancone en Egypte," *Mededelingen der Koninklijke Nederlandse Akademie van Wetenschappen, Afdeling Letterkunde* 21 (1958): 293–306, esp. 304–6. There are other versions, mentioned in Gentile, *Firenze*, 175–77 (the letter in the Florence manuscript is dated 1442 on p. 175 and 1441 on p. 177).

174. A forged inscription, which Ciriaco claimed to have taken from the Columns of Hercules, reveals a certain ironic assessment of his own aspirations: "Sanctified to the divine spirits of the dead, if you want, read, I, Heliiodorus the madman of Carthage, ordered them to embalm me in this sarcophagus at the edge of the world so that I might see if anyone more insane than I would come as far as this place in order to look upon me." *Corpus Inscriptionum Latinarum*, 2:18\* (149\*); see Roberto Weiss, *The Renaissance Discovery of Classical Antiquity* (Oxford: B. Blackwell, 1969), 141.

175. Gentile notes that the humanists' interest in Strabo and Diodorus Siculus was probably aroused by Plethon; see Sebastiano Gentile, "Giorgio Gemisto Pletone e la sua influenza sull'Umanesimo fiorentino," in *Firenze e il concilio del 1439: Convegno di studi*, ed. Paolo Viti, 2 vols. (Florence: L. S. Olschki, 1994), 2:813–32, and idem, *Firenze*, 168. The history of the Italian humanists' confrontation of Ptolemy's and Strabo's opinions has yet to be written; there are no real studies of the reception of Strabo.

176. Aubrey Diller, "A Geographical Treatise by Georgius Gemistus Pletho," *Isis* 27 (1937): 441–51; reprinted in *Studies in Greek Manuscript Tradition*, by Aubrey Diller (Amsterdam: Adolf M. Hakkert, 1983), 371–82. Compare Gentile, *Firenze*, 165–68.

177. Diller, "Geographical Treatise," 443.

Biondo's "Decades" as defending Ptolemy's opinions against accounts that seemed to contradict it, included contemporary humanists. However, Biondo, together with Poggio and Ciriaco d'Ancona, represented another current of humanism, with the same concerns yet with a more critical approach: Ptolemy was not an absolute authority, and it was legitimate to measure his maps against contemporary evidence of the world. Open-mindedness and close-mindedness were two positions that would become even more sharply drawn during the second half of the fifteenth century. For some Ptolemy would become an insuperable model, but others would use his maps as a means of exploring a yet-to-be-defined world that was gradually being extended by discoveries in the New World. Nevertheless, these two currents of thought did have one thing in common: questions relating to "projection," to how a sphere might be depicted on a plane surface, lay outside their range of interests, as they did for most humanists, leaving an essential part of the *Geography* yet to find a use. This situation was undoubtedly due to the abiding relevance of earlier modes of representation. No one thought that circular *mappaemundi* or marine charts had become obsolete. And, as we have seen, in 1432 Jean Fusoris took Ptolemy to be the author of a "book of marine chart," a misattribution that is most revealing about the ideas held by this maker of astronomical instruments, even if it is easy to see why Ptolemy and marine charts, both of which had an exactitude of representation, should be associated.

#### COMPARISONS BETWEEN PTOLEMY AND OTHER TYPES OF CARTOGRAPHY

##### In South Germany and Upper Austria (ca. 1450)

As we have seen, at a date probably fairly close to that of Angeli's translation of the *Geography*, a German scholar drew up a commentary dedicated to the geometry of modes of "projection." It would be interesting to have a name for this figure, and to know something about the milieu within which he was working. Although that is impossible, the tables of coordinates that were undoubtedly part of the commentary also appear in Munich scientific manuscripts copied by Fridericus, a monk at St. Emmeran in Ratisbon, whom documents show to have been at work between about 1445 and 1464.<sup>178</sup> One of these manuscripts was copied between 1447 and 1451 and is particularly important because it contains a compendium of texts on astronomy and geography—including the *Geography*—and lists of coordinates that later served as the basis for Durand's reconstruction of what he calls the Munich "cosmographies" and the "Klosterneuburg map of central Europe."<sup>179</sup> This ensemble of material deserves much more in-depth study.

Format and handwriting reveal that the text of the *Geography* in this manuscript was a working copy containing various omissions—subsequently made good—as well as *variae lectiones*, above all, in the figures given for the coordinates. In order to copy more quickly, Fridericus followed a system of conventions and symbols that he took from his original.<sup>180</sup> The text is disordered, with several blocks of the *Geography* (some containing repeated passages) separated by texts of various kinds, most notably descriptions of four maps that are very revealing of how the author viewed such artifacts.<sup>181</sup> The text makes an interesting point that the world drawn "after the art of geometry" (*durch punkten und parten*), which makes it possible to give the location of places, produces representations that are useful in enabling sovereigns to view the economic relations between kingdoms. Ptolemy is only a discrete presence in this description of the maps;

178. This Fridericus is named "Amann" by Durand on the basis of the final note on fol. 106v of the Munich manuscript, Bayerisches Staatsbibliothek, Clm 14504: "Conscriptum per fratrem Fridericum Aman" (Written by brother Fridericus). "Aman" is surmounted by a dash, which suggests it could be an abbreviation for "Amanuensis" (Grössing, *Humanistische Naturwissenschaft*, 128). Given the cursive nature of the handwriting, one could also read "Amen," a banal ending to the last page of a text. This Fridericus has been identified with the F. Gerhardt mentioned in the abbey records; see Bernhard Bischoff, *Mittelalterliche Studien: Ausgewählte Aufsätze zur Schriftkunde und Literaturgeschichte*, 3 vols. (Stuttgart: Anton Hiersemann, 1966–81), 2: 128–29. Recently it has been argued there were two "Friedrichs" at St. Emmeran, on the sole basis of the superscription to Clm 14504; see Elisabeth Wunderle, *Katalog der lateinischen Handschriften der Bayerischen Staatsbibliothek München: Die Handschriften aus St. Emmeran in Regensburg* (Wiesbaden: O. Harrassowitz, 1995–), 1:xiv. The Fridericus of Clm 14504 and 14583 is claimed to be the same as "Fridericus Ammon de Wysenfelt" who was enrolled in the Bavarian "nation" at the University of Leipzig in 1427; see Georg Erler, ed., *Die Matrikel der Universität Leipzig*, 3 vols. (Leipzig: Universität Leipzig, 1895–1902), 1:94. Bernleithner has attempted to give 1421 as the date of the Klosterneuburg "map of Central Europe" by "Fridericus de Klosterneuburg," a map that seems to be at the basis of another list of coordinates and that Durand attributes to "Magister Reinhardus"; this opinion is put forward in various articles without any proof being adduced; see, most recently, Ernst Bernleithner, "Die Klosterneuburger Fridericuskarte von etwa 1421," in *Kartengeschichte und Kartenbearbeitung: Festschrift zum 80. Geburtstag von Wilhelm Bonacker*, ed. Karl-Heinz Meine (Bad Godesberg: Kirschbaum, 1968), 41–44. On this point, there is no answer to the criticisms made by Grössing (*Humanistische Naturwissenschaft*, 129–30).

179. Munich, Bayerische Staatsbibliothek, Clm 14583.

180. The list on fol. 131r is incomplete; in the text, the abbreviations are sometimes "translated" between the lines. The features mentioned are *mons*, *montes*, *promontorium*, *insula*, *ciuitas*, *ciuitates*, *uilla*, *fluuius*, *fluuii ostia*, *emporium*, *portus*, *fons*, *fontes*, *orientalis*, *tabula*.

181. Durand, *Vienna-Klosterneuburg Map Corpus*, 371–73. In spite of some similarity with Durand's "cosmographies," it is unlikely that these texts are descriptions of such works; they make reference to values of a degree in miles that could not correspond to the maps one might reconstruct from them.

his work is mentioned—along with the “Kosmographia”<sup>182</sup> of “Pope Honorius” (Honorius Augustodunensis), the *Lucidarium*, and the work of Mark the Venetian (Marco Polo) and Paponius Melis (Pomponius Mela)—as one of the sources of the first map, with no distinction made between these works by various authors. The only other mentions of the Alexandrine regard the extension of the *oikoumene* as shown in these maps: the figures vary, but Ptolemy (who measured the distance north-south) is listed alongside Alexander and Hercules (who measured it east-west).<sup>183</sup> Finally, the reference to the *climata* recalls that such works are always to be seen in association with astrology. However, one cannot push things any further.

The same must also be said of the “cosmographies” that Durand tried to reconstruct on the basis of the long lists of place-names to be found in the same manuscript.<sup>184</sup> According to Durand, these lists are mnemonic aids or working documents that can be used in reconstructing maps drawn using “a sort of azimuthal projection” of Arabic origin.<sup>185</sup> The truth is that the system of coordinates used in the lists reveals no Eastern influences but rather a much more practical concern that certainly owes nothing to Ptolemy. A circle or semicircle is divided into sectors of thirty degrees (*signa*), and each *signum* is divided into *minuta*—and this is the basis of the “longitudes.” The “latitudes” are then just measured along the traced lines. Whatever the origin of this system, it would be wrong to describe it as a sort of projection; the tables are intended to provide the means for the reproduction of *existing* maps. There are corrections, variants, and precise instructions for draftsman or painter. All of those certainly indicate the seriousness with which these maps were taken as objects offering an exact view of the world. However, while they draw on various sources for their place-names (most notably marine charts or so-called transitional maps), these lists appear to make only a very secondary use of the *Geography*.<sup>186</sup> In a table headed “Nova cosmographia,” which describes a large circular map, there are some first-person comments relating to the validity of certain data, referring the reader to a *liber* said to contain more precise information. That *liber* does not seem to have been the *Geography*.<sup>187</sup>

Moreover, Ptolemy's work played no essential role in determining either the structure or the content of the map.<sup>188</sup> What we have here is an example of synthetic cartography, drawing on all available sources, including charts, to improve the existing *imago mundi*.<sup>189</sup> In the milieu in which this work was carried out—one possible hypothesis is the monastery of Reichenbach, whose monks were famous for their work in astronomy—Ptolemy was a respected name, an authority whom it was indispensable to mention. But he was still only one authority among others.<sup>190</sup>

The extant maps that are close to this “Nova cosmographia” do not contradict this conclusion. One can find no distinctively Ptolemaic influence on either schema or details in the Andreas Walsperger map of 1448, the cartographic fragments in the James Ford Bell Collection, or the map in the Zeitz manuscript.<sup>191</sup> A text that appears under the Walsperger map recalls in form and structure the descriptive texts in the Munich manuscript (Clm 14583); it also puts the same emphasis on geometry and the exact measurement of distances, and it mentions Ptolemy in relation to marine charts.<sup>192</sup>

Durand argues that all these works ultimately resulted in a “map of central Europe” that marked the culmination of a process whereby Ptolemy was superseded and abandoned.<sup>193</sup> Yet this simplistic vision of the gradual and progressive accumulation of knowledge rests on a

182. The text reads: “. . . the world . . . described through Cosmography and Ptolemy.”

183. Durand makes a mistake in his reference to Hercules; this has nothing to do with the Columns of Hercules (*Gades Herculis*), but is the name of Hercules the geometer, the inventor of the *stadium*.

184. Durand, *Vienna-Klosterneuburg Map Corpus*, 374–476.

185. It is said to reproduce the mode of projection for the celestial sphere that is partially described in a 1426 manuscript (BAV, Pal. Lat. 1368, fols. 63v–64r) and given in full in the Vienna manuscript, ÖNB, 5415, fols. 168r and 170v. Saxl, *Verzeichnis astrologischer und my-thologischer illustrierter Handschriften*, 24–25 and 30.

186. The place-names and positions should be very carefully compared with those given in the *Geography*. In any case, the very precise outlines of rivers and coasts that Durand gives in his reconstructions (pls. X, XI, and XII) are pure flights of fancy; the number of coordinates would not allow one to draw them in such detail.

187. For example, Durand, *Vienna-Klosterneuburg Map Corpus*, 427 and 433–34.

188. Fritz Bönisch, “Bemerkungen zu den Wien-Klosterneuburg-Karten des 15. Jahrhunderts,” in *Kartengeschichte und Kartenbearbeitung: Festschrift zum 80. Geburtstag von Wilhelm Bonacker*, ed. Karl-Heinz Meine (Bad Godesberg: Kirschbaum, 1968), 45–48.

189. A section of the tables of coordinates in the Munich manuscript—entitled “Schylfkarten id est quarta pars descripcionis terre” (Clm 14583, fols. 300r–312r)—comes from one or more marine charts (Durand, *Vienna-Klosterneuburg Map Corpus*, 218–24 and 457–76).

190. The association of Ptolemy and Pomponius Mela in the description of the previously mentioned circular map suggests the influence of Italian humanism.

191. The Walsperger map is in BAV, Pal. Lat. 1362; the Zeitz manuscript is in the Stiftsbibliothek, Hist. Fol. 497. Konrad Kretschmer, “Eine neue mittelalterliche Weltkarte der vatikanischen Bibliothek,” *Zeitschrift der Gesellschaft für Erdkunde zu Berlin* 26 (1891): 371–406, esp. 376–77 (reprinted in *Acta Cartographica* 6 [1969]: 237–72); Heinrich Winter, “A Circular Map in a Ptolemaic MS.,” *Imago Mundi* 10 (1953): 15–22; John Parker, “A Fragment of a Fifteenth-Century Planisphere in the James Ford Bell Collection,” *Imago Mundi* 19 (1965): 106–7; and Scott D. Westrem, *Learning from Legends on the James Ford Bell Library Mappamundi* (Minneapolis: Associates of the James Ford Bell Library, 2000).

192. See the description of the first map in Clm 14583, Durand, *Vienna-Klosterneuburg Map Corpus*, 371–73.

193. Durand, *Vienna-Klosterneuburg Map Corpus*, 273. The attribution of this “map of Central Europe” to a “Magister Reinhardus”

manipulative reading of the facts. Rather, the documents that have been discussed earlier allow us to draw two more prudent conclusions. First, Ptolemy's authority by the end of the first third of the century was such that cartographers who were anxious to respect generally held opinions felt obliged to cite him, even if they did not use his work.<sup>194</sup> Second, the concern for accuracy shown so early in German-speaking countries does not seem to have originated from a study of the *Geography*. This synthetic cartography still requires more detailed research, but it seems to have been an autonomous phenomenon, one that arose from the interest in astronomy and astrology felt in certain arts faculties and monasteries, particularly those of southern Germany and upper Austria, where such studies were most advanced. Quite apart from the question of the "map of central Europe," it is clear that the methods employed by these cartographers did not generate any school or followers, undoubtedly because Ptolemy's work was not found to be the essential key to accurate cartographic representation.<sup>195</sup>

#### In Venice: Ptolemy and Marine Charts

Venice, an often overlooked center for the diffusion of the *Geography*, provides us with detailed evidence of what developed from the encounter between charts and *map-paemundi*, two very different types of cartography.<sup>196</sup> Andrea Bianco was a sailor who had served several times as an officer on Venetian trading galleys, and his work as a cartographer is fairly well known to us. Most notably, he was the author of a 1436 atlas of charts, which shows his great openness to the various types of cartographic representation then available.<sup>197</sup> Along with a *raxon de marteloio*,<sup>198</sup> there are six charts representing the different parts of what Nordenskiöld rather bizarrely called "the normal portulan"; a joint map showing coastlines of the Atlantic, the Mediterranean, and the Black Sea; a circular *mappamundi*; and a Ptolemaic world map. This combination reveals that the atlas was put together not as a practical aid to navigation but as a compendium of existing knowledge.<sup>199</sup> There is no differentiation between the value of each of these representations of geographical space; it would be purely anachronistic to see as the Venetian cartographer's intention a comparison of "old" geographical notions and those "new" notions that had emerged from a study of Ptolemy and from Lusitanian voyages of exploration.<sup>200</sup> Bianco's atlas is a juxtaposition of images of the world that, far from being seen as contradictory, were there to complement each other. The individual nature of each image makes a specific contribution to knowledge of the world.

Even though it is contemporary with the rest of Bianco's atlas,<sup>201</sup> the Ptolemaic world map is not intended as some implicit criticism of the other types of carto-

graphic representations. Rather, it is there to supplement the tools of geographical investigation available. One would be interested to know how Bianco acquired knowledge of the cartographic technique required to make this map. It has been claimed that there are certain clear resemblances between this world map and the map of the world in a Ptolemaic atlas in the Vatican library (fig. 9.1).<sup>202</sup> Fischer attributes this latter manuscript to the workshop of Palla Strozzi's son Nofri, who is said to have copied it at Padua in 1458; but it is probably older, and could have come to the city with Palla Strozzi himself when he was exiled to Padua in 1434.<sup>203</sup> Whatever the truth regarding these theories about the Vatican atlas, comparison of this atlas with that of Bianco does not bear out the claims of great similarity. There are, for example, sizeable differences in the depiction of the hydrology of western Africa. On the other hand, it has been correctly noted that the coastlines in this world map do seem to

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(pp. 232–35) is a pure conjecture. What is more, the use of the *Geography* as a touchstone in dating a work leads to errors that reveal the preconceived notions of scholars. So one might give an earlier date to this "map of Central Europe," judging it prior to the reception—and therefore independent of the influence—of the *Geography* (Bernleithner, e.g., "Die Klosterneuberger Fridericuskarte"); alternatively, one can give it a later date and take it as revealing a move beyond Ptolemy (as Durand does). In either case, ahistorical reasoning is at work.

194. See Woodward, "Medieval *Mappaemundi*," 316.

195. The works derived from it are the map supposedly (but, in my opinion, with not very convincing arguments) drawn up by Nicolaus Cusanus, the map engraved at Eichstätt in 1491, a map to be found in the manuscripts of Henricus Martellus Germanus, and Erhard Etzlaub's *Rom Weg* (Durand, *Vienna-Klosterneuburg Map Corpus*, 251–70).

196. For an in-depth study of the Venetian reception to the *Geography*, see Angelo Cattaneo, "Letture e lettori della Geografia di Tolomeo a Venezia intorno alla metà del Quattrocento," *Geographia Antiqua* 13 (2004): 41–66.

197. Tony Campbell, "Portolan Charts from the Late Thirteenth Century to 1500," in *HC* 1:371–463, esp. 432–33. The 1436 chart is in Venice, Biblioteca Nazionale Marciana, Ms. It. Z. 76; see the facsimile: Andrea Bianco, *Atlante nautico*, 1436, ed. Piero Falchetta (Venice: Arsenale, 1993).

198. Campbell, "Portolan Charts," 441–42.

199. Bianco, *Atlante nautico*, 10.

200. Falchetta argues that the circular *mappamundi* is an expression of a "religious" geography and a "moralistic" cosmography (Bianco, *Atlante nautico*, 10). It is worth repeating that for Bianco and his contemporaries, the *mappamundi* was as informative on the real space of the world as any marine chart or Ptolemy's *Geography*.

201. In the absence of a full study of the codex of the manuscript, one cannot be certain on this point. Falchetta limits himself to general comments.

202. Gentile, *Firenze*, pl. XI. Gentile claims that Bianco's planisphere derives from a Greek model independent from codex Urb. Gr. 82. This also implies that the Venetian *ammiraglio* could have had access to other Greek codices of the *Geography*, either lost or currently unknown to us; see Gentile, "Umanesimo e cartografia," 9–10. See also Bianco, *Atlante nautico*, 25.

203. Gentile calls it "the oldest manuscript of Latin maps of the *Geography*," a claim yet to be proven (*Firenze*, 84).

have been drawn by an expert in marine cartography. The three Mediterranean peninsulas are shown as they appear in marine charts; most notably, Italy is not shown with the west-east alignment that appears in Ptolemy. Furthermore, the Venetian copy contains some annotations referring to the extent of the inhabited globe. The mile equivalent of a degree is given (hence the area of the inhabitable world and the circumference of the globe), along with the values for the lengths of various parallels.

Thanks to the work of Milanese, we can study Venetian reactions to the *Geography* in greater depth.<sup>204</sup> A BL manuscript comes from northern Italy and can be dated to before 1450 (thanks to the watermark, one can probably put it sometime in the second quarter of the century). This collection of texts and maps reveals careful study of Ptolemaic cartography. However, the person who produced the manuscript was not interested in questions relating to modes of representation. Although he collated the text with those from other manuscripts and drew comparisons with what he read in Pliny, the author made no annotations at all in books 1 and 7. The crude Latin and the mistakes in the copy reveal that the author was not a humanist, a deduction borne out by the eighteen regional maps.<sup>205</sup> The information gleaned from Ptolemy is most evident in the depiction of distant regions, while the others are modeled on charts and resemble those to be seen in Andrea Bianco's atlas. All these features lead one to identify this work as coming from Venice rather than from some other center of northern Italy. Familiar with marine cartography, the author seems to have set himself the task of understanding the *Geography* with the intellectual and technical means at hand, and thus interpreting it in line with the maps he knew best. He also made some effort to bring it up to date, giving the modern equivalents of the ancient names for various regions. This is therefore the work of a technician who attempted to resolve the problems posed by the *Geography* by bringing that work together with other types of representation.

Attention has been called to an important and interesting manuscript, so far forgotten, concerning the Venetian reception to the *Geography*. A working manuscript, written in Italian, it displays the efforts of an author, who was probably not part of the humanistic circles in Venice, to understand the most central part of Ptolemy's work, the so-called projections, and to adapt them to contemporary fifteenth-century geographical knowledge. This anonymous author translated large portions of the *Geography*, in particular the theoretical books. This appears to be the first translation into the vernacular of Ptolemy's oeuvre, written several years before Berlinghieri's *Septe giornate della geografia in terza rima*, which will be discussed later. This codex contains a critical analysis of the theory and practice of "projections," specifically proposing to extend the first "projection" to the regions south

of the Equator to 63°S. Through this "projection," called *dopea figura*, the author clearly shows the need to adapt Ptolemy's methods to a larger *oikoumene*. This is not the only innovation, however. In the rest of the codex, a geographical description of the *oikoumene* is provided based not only on Ptolemy, but also on other classical authors (Pliny, Solinus, Julius Caesar, and Tacitus) and a modern traveler (Marco Polo). This description is illustrated by several schematic maps in which a little cross, placed in a small planisphere, points to a region of the *oikoumene* then illustrated on the same page in an amplified regional map generally placed right below it.<sup>206</sup>

#### In Venice: Fra Mauro's *Mappamundi*

Our final example is very different from the above examples and yet close to them in conceptual framework. This work was produced by Fra Mauro, about whom we know little more than that he was a Camaldolese monk at the monastery of San Michele on Murano and that he produced various maps. The sole extant example of his work is the *mappamundi* in the Biblioteca Marciana, Venice, which is claimed to be a copy of one commissioned by the king of Portugal, Afonso V, in 1457 and delivered in 1459; recently, Cattaneo supported the reverse sequence with good arguments, dating Fra Mauro's map between 1448 and 1453.<sup>207</sup> Although evidence reveals that Fra Mauro's

204. Marica Milanese, "A Forgotten Ptolemy: Harley Codex 3686 in the British Library," *Imago Mundi* 48 (1996): 43–64.

205. Milanese's argument in support of the claim that he knew astronomy is not, however, totally convincing: writing *paralellus* instead of *parallelus* does not appear to be very significant (Milanese, "Forgotten Ptolemy," 54–55). The regional maps are the following: Ireland (fol. 12r); Tille, Scotland, and England (fol. 13r); Iberian Peninsula (fol. 15r); France (fol. 20r); Germany (fol. 23r); Italian Peninsula with islands and part of Balkans (fols. 28v–29r); Corsica (fol. 31v); Sardinia (fol. 32v); Sicily (fol. 33v); Greece (fol. 34v); Euboea (fol. 36r); Crete (fol. 36v); the north and west coasts of the Black Sea (fol. 41v); the region east of the Caspian Sea (fol. 98r); central and eastern Asia between "Sogdii Montes" and *terra incognita* (fols. 98v–99r); the Strait of Gibraltar and northwest Africa (fol. 99v); the Baltic and Scandinavia (fol. 100r); Eastern Europe (fols. 100v–101r). Milanese, "Forgotten Ptolemy," 45.

206. This codex (Venice, Biblioteca Marciana, It. Cl. VI, 24) is in need of further in-depth study, which is being undertaken by Angelo Cattaneo, who has already published the first results of his investigation in "Letture e lettori della Geografia di Tolomeo," 47–55.

207. Angelo Cattaneo, "Fra Mauro *Cosmographus Incomparabilis* and His *Mappamundi*: Documents, Sources, and Protocols for Mapping," in *La cartografia europea tra primo Rinascimento e fine dell'Iluminismo*, ed. Diogo Ramada Curto, Angelo Cattaneo, and André Ferland Almeida (Florence: Leo S. Olschki, 2003), 19–48, esp. 29–30. Earlier literature includes Roberto Almagià, *Monumenta cartographica Vaticana*, 4 vols. (Vatican City: Biblioteca Apostolica Vaticana, 1944–55), vol. 1, and idem, "Presentazione," in *Il mappamondo di Fra Mauro*, ed. Tullia Gasparrini Leporace (Rome: Istituto Poligrafico dello Stato, 1956), 5–10. There is a different point of view in Alfredo Pinheiro Marques, *A maldição da memória do Infante dom Pedro: E as origens dos descobrimentos portugueses* (Figueira da Foz: Centro de

influence remained notable well into the sixteenth century, that influence outside Italy has yet to be gauged.<sup>208</sup>

Fra Mauro's map is often described as the last example of "medieval"—or clearly "archaic"—cartography. Fundamentally, this is a sound evaluation. This *mappamundi* abounds in figurative details, reveals a close association between written text and map, and is clearly inspired by a desire to present a compendium of knowledge of the cosmos—all characteristics that place it well within the tradition of *mappaemundi*. Others have focused on the cartographer's independence of thought and his personal reflections on his material. He is claimed to have stood against the religious and scholastic prejudices of his day, favoring concrete facts and information gleaned from direct experience, thus obtaining more positive results in his work.<sup>209</sup> Fra Mauro's criticism of the authority of Ptolemy plays an essential role in this rather simplistic view, while one would be closer to the truth in claiming that awareness of the experiential origin of knowledge tempted him to measure empirical facts against the Ptolemaic model.<sup>210</sup> Yet even here one must not overstate the case; the Venetian cartographer's attitude toward Ptolemy was far from straightforward.

First of all, one must point out that Ptolemy is the author cited most often and the only one to be criticized by name. Fra Mauro is painstaking in indicating Ptolemy's errors—his most frequent criticism is related to the failings in Ptolemy's image of the world—errors regarding the area of a specific region and ignorance of what Ptolemy called *terrae incognitae* and even of those geographical features that he clearly knew nothing about (for example, the Baltic).<sup>211</sup> Often the criticisms refer to names. Fra Mauro was concerned about the changes in the names of regions since classical antiquity and was worried that the use of the ancient names would create confusion in the minds of those who were not "learned."<sup>212</sup> This is the context within which Fra Mauro's appeal to experience is to be understood. It is clear that the famous mention of the Portuguese voyages of discovery along the coast of Africa—in answer to the false idea that the southern limit of the inhabitable world was not bound by water—was originally directed against Ptolemy, even if he is not named.<sup>213</sup> But Fra Mauro also expresses appreciation for Ptolemy's work, accepting his opinion regarding the limit of Asia and Africa, and—on the basis of his authority alone—dismissing a faulty identification.<sup>214</sup> Even though these may simply be details, they mean that any reconstruction of Fra Mauro's attitude toward Ptolemy as straightforward rejection is too sharp and must be nuanced. Fra Mauro was aware of both the advantages and the failings of the Ptolemaic system. Two legends situated in the north of his map—toward the bottom of the map, and thus immediately evident to the eye—recognize that his own work was not

perfect, and they also answer the criticism of those who might reproach him for not having "observed the meridian and parallels" of Ptolemy.<sup>215</sup> His response reveals the basic principles followed: if he had used Ptolemy's system, he would have had to omit many of the regions unknown to Ptolemy for which there are no coordinates. Thus Fra Mauro was undoubtedly more aware than others that the *Geography* was not a *ne varietur* model but a stimulus to the development of a method. As conditions (in Italy, at least) were not yet favorable for such development, Fra Mauro found nothing contradictory in improving the tra-

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Estudos do Mar, 1994). One might also look at Luciano Tajoli, "Die zwei Planisphären des Fra Mauro (um 1460)," *Cartographia Helvetica* 9 (1994): 13–16.

208. The Vatican map, BAV, Borgia V, which is very similar to the Marciana *mappamundi*, was probably produced in Fra Mauro's workshop. See Heinrich Winter, "The Fra Mauro Portolan Chart in the Vatican," *Imago Mundi* 16 (1962): 17–28, with very inexact versions of the legends; contrary to the title of the article, this is not a chart. Five pages of an atlas of marine charts produced by Angelo Freducci and dating from 1556 are also very close (Giuseppe Caraci, "The Italian Cartographers of the Benincasa and Freducci Families and the So-Called Borgiana Map of the Vatican Library," *Imago Mundi* 10 [1953]: 23–49), as is a chart by Giorgio Sideri (Il Callapoda) dated 1541 (Antonio Ratti, "A Lost Map of Fra Mauro Found in a Sixteenth Century Copy," *Imago Mundi* 40 [1988]: 77–85). In spite of the arguments brought forward by Almagià, Caraci, and Ratti, the relation between these works is not simple and straightforward. Certainly other maps must have been produced in Fra Mauro's workshop or else copied from those works.

209. Günther Hamann, "Fra Mauro und die italienische Kartographie seiner Zeit als Quellen zur frühen Entdeckungsgeschichte," *Mitteilungen des Instituts für Österreichische Geschichtsforschung* 78 (1970): 358–71. The examples given concern the notion of how inhabitable and negotiable the torrid zone is, whether the Atlantic Ocean is negotiable along the coast of Africa, whether Africa is circumnavigable, and how Africa is shaped. But on all these points Fra Mauro does not say anything unusual. What is more, it does not seem that one can credit him with rejecting "Aristotelian" knowledge if his work reflects all the most recent advances concerning the relation between the spheres of earth and water. There is particular insistence on the "modernity" of Fra Mauro, among many fanciful affirmations and inconclusive theories, in Marques, *A maldição da memória do Infante dom Pedro*, 184–92.

210. For example, Iwańczak, who correctly notes that Fra Mauro has great respect for Ptolemy. Wojciech Iwańczak, "Entre l'espace ptolémaïque et l'empire: les cartes de Fra Mauro," *Médiévales* 18 (1990): 53–68.

211. See the edition by Tullia Gasparrini Leporace, *Il mappamondo di Fra Mauro* (Rome: Istituto Poligrafico dello Stato, 1956). The errors can be seen in the following plate and legend numbers and in the page number (in parentheses) where that legend is transcribed: XIV, 49 (28); XXVII, 57 (44); XXXI, 9 (53); XL, 23 (62); XLI, 27 (63).

212. Gasparrini Leporace, *Il mappamondo di Fra Mauro*, XXX, 89 (52); XXIII, 127 (40); XXVI, 58 (43).

213. Gasparrini Leporace, *Il mappamondo di Fra Mauro*, XI, 2 (26–27).

214. Gasparrini Leporace, *Il mappamondo di Fra Mauro*, XXIII, 51 (39), and XXVII, 68 (45).

215. Gasparrini Leporace, *Il mappamondo di Fra Mauro*, XL, 49 (62); XLI, 21 (63).



dition of *mappaemundi* with marine cartography. In effect, the encyclopedic nature of the resulting work seems to have been much more important to him than the achievement of some partial exactitude. The people for whom Fra Mauro reserves his most clear-cut criticism were figures he repeatedly described as *cosmographi*, to whom he sometimes meted out mordently ironic comments in his legends. These contemporaries, whose prejudices and preconceptions might be compared to those of the cardinals responsible for interrogating the Ethiopian emissaries, are people who would have argued for the maintenance of Ptolemaic names, opposing any addition to the classical work on the basis of modern knowledge (be it drawn from books or from direct experience).<sup>216</sup>

This “bricolage” of *mappaemundi* improved by the use of marine cartography does not make Fra Mauro’s work “archaic” any more than absolute faith in the Ptolemaic model of the world can be described as “modern.” In fact, the undoubted modernity of Fra Mauro’s map arises from his recognition of cartography as a specific kind of discourse. Time and again in his legends, he clearly stated that a map was an object constructed using authorities and new information that the all-powerful cartographer manipulated with total confidence in his ability, aiming to establish a problematic picture of the truth.<sup>217</sup> He expressed this point very well when he mentioned the maps received from the Ethiopians, which he had been unable to include in his work “because there is no place that is free space.”<sup>218</sup> In line with the comments made by Guillaume Fillastre four decades earlier, Fra Mauro’s own work revealed what was an essential feature in the reception of the *Geography*: Ptolemy could represent either a rigid corpus of knowledge or an opening toward innovation.

#### Other Attempts at Reconciliation

Numerous other, less well-studied, maps reveal that throughout the fifteenth century the engagement with Ptolemaic cartography could take various forms. The Wilczek-Brown manuscript contains maps alone but is, unfortunately, without any precise date. It may be of German origin, but links with Venice have also been identified. The maps in the manuscript do not respect the relation between degrees of longitude and latitude in Ptolemy. There is also an altogether original feature in the fourth map of Africa: the part beyond the equator is depicted using a trapezoidal “projection,” with the meridians converging toward the pole. This map also seems to have been subject to variations. Africa itself has been extended—to around the twenty-fifth degree of latitude—and as a result the entities that figure on the Ptolemaic map have been shifted southward (plate 10). Moreover, Africa, which originally extended as part of a single land-

mass, has been corrected so that it is entirely surrounded by the ocean.<sup>219</sup> Rather than the corrections of an apprentice (the easiest, but not necessarily the most exact explanation), I see here another, perhaps early, attempt to adapt the map.

Not all the cartographers in Venice worked on such complex projects as those undertaken by Andrea Bianco and Fra Mauro. In the last of his three circular *mappaemundi* (dating from 1452), Giovanni Leardo seems to have applied some regional names drawn from the *Geography* to a depiction of the world drawn from Catalan cartography.<sup>220</sup> Around the same date, a far more ambitious and well-conceived project had a cartographer trying to insert data from Ptolemy in a work inspired by circular *mappaemundi* and marine cartography and filled with information brought to Florence by Niccolò de’ Conti. The so-called Genoese *mappamundi* of 1457 (“so-called” because we know nothing of its origin) is mandorlali-like in form, doubtless due to the longitudinal stretching of a circle in order to show the complete longitudinal extension of the *oikoumene*.<sup>221</sup> An inscription placed off the coast of Africa criticizes the very notion of a *terra incognita* beyond the equator and cites Pomponius Mela as a classical source on the ancient circumnavigations from Spain to India.<sup>222</sup> Various depictions on the

216. Gasparrini Leporace, *Il mappamondo di Fra Mauro*, X, 30 (26); XXIV, 32 (41); XXXIV, 31 (57); XXXIX, 88 (61–62).

217. On the cartographer as master of his rendition of the world, see Patrick Gautier Dalché, “Weltdarstellung und Selbsterfahrung: Der Kartograph Fra Mauro,” in *Kommunikation mit dem Ich: Signaturen der Selbstzeugnisforschung an europäischen Beispielen des 12. bis 16. Jahrhunderts*, ed. Heinz-Dieter Heimann and Pierre Monnet (Bochum: Winkler, 2004), 39–51.

218. As regards the specificity of cartographic discourse, see also Fra Mauro’s comments following the note on the signs used to indicate frontiers (green lines dotted with trees). Those who want to understand a map, he adds, must have seen with their own eyes (*ad ochio*) or else read carefully; they must understand the winds and have a good knowledge of geometry and drawing. Gasparrini Leporace, *Il mappamondo di Fra Mauro*, XL, 19 (62).

219. Wilczek-Brown manuscript, John Carter Brown Library, Brown University, Providence, R.I. See Leo Bagrow, “The Wilczek-Brown Codex,” *Imago Mundi* 12 (1955): 171–74, esp. 171–72; O. A. W. Dilke and Margaret S. Dilke, “The Wilczek-Brown Codex of Ptolemy Maps,” *Imago Mundi* 40 (1988): 119–24; and Susan L. Danforth, “Notes on the Scientific Examination of the Wilczek-Brown Codex,” *Imago Mundi* 40 (1988): 125.

220. John Kirtland Wright, *The Leardo Map of the World, 1452 or 1453, in the Collections of the American Geographical Society* (New York: American Geographical Society, 1928), 8–10, and *The World Encompassed: An Exhibition of the History of Maps Held at the Baltimore Museum of Art October 7 to November 23, 1952* (Baltimore: Trustees of the Walters Art Gallery, 1952), no. 21.

221. Florence, Biblioteca Nazionale, Port. 1.

222. The text given by Edward Luther Stevenson in *Genoese World Map, 1457: Facsimile and Critical Text Incorporating in Free Translation the Studies of Professor Theobald Fischer, Rev. with the Addition of Copious Notes* (New York: DeVinne Press, 1912), 8 and 56, is incorrect.

map seem to result from a free interpretation of those given in Ptolemaic maps, for example, the hydrography of Africa, the Ganges coast of India, the end of the Indian peninsula, the Caspian Sea, and the Indus.<sup>223</sup> This combination of Pomponius Mela and Ptolemy is once again characteristic of a humanist milieu.

Finally, even circular *mappaemundi* reveal the influence of Ptolemy. An Italian copper-engraved map of the world—probably dating from the 1480s—brings together very ancient features (for example, the location of the earthly paradise in the East) with features from synthetic *mappaemundi* (the correct outline of Europe and the Mediterranean), facts drawn from recent observation (the north-south alignment of the Caspian Sea), and data taken from Ptolemy. In the representation of Africa in particular, the author seems to be following two versions of geographical reality: the Ptolemaic linking of Africa and Asia, which may be due to a desire to see the Nile flow from the earthly paradise, and the information gleaned from Portuguese discoveries on the West African coast, the southernmost known point of which seems to be two degrees below the equator. Overall, here Ptolemy plays a secondary role, and his work does not provide the dominant principle behind the representation given.<sup>224</sup>

A map on the frontispiece of a 1460 manuscript of Marcus Junianus Justinus's "Epitoma historiarum Philippicarum" is another example of such adaptations. The circular form makes it possible to break the link between Asia and Africa, the latter ending to the east in a long narrow peninsula that almost reaches a group of small islands near Taprobane.<sup>225</sup> One might mention another manuscript, probably a copy dating from the second half of the century of a work that contains extracts from the *Geography* together with a circular *mappamundi* drawn according to Ptolemaic criteria, yet showing Africa elongated southward and unconnected to Asia.<sup>226</sup>

In all the cases mentioned, Ptolemy is not taken as an inviolable model. On the contrary, certain features of his maps are chosen in a way that may appear arbitrary to us but at the time must have answered certain specific intentions. Whatever the truth of the matter, the framework within which these features are incorporated is not Ptolemaic but a compendium considered to reveal the truth about the world, with *mappaemundi* modified by input from marine cartography. Ptolemy appears as one source among others.

### THE GEOGRAPHY AS A MODEL FOR THE IMAGE OF THE WORLD

In his *Commentari* (mid-fifteenth century), the Florentine artist Lorenzo Ghiberti discussed the works of the painter Ambrogio Lorenzetti. In describing Lorenzetti's decorations for the Palazzo Pubblico in Siena, Ghiberti made

this comment regarding the no-longer-extant *mappaemundi* that was part of that work: "There is a cosmography—that is, all the inhabitable world. There was then no knowledge of the Cosmography of Ptolemy, so it is no surprise that his is not perfect."<sup>227</sup> By the middle of the fifteenth century, that tendency to see Ptolemy's *Geography* as an insuperable model of the world—a tendency we have already seen exemplified elsewhere—was advanced in Florence with no reservations whatsoever. Let us look at how—and in what milieu—this image of the *Geography* continued to develop, and whether there were any alternatives to it.

#### A COMMONPLACE MODEL: LUXURY MANUSCRIPTS AND PRINTED EDITIONS

Originally Ptolemy was seen as the best of geographers in his own field and his own language, an appraisal that in no way diminished the standing of Latin geographers, often mentioned alongside him. Gradually, however, Ptolemy began to stand ahead of all others. In the second half of the fifteenth century, most of the factors that served to establish the idea of the perfection of the *Geography* had little to do with its "scientific" or cartographic content, but were related to the political and cultural conditions of the milieu within which the work was appreciated. First of all, people continued to confuse Ptolemy the geographer with the kings of the same name who had ruled Lagid Egypt. In the luxury manuscripts of the texts, the author is often shown with the attributes of kingship. Even if it is probable that the humanists did not make the same mis-

223. Stevenson, *Genoese World Map*, 22, 31–32, 34, and 57.

224. Erich Woldan, "A Circular, Copper-Engraved, Medieval World Map," *Imago Mundi* 11 (1954): 13–16. The description given by Destombes is full of errors; see Marcel Destombes, *Catalogue des cartes gravées au XV<sup>e</sup> siècle* ([Paris?], 1952), 90–91. That given by Campbell is very exact, but there is a clear anachronism in his final considerations concerning the reconciliation of direct observation of coastlines, "medieval superstition," and the "dictates of Ptolemy"; see Tony Campbell, *The Earliest Printed Maps, 1472–1500* (London: British Library, 1987), 23–25.

225. BAV, Ottob. Lat. 1417, fol. 2v. The map is at the beginning, in the middle of a page filled with lists of place-names, and serves as an introduction to Justinus's text. The illustrations in the manuscript can be dated by the inscriptions, from 1460. Perhaps the map is of later date; the depiction of Scandinavia is close to that given by Nicolaus Germanus reproduced in *Vedere i Classici: L'illustrazione libraria dei testi antichi dall'età romana al tardo medioevo*, ed. Marco Buonocore (Rome: Fratelli Palombi, 1996), 415, fig. 422.

226. Paolo Revelli, *I codici ambrosiani di contenuto geografico* (Milan: Luigi Alfieri, 1929), pl. 14.

227. Lorenzo Ghiberti, *I Commentari*, ed. Ottavio Morisani (Naples: R. Ricciardi, 1947), 38. According to Edgerton, Ghiberti is talking about Simone Martini; this contradicts the text of the *Commentari*, which is perfectly explicit. See Samuel Y. Edgerton, *The Renaissance Rediscovery of Linear Perspective* (New York: Basic Books, 1975), 180 n. 21.

take, this idea, dating back to the medieval *accessus* to treatises of astronomy, reinforced the authority attached to the work. Produced by a king who was also the king of geographers, the work was an obvious addition to the libraries of princes.<sup>228</sup> The spread of the *Geography* as a geographical model can also be partly explained by the links that the humanists were trying to establish between learning and aristocracy, for it was through power that their program of cultural transformation could best succeed. This prestigious work was considered not only an encyclopedia of classical geography, making it possible to read the ancients and understand the development of their geographical knowledge, but also as the basis for any correct representation of the world. Thus all those great personages with whom the humanists were in contact naturally desired to possess a copy.<sup>229</sup>

Not surprisingly, the *Geography* made its appearance quite quickly in princely libraries in Italy and beyond. Commissioned by Cosimo de' Medici to draw up a plan for a future Medicean library built around the core of books put together by Niccoli, Tommaso Parentucelli (the future pope Nicholas V) would, sometime before 1444, present an "Inventarium" that listed the *Geography* as one of the necessary books of mathematics, alongside the *Almagest* "and anything outstanding that was written by Ptolemy."<sup>230</sup> In 1451, Humphrey, the duke of Gloucester, who had contacts with Italian humanist circles, ordered his Milanese supplier, Pier Candido Decembrio, to acquire various classical Latin texts, including "Pomponium Melam et Ptolemei *cosmographiam*."<sup>231</sup> As already mentioned, in 1457 Jacopo Antonio Marcello of Venice sent a copy of the *Geography* to René d'Anjou, and in Portugal in 1460 and 1461 Alvaro Alfonso, bishop of the Algarve, made three payments to Piero del Massaio *dipintore* for a book "of the plates of Ptolemy."<sup>232</sup> Several years earlier, in 1453, Afonso V, the Magnanimous, had acquired a book entitled "Tolomeo ossia mappa mundo" through the intermediary Antonio Beccadelli (Il Panormitano), and in 1456 a Florentine merchant had received payment from the royal treasury for "a large book called the Cosmography of Ptolemy, written on parchment with antique letters."<sup>233</sup>

Teaching was another channel for the spread of humanism, with intellectuals hoping to influence members of the aristocracy by offering their services as tutors.<sup>234</sup> This would play a role in the spread of the Ptolemaic model of the world, and the *Geography* was always mentioned in theoretical treatises of pedagogy as a work a knowledge of which was essential for any full education. For example, in his 1459 *De ordine docendi*, based on the experience of his father, Guarino da Verona, Battista Guarini underlined the specificity of "Ptolemy's picture" for studying the Latin poets, among the texts of geography.<sup>235</sup>

Accounts of the reception of Ptolemy's *Geography* have for a long time been limited to a discussion of those luxury manuscripts listed by Fischer and of printed editions (appendix 9.1).<sup>236</sup> However, the luxury manuscripts that began to emerge around the 1450s (with a particular concentration in Florence) were primarily symbols of power and prestige, a demonstration of a prince's aesthetic taste rather than an instrument of study. Given that such works would have only rarely been read, a full description of them or an account of the links between them is much less

228. Marica Milanese, "Testi geografici antichi in manoscritti miniati del XV secolo," *Columbeis* 5 (1993): 341–62, esp. 343–46. This combination is well illustrated by the *Elencho storico et cosmografo* of Joan Marco Cinico, translator, copyist, and librarian to King Ferdinand II of Aragon, which was drawn up before 1489 on the basis of the texts in his library. This is how he presents Ptolemy: "Ptolemy Philadelphie . . . the second king of that name in Egypt. . . . The most just and very gentle; and generous; and most learned in astrology and in other sciences." Tamaro de Marinis, *La biblioteca napoletana dei re d'Aragona*, 4 vols. (Milan: Hoepli, 1947–52), 1:240.

229. A systematic study is yet to be made. To the observations that follow one should add the mention of a "Libro de la Cosmographya de Ptolomeo" in the 1469 inventory of the books acquired by Galeazzo Maria Sforza. Elisabeth Pellegriin, *La bibliothèque des Visconti et des Sforza, ducs de Milan, au XV<sup>e</sup> siècle* (Paris: Service des Publications du C.N.R.S., 1955), 351, no. 124.

230. Enea Piccolomini, "Ricerche intorno alle condizioni e alle vicende della Libreria Medicea Privata dal 1494 al 1508," *Archivio Storico Italiano* 21, ser. 3 (1876): 102–12 and 282–98, esp. 105.

231. Remigio Sabbadini, *Le scoperte dei codici latini e greci ne' secoli XIV e XV*, 2 vols., ed. Eugenio Garin (Florence: G. C. Sansoni, 1967), 1:193 and 206.

232. Virginia Rau, "Bartolomeo di Iacopo di ser Vanni mercadorbanqueiro florentino 'estante' em Lisboa nos meados do século XV," *Do Tempo e da História* 4 (1971): 97–117, esp. 113, and Gentile, *Firenze*, 200–202, esp. 200.

233. De Marinis, *La biblioteca napoletana dei re d'Aragona*, 1:3, 2: 237, and 2:241–42. These two manuscripts are El Escorial e.I.1 (Vitrius 19) and BL, Harley 7182. See Gentile, *Firenze*, 206. On geography at the Aragonese court, see Aldo Blessich, *La geografia alla corte aragonese in Napoli: Notizie ed appunti* (Rome: E. Loescher, 1897).

234. Rico, *El sueño del humanismo*, 73–75.

235. "However, since much in the poets has been taken from astrology and geography, it will be desirable for students to know thoroughly the treatise *On the Sphere* [of Johannes de Sacrobosco], and to look at Pomponius Mela, Hyginus, Solinus, Martianus Capella, and Strabo. . . . For this purpose it will also be extremely useful to familiarize students with Ptolemy's world-map, so that in describing various locations they may place that image before their mind's eyes and seem to be gazing on the real thing, as though they were actually present. Describing the world in any other way is usually a source of confusion." Battista Guarini, *De ordine docendi et studendi / A Program of Teaching and Learning*, in *Humanist Educational Treatises*, ed. and trans. Craig W. Kallendorf (Cambridge: Harvard University Press, 2002), 260–309, esp. 290–91. See also Paul F. Grendler, *Schooling in Renaissance Italy: Literacy and Learning, 1300–1600* (Baltimore: Johns Hopkins University Press, 1989), 203.

236. As Milanese so justly observes, "Whatever he [Fischer] neglected has passed into oblivion" (Milanese, "Forgotten Ptolemy," 43)—that is to say, Fischer neglected the essential, all those manuscripts that reveal traces of a real working study of the *Geography*.

interesting than an analysis of the expectations they were intended to satisfy.<sup>237</sup>

#### Nicolaus Germanus, or Fake Exactitude

The first manuscripts of Ptolemy accompanied by *tabulae modernae* were produced by a figure named Nicolaus Germanus, who made his appearance on the scene in 1466. Although various scholars have tried to bring together in one individual all the “Nicolauses” mentioned in relation to the production of illustrated manuscripts, as well as in relation to printing and cartography in general, the origins of this figure are unknown to us.<sup>238</sup> Following Gentile’s cautious conclusion, it is highly improbable that all these references to “Niccolò Tedesco” can be identified with the cartographer.<sup>239</sup> This, however, did not stop Durand from taking up a claim, reported by the bibliographer Johannes Trithemius, that this “Nicolaus” was a monk at Reichenbach and then inventing a whole career for him prior to his arrival in Italy, falsely arguing that his innovations derive from the “Vienna-Klosterneuburg school.”<sup>240</sup>

Nicolaus’s manuscripts of the *Geography* have been classified by Fischer in three groups, which are worth reviewing in detail.<sup>241</sup> Their distinctive feature is the addition of *tabulae modernae* whose numbers increase from one group of manuscripts to the next. The first maps show Spain, Italy, and northern Europe (in a version derived from the map of Claudius Clavus); then France and Palestine (based on a map that accompanied the copies of Marino Sanudo’s “Liber fideliorum crucis” at the beginning of the fourteenth century). Nicolaus was responsible for various modifications, which he presented with great fanfare in the dedicatory letter addressed to Borso d’Este, duke of Ferrara (from the second group onward, the dedication is to Pope Paul II). In the regional maps Nicolaus used a “trapezoidal projection” with converging meridians;<sup>242</sup> he also increased the number of modern place-names and showed frontiers using dotted lines. Rather than looking at the supposedly new and original aspects of the “projection” used,<sup>243</sup> it is probably more fruitful to consider what the dedication—and the reactions of the dedicatee<sup>244</sup>—reveal about the public view of Ptolemy’s *Geography* at the beginning of the second half of the fifteenth century. What strikes one first is the care that Nicolaus took to forestall possible criticism of innovations and to answer the charge that he might have been guilty of ignorance or temerity in daring to correct the “immense work” of “such a great man who, before anyone, discovered the way of representing all the lands of the world in maps.” Everything he has done, Nicolaus argues, is in line with the *ratio* or intention of Ptolemy’s work. In his explanations, Nicolaus depicted himself as more Ptolemaic than Ptolemy himself, choosing to con-

struct his regional maps with “curved and inclined lines [an awkward description of lines running from the pole, i.e., meridians] as required by the form of the earth.”

Nicolaus’s other innovations are intended to make the work easier to use. The outlined frontiers made it easier to read the map by indicating what provinces specific peoples or geographical features belong to; the more manageable format respected proportion in the distances between places; and finally, the modern maps, drawn up according to a *certa ratio*, were destined to compensate

237. Milanesi has investigated how the decoration of manuscripts reveals the way artists and purchasers of these works viewed Ptolemy—clearly, an approach that should be developed further (Milanesi, “Testi geografici antichi,” 341–62).

238. One finds mentioned a Nicolaus Theotonicus, pupil of the painter Francesco Squarcione in Padua toward the middle of the fifteenth century; a “maistro Nicolò Todescho cartolaro,” who supplied paints for the miniaturist Taddeo Crivelli in Ferrara from 1452–56 and also assisted in some of his work; and the printer Niccolò Tedesco, active in Florence between 1474/75 and 1486. Compare Fischer, *Die Entdeckungen der Normannen in Amerika*, 75–84; Leo Bagrow, “A. Ortelii catalogus cartographorum,” *Petermanns Mitteilungen, Ergänzungsheft* 199 (1928): 1–137, and 210 (1930): 1–135, esp. 33–37; Józef Babicz, “Donnus Nicolaus Germanus—Probleme seiner Biographie und sein Platz in der Rezeption der ptolemäischen Geographie,” in *Land- und Seekarten im Mittelalter und in der frühen Neuzeit*, ed. C. Koeman (Munich: Kraus International Publications, 1980), 9–42; and idem, “The Celestial and Terrestrial Globes of the Vatican Library, Dating from 1477, and Their Maker Donnus Nicolaus Germanus (ca 1420–ca 1490),” *Der Globusfreund* 35–37 (1987–89): 155–68. No document supplies evidence helpful in identifying who produced the two spheres mentioned in the accounts for the year 1477.

239. Gentile, *Firenze*, 208–9. Maracchi Biagiarelli’s is an accurate and well-balanced account of what we really know about his career; see Berta Maracchi Biagiarelli, “Niccolò Tedesco e le carte della Geografia di Francesco Berlinghieri autore-editore,” in *Studi offerti a Roberto Roldi direttore de La bibliofilia*, ed. Berta Maracchi Biagiarelli and Dennis E. Rhodes (Florence: L. S. Olschki, 1973), 377–97. See also Lorenz Böniger, “Ein deutscher Frühdrucker in Florenz: Nicolaus Laurentii de Alemania (mit einer Notiz zu Antonio Miscomini und Thomas Septemcastrensis),” *Gutenberg-Jahrbuch*, 2002, 94–109.

240. Durand, *Vienna-Klosterneuburg Map Corpus*, 81–85 and 150–51.

241. Fischer, *Die Entdeckungen der Normannen in Amerika*, 78–80, and idem, *Codex Urbinas Graecus* 82, 1:215–17 and 335–64. On the problems raised by these recensions, see the comments made in Gentile, *Firenze*, 207–15.

242. This figure is sometimes called Nicolaus Donis, and the “projection” continues to be known as the “Donnus” or “Donnis” projection. “Donnus,” in fact, is just one way of writing “Dominus,” and thus could not be used to identify a person as if it were a proper name. As for “Donis,” this results from an error in the 1482 Ulm edition. Hence the surname “Donis” is a complete fiction, of which the history of cartography would do well to rid itself.

243. Wilhelm Bonacker and Ernst Anliker, “Donnus Nicolaus Germanus, sein Kartennetz, seine Ptolemäus-Rezensionen und -Ausgaben,” *Schweizerisches Gutenbergmuseum / Musée Gutenberg Suisse* 18 (1932): 19–48 and 99–114.

244. The letter of dedication is published in Fischer, *Die Entdeckungen der Normannen in Amerika*, 116–21, and in Maracchi Biagiarelli, “Niccolò Tedesco,” 393–95.

for the changes that had occurred over time, adding details that could simply not have been known to Ptolemy or Strabo. Quite apart from this updating (which was very limited, considering what had occurred since the translation), the important thing here was the conservation of the *dimensio certa* and *ratio verissima* followed by the classical author. Hence, Nicolaus was concerned to avoid any appearance of straying from the exactitude of the *Geography* so highly prized by the princely and aristocratic reading public. Indeed, he strove to underline that precision. Borso d'Este's reaction to the presentation justified this concern. He appointed Giovanni Bianchini and Pietrobono Avogaro, two important astronomers/astrologers at the Ferrara court, to check corrections of the text and to establish that "all these picture [maps] are made with due measure and [correct] designation of the parts to the places shown."<sup>245</sup> Undoubtedly, Nicolaus Germanus was himself an astrologer; along with the *Geography*, he had presented Borso d'Este with a "Tacuinus multorum annorum," which must have been a collection of astronomical tables (in 1477 it was probably he who signed a receipt for payment for certain works visible "in the library" with this description of himself: "Ego donnus Nicholaus germanus Astrologus").<sup>246</sup>

The aristocratic public expected what they considered the hallmarks of Ptolemy's work: exactitude and rigor. Nicolaus Germanus knew this, but was also aware of the scant mathematical knowledge of that same public. He thus found a way of obtaining easy success with the "great" of his day, a success he enjoys to this day with a number of historians of cartography. With the exception of Regiomontanus (whom I discuss later), no one before Gentile pointed out that, far from revealing a great mastery of geometry, Nicolaus's explanations betray a total incomprehension of Ptolemy's text. Ptolemy himself had pointed out that rectangular "projection" was best suited to regional maps, reserving the "curved and inclined lines" (Nicolaus's rough-and-ready description of straight lines that intersect at the pole) solely for world maps.<sup>247</sup> Moreover, the *tabulae modernae* did not indicate a new departure, nor did they have the importance that has been attributed to them. Rather, they were simply the repetition, in luxury edition format, of encounters with other cartographies that had already been taking place for some time.

#### Piero del Massaio, or Mass Production

A second figure who is considered to have played an important role in this story is Piero del Massaio, the Florentine painter whose contribution perhaps needs some clarification.<sup>248</sup> He is known to have produced various deluxe manuscripts illustrated with regional maps (of Spain, Italy, Tuscany, the Peloponnesus, Crete, and

Egypt) and city maps (of Milan, Venice, Florence, Rome, Constantinople, Damascus, Jerusalem, Cairo, and Alexandria).<sup>249</sup> He is also known to have been employed as a painter at the Florence cathedral in 1463–73.<sup>250</sup> Due to a mistaken reading of extant accounts, he was long credited with being the first to produce modern maps: a manuscript of the *Geography* was dated 1456, whereas it really dates from between 1464/65 and 1480.<sup>251</sup> Nevertheless, other extant documents show that as early as 1460 Massaio had been commissioned for "the painting of a Ptolemy."<sup>252</sup> In 1932, Fischer identified four manuscripts as bearing his signature,<sup>253</sup> and since then, maps in various other manuscripts have been attributed to him on the basis of more or less reliable indirect evidence that seems to indicate that his work as a cartographer began in the 1450s.<sup>254</sup> However, there are slight differences between the maps in these manuscripts. In some manuscripts certain "improvements" have been made in the modern maps (most notably, that of Italy) compared to the manuscript maps signed by Massaio.<sup>255</sup> And even in the manuscripts that are definitely Piero del Massaio's work, there are differences in the techniques of representation used. It seems, therefore, that the painter switched

245. Letter from Borso d'Este to Ludovico Casella, 15 March 1466, in Fischer, *Die Entdeckungen der Normannen in Amerika*, 113.

246. Giovanni Mercati, *Opere minori*, 6 vols. (Vatican City: Biblioteca Apostolica Vaticana, 1937–84), 4:175.

247. Gentile, *Firenze*, 210.

248. There is a brief description of the manuscripts and outline of the results of the previous research in Germaine Aujac, "Le peintre florentin Piero del Massaio, et la *Cosmographia* de Ptolémée," *Geographia Antiqua* 3–4 (1994–95): 187–209.

249. One manuscript adds a plan of Andrinople, another of Volterra.

250. Mirella Levi D'Ancona, *Miniatura e miniatori a Firenze dal XIV al XVI secolo: Documenti per la storia della miniatura* (Florence: L. S. Olschki, 1962), 220–23.

251. BNF, Lat. 4802. The error originates with Mazzatinti, with regard to a payment made in 1456; see Giuseppe Mazzatinti, *La biblioteca dei re d'Aragona in Napoli* (Rocca S. Casciano: L. Capelli, 1897), 107. The manuscript bears the coat of arms of Alfonso, duca di Calabria (1458–94).

252. Gentile, *Firenze*, 200.

253. BAV, Vat. Lat. 5699 and Urb. Lat. 277; BNF, Lat. 4802; and San Marino, Huntington Library, HM 1902. Fischer, *Codex Urbinas Graecus* 82, 1:217–18 and 365–75. For the last, Ricci gives the number 1092; see Seymour de Ricci, *Census of Medieval and Renaissance Manuscripts in the United States and Canada*, 3 vols. (New York: H. W. Wilson, 1935–40), 1:91.

254. Florence, Biblioteca Medicea Laurenziana, XXX.2 and XXX.1; BNF, Lat. 8834; El Escorial e.I.1 (which may be one of the manuscripts the king of Aragon bought in Naples in 1453 and 1456); and BAV, Urb. Lat. 273 (one of the two manuscripts of Berlinghieri's *Septe giornate*); see Gentile, *Firenze*, 202–7 and 226–29.

255. For example, Florence, Biblioteca Medicea Laurenziana, XXX.1. Roberto Almagià, "Osservazioni sull'opera geografica di Francesco Berlinghieri," *Archivio della R. Deputazione romana di storia patria* 68 (1945): 211–55; reprinted in idem, *Scritti geografici (1905–1957)* (Rome: Edizioni Cremonese, 1961), 497–526, esp. 524–25.

models with a certain nonchalance, and certain features were a matter of choice to be decided by the actual purchaser of the manuscript. All of this leads one to the conclusion that the manuscripts were all produced in one bookseller's *bottega* (workshop). It has been argued the bookseller in question must have been Vespasiano da Bisticci, because on the map of Florence in one of the manuscripts definitely by Piero del Massaio another hand has indicated Vespasiano's house and gardens.<sup>256</sup> However, it is also possible that Massaio kept his own shop and made the maps himself while farming out the production of manuscript copies and decorations.<sup>257</sup> Whatever the truth, Massaio's mark, or that of the workshop where he was employed, is to be found among the manuscripts of Francesco Berlinghieri.

#### Francesco Berlinghieri, or a Platonic Ptolemy

The *Septe giornate della geographia*, produced by Francesco Berlinghieri, enables us to form a clearer idea of the reaction to the *Geography* among Neoplatonic circles in Florence of the 1470s.<sup>258</sup> Born into a patrician family, Berlinghieri received a humanist education and knew Greek. Sometime between 1460 and 1465, he set to rendering the *Geography* in Tuscan verse, using as his inspiration the Dantesque model of a journey in the company of a guide (in this case, Ptolemy himself). So far, commentators have failed to point out that there was also another, more recent, model at work here. Just over a century earlier, Fazio degli Uberti had written a poem in the Tuscan dialect entitled "Dittamondo," in which he described the world in the company of a different guide, Caius Julius Solinus (the change in mentor signifies changes in cultural attitudes toward geography itself). Completed sometime between 1478 and the beginning of 1482, Berlinghieri's work contained the twenty-seven usual maps plus four modern additions. It has come down to us in two manuscripts and a 1482 printed edition produced by one Nicolo Todescho, who probably had nothing to do with the previously mentioned Nicolaus Germanus.<sup>259</sup> For years poor Berlinghieri was scorned by historians of literature for his atrocious verse and by historians of cartography for his lack of originality. But this negative assessment is beginning to change as it becomes clear that this work, by a man who was part of the close circle of Lorenzo de' Medici (il Magnifico) and a member of Marsilio Ficino's Platonic Academy, cannot be correctly judged unless considered within its cultural context.<sup>260</sup>

Compared to other manuscripts and editions of the *Geography*, the *Septe giornate* contains various formal innovations intended to make the work easier to consult. The maps are distributed in groups throughout the text, close to the passages that deal with the specific places.<sup>261</sup>

The place-names, with coordinates, are given in alphabetical order at the end of each book, before the group of maps in which they appear. The prologue is imbued with Ficino's Neoplatonism (indeed the "Apologus," in which the work is presented to the duke of Urbino, is by Marsilio Ficino himself). The author underlines that not only statesmen but all living beings have a need for *notitia del terreno*, knowledge that leads to an awareness of the works of God. At this point, Ptolemy on a cloud appears to Berlinghieri and an unnamed friend—undoubtedly Ficino<sup>262</sup>—and is praised not only for his majesty but also for his role as an intermediary between heaven and earth (a clear indication of the almost religious significance that Berlinghieri and his contemporaries attributed to his work):

"Tell me who you are, if I be worthy,  
Whether god or man, if honesty allows."  
"A man I am not, nor of the divine kingdom,"  
said he, "an inhabitant, and if to you  
I look divine it is only for what I reveal and teach.  
But from Egypt I was, an Alexandrine,  
And of the stars I wrote and the earth,  
during the pitiful reign of Antoninus"  
"O Ptolemy through whom the visible world opens up,  
and then closes again; and I will not hide this,  
following you, whom no one can go astray following.  
O light, O great glory of the world."

The reason for this exaltation is evidently to be found in the then-dominant idea of Ptolemy as a master of geometry. Even if the "mathematics" of the *Geography* was still little or ill understood by its readers, Ptolemy was the creator of an *imago* that reproduced the real universe

256. Albinia Catherine de la Mare, "New Research on Humanistic Scribes in Florence," in *Miniatura fiorentina del Rinascimento, 1440–1525: Un primo censimento*, 2 vols., ed. Annarosa Garzelli (Scandicci, Florence: Giunta regionale toscana: La Nuova Italia, 1985), 395–600, esp. 567.

257. This is the theory put forward by Louis Duval-Arnould in "Les manuscrits de la *Géographie* de Ptolémée issus de l'atelier de Piero del Massaio (Florence, 1469–vers 1478)," in *Guillaume Fillastre*, 227–44.

258. For a general introduction to the figure and his work, see Angela Codazzi, "Berlinghieri, Francesco," in *Dizionario biografico degli Italiani* (Rome: Istituto Della Enciclopedia Italiana, 1960–), 9:121–24.

259. If both are "Nicolaus Germanus," one does not see why the maps in the 1482 edition are drawn up using orthogonal "projection" and not the projection to which Germanus has given his name; see R. A. Skelton, "Bibliographical Note," in *Geographia: Florence, 1482*, by Francesco Berlinghieri, ed. R. A. Skelton (Amsterdam: Theatrum Orbis Terrarum, 1966), V–XIII, esp. XI.

260. Rossella Bessi, "Appunti sulla 'Geographia' di Francesco Berlinghieri," *Rivista Geografica Italiana* 100 (1993): 159–75.

261. The original order of the Milan manuscript, Biblioteca Nazionale Braidense, AC XIV 44, was further altered to make it conform to the usual model for such works.

262. Gentile, *Firenze*, 230 and 233; this is certainly not Apollo, as ancient critics had thought (compare Bessi, "Appunti," 169 n. 19).

through the use of numbers. Indeed, he was often depicted with the attributes of the astronomer/mathematician: the armillary sphere and compass.<sup>263</sup> The decoration of the initial sheet of the two manuscripts renders this vision even more clearly: Berlinghieri, Ptolemy *redivivus*, is shown in the three ovals of the inner margin, in one drawing a Ptolemaic world map on a lectern, in another contemplating a sphere mounted on a tripod, and in the third using a compass to measure another (terrestrial) sphere. In the outer margin, three circles contain illustrations of scenes referred to in the text: Berlinghieri in discussion with a friend—undoubtedly Ficino—under a (laurel?) tree against a backdrop of Florence, Ptolemy on a cloud, and the three figures contemplating the earth from the heavens (plate 11).<sup>264</sup> As can be seen, the map is an object that is intimately bound up with things celestial. The guide then accompanies the author on a celestial journey that covers the whole of the *oikoumene*.

Later writers have often underlined the crudeness and error in both Berlinghieri's maps and his text. Some have even gone so far as to speak of his "stupidity."<sup>265</sup> Yet such value judgments ultimately tell us nothing. The translation into Tuscan dialect, the numerous echoes of Dante and Petrarch, were all part of that exaltation of "things Florentine" required by Lorenzo il Magnifico (at this time, various other classical texts were also being rendered in "the vulgar tongue"). It is all the more interesting to study the modifications made to the *Geography* that go well beyond simply rendering it in a verse translation.<sup>266</sup> In effect, what we have in Berlinghieri's version of the *Geography* is a complete rewriting that reveals innovations in both content and method.<sup>267</sup> Each region is shown with name and borders; then the coastal locations, mountains, and rivers are listed, followed by the inland sites, the peoples inhabiting the region, and finally—if space allows—the islands lying off the coast. On numerous occasions Berlinghieri launches into historical, mythological, or ethnological digressions.<sup>268</sup> The great variety of literary sources used form a compendium of the very highest level of humanist culture, which Berlinghieri thus tries to incorporate within the geographical text itself. Hence we find, for example, the works of Strabo (recently translated, in 1458, with parts subsequently published in 1469) and Diodorus Siculus (translated at the beginning of the 1450s). Nevertheless, most striking is that this use of other sources is accompanied by great care to modernize place-names, an enormous task undertaken with the aid of the *tabulae modernae* (for northern Europe, the British Isles, Spain, France, Italy, and Palestine) and marine charts. The results are uneven, yet it seems that when working at this task Berlinghieri made continual reference to maps. His working method here is the first example we have of Ptolemy's being "strabonized"—that is, being rendered in a form that meets the needs of

politician and statesman.<sup>269</sup> The author seems to have set himself the enormous task of drawing up a Platonic encyclopedia of the terrestrial world whose precision and modernity of detail would make it possible for the reader to understand—at a glance—the links between peoples, sites, and heavens.<sup>270</sup> However, such a task was impossible at that time, and there would be no successors to this attempt, revealing the impasse reached in trying to establish the *Geography* as a perfect model—a perfect model that would have been "rejuvenated" by the update that Berlinghieri was striving to achieve.

There is still a lot of work to be done before we can fully understand the intellectual background and material conditions in which the maps of Nicolaus Germanus, Piero del Massaio, and Francesco Berlinghieri were produced. First of all, there should be a detailed study of those subordinate features (script, decoration, etc.) that enable us to attribute manuscripts to one figure or another. Complete descriptions are also needed that would enable us to examine in detail the differences not only between "modern" but also between ancient maps. Certain basic remarks must also be made. The slightly varying characteristics of Piero del Massaio's maps, together with their relation to the maps produced by Berlinghieri, reveal that Massaio was more a painter specializing in the production of cartographic models than a cartographer pondering upon the material he had to work with.<sup>271</sup>

263. Milanese, "Testi geografici antichi," 353.

264. Detailed description in Gentile, *Firenze*, 230 and 233.

265. Almagià, "Osservazioni," 246, and Skelton, "Bibliographical Note," X–XII. But see also Osvaldo Baldacci, "La toponomastica 'novella' della Sardegna tolemaica nella versione in rima di Francesco Berlinghieri (1482)," *Atti della Accademia Nazionale dei Lincei, Classe di Scienze Morali, Storiche e Filologiche, Rendiconti*, 9th ser., 6 (1995): 651–66. Gentile comes to Berlinghieri's defense by claiming that his lack of interest in the "individual" was due to his Platonism—a rather unconvincing explanation (Gentile, *Firenze*, 234).

266. There is yet to be a full study of the maps and text—that is, one unblemished by preconceptions.

267. For more factual details regarding what follows, see Almagià, "Osservazioni," 228–32.

268. See the summary that Berlinghieri gives in the dedication to Sultan Cem, son of Mehmed II, of a copy of the printed edition in 1484: ". . . treating of the universal site of the world, of known regions, seas, mountains, rivers, peoples, lakes, swamps, ponds, islands, springs, wildlands, cities, ports, lands and promontories; and the various changes of names, of their etymologies and reasons for these, and of [mankind's] customs and habits, many of them repellent; and of almost all the things in peace and war, and was in fitting memory celebrated; of the many men in many places who by all are reputed to be most excellent" (Almagià, "Osservazioni," 222).

269. The expression is taken from Milanese, "Testi geografici antichi," 358.

270. The encyclopedic nature of the whole enterprise is even clearer in the dedication to Sultan Cem (Almagià, "Osservazioni," 233; Milanese, "Testi geografici antichi," 357).

271. Gentile, *Firenze*, 206 and 229.

These deluxe manuscripts were “production line” affairs, and each would await a purchaser on the shelf of a bookseller, which explains why some parts might predate others by as much as ten years,<sup>272</sup> why the decoration of an unsold manuscript might be left unfinished, and why the space for the owner’s coat of arms was sometimes left blank.<sup>273</sup>

As far as the appearance and content of the new maps is concerned, what is striking is the extent to which charts served as models.<sup>274</sup> The fact that the maps of these large manuscripts were generally without a network of coordinates should make us wonder just how much Ptolemy was understood by those producing—and buying—these large manuscripts. Here, two observations should be made. The basis of representation was not the Ptolemaic method of “projections”; far from it. Marine charts, the most precise and accurate form of contemporary cartography, were used to make good the faults and lacunae found in Ptolemy’s *Geography*. The luxury manuscripts of the 1470s and 1480s marked the culmination of a process that began as soon as the original work had been translated. Here we need to have more precise information on how the ancient place-names were identified with the modern and how the modern maps influenced the reading of the ancient and vice versa. These are points on which we still do not have specific studies of adequate detail.

A second source of material for updating Ptolemy was found not in charts but in written accounts of journeys and itineraries. Here we are, in fact, closer to the original than we would think, given that Ptolemy himself drew more extensively on such accounts than on astronomical measurements. A pioneering study of this material—with reference to the modern map of Ethiopia<sup>275</sup>—should undoubtedly be followed by others. The three extant versions of that map all have variants or additions that reveal that none could have been the basic prototype for the others;<sup>276</sup> hence, there must have been an older (perhaps Greek) map of which all three are copies. Later, the information they contained was summarized in the Behaim globe, in the 1507 Waldseemüller world map, and in the 1516 *Carta marina*.<sup>277</sup> There are great differences between this older map and the text and original maps of the *Geography*. For example, the hydrology, which is shown very accurately, corresponds not to the schema given in Ptolemy but to that in the Hudson Anonymous.<sup>278</sup> And the area between the different watercourses is filled with around 250 place-names of Ethiopian origin, revealing direct knowledge of Abyssinian geography. It is therefore probable that the place-names were systematically gathered, probably during the Council of Florence, from Ethiopians themselves, and that some of these place-names were also gathered in the form of more or less correctly understood itineraries.

Nevertheless, it is clear that the concern with exactitude and precision that appears in the German-speaking world and, in a less pronounced fashion, in the Florence of Lorenzo il Magnifico and Marsilio Ficino was, in a way, an illusion and cannot be taken as indicative of “scientific progress.” The limits of this precision are clear in the very works that boast of such concern. Modernizing Ptolemy, in effect, meant improving the geography and cartography of classical antiquity; it did not mean using the Ptolemaic method to construct an *imago mundi* that more closely reflected contemporary “reality.” By considering the modern maps a mere improvement to the original *Geography*, one actually limits their significance. In fact, they were not produced under the influence of the Ptolemaic method, and only later encountered the *Geography*—in deluxe manuscript copies. We know that there were other attempts at modern maps that did not find their place in the corpus at all,<sup>279</sup> just as we know that the first printed editions of the *Geography* proper (Vicenza 1475, without maps; Bologna 1477; and Rome 1478) did not contain modern maps.

272. In the manuscript in the BNF, Lat. 4801, there are ten years between the frontispiece and the dedication to Borso d’Este; and there is again a ten-year gap in Lat. 8834, bought by Matthias Corvinus (Milanesi, “Testi geografici antichi,” 348–49).

273. Florence, Biblioteca Medicea Laurenziana, Laur. XXX.1, fol. 1r.

274. Except for the map of Palestine, which comes from “Liber secretorum fidelium crucis” by Marino Sanudo (beginning of the fourteenth century). Its biblical content (it gives the division of the tribes of Israel) should not lead one to fall in with the anachronism applied by a good number of modern historians and judge it “outmoded.”

275. Bertrand Hirsch, “Les sources de la cartographie occidentale de l’Ethiopie (1450–1550): Les régions du la Tana,” *Bulletin des Études Africaines de l’INALCO* 7, nos. 13–14 (1987): 203–36. See also the pioneering work of Laura Mannoni, “Una carta italiana del Bacino del Nilo e dell’Etiopia del secolo XV,” *Pubblicazioni dell’Istituto di Geografia della R. Università di Roma* 1, ser. B (1932): 7–12.

276. “Egyptus novelo” (BNF, Vat. Lat. 4802, fols. 130v–31r), “Aegyptus cum Ethiopia moderna” (BAV, Lat. 5699, fol. 125), and “Descriptio Egypti noua” (BAV, Urb. Lat. 277, fols. 128v–29r).

277. Joseph Fischer, “Abessinien auf dem Globus des Martin Behaim von 1492 und in der Reisebeschreibung des Ritters Arnold von Harff um das Jahr 1498,” *Petermanns Geographische Mitteilungen* 86 (1940): 371–72, and idem, “Die Hauptquelle für die Darstellung Afrikas auf dem Globus Mercators von 1541,” *Mitteilungen der Geographischen Gesellschaft Wien* 87 (1944): 65–69.

278. Late Greek description of the Nile, which takes up certain data from Ptolemy (Müller, *Claudii Ptolemaei Geographia*, 2:776–77). See Jehan Desanges, “Les affluents de la rive droite du Nil dans la géographie antique,” in *Proceedings of the Eighth International Conference of Ethiopian Studies, University of Addis Ababa*, 1984, 2 vols., ed. Tadese Beyene (Addis Ababa: Institute of Ethiopian Studies, 1988–89), 1: 137–44; reprinted in *Toujours Afrique apporte fait nouveau: Scripta minora*, by Jehan Desanges, ed. Michel Reddé (Paris: De Boccard, 1999), 279–88.

279. Apart from the regional maps of Italy—which sometimes cover quite a sizeable area—there are mentions of other maps that clearly were not based on the Ptolemaic model. As one example, one might mention Francesco Rosselli’s map of Hungary.



## A PROBLEMATIC MODEL

The influence of the *Geography* is not to be measured solely by the increasing number of deluxe manuscripts or printed editions. Other texts enable us to examine how that work was used and exploited when, from the middle of the fifteenth century onward, it became more available. However, it is not a question of drawing up an exhaustive list of the mentions made of the *Geography*. Nevertheless, there are two fundamental texts marking a further stage in the evolution of the interest shown in the *Geography* by the circle gathered around Niccolò Niccoli. One of these texts is “Italia illustrata” by Flavio Biondo, who, as we have already seen, was active at the Council of Florence. Reworked several times in the 1450s, “Italia illustrata” was dedicated to Nicholas V in 1453, then to Pius II in 1462. The work focuses on chorography, with its essential sources the usual Pliny, Pomponius Mela, and Ptolemy, who have by this time been joined by Strabo.<sup>280</sup> It is certain that Biondo used Ptolemy's map of Italy. In the discussion of the location of Ortona, he cites various authorities, concluding that that map incorrectly places it to the right of the river Ateronus.<sup>281</sup> Overall, as in this particular passage, Biondo seems to take Pliny as his most credible source, probably because he had first-hand knowledge of Italy. But this detail itself shows that Ptolemy had now become part of the intellectual baggage of the scholars of the day, without, however, enjoying the status of an unchallenged scientific superiority. Biondo does not try to follow in Ptolemy's footsteps. His descriptive geography is intended to make ancient place-names comprehensible to the moderns, and the materials he draws on in constructing his image of Italy are both physical and historical, comprising hydrology, road networks, and descriptions of ancient provinces.

The project behind Enea Silvio de' Piccolomini's *Asia* and *Europa* is of the same nature; again there is a comparison of ancient and modern sources.<sup>282</sup> The *Geography* provides the overall schema, the boundaries within which to place features described by Solinus and Strabo. Undoubtedly, the maps rather than the text were the main source of information.<sup>283</sup> But again, the future Pius II does not attribute any particular superiority to Ptolemy—a perfect cartographer, no doubt, but simply one geographer among others.<sup>284</sup>

The consolidation of the humanist model in the writing of history and historical geography, together with the greater access to the work resulting from the advent of printed editions, meant that these uses of the *Geography* gradually spread beyond Italy, to both central and southern Europe. In the first book of his “Annales seu cronicae incliti regni Poloniae” (written between 1464 and 1466), Jan Długosz takes the Ptolemaic description as a basic

framework for an analytic work that attempts to recover the ancient names of modern places from Ptolemy's lists and maps.<sup>285</sup> Commissioned by Matthias Corvinus in 1486 to write the “Rerum Ungaricarum decades,” Antonio Bonfini makes a rather banal use of the maps in the *Geography* and of other sources to list the inhabitants of the ancient world (sometimes together with the modern equivalents of their names).<sup>286</sup> The same thing can be seen in the “Chronica regnorum aquilonarium” by Albert Krantz, from 1500–1504.<sup>287</sup> In Spain, the first to adopt this method was the bishop of Gerona, Juan Margarit y Pau, who had occasion to meet both Biondo and Pius II at the Congress of Mantua. The lists of peoples, rivers, and cities in Margarit y Pau's “Paralipomenon Hispaniae” is taken from the *Geography*. Other sources, including marine charts, are also used, and some of the details in Ptolemy are contradicted (even if the geographer is described as “brilliant and well known as skilled in all the arts”).<sup>288</sup>

In all the geographical descriptions of the second half of the fifteenth century, one can see great respect professed for Ptolemy as the representative of a specific method, accompanied by the use of contemporary and

280. Ottavio Clavuot, *Biondos “Italia Illustrata”—Summa oder Neuschöpfung?: Über die Arbeitsmethoden eines Humanisten* (Tübingen: M. Niemeyer, 1990), 37 and 219.

281. Flavio Biondo, *Roma triumphans*; see Flavio Biondo, *Blondi Flavii Forliviensis, de Roma triumphante lib. X . . .*, 2 vols. (Basel: Froben, 1559), 1:398g, and Clavuot, *Biondos “Italia Illustrata,”* 143 and 198.

282. Nicola Casella, “Pio II tra geografia e storia: La ‘Cosmographia,’” *Archivio della Società Romana di Storia Patria* 95 (1972): 35–112, esp. 55, 72–73, and 83.

283. For example, Casella, “Pio II tra geografia e storia,” 55–56 n. 68, 67–68, and 79.

284. For example, he was against Ptolemy's division of Asia Minor into eight parts, as well as Strabo's division (which allocated each people their own region), preferring a division based on natural boundaries (Casella, “Pio II tra geografia e storia,” 82).

285. Długosz recognizes that he cannot identify the Ptolemaic names of the cities on and to the west of the Vistula; the numbering does not follow that in the *Geography* and seems to come from Europe IV. Jan Długosz, *Annales seu Cronicae incliti regni Poloniae*, ed. Jan Dąbrowski (Warsaw: Państwowe Wydawn. Naukowe, 1964–), 1:113–14, and B. Modelska-Strzelecka, *Le manuscrit cracovien de la “Géographie” de Ptolémée* (Warsaw: Państwowe Wydawn. Naukowe, 1960), 4. According to Modelska-Strzelecka, the manuscript used by Długosz was Cracow, Biblioteka Jagiellońska, 7805, very similar to Vat. Lat. 5698, itself possibly a direct copy of Urb. Gr. 82 (Gentile, *Firenze*, 83–84).

286. Antonio Bonfini, *Rerum Ungaricarum decades*, ed. Margit Kulcsár and Péter Kulcsár (Budapest: Akadémiai Kiadó, 1976).

287. V. A. Nordman, *Die Chronica regnorum aquilonarium des Albert Krantz: Eine Untersuchung* (Helsinki: Suomalainen Tiedekatemia, 1936), 155.

288. Robert Brian Tate, “El manuscrito y las fuentes del *Paralipomenon Hispaniae*,” and idem, “El Paralipomenon de Joan Margarit, Cardenal Obispo de Gerona,” both in *Ensayos sobre la historiografía peninsular del siglo XV* (Madrid: Editorial Gredos, 1970), 151–82, esp. 137 n. 42, and 123–50, esp. 170.

ancient sources to update his maps. There were, however, variations in the extent to which modern input was used and in the critical criteria applied in assessing it. A Naples manuscript copied by the famous printer Arnaud de Bruxelles provides an excellent example of the tendency to pile together all the ancient source material available. Included are compendia from late antiquity or the early Middle Ages (rediscovered by humanism), book 7 of Martianus Capella's *Marriage of Philology and Mercury*, material from Pomponius Mela, and extracts from the *Geography*—concerning the extent of the inhabitable world, the drawing of the *oikoumene* on an armillary sphere, and the regional maps (book 7, chap. 5, to book 8, chap. 2).<sup>289</sup>

On the other hand, a number of inquiring spirits showed themselves increasingly aware of the numerous practical and theoretical problems raised by the Ptolemaic world image when considered in relation to the changes in populations and political divisions within what had been the ancient world and the material gleaned from other sources, including the Iberic voyages of discovery. It is perhaps far from astonishing—though even this point would require more exhaustive study—that the texts focusing on the problems raised by the *Geography* came out of the Venetian area and Naples, not out of Florence.

The starting point for the discussion of the inhabitable world in the “Astrologia medicinalis,” written by the Venetian physician and astrologer Leonardo Qualea in 1470–75, was indeed Ptolemy's world map. However, correcting Ptolemy, Qualea concluded that all the inhabitable zones of the world—the entire *oikoumene*—extended over 270 degrees of longitude, and that almost the whole of Africa was surrounded by sea.<sup>290</sup> Similarly, the enormous historical and geographical encyclopedia compiled by the Sicilian Dominican and humanist Pietro Ransano (“Annales omnium temporum”) highlights the errors in Ptolemy through a critical comparison of the various classical sources, which are then collated with modern sources, including maps.<sup>291</sup>

Two geographical descriptions dating from the beginning of the sixteenth century might be taken as indicating the consolidation of this tradition. The Venetian Pescennio Francesco Negro was one of those “small-time humanists” who was convinced of his own importance and yet spent most of his time chasing after some sort of appointment that would satisfy his perhaps excessive ambitions. In Negro's encyclopedia, entitled “Cosmodystichia” (written between 1503 and 1513), the part dedicated to geography contains a mere summary of the regions given in Ptolemy, with a simple indication of the number of individual geographical entities and a discussion of the first “projection.” The coordinates that are a specific characteristic of the Ptolemaic work are still

seen as relating to celestial influences—and thus the concern primarily of astrology.<sup>292</sup> In 1509 a much more ambitious work, entitled “Geographia” and dedicated to Pope Leo X, was produced by the Ferrara scholar Sebastiano Compagni,<sup>293</sup> who had formerly worked with his uncle Antonio Leonardi, a cartographer active in Venice and Rome and noteworthy as the creator of the map of Italy that adorned the doge's palace in Venice (before the palace was destroyed by fire in 1483).<sup>294</sup> These two figures mark the perfect fusion of humanism and cartography and throw into sharp focus the problems raised by the encounter of these two “disciplines” at the beginning of the sixteenth century. Compagni placed the greatest trust in the work of Ptolemy; his goal was to describe the earth including the novelties revealed by voyages of discovery “next to those in the manner of Ptolemy,” whose text and maps provided Compagni his basic framework.

289. Naples, Biblioteca Nazionale, IV. D. 22 bis, fols. 112ra–114vb; see Claudio Leonardi, “I codici di Marziano Capella,” *Aevum* 34 (1960): 411–524, esp. 411–12. On Arnaud de Bruxelles, printer in Naples from 1472 to 1477, see Emmanuel Pouille, *La bibliothèque scientifique d'un imprimeur humaniste au XV<sup>e</sup> siècle: Catalogue des manuscrits d'Arnaud de Bruxelles à la Bibliothèque Nationale de Paris* (Geneva: Droz, 1963).

290. BNF, Lat. 10264, fols. 61r–64r. On the manuscript, see Pouille, *La bibliothèque scientifique*, 54–58, and W. J. Wilson, “An Alchemical Manuscript by Arnaldus de Bruxella,” *Osiris* 2 (1936): 220–405, esp. 230–31. On Leonardo Qualea's image of the world, see Pierre Duhem, “Ce que l'on disait des Indes occidentales avant Christophe Colomb,” *Revue Générale des Sciences Pures et Appliquées* 19 (1908): 402–6.

291. Ferdinando Attilio Termini, *Pietro Ransano, umanista palermitano del sec. XV* (Palermo: A. Trimarchi, 1915), 120–21; Carmelo Trasselli, “Un italiano in Etiopia nel XV secolo: Pietro Rombulo da Messina,” *Rassegna di Studi Etiopici* 1 (1941): 173–202, esp. 184 (the author's view of the negative effects of the use of Ptolemy is anachronistic); and Bruno Figliuolo, “Europa, oriente, mediterraneo nell'opera dell'umanista palermitano Pietro Ranzano,” in *Europa e Mediterraneo tra Medioevo e prima età moderna: L'osservatorio italiano*, ed. Sergio Gensini (San Miniato: Pacini, 1992), 315–61, esp. 329–33.

292. BAV, Vat. Lat. 3971, fols. 370r–386r; the passage ends with a “Ptholemaei mappa,” which reproduces the map in the edition of Pomponius Mela obtained in Venice in 1482 by Erhard Ratdolt (Campbell, *Earliest Printed Maps*, 118–19). On Negro, see Giovanni Mercati, *Ultimi contributi alla storia degli umanisti*, 2 vols. (Vatican City: Biblioteca Apostolica Vaticana, 1939), 2:25–128, and Carmen Lozano Guillén, “Apuntes sobre el humanista F. Niger y su obra,” in *Humanismo y pervivencia del mundo clásico: Homenaje al Profesor Luis Gil*, 3 vols., ed. José María Maestre Maestre, Joaquín Pascual Barea, and Luis Brea (Cádiz: Servicio de Publicaciones de la Universidad de Cádiz, 1997), 3:1353–60.

293. Roberto Almagià, “Uno sconosciuto geografo umanista: Sebastiano Compagni,” in *Miscellanea Giovanni Mercati*, 6 vols. (Vatican City: Biblioteca Apostolica Vaticana, 1946), 4:442–73.

294. We have only indirect evidence concerning the life and works of Antonio Leonardi. See Rossella Bianchi, “Notizie del cartografo veneziano Antonio Leonardi: Con una Appendice su Daniele Emigli (o Emilei) e la sua laurea padovana,” in *Filologia umanistica per Gianvito Resta*, 3 vols., ed. Vincenzo Fera and Giacomo Ferrau (Padua: Antenore, 1997), 1:165–211.

Whatever novelties or discoveries are mentioned, Compagni's unflinching concern is to show that Ptolemy had already been aware of them and depicted them. Thus, with regard to the "newly discovered" coasts and islands, his excuse for the cartographer's incorrect representation was lack of space.<sup>295</sup> The ancient geographer's errors are noted but explained away.<sup>296</sup> However, this does not prevent Compagni from bringing the ancient place-names up to date by comparing Ptolemy's maps with marine charts. The very uneven final result reveals just what sort of questionable text emerged from such overly reverential treatment of the *Geography*.

#### PTOLEMY AND GEOGRAPHICAL DISCOVERIES

The question of the relation between the *Geography* and the great discoveries is in fact only one aspect of a much vaster question that is nowhere near as simple as it might appear: what role did maps play in this process of discovery?<sup>297</sup> Historians have long studied maps as if their function was limited to recording the *results* of such explorations. This has led them to judge this or that map "advanced" or "backward," this or that cartographer "open" or "resistant" to innovation. From the point of view of cultural history, however, there is a whole field that awaits individual and detailed studies showing precisely how the geographical discoveries themselves played a role in establishing cartographic representation as the equivalent of reality confirmed.

The issue has been muddled by contrasts that are hardly likely to favor an exact perception of how things stood in the past. For example, attention has been focused on a comparison of the effects of Ptolemaic as opposed to marine cartography. The former is said to have been uninfluenced by the new discoveries because its main public was erudite circles, while the latter, the product of people working "hands on," is said to have been much readier to accept new input and face the questions raised about modes of representation. Thus Ptolemy, "in an apparently paradoxical fashion," is claimed to have "both stimulated and hindered the science and art of cartography."<sup>298</sup>

Similarly, historical accounts of representations of physical space tend to talk in terms of conflicting "models"—notions that appear coherent only when one overlooks the fact that knowledge of that time was accumulative in nature. Hence, it is argued that the Ptolemaic "model" introduced the notion of spaced parallels and converging meridians, a first step toward the recognition of a uniformly curved globe of land and water masses. This is contrasted with a so-called biblical-Aristotelian model relaunched by Jean Buridan and the *physiciens* of fourteenth-century Paris, and it is said to have implied the existence of a flat *oikoumene* emerging from a sphere of

waters, thus making a voyage to the southern hemisphere inconceivable.<sup>299</sup> Such voyages, it is argued, therefore confirmed the validity of Ptolemaic principles and led to the abandonment of the post-Aristotelian theory of two distinct spheres of land and water. Perhaps here it is enough simply to point out that a century before Jacopo Angeli's translation of the *Geography* there were already *mappaemundi* showing Africa as circumnavigable.

Let us leave these theory-bound views, however, to look more closely at the actual documentary data and how they might be interpreted. The relation between the

295. BAV, Vat. Lat. 3844, fol. 174v.

296. With regard to a landlocked Indian Ocean: "Even in our age the Lusitani [Portuguese], who, in order to trade, sail from Olisipo [Lisbon] through the Atlantic sea as far as the Indi, have found that the open sea and ocean are far from uncertain, so that I cannot be amazed enough that Ptolemy got it wrong, inasmuch as he wanted that space to be bordered along every side by the land and in the manner of a lake within land" (Vat. Lat. 3844, fol. 257v).

297. O. A. W. Dilke and Margaret S. Dilke, "The Adjustment of Ptolemaic Atlases to Feature the New World," in *The Classical Tradition and the Americas*, ed. Wolfgang Haase and Meyer Reinhold, vol. 1, *European Images of the Americas and the Classical Tradition*, 2 pts. (New York: W. de Gruyter, 1994), pt. 1, 119–34, and Angel Paladini Cuadrado, "La cartografía de los descubrimientos," *Boletín de la Real Sociedad Geográfica* 128 (1992): 61–152.

298. Alfredo Pinheiro Marques, *Origem e desenvolvimento da cartografia portuguesa na época dos descobrimentos* (Lisbon: Imprensa Nacional–Casa da Moeda, 1987), 53–55 and 108. It is perhaps rather difficult to conceive of such a contradictory process; however, the very idea is undermined when one sees Ptolemy being described as someone who "contributed to the introduction of the idea of the earth as spherical" (an idea that was never questioned during the Middle Ages!). This opinion is frequently given as an accepted truth (for example, in Brigitte English, "Erhard Etzlaub's Projection and Methods of Mapping," *Imago Mundi* 48 [1996]: 103–23, esp. 104). The anachronism is pointed out in Anthony Grafton, *New Worlds, Ancient Texts: The Power of Tradition and the Shock of Discovery* (Cambridge: Belknap Press of Harvard University Press, 1992), 50.

299. W. G. L. Randles, "Modèles et obstacles épistémologiques: Aristote, Lactance et Ptolémée à l'époque des découvertes," in *L'humanisme portugais et l'Europe: Actes du XXI<sup>e</sup> Colloque International d'Études Humanistes* (Paris: Fondation Calouste Gulbenkian, 1984), 437–43, and idem, "Classical Models of World Geography and Their Transformation Following the Discovery of America," in *The Classical Tradition and the Americas*, ed. Wolfgang Haase and Meyer Reinhold, vol. 1, *European Images of the Americas and the Classical Tradition*, 2 pts. (New York: W. de Gruyter, 1994), pt. 1, 5–76. As used in the Middle Ages, the word *orbis* indicates the *oikoumene* and never implies the notion of flatness. Randles notes with remarkable frequency that medieval writers were apparently unaware of the contradictions he notes between "models," but it would be easy to give facts and quotations that contradict such claims. The "scholastics" who examined Columbus's project may have been "Aristotelian," but they knew the *Geography*; Pierre d'Ailly, Guillaume Fillastre, Jean Fusoris—all products of the Aristotelian education to be had in the Faculté des Arts—were among the first to study the cosmographical problems that work raised. Toscanelli, a connoisseur of the *Geography*, did not use converging meridians in the map and the accompanying letter sent to Fernand Martins because his intention was to illustrate the maritime link between Europe and the Indies (discussed later).

*Geography* and the voyages of discovery should be examined from two angles: Did the maps have any effect on the process of exploration, and if so, what effect? How were the results of those explorations received by Ptolemaic cartography? First of all, it is conceivable that a reading of the *Geography*, both its novel aspects and its mistakes, might have nurtured doubts about both classical and medieval geography. These doubts cannot have failed to stimulate questions among scholars as to the extent of the inhabitable world, its form, the existence of an oceanic band marking the equator, and the possibility of reaching the Orient by circumnavigating Africa. These were the subjects that interested the first commentators, d'Ailly and Fillastre, and were discussed at the Council of Florence. The very contradiction between the Ptolemaic map of the world and the *mappaemundi* that were then more widespread was in itself an intellectual stimulus to empirical exploration.

We have no extensive or detailed information with regard to how widely the *Geography* was known in Spain and Portugal.<sup>300</sup> Here the very designations used in referring to maps are important. It is not impossible that the circle around Prince Henry was familiar with the *Geography* from the very beginning of the voyages of exploration to the African coast. The charter of privilege granted him in 1443 by Afonso V states that one of the reasons for the expeditions to the unknown lands beyond Capo Bojador was “that neither in the marine charts nor in the world map [*mapamundo*] the unknown lands were rightly drawn.”<sup>301</sup> No commentator has mentioned that the *mapamundo* probably indicated the world map in Ptolemy's *Geography*, which the passage goes on to judge to be as arbitrary as all other previous representations.

As the Portuguese drew closer to the moment when they would actually sail around the Cape of Good Hope, recourse to the Ptolemaic view of the world became more frequent. When making his declaration of fealty to the pope in 1485, the Portuguese ambassador Vasco Fernandes de Lucena used an almost entirely Ptolemaic vocabulary to describe the progress of the Portuguese. The previous year, he said, they had come close to the Prassum Promontorium, where the Arabian Gulf began.<sup>302</sup> Vasco Fernandes de Lucena had been part of the Portuguese delegation to the Council of Florence, where there had been discussion of Ethiopia and the actual shape of Africa and Asia. According to João de Barros, in 1486, when consulting with his cosmographers in order to locate the exact position of the kingdom of Prester John, the king of Portugal had used “a general map of Ptolemy” to show the distances between the different *padrons* established on the African coast by explorers and had concluded that the circumnavigation of Africa must necessarily bring ships around to this same Prassium Promontorium.<sup>303</sup> The following year, Pero da Covilhã was sent overland to-

ward the Indian Ocean at the same time as Bartolomeu Dias undertook his expedition. Before leaving, da Covilhã received “a navigation chart taken from a world map” on which to mark the kingdom of Prester John and the routes by which it could be reached, a map that must have been the product of various hands (those who, to use an invention of the historiography of the discoveries, are supposed to have formed the Junta dos Matemáticos of João II).<sup>304</sup> One of these figures was undoubtedly Diogo Ortiz de Calzadilla (or de Vilhegas), who assessed the project that Columbus had submitted to the Portuguese king just a short time before. He was professor of astrology at Salamanca until 1469, and we know that he read a manuscript of Ptolemy's *Geography* now housed in Salamanca.<sup>305</sup> The map “taken from a world map” that was given to Pero da Covilhã was intended to make it possible to measure distance, and it is highly probable

300. In a very quick survey, the Portuguese historian Armando Cortesão dealt with only one aspect of the question: the influence of Portuguese discoveries and cartography on Ptolemy. See Armando Cortesão, “Curso de história da cartografia,” *Boletim do Centro de Estudos Geográficos da Faculdade de Letras da Universidade de Coimbra* 8 (1964); reprinted in *Esparsos*, by Armando Cortesão, 3 vols. (Coimbra: Por ordem da Universidade, 1974–75), 2:248–59. The same aim is fulfilled in Cortesão's “Cartografia Portuguesa e a Geografia de Ptolomeu,” *Boletim da Academia das Ciências de Lisboa* 36 (1964): 388–404.

301. João Martins da Silva Marques, *Descobrimientos portugueses: Documentos para a sua história*, 3 vols. (Lisbon: Edição do Instituto para a Alta Cultura, 1944–71), 1:435, no. 339; more recently in Luís de Albuquerque, Maria Emília Maderia Santos, and Maria Luísa Esteves et al., *Portugaliae monumenta Africana* (Lisbon: CNCDP, Imprensa Nacional–Casa da Moeda, 1993–), 1:23, no. 1. The passage has been misinterpreted as meaning that there are no maps of these regions and that they do not appear on any map; see Charles Verlinden, “Navigateurs, marchands et colons italiens au service de la découverte et de la colonisation portugaise sous Henri le Navigateur,” *Moyen Age* 64 (1958): 467–97, esp. 474. The correct interpretation is confirmed by Gomes Eanes de Zurara's “Chronique de Guinée” (1453), chap. 78; see Gomes Eanes de Zurara, *Crónica dos feitos da Guiné* (Lisbon: Publicações Alfa, 1989), 149.

302. The text is edited from an incunabulum in *Jornal de Coimbra* 3 (April 1813): 309–23. The errors in the location of this cape and other place-names is of slight importance; the influence of Ptolemy is enough to explain them, and there is no need for a correction of the text such as that carried out by Geo. Pitarino and reported in “I Portoghesi verso l'Asia del Prete Gianni,” *Studi Medievali* 2 (1961): 75–137, esp. 110–14.

303. João de Barros, *Ásia de Joam de Barros: Dos feitos que os portugueses fizeram no descobrimento e conquista dos mares e terras do oriente, primeira década*, 4th ed., ed. António Baião (Coimbra, 1932), 83–84.

304. The fact is reported by someone who met da Covilhã in Abyssinia in 1524; see Francisco Álvares, *Verdadeira informação das terras do Preste João das Índias* [1540], new ed. (Lisbon: Imprensa Nacional, 1889), 128.

305. Salamanca, Biblioteca Universitaria, 2495; see Francisco Rico, “Il nuovo mondo di Nebrija e Colombo: Note sulla geografia umanistica in Spagna e sul contesto intellettuale della scoperta dell'America,” in *Vestigia: Studi in onore di Giuseppe Billanovich*, 2 vols., ed. Rino

that it was Ptolemaic in character.<sup>306</sup> Hence, just as the great Portuguese undertaking was about to achieve its goal, it was a Ptolemaic map of the world (with a corrected depiction of Africa) that was to provide an overall picture within which to link east and west. This was the technical instrument on which it would be possible to register measured distances and record the coordinates taken as the voyage progressed.

The picture that emerges with regard to the explorations in the New World is the same. If one examines the writings of the explorers themselves (most notably, of Christopher Columbus), one sees that Ptolemy played an important role.<sup>307</sup> Columbus read the *Geography* and studied its maps, undoubtedly in the 1490 edition. A postille to a copy of Pierre d'Ailly's *Ymago mundi* mentions, with regard to Tharsis, the "translator Ptholomei in alphabeto," which must be a reference to the alphabetical index in that edition.<sup>308</sup> According to Bartolomé de Las Casas, Columbus was critical of Ptolemy and also looked to him for support for his own theories.<sup>309</sup> We also know that Bartholomew Columbus (like his brother, a cartographer) presented Henry VII with a world map in 1488. Its contents were summarized in these Latin verses: "It [the map] confirms what has been said by Strabo, Ptolemy, Pliny, and Isidore, though these authorities are not of the same opinion." So once again we see Ptolemy referred to simply as one among many classical and medieval authorities.<sup>310</sup> At the same time, Christopher Columbus was well aware how his own project contradicted the Ptolemaic view of the world. In his account of his fourth voyage, he criticized that world picture on two counts, supporting instead the notions put forward by Marinus of Tyre with regard to the extension of the *oikoumene* as far as Cattigara (225°) and the location of Ethiopia farther to the south of the equator.<sup>311</sup>

During the Columbus voyages, two procedures were used to record and interpret the new lands discovered. Like those who came after him, Columbus drew maps,<sup>312</sup> undoubtedly constructed following the method of marine cartography (the investigations of the Columbian *pleitos* are full of mentions of them).<sup>313</sup> He also took measurements of latitude.<sup>314</sup> In the account of the second voyage in "Libro copiador," he gives a precise description of the method followed in producing the map sent to the Catholic kings in order to give them some idea of the position of the newly discovered islands. This map was built around meridians and equidistant parallels, with one degree equal to al-Farḡhānī's value (fifty-six and two-thirds miles), enabling the calculation of distances "in the manner of Ptolemy"—that is, by taking account of the relation between a degree of latitude and of longitude.<sup>315</sup> A

sobre la geografía humanística en España y el contexto intelectual del descubrimiento de América," in *Nebrija y la introducción del renacimiento en España*, ed. Victor García de la Concha (Salamanca: Ediciones Universidad de Salamanca, 1983), 157–85.

306. The nature of this map has been studied by Cortesão, whose conclusions are weakened by that "theory of the secret" that has enabled Portuguese historians to suggest just about anything and its opposite; see Armando Cortesão, "A 'Carta de Marear' em 1487 entregue por D. João II a Pêro da Covilhã," *Memórias da Academia das Ciências de Lisboa, Classe de Ciências* 17 (1974): 165–75; reprinted in Armando Cortesão, *Esparsos*, 3 vols. (Coimbra: Por ordem da Universidade, 1974–75), 3: 215–26. In another article, he attributes the map to both Fra Mauro and Ptolemy; see Armando Cortesão, "O descobrimento da Australásia e a 'questão das Molucas,'" in *Esparsos*, 1:263–303, esp. 267.

307. There is no useful study of Columbus and cartography; see Maria Fernanda Alegria, "Fontes cartográficas de Cristóvão Colombo: O mito e a realidade," in *Las relaciones entre Portugal y Castilla en la época de los descubrimientos y la expansión colonial*, ed. Ana María Carabias Torres (Salamanca: Ediciones Universidad de Salamanca, Sociedad V Centenario del Tratado de Tordesillas, 1994), 145–64.

308. Now in Seville, Bibliotheca Colombina; d'Ailly, *Ymago mundi*, 2:304–6. The 1478 edition, which bore his signature, was among his books (Christopher Columbus, *Scritti di Cristoforo Colombo*, 4 vols. [Rome: Ministero della Pubblica Istruzione, 1892–94], 2:523) and is now in the library of the Real Academia de la Historia, Madrid (Incunabile n° 2). Even if in various hands, the annotations are considered "Columbian" by Contreras in "Diversas ediciones de la cosmografía de Ptolomeo," 257–59. The barbarous Latin in the published text of the notes seems too poor even for Columbus.

309. With regard to the longitude of Thule and to wood found in the Atlantic and considered to come from the Indies; see Bartolomé de Las Casas, *Las Casas on Columbus: Background and the Second and Fourth Voyages*, ed. and trans. Nigel Griffin (Turnhout: Brepols, 1999), 257 and 267.

310. Las Casas, *Columbus*, 277.

311. Christopher Columbus, *Oeuvres complètes / Christophe Colomb*, ed. Consuelo Varela and Juan Gil, trans. Jean-Pierre Clément and Jean-Marie Saint-Lu (Paris: La Différence, 1992), 558 (the French translation of this passage is totally incorrect).

312. These maps are to be distinguished from the map taken on the first voyage—on which "the Admiral had painted several islands in that sea." This earlier map must have been a *mappamundi* like the so-called Genoese *mappamundi*. A useful discussion of this map and how Las Casas assimilates it with Toscanelli's is found in Christopher Columbus, *Diario del primer viaje de Colón*, ed. Demetrio Ramos Pérez and Marta González Quintana (Granada: Diputación Provincial de Granada, 1995), 83 and 90. General—and sometimes imaginative—views regarding Columbus's maps are found in Jesús Varela Marcos, "La cartografía del segundo viaje de Colón y su decisiva influencia en el tratado de Tordesillas," in *El tratado de Tordesillas en la cartografía histórica*, ed. Jesús Varela Marcos (Valladolid: Junta de Castilla y León: V Centenario Tratado de Tordesillas, 1994), 85–108.

313. On the subject of the maps drawn up by Columbus, see William D. Phillips, Mark D. Johnston, and Anne Marie Wolf, *Testimonies from the Columbian Lawsuits* (Turnhout: Brepols, 2000), 75, 100, and 102–3.

314. Phillips, Johnston, and Wolf, *Columbian Lawsuits*, 252; d'Ailly, *Ymago mundi*, 2:530 (the French translation of page 531 is incorrect, as is often the case with Buron's translations; see Elisabetta Sarmati, "Le postille di Colombo all' 'Imago mundi' di Pierre d'Ailly," *Columbeis* 4 [1990]: 23–42, esp. 35).

315. Antonio Romeu de Armas, *Libro Copiador de Cristóbal Colón: Correspondencia inedita con los Reyes católicos sobre los viajes a América*, 2 vols. (Madrid: Testimonio Compañía Editorial, 1989), 2: 451–52.

Avesani et al. (Rome: Edizioni di Storia e Letteratura, 1984), 2:575–606, esp. 583, in Spanish, "El nuevo mundo de Nebrija y Colón: Notas

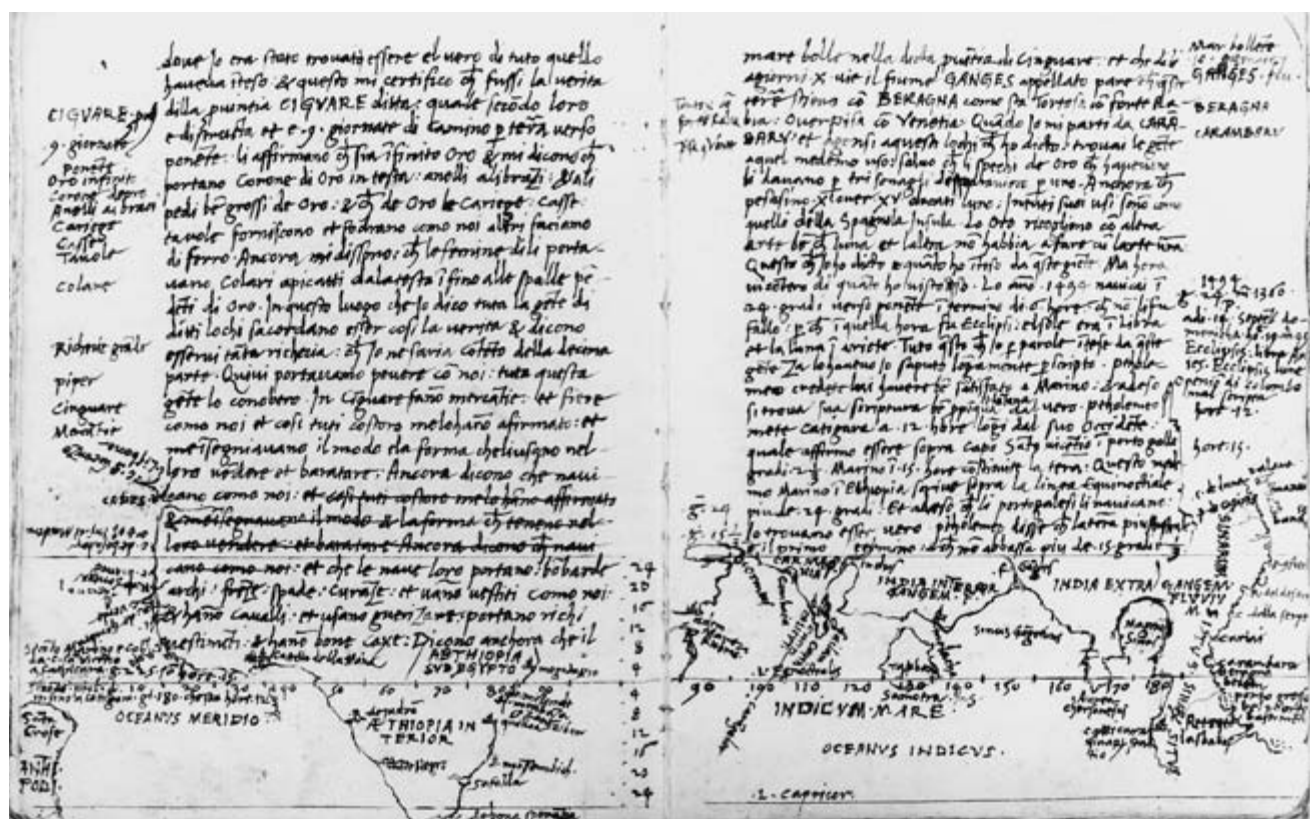


FIG. 9.6. WORLD MAP WITH “MONDO NOVO” BY ALESSANDRO ZORZI. Size of each original: 21.2 × 15.9 cm. Biblioteca Nazionale

Centrale, Florence (Banco Rari 234, fols. 56v–57r and 60v). By concession of the Ministero per i Beni e le Attività Culturali della Repubblica Italiana.

red meridian line distinguished the islands discovered during the first voyage from those Columbus later encountered.<sup>316</sup>

Herein lies the originality of the use of Ptolemy in these voyages of discovery. The navigator could draw up charts of coasts without too much thought about modes of representation, but if he wanted to locate these coasts in relation to the known world and make their position understandable, he had to resort to “the manner of Ptolemy,” irrespective of the errors of content that might be in the *Geography*. For the huge spaces of the Atlantic, marine cartography was not enough. It had to be integrated within a system of cartographic projections and a network of parallels and meridians.<sup>317</sup>

It is instructive to compare this theoretical and practical use of the *Geography* with the criticisms made of Columbus’s project during the Santa Fé conference, according to Las Casas, criticisms drawing on the authority of Ptolemy. The Alexandrine, it was argued, “like many other astrologers, cosmographers, and scholars,” had never mentioned the Indies as described by Columbus. If the earth were curved, one could not return upward once one left the upper hemisphere as described by Ptolemy.<sup>318</sup>

Here is a clear contrast between the idea of the *Geography* as a perfect model of the world—an idea espoused by those examining the project—and the use of the work’s technique of cartographic representation independent of its geographical content. We have no reason to share the irony that emerges in the comments made by Las Casas or Alessandro Geraldini with regard to this Santa Fé gathering of scholars; the latter were simply the distant heirs of Niccoli, Plethon, and all those who had discussed the *imago mundi* at the Council of Florence.

316. Contrary to what is claimed by editors Varela and Gil (*Oeuvres complètes*), this red meridian line does not make it possible to determine the color used in drawing the parallels.

317. This is the conclusion drawn by Massimo Quaini in “L’immaginario geografico medievale, il viaggio di scoperta e l’universo concettuale del grande viaggio di Colombo,” *Columbeis* 5 (1993): 257–70, esp. 269. These data cannot be taken as indicating that Columbus knew and used Ptolemy’s “squared plane projection”; see Simonetta Conti, “È di Cristoforo Colombo la prima geocarta di tipo tolemaico relativa alla grande scoperta,” *Geografia* 13 (1990): 104–8.

318. Las Casas, *Columbus*, 280–81, and Alessandro Geraldini, *Itinerarium ad regiones sub aequinoctiali plaga constitutas* (Rome: Guilelmi Facciotti, 1631), 204–5.



FIG. 9.6. (continued)

The method adopted by Amerigo Vespucci of Florence was little different from that employed by Columbus, and it is known to us in more detail thanks to his letters and his *Mundus novus*. Repeatedly, Vespucci identifies cartographic realities with the points that can be noted in Ptolemy's maps.<sup>319</sup> In the account of the 1499–1500 voyage on which he is said to have served as a pilot, it becomes clear that it was the *Geography* that precisely determined the route taken. Having reached land, Vespucci sailed south because “his intention was to see if he could pass round a cape that Ptolemy calls the Cape of Cattigara, near to Sinus Magnus”; latitude and longitude led him to believe that this cape was close by. The second letter to Lorenzo di Pierfrancesco de' Medici (1501), in which Vespucci recounts what he learned at Cape Verde on the Cabral expedition, is introduced by a sentence that synthesizes this use of Ptolemy as a reference work: “Everything will be recounted here briefly to Your Excellency: not through cosmography, because in that crowd there was no cosmographer or mathematician (which was a grave mistake), but I will tell in an uncontrived fashion what they told me, except that sometimes I will correct it using Ptolemy's Cosmography.”<sup>320</sup> Complete with measurements of coordinates, the first letter concerning the voyage along the southern coasts was to be accompanied

by a “plane-surface map” and a globe. Certainly the sarcasm Vespucci shows toward the Portuguese navigators reveals that this Florentine explorer-cosmographer had a clear sense of his own superiority (unlike less learned navigators, he had read his Ptolemy). And while this air of superiority obviously served the rhetorical purpose of making his own account appear all the more authentic, it was also typical of the Florence humanist-mercantile milieu that Vespucci was addressing. The *Geography* had by then been an object of study for decades, and reverence for its method, though misunderstood, plus belief in the perfection of the *imago mundi* it offered, meant that both that method and that *imago mundi* had become means to be employed in understanding the new discoveries.

The work of the Venetian Alessandro Zorzi further enables us to understand the mental framework within which the work of Ptolemy was measured against the new discoveries. At the beginning of the sixteenth century, Zorzi copied a collection of texts relating to the discoveries made in Asia and the Americas. The margins of his texts are full of notes and diagrams. For example, Zorzi identifies the position of the 1499–1500 explorations on the coast of South America (referred to as “Paria” in the sources) using a small globe on which the outline of the landmasses is taken from Ptolemy (though the Indian Ocean is not shown landlocked).<sup>321</sup> Vespucci's voyage is illustrated in a marginal drawing in which the coasts of Europe and Africa are shown opposite those of the *Mundus Novus*, all in relation to the equator, the tropics, and the poles.<sup>322</sup> Similarly, the three maps sketched in the margin of Zorzi's copy of Columbus's letter of 7 July 1503 reflect an attempt to reconcile the Ptolemaic view of Asia with the discoveries that had emerged from Columbus's fourth voyage (fig. 9.6). The maps show the extent of the *oikoumene* marked to 180 degrees on the equator. The nomenclature is Ptolemaic, and two notes recall the two estimates of the extent of the *oikoumene* put forward by Ptolemy and Marinus and summarized in Columbus's own account of his fourth voyage.<sup>323</sup> The written notes and drawings in

319. Mario Pozzi, ed., *Il mondo nuovo di Amerigo Vespucci: Scritti vespucciani e paravespucciani*, 2d ed. (Alessandria: Edizioni dell'Orso, 1993), 79, 81, and 105. The question of whether Vespucci's voyages actually took place as described—or of the degree of confidence that one can have in the published or manuscript accounts—is clearly irrelevant here.

320. Pozzi, *Il mondo nuovo di Amerigo Vespucci*, 74–75.

321. Laura Laurencich Minelli, *Un “giornale” del Cinquecento sulla scoperta dell'America: Il manoscritto di Ferrara* (Milan: Cisalpino-Goliardica, 1985), 83 and fig. 72; another reproduction of the folio in its entirety can be found in Columbus, *Cristoforo Colombo*, 2:665.

322. Laurencich Minelli, *Un “giornale” del Cinquecento*, 98 and fig. 83.

323. Florence, Biblioteca Nazionale Centrale, Banco Rari 234 (olim Magl. XIII 81), fols. 56v, 57r, and 60v; Ferrara, Biblioteca Comunale Ariostea, Cl. II, 10, fol. 63v, 70v (see Laura Laurencich Minelli, “Il mano-

these manuscripts reflect the interests of the merchant circles in a maritime city where people were eager for precise information on how to reach the newly discovered lands and thus anxious to be able to locate these discoveries within the existing image of the world.<sup>324</sup>

Ptolemaic maps (or, more generally, Ptolemaic ideas) were also used in resolving territorial disputes between Castille and Portugal in these newly discovered regions. The Treaty of Tordesillas (1494) was to establish a line “by degrees or some other manner” at 370 leagues from the islands of Cape Verde; the choice of the zero point, Ptolemy’s original meridian as corrected during the Middle Ages,<sup>325</sup> was highly significant. However, difficulties arose when it came to physically tracing out this line, and the Catholic kings sought experts throughout their kingdoms. They turned to Jaime Ferrer, who had long been a purchaser of precious stones for the Naples court and had established for himself a reputation as a cosmographer. In a letter of 27 January 1495, Ferrer announced the dispatch of a “large map of the world” on which the sovereigns were to see the two hemispheres, the equator, the tropics, and the seven *climata*.<sup>326</sup> Two sources are mentioned on this occasion: Johannes de Sacrobosco’s treatise on the sphere and a work Ferrer entitled “De situ orbis,” by which he meant the *Geography*.<sup>327</sup> It is not important here to go into the empirical procedure Ferrer used to establish the previously mentioned line; in effect, he used the procedure of *marteloio*, supplementing and improving it by measuring longitude along a wind rhumb. What is important is that this procedure is essentially Ptolemaic. Ferrer says that, using convergent lines running from pole to pole, he marked the distance corresponding to twenty-three degrees at the equator. More important, he compared different modes of representation, contrasting the marine and the Ptolemaic map. He found the former of no use “in the mathematical exposition” of the rule he was attempting to demonstrate. What was required was a spherical map, one that took the spherical nature of the earth into account and in which “each thing is shown in its place.” To fully understand this rule, Ferrer concluded, one had to be a cosmographer, mathematician, and sailor.<sup>328</sup>

This gradual integration of new geographical discoveries with what was already known of the world can also be seen in the more successful works of cartography intended for a wider public. Whether claimed as Portuguese or Castilian possessions, the new lands soon made their appearance on the maps of the learned. Henricus Martellus Germanus, for example, produced various Ptolemaic world maps with degrees of longitude and latitude. Most were illustrations to the manuscripts of his “Insularium,” but there was also the large painted map on paper now at Yale University. These works show the progress of Portuguese explorations in Africa up to 1489, while the image

of Asia they present is in line with that propounded by Christopher Columbus. (The Eurasian continent occupies some three-quarters of the world’s circumference.)<sup>329</sup> Henricus Martellus’s work is typical of a humanist approach. Alongside the modern maps in his copies of the *Geography*, he gives classical (for example, Pomponius Mela) as well as medieval texts referring to the regions depicted. This is the “late-fifteenth-century modified version of Ptolemy” that would provide the model within which the discoveries of the *mundus novus* were organized throughout the early part of the following century.<sup>330</sup>

There is no doubt that Ptolemaic world maps made their contribution to the general interest in the voyages of

scritto di Ferrara: Prime immagini del Nuovo mondo,” in *Pietro Martire d’Anghiera nella storia e nella cultura* [Genova: Associazione Italiana Studi Americanistici, 1980], 241–53; Ilaria Luzzana Caraci, “L’America e la cartografia: Nascita di un continente,” in *Cristoforo Colombo*, 2: 603–34, esp. 606–7 and *Schede*, 664–70, with the reproduction of fol. 60v of the Florence manuscript). The role played by Christopher Columbus, Bartholomew Columbus, and Alessandro Zorzi in the ideas behind these sketches has given rise to a scholarly debate that is of no real pertinence (Roberto Almagià, “Intorno a quattro codici fiorentini e ad uno ferrarese dell’erudito veneziano Alessandro Zorzi,” *Bibliofilia* 38 [1936]: 313–471, and George E. Nunn, “The Three Maplets Attributed to Bartholomew Columbus,” *Imago Mundi* 9 [1952]: 12–22). The reproductions of the Florence manuscript given by Nebenzahl are taken not from the originals but from facsimiles; see Kenneth Nebenzahl, *Atlas of Columbus and the Great Discoveries* (Chicago: Rand McNally, 1990), 38–39. The maps in the Ferrara manuscript are reproduced in Laurencich Minelli, *Un “giornale” del Cinquecento*, figs. 88 and 89.

324. The portrayal of Zorzi as a humanist does not appear to be accurate; he was more a compiler of news for the previously mentioned milieu (Laurencich Minelli, *Un “giornale” del Cinquecento*, 17–18).

325. Gerald R. Tibbetts, “The Beginnings of a Cartographic Tradition,” in *HC* 2.1:90–107, esp. 102–3.

326. Jaime Ferrer, “Letra feta als molt Catholichs Reys de Spanya Don Ferrando y dona isabel: Per mossen laume Ferrer,” in *Sentencias catholicas . . .*, by Jaime Ferrer (Barcelona, 1545), no pagination. The letter is reproduced by Martín Fernández de Navarrete, *Colección de los viajes y descubrimientos que hicieron por mar los españoles desde fines del siglo XV*, 5 vols. (Madrid: Imprenta Nacional, 1825–37), 2:111–15. On the work of Jaime Ferrer, see José María Millás Vallicrosa, “El cosmógrafo Jaime Ferrer de Blanes,” in *Estudios sobre historia de la ciencia española*, 2 vols. (1949; reprinted Madrid: Consejo Superior de Investigaciones Científicas, 1987), 1:455–78, and idem, “La cultura cosmográfica en la Corona de Aragón durante el reinado de los Reyes Católicos,” in *Nuevos estudios sobre historia de la ciencia española* (1960; reprinted Madrid: Consejo Superior de Investigaciones Científicas, 1991), 299–316, esp. 307–11.

327. He attributes such a work to Ptolemy in his commentary on Dante’s *Divine Comedy* (Millás Vallicrosa, “El cosmógrafo Jaime Ferrer,” 464).

328. Navarrete, *Colección*, 2:114.

329. Roberto Almagià, “I mappamondi di Enrico Martello e alcuni concetti geografici di Cristoforo Colombo,” *Bibliofilia* 42 (1940): 288–311; Gentile, *Firenze*, 237–43; and Alexander O. Viator, “A Pre-Columbian Map of the World, circa 1489,” *Imago Mundi* 17 (1963): 95–96.

330. Luzzana Caraci, “L’America e la cartografia,” 622 and 626.



discovery. By the end of the fifteenth and the beginning of the sixteenth century, Ptolemaic place-names for the extremities of the world (for example, Rhaptum Promontorium or Cattigara in Asia) were current—indeed, commonplace—expressions. Thus, for example, in his 1502 poem *De hortis hesperidum*, Giovanni Pontano makes mention of the “Prassi oras” and the “Rhapti procellas” in celebrating the voyage of Vasco de Gama in a work that combines poetry, ancient geography, echoes of Ptolemy, and news of the new discoveries from Portugal and Spain.<sup>331</sup> Here again, another area to be investigated is the use of Ptolemaic references and expressions in texts that are not strictly geographical; the results would certainly undermine that old idea of humanist indifference to the new discoveries and the discussions regarding the *imago mundi* that they provoked.

With the discovery of the New World, new problems arose with two modes of representation that differed both in their aims and their concerns. Charts met the practical needs of navigators who had to reach and recognize the newly discovered lands. Theoretical questions hardly impinged at all upon the Juan de la Cosa map, the Cantino map, the map of Nicolò de Caverio, or the Pesaro map; indeed, the sole borrowing from cosmography is found in the use of the equator and the tropics. However, from the very early years of the sixteenth century, scholarly—that is, necessarily Ptolemaic—cartography was tackling three problems: the location of the discoveries within the *oikoumene*, the establishment of the precise relation between America and Asia, and the examination of the effects of the discoveries on modes of representation. We can understand how cartographers dealt with these problems only after looking at the changes in the way Ptolemy was read from the third quarter of the fifteenth century onward.

## TOWARD A “MATHEMATICAL CARTOGRAPHY”

### A FALSE PROBLEM AND A FALSE START: TOSCANELLI

As Garin noted, the figure of the Florentine physician Paolo dal Pozzo Toscanelli “emerges from the echoes that reveal his presence in the lives of others.”<sup>332</sup> He had links with most of the important figures of the Renaissance, learned Greek from Niccoli, and was friends with the likes of Filippo Brunelleschi, Leon Battista Alberti, Nicolaus Cusanus, and Johannes Regiomontanus. Thanks to the imaginative work of Uzielli, Toscanelli has been credited with an important role in the genesis of Columbus’s projected voyage and an equally important contribution to the development of geographical knowledge through a critical reading of Ptolemy.<sup>333</sup> Few have received such praise for the extent of their knowledge in the varied domains of science, language, and literature.<sup>334</sup> Yet no figure remains as enigmatic as this man without identified

works, and no historical reconstruction seems as arbitrary as that which continues to insist that Florence played a direct part in the voyages of discovery. Without going back to those “echoes” of Toscanelli’s work, I limit myself here to establishing the exact nature of his role in the reception of Ptolemy’s *Geography*,<sup>335</sup> beginning with a review of all the comments or indications that bear witness to his interest in questions relating to the representation of the world. It has already been mentioned that at the time of the Council of Florence Toscanelli was in possession of a map of north Europe by Claudius Clavus, a map similar to the one that Cardinal Fillastre had already added to his copy of Ptolemy. In his commentary on the *Georgics*, Cristoforo Landino, in a discussion of the famous line about the “ultima Thule,” mentions a detail that further confirms the physician’s interest in the northern limits of the world: Toscanelli is said to have questioned those men who came from near the sources of the Tanais.<sup>336</sup> After mentioning this, Landino gives the lengths of the longest day from the parallel of Thule to the seventy-first parallel, commonplace information that could easily be gleaned from any of the maps in the *Geography*, and certainly not the exceptional calculations with which Uzielli credits Toscanelli.<sup>337</sup> For his part, Antonio Manetti, in a note to a passage in a *volgarizzamento* of Honorius Augustodunensis’s *Imago mundi* that deals with the circumference of the world and the relation of a mile to a *stadium*, quotes the opinion of “maestro

331. Liliana Monti Sabia, “Echi di scoperte geografiche in opere di Giovanni Pontano,” *Columbeis* 5 (1993): 283–303.

332. Eugenio Garin, *Ritratti di umanisti* (Florence: Sansoni, 1967), 59.

333. Gustavo Uzielli, *La vita e i tempi di Paolo dal Pozzo Toscanelli* (Rome: Ministero della Pubblica Istruzione, 1894). See also Leonardo Rombai, “Tolomeo e Toscanelli, fra Medioevo ed età moderna: Cosmografia e cartografia nella Firenze del XV secolo,” in *Il mondo di Vespucci e Verrazzano, geografia e viaggi: Dalla Terrasanta all’America*, ed. Leonardo Rombai (Florence: L. S. Olschki, 1993), 29–69, esp. 50–64, and idem, “Paolo dal Pozzo Toscanelli (1397–1482) umanista e cosmografo,” *Rivista Geografica Italiana* 100 (1993): 133–58.

334. There is no precise information on his education and background. Uzielli’s claim that he studied in Padua under Prosdocimo de’ Beldomandi, and there met Nicolaus Cusanus, is pure conjecture (*La vita*, 22 and 37). Gentile has shown that there is another possibility for that encounter: Rome in the years 1427–28 (*Firenze*, 123).

335. A sober and informed overall picture of the life of Toscanelli is given by Carmen Gallelli, “Paolo dal Pozzo Toscanelli,” in *Il mondo di Vespucci e Verrazzano, geografia e viaggi: Dalla Terrasanta all’America*, ed. Leonardo Rombai (Florence: L. S. Olschki, 1993), 71–92. An overall appreciation of his role—borne out by existing documents and the actual facts of the case—is given in Gentile, “Toscanelli,” 113–31.

336. Cristoforo Landino, *Scritti critici e teorici*, 2 vols., ed. Roberto Cardini (Rome: Bulzoni, 1974), 2:309. Compare Gentile, *Firenze*, 148–50.

337. Uzielli, *La vita*, 113–33. Toscanelli’s further curiosity about Ethiopia can be deduced from a 1438 letter to Ambrogio Traversari (Mercati, *Ultimi contributi alla storia degli umanisti*, 1:12–13).

Pag[ol]o matematico.”<sup>338</sup> The mention by Plethon (quoted earlier) is not the only thing that bears witness to Toscanelli’s interest in cartography. In his “Ricordanze,” the Florentine patrician Francesco Castellani mentioned that in 1459 he lent the physician “a large *mappamundi* with legends and complete in everything” so that it could be shown to the ambassadors of the king of Portugal.<sup>339</sup> This fact has led commentators to attribute a key role in the choice of a western route to the Indies to Toscanelli; he is said to have produced this *mappamundi* in such a way that it showed how the Indies could be reached from this direction.<sup>340</sup> All we can really say for sure, however, is that the sum total of Toscanelli’s intellectual approach to cartography amounts to no more than interest in the limits of the *oikoumene* and in the measurement thereof, together with careful study of the maps that might make a contribution to debate on this subject. There is nothing that reveals deep skills or capacity in any way out of the ordinary in Florence—or elsewhere—for decades after the translation of the *Geography*.

Do two famous documents—the Banco Rari 30 manuscript and the letter to Fernand Martins accompanying a map—throw Toscanelli’s abilities into better relief? The autograph pages of the Banco Rari 30 manuscript are said to bear direct witness to his cartographic work;<sup>341</sup> Uzielli argues that the four lists of coordinates on folio 254r were calculated by Toscanelli himself.<sup>342</sup> However, two of these lists are not original,<sup>343</sup> while the other two are very banal—as is a nearby remark regarding the degree, the mile, and the fathom that, in this context, provide for the calculation of positions from data regarding itinerary. In effect, most of the autograph material concerns calculations regarding various comets and schematic measurements of their position in relation to the fixed stars.<sup>344</sup> One of these diagrammatic schema (fols. 253v/256r) shows a framework complete with three points of the compass, at the top and to the sides (south is not indicated), divided in 90 degrees from north to south and 180 degrees from east to west. There is no reason to think that this grid, which occurs among the sheets bearing scales for use in indicating the position of comets, was intended for anything other than recording the observed positions.<sup>345</sup> And even if it had been intended with some terrestrial cartographic use in mind, it is clear, as Gentile has pointed out, that it was never used as such. Any conclusion based on the existence of this essentially blank document would be pure speculation.<sup>346</sup> Similarly, far from indicating the emergence of a cartography that surpasses Ptolemy in precision,<sup>347</sup> the observations of comets, the lists of coordinates (indispensable in resolving certain astronomical problems), and the framework divided into degrees reveal nothing but astrological concerns that were commonplace among the physicians of the day. They appear in neighboring folios,<sup>348</sup> and they reappear in the rest of the manuscript from which, in the

nineteenth century, the Toscanelli sheets of Banco Rari 30 were separated (with the precise intention of enhancing their “scientific” status—in the modern sense of the term—by freeing them from association with works that were then considered mere expressions of superstition).<sup>349</sup> In essence, astrology was the very basis of Toscanelli’s probable interest in the *Geography* and provided the framework for his studies of the work.

Wagner uses the double sheet, with its double graduation in degrees, to reconstruct the map that Toscanelli sent to the humanist Portuguese canon Fernand Martins. Wagner’s reconstruction is the one that is currently accepted as most convincing. However, the very basis of Wagner’s work is a view of Toscanelli as some sort of “Marinus redivivus,” the first to dare to challenge the authority of Ptolemy by reducing the extent of the oceans between Europe and Asia to 130 degrees—that is, the value given by Marinus of Tyre and criticized by

338. “At 8 stadia to the mile, that makes 22,500 miles; but Maestro Pagolo the mathematician tells me that 8 stadia are something less than a mile”; and “so, according to him, the earth turns 22,500 miles, but Maestro Pagolo the physician tells me that 8 stadia are not the measure of 1 mile” (Florence, Biblioteca Nazionale Centrale, Conv. Soppr. G II 1501, fol. 3v; see Gentile, *Firenze*, 151–53).

339. The passage has been published numerous times. See Gentile, *Firenze*, 146–48.

340. The arbitrary interpretation of Crinò—that this *mappamundi* was the so-called Genoese map (Florence, Biblioteca Nazionale Centrale, Portolano 1)—has now been rejected. See Sebastiano Crinò, *La scoperta della carta originale di Paolo dal Pozzo Toscanelli* (Florence: Istituto Geografico Militare, 1941), and idem, *Come fu scoperta l’America* (Milan: U. Hoepli, 1943).

341. Florence, Biblioteca Nazionale Centrale; description and discussion in Gentile, *Firenze*, 131–36.

342. Uzielli, *La vita*, 457–58, 463–71, and 615–29.

343. Hermann Wagner, “Die Rekonstruktion der Toscanelli-Karte vom J. 1474 und die Pseudo-Facsimilia des Behaim-Globus vom J. 1492,” *Nachrichten von der Königl. Gesellschaft der Wissenschaften zu Göttingen, Philologisch-historische Klasse*, 1894, 208–312, esp. 307; Garin, *Ritratti di umanisti*, 63–64; and Gentile, *Firenze*, 135.

344. The new concern about precision revealed by these measurements has already been pointed out; see Jane L. Jervis, *Cometary Theory in Fifteenth Century Europe* (Dordrecht: D. Reidel, 1985), 67–68.

345. Two leaves of the manuscript bearing data regarding comets are reproduced without folio number as “manuscripts, containing a graded outline for a cartography of the area between Europe and Asia” in a catalog celebrating the glory of Florentine historiography; see Brunetto Chiarelli, “Paolo dal Pozzo Toscanelli,” in *La carta perduta: Paolo dal Pozzo Toscanelli e la cartografia delle grandi scoperte* (Florence: Alinari, 1992), 13–22, esp. 19–20.

346. Gentile, *Firenze*, 135.

347. For example, Rombai, “Tolomeo e Toscanelli,” 54.

348. Garin was the first to underline this: it is absurd to separate medicine, astrology, astronomy, and geography; obviously a physician would be interested in astrology—and thus the *climata*—in order to be able to locate places exactly and have a precise understanding of the influence of things celestial on things terrestrial, such as diseases (Garin, *Ritratti di umanisti*, 54 and 64).

349. Garin, *Ritratti di umanisti*, 50 n. 8.

Ptolemy.<sup>350</sup> This is an essential factor in the legend spun around Toscanelli, apparently borne out by the mathematical expertise with which his contemporaries credited him. However, looking at the mentions and descriptions that have come down to us, it seems that the map sent to the Portuguese canon (with whom Toscanelli had had frequent discussions in Italy) was not necessarily connected with the Ptolemaic method at all: the physician appears to see his work as drawn from *carte nauigacionis*.<sup>351</sup> Similarly, in the apocryphal correspondence between Toscanelli and Columbus, the former announces the dispatch of what is referred to by Ferdinand Columbus as a “*carta navigatoria*” (navigation chart)<sup>352</sup> and what Las Casas calls a “*carta de marear*” (sea chart),<sup>353</sup> descriptions that reveal how these two contemporaries of Columbus viewed a work that they may have even made up. As described, the *recte* and *transverse* of this map chart out *spatia* given in miles, which calls to mind a marine chart complete with scale rather than a map constructed using meridians and parallels.<sup>354</sup> It would be unwise to go so far as to totally dismiss the work's connection with Ptolemaic representations, but there is no doubt that the attempt in the text of the letter to reconcile different modes of representation is far from original. We have already seen Venetian works dating from much earlier that show such attempts were widespread. As for the argument that the maritime route to Asia was the shortest, this had already been put forward by Roger Bacon, Pierre d'Ailly, Guillaume Fillastre, and many others. Toscanelli was not an original cartographer, and the reconstruction says more about Wagner's abilities than about Toscanelli's own.<sup>355</sup>

In conclusion, one might summarize the knowledge and works of Toscanelli with two lines from Ugolino Verino's funeral eulogy: “Paolo knew the earth and the stars / And made a commentary upon the great work by Ptolemy.”<sup>356</sup> The Florentine physician's interest in maps and questions relating to the extension of the *oikoumene* was something he had in common with all scholars of his day, but the “great work by Ptolemy” on which Toscanelli made his commentary was the *Almagest* (Latin title: *Magna compositio*). Like all his contemporaries with a similar background, Toscanelli was an astrologer. If he did look into the *Geography*, it was not to consider its “mathematics” but to try to understand the effects of things celestial upon things terrestrial.<sup>357</sup>

#### THE GEOGRAPHY AND THE BIRTH OF PERSPECTIVE?

The relation of Ptolemaic “projection” to the invention of pictorial perspective by the Florentine artist-engineer Filippo Brunelleschi in the years shortly after the appearance of the translation of the *Geography* is a problem sometimes thought to have been definitively resolved. Certain art historians have claimed that the Ptolemaic

systems of “projection” played a fundamental role in this artistic development. The idea seems to have been put forward for the first time in 1958, in a very confused and ill-researched article whose author concluded that Brunelleschi turned to Toscanelli when he encountered difficulties in perfecting the system of perspective. The physician is then seen to have combined the intuition of the craftsman with the caution of a scholar and dreamed up the “optical box” set up in front of the Florentine cathedral of Santa Maria del Fiore (the design for which drew on his knowledge of conical “projection,” which is supposedly analogous to monocular perspective).<sup>358</sup> However, it was Edgerton who most fully developed this connection in a series of publications written from 1974 onward, arguing that it was not conical “projection” but the third mode of Ptolemaic “projection” that was the direct forebear of linear perspective.<sup>359</sup> In effect, this procedure for depicting the *oikoumene* on an armillary sphere—in such a way that the annulets representing the equator and the Tropic of Cancer do not obstruct the

350. Wagner, “Die Rekonstruktion der Toscanelli-Karte,” 236–37.

351. At least this is what one can deduce from the passage preceding the announcement that the map is being sent: “Although I know that it is a consequence of the spherical form of the earth, I have decided, nevertheless, so as to be better understood and to facilitate the enterprise, to demonstrate in constructing a nautical chart that the said route is proved to exist.” Henry Harrisse, *The Discovery of North America: A Critical, Documentary, and Historic Investigation, with an Essay on the Early Cartography of the New World, Including Descriptions of Two Hundred and Fifty Maps or Globes Existing or Lost, Constructed before the Year 1536* (London: Henry Stevens and Son, 1892), 381.

352. Fernando Colón, *Historie del S. D. Fernando Colombo: Nelle quali s'ha particolare, & vera relatione della vita, & de fatti dell'Amiraglio . . .* (Venice: Francesco de'Franceschi Sanese, 1571), 8.

353. Las Casas, *Columbus*, 264. Las Casas also says that he has the “*carta de marear*” sent by “Paulo, físico florentín” and used by Columbus during his first voyage (pp. 263 and 266).

354. The expression “In the west, those that are set crosswise show spaces from the south to the north” would be very strange if one took the text to be referring to parallels.

355. The same conclusion is reached in Jacques Heers, *Christophe Colomb* (Paris: Hachette, 1981), 154.

356. Ugolino Verino, *Eulogium Pauli Thusci medici ac mathematici preclarissimi* (quoted in Gentile, *Firenze*, 156).

357. One might quote Conrad Heingarten, astrologer to Louis XI, who in 1472 was in Rome. In his commentary on “*Quadripartitum*” (written around 1476), he refers the reader to Ptolemy: “and you might these provinces determine by the book of the *Cosmography* by Ptolemy.” BNF, Latin 7305, fol. 113r; see Lynn Thorndike, *A History of Magic and Experimental Science*, 8 vols. (New York: Macmillan, 1923–58), 4:371.

358. Jean-Gabriel Lemoine, “Brunelleschi et Ptolémée: Les origines géographiques de la ‘boîte d'optique,’” *Gazette des Beaux Arts* 51 (1958): 281–96. Parronchi considers this idea wrong-headed; see Alessandro Parronchi, *Studi su la dolce prospettiva* (Milan: A. Martello, 1964), 228. Curiously enough, Lemoine's article is not cited by the historians who later developed the notion of a direct link between perspective and Ptolemy.

359. Samuel Y. Edgerton, “Florentine Interest in Ptolemaic Cartography as Background for Renaissance Painting, Architecture, and the

view of the observer—seems to imply the existence of a viewing point and a pyramid of vision.

It must be pointed out that the arguments brought forward in support of this claim are very general in nature. The representation of space in medieval cartography—with its heterogeneous constituents, its multiplicity of viewpoints, its subjectivity, its focus on concrete qualities and lack of any exact representation of distances—is supposedly challenged by a Renaissance space with the opposite characteristics. However, in these simple and undemonstrable contrasts, it is not difficult to recognize the general ideas put forward by the French art historian Pierre Francastel.<sup>360</sup> Moreover, the link between perspective and the *Geography* is seen as one of the constituent features of a “Renaissance paradigm”—that is, “a cultural constellation of related ideas; a realm in which science, art, philosophy, and religion all interact.”<sup>361</sup> Yet all of this is based only on allusions, shaky analogies, and unproven conjectures. No proof of a direct link in theory or practice has been brought forward, and an analysis of the third mode of Ptolemaic “projection” does not address the essential point, namely, that this mode of representation was not understood by the men of the fifteenth century, most of whom were not interested in the procedures of “projection” and, in fact, left no extant example of a map produced using this procedure (anyway, all the schema of construction in the Latin translation of the *Geography* are full of errors). The advent of perspective is said to coincide with the widespread use of grids in taking the elevations of ancient buildings and in the production of copies. Indeed, the use of such frameworks is claimed to reveal a “grid mentality,” for which space was a homogeneous geometrical milieu. At this point, Toscanelli is called forward in support of the whole thesis. Giorgio Vasari says that upon his return from university in 1424–25, Toscanelli invited Brunelleschi to visit him; and the latter, hearing him discourse upon mathematics, became a close member of his circle and studied geometry with him.<sup>362</sup> It is claimed that the physician explained the subtleties of the third “projection” to the engineer and thus made the discovery of perspective possible. Moreover, thanks to Toscanelli’s presence—a veritable adept of the “grid mentality” (as one can supposedly see from his letter with map to the canon Fernand Martins)—the discovery of perspective would have to be intimately bound up with the discovery of the New World itself.<sup>363</sup>

Fine—except that this whole scenario is built on a false premise. When he came back from university, Toscanelli was twenty-eight years old, while Brunelleschi, whose reputation as an architect was already established, was forty-eight. It is difficult to imagine a man whose work had already received such recognition sitting down to receive lessons from a student. Furthermore, the fundamental work at Santa Maria del Fiore occurred around 1413, some ten years before the period mentioned by

Vasari. The author of this ingenious thesis shifts continually between a claim of mere analogies that are not based on any precise analyses (with Ptolemy and perspective seen as part of some new experience of visual perception) and an argument that supposes that the *Geography* exerted *direct* specific influence (a claim unsupported by any textual comparisons). In fact, it has now been shown, by well-constructed argument based on extant texts, that thirteenth-century optics—together with empirical experience—was the basis of the discovery of perspective.<sup>364</sup> Ptolemy played no part in inspiring the new organization of pictorial space that emerged in the fifteenth century.

#### THE STUDY OF THE “MATHEMATICAL” PROBLEMS IN THE *GEOGRAPHY*

As manuscripts and printed editions of the *Geography* became more widely available, the more searching readers became aware of the faults in the maps; they were anxious to provide themselves with a method for calculating coordinates so that they could improve the Ptolemaic world image. However, it was not in Italy that this updating of the *Geography* took place.

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Discovery of America,” *Journal of the Society of Architectural Historians* 33 (1974): 275–92; idem, *Renaissance Rediscovery of Linear Perspective*; and idem, *The Heritage of Giotto’s Geometry: Art and Science on the Eve of the Scientific Revolution* (Ithaca: Cornell University Press, 1991), 150–59. Veltman moderates somewhat the theory built up by Edgerton and replaces cartography with astronomy; see Kim H. Veltman, “Ptolemy and the Origins of Linear Perspective,” in *La prospettiva rinascimentale: Codificazioni e trasgressioni*, ed. Marisa Dalai Emiliani (Florence: Centro Di, 1980–), 1:403–7.

360. Pierre Francastel, *Peinture et société: Naissance et destruction d’un espace plastique, de la Renaissance au cubisme* (Paris: Gallimard, 1965), 11–69. Note that a number of Edgerton’s comments regarding details are also suspect. He claims that marine charts gave no precise account of distance—something that will astonish all those who have seen the scales of distance within them; it is said that Pope Pius II and the Catholic Church granted an “official nihil obstat” to the *Geography*, as if it were a dangerous work; and a passage from Giovanni Cavalcanti’s “Istorie Fiorentine” is quoted in an abridged and inaccurate way—contradicting its original meaning—in order to prove the existence of a “rational” perception of space. See Patrick Gautier Dalché, “Pour une histoire du regard géographique: Conception et usage de la carte au XV<sup>e</sup> siècle,” *Micrologus* 4 (1996): 77–103, esp. 99.

361. Edgerton, *Renaissance Rediscovery of Linear Perspective*, 162. This vague definition ends up seeing perspective as a simple conventional expression of the Zeitgeist; see H. Damisch, *Les origines de la perspective* (Paris, 1974), 47ff.

362. Giorgio Vasari, *Le opere di Giorgio Vasari*, 9 vols., ed. Gaetano Milanesi (Florence: Sansoni, 1878–85), 2:333.

363. Edgerton, *Renaissance Rediscovery of Linear Perspective*, 120–23.

364. The commonsense observations Chastel made with regard to the “simplifying equation” perspective = logical structure = the end of transcendence could also be made with regard to another simplifying equation that Edgerton links with it: Ptolemaic maps = rational structure of space = no values and meanings attached to space; see André Chastel, “Les apories de la perspective au Quattrocento,” in *La prospet-*

## Antecedents: Amiroutzes, Peurbach

With Toscanelli removed from the picture, the only evidence we have that such a mathematical study was undertaken in Italy involves a Greek.<sup>365</sup> Scion of an important Trebizond family, George Amiroutzes studied in Constantinople under John Argyropoulos, who himself had studied and taught in Italy, most notably at Padua, where he had made the acquaintance of Palla Strozzi. Amiroutzes held important posts at the court of the Comnenian dynasty and was present at the Council of Florence in the company of Cardinal Johannes Bessarion and Plethon. According to Kritovoulos, after the fall of Trebizond in 1461, Mehmed II, noting that the maps of Ptolemy divided the world into excessively small sections, commissioned Amiroutzes to produce one overall map on a single canvas—a task the scholar carried out, for all its proclaimed difficulties, to the best of his abilities. The final work gave indications of direction, scale, and distances, and it was accompanied by a “treatise,” the content of which is not described and that does not seem to have come down to us in Greek.<sup>366</sup> However, in 1514 Johannes Werner published in Nuremberg a Latin version of the *Geography*, including a commentary and a treatise by Amiroutzes under the title *De his quae geographiae debent adesse*, which may have been the text that accompanied the map drawn for Mehmed II. The content here is purely mathematical, and the essential problem considered is that of the variation in the degree of longitude, the resolution of which was considered indispensable for the resolution of two further issues, one scientific and the other practical: how to establish the relative distance between cities and between cities and the ends of the world and how to provide means for planning swift and efficient military operations.<sup>367</sup> This is the only fifteenth-century treatise to deal with such questions, and the fact that this Latin translation was published by Werner in Nuremberg should lead us to wonder if its contents were known to Georg von Peurbach and Johannes Regiomontanus. For the moment, we have insufficiently detailed information to answer that question.

In fact, it was in Germany—where, as we have already seen, interest in the “scientific” aspects of the *Geography* emerged in the first half of the fifteenth century—that such mathematical questions were first seriously studied. Two astronomers and mathematicians played an essential, if yet relatively unstudied, role in developing interests in these aspects of Ptolemy's work. Independent of the fact that he was the teacher of John of Königsberg (better known as Regiomontanus), the career of Georg Aunpeck, born at Peurbach in 1423, is significant here.<sup>368</sup> We know nothing about him before he took his degree at the University of Vienna, from which he emerged as a master of arts in 1452.<sup>369</sup> A period in Italy (1448–51) had perhaps given him the opportunity to meet Nicolaus Cu-

sanus and Toscanelli, as well as Giovanni Bianchini, the Ferrara astrologer whom Borso d'Este commissioned some fifteen years later to verify the exactitude of the version of Ptolemy presented to him by Nicolaus Germanus.<sup>370</sup> We know that, once he returned to Vienna, he was part of the close circle of Enea Silvio Piccolomini, who was then staying in the city, and of Bessarion, papal legate to Austria. Through such people Peurbach became familiar with humanist thought, which explains why he gave courses on the Latin poets (Virgil, Juvenal, and Horace) and on the very specialist text of the *Rhetorica ad Herennium*. In fact, the cultural “location” of Peurbach may strike us as rather strange; he was a stylist, an author of Latin poems and of a treatise on the “*Positio et determinatio de arte oratoria sive poetica*” (1458), but he taught very little regarding his main field of interest, astronomy. However, that field of interest does predominate in his written work, and it is there one has to look for the origins of his interest in the *Geography*. Peurbach was primarily interested in the theoretical and practical questions involved in the manufacture of sundials, having been credited with inventing a portable sundial equipped with a compass. He was also court astrologer to the Hungarian kings Ladislaus V and Frederick III, making astronomical observations regarding eclipses and comets. All of these activities imply a knowledge of the notions of geographical coordi-

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*tiva rinascimentale: Codificazioni e trasgressioni*, ed. Marisa Dalai Emiliani (Florence: Centro Di, 1980–), 1:45–62. On the medieval origin of perspective, see Dominique Raynaud, *L'hypothèse d'Oxford: Essai sur les origines de la perspective* (Paris: Presses Universitaires de France, 1998), 165–66, which gives all the necessary proof—and a brief but unanswerable criticism—of Edgerton's thesis.

365. Emile Legrand, *Bibliographie hellénique; ou, Description raisonnée des ouvrages publiés par des Grecs au dix-septième siècle*, 5 vols. (Paris: J. Maisonneuve, 1903), 3:194–205. I owe this information on Amiroutzes to my colleague Brigitte Mondrain.

366. Diether Roderich Reinsch, *Mehmet II. erobert Konstantinopel: Die ersten Regierungsjahre des Sultans Mehmet Fatih, des Eroberers von Konstantinopel 1453: Das Geschichtswerk des Kritobulos von Imbros* (Graz: Styria, 1986), 280–82.

367. Facsimile of fol. Iv in Dieter Harlfinger, *Die Wiedergeburt der Antike und die Auffindung Amerikas: 2000 Jahre Wegbereitung einer Entdeckung*, exhibition catalog (Wiesbaden: In Kommission bei L. Reichert, 1992), 116, fig. 82.

368. Ernst Zinner, *Regiomontanus: His Life and Work*, trans. Ezra Brown (Amsterdam: North-Holland, 1990), 17–25; Paul Lawrence Rose, *The Italian Renaissance of Mathematics: Studies on Humanists and Mathematicians from Petrarch to Galileo* (Geneva: Droz, 1975), 91–92; and Grössing, *Humanistische Naturwissenschaft*, 79–107.

369. His connection with Johannes von Gmunden and his links with Klosterneuburg are pure conjecture, based on only the slightest evidence: the presence of the latitude of Peurbach itself in the list of coordinates for central Europe supplied by Fridericus.

370. According to a passage in the letter of dedication to Toscanelli within Nicolaus Cusanus's treatise on the squaring of the circle: “That that treatise should be given to our venerable, faithful, choice master Georg von Peurbach, astronomer” (Grössing, *Humanistische Naturwissenschaft*, 256 n. 11).

nates,<sup>371</sup> and Peurbach was certainly familiar with the *Geography*. Indeed, one manuscript of that work was perhaps in his hand.<sup>372</sup> Moreover, in 1455 he requested that Johannes Nihil, astronomer to Frederick III, return to him a “mappa cum cosmographia” as soon as Nihil had taken from it the material he required.<sup>373</sup> It has been conjectured that Peurbach also drew up maps himself, leaving some “geographical pictures that exist today,” according to Regiomontanus, pictures that bore witness to his manual ability.<sup>374</sup> There seems to be no reason to doubt this comment by his student or to suppose that these cartographic works were mere sketches taken during an undocumented stay at Klosterneuberg.<sup>375</sup>

One would like to know more, particularly whether Peurbach’s interest in Ptolemy extended to an interest in general notions behind the theory of cartographic representation and spherical trigonometry. According to Col-limitius (Georg Tannstetter), Peurbach’s works included a table with readings that showed the relation between a degree of longitude at the equator and a degree at other parallels.<sup>376</sup> If that work ever existed, it does not seem to have come down to us. Whatever the truth, Peurbach’s career does seem to offer the first concrete evidence of humanist, literary interests coinciding with mathematical, scientific concerns. Nevertheless, as Grössing has pointed out, even in Peurbach, humanism and science seem to have remained side by side, like two separate blocks.<sup>377</sup> It would take his pupil, Regiomontanus, to overcome the distinction between the two.

### The Unfinished Project of Regiomontanus

The interest shown in the problems of the representation of physical space by John of Königsberg, known as Regiomontanus, was initially stimulated by his years of study in Vienna with Peurbach (1450–60). A horoscope dates from this period that was made for Frederick III’s fiancée, Leonora of Portugal, in which the author used the coordinates given in the *Geography* to calculate the true local time in the girl’s place of birth, Lisbon.<sup>378</sup> Teacher and pupil were together again in 1457 at Melk to observe an eclipse. Regiomontanus further pursued these observations in 1461, when in Rome and Viterbo he took note of longitude and latitude and referred to Ptolemy as the occasion arose.<sup>379</sup> The observation of comets and the measurement of the positions of the planets required knowledge of the latitude of the observer’s position. If we look at one of the problems that Regiomontanus formulated for Giovanni Bianchini, we can get some idea of the difficulties in spherical astronomy that trigonometry was used to solve. For example, at the beginning of a lunar eclipse, two observers at the same moment establish the height and azimuth of a star; given the distance in miles between the two, calculate the declination of the star and the geographical coordinates of the two observers.<sup>380</sup> We

also know that, in addition to theoretical problems, throughout his career Regiomontanus was interested in the manufacture and use of astronomical instruments.<sup>381</sup>

As in the case of Peurbach—indeed, one might say, as in the vast majority of cases in the fifteenth century—Regiomontanus’s original interest in the *Geography* arose from concerns other than the representation of physical space—that is, from astronomical-astrological interests. A good part of his calculation of coordinates was intended to serve astrological purposes. His “Tabulae directionum profectionumque” (1467), the commentary that contains tables of sines, tangents, and the solar declination, was intended for the calculation of the divisions of the zodiac (the “domus”) in latitudes up to sixty degrees north. His *Ephemerides* contains tables with the coordinates of sixty-two cities (with the longitude expressed in terms of the distance in hours from Nuremberg), with

371. One of Peurbach’s rare lessons on astronomy concerns the *Orarium*, a semicircle with equal hours for the latitude of Vienna. The tables for the calculation of eclipses are calculated for the longitude and latitude of Grosswardein, near Vienna (Zinner, *Regiomontanus*, 25 and 27); Peurbach’s “Compositio tabulae altitudinis solis ad omnes horas” also concerns the same latitude. It is pure conjecture that he also measured the coordinates for Budapest (Grössing, *Humanistische Naturwissenschaft*, 104).

372. ÖNB, 5266.

373. Albin Czerny, “Aus dem Briefwechsel des grossen Astronomen Georg von Peurbach,” *Archiv für Kunde Österreichische Geschichte* 72 (1888): 283–304, esp. 298. The editor takes it for the work of Johannes von Gmunden.

374. In a fashion that perhaps reveals a methodological link, the work on the “almanach” (that is, an astronomical calendar) is mentioned immediately before the reference to the world map; see “Clarissimi aetatis nostrae mathematici Iohannis de Monte Regio fragmenta quaedam annotationum in errores quae Jacobus Angelus in translatione Ptolemaei commisit,” in Ptolemy, *Geographia*, Strasbourg 1525, fol. 1v. However, this passage does not show that Peurbach took extracts from a cosmography, as Grössing claimed in *Humanistische Naturwissenschaft*, 105.

375. Grössing, *Humanistische Naturwissenschaft*, 104.

376. “Tabula nova proportionis parallelorum ad gradus aequinoctialis cum compositione eiusdem” (Grössing, *Humanistische Naturwissenschaft*, 266 n. 144).

377. Grössing, *Humanistische Naturwissenschaft*, 85.

378. Johannes Regiomontanus, “Judicium super nativitate imperatricis Leonorae, uxoris imperatoris Friderici III,” in *Joannis Regiomontani: Opera collectanea*, ed. Felix Schmeidler (Osnabrück: Zeller, 1972), 1–33. See also Zinner, *Regiomontanus*, 31–32, but note that in 1451 Regiomontanus was fifteen years old; it is doubtful that he was the author, even if the text in the manuscript Clm 453 (fols. 78r–85v) is in his hand (Felix Schmeidler, “Regiomontanus Wirkung in der Naturwissenschaft,” in *Regiomontanus-Studien*, 75–90, esp. 85).

379. Johannes Regiomontanus, “Ioannis de Montereio, Georgii Peverbachii, Bernardi Waltheri, ac aliorum, eclipsium, cometarum, planetarum ac fixarum obseruationes,” in *Joannis Regiomontani: Opera collectanea*, ed. Felix Schmeidler (Osnabrück: Zeller, 1972), 645–60, esp. 646, 652, and 655.

380. Zinner, *Regiomontanus*, 67.

381. Diedrich Wattenberg, “Johannes Regiomontanus und die astronomischen Instrumente seiner Zeit,” in *Regiomontanus-Studien*, 343–62.

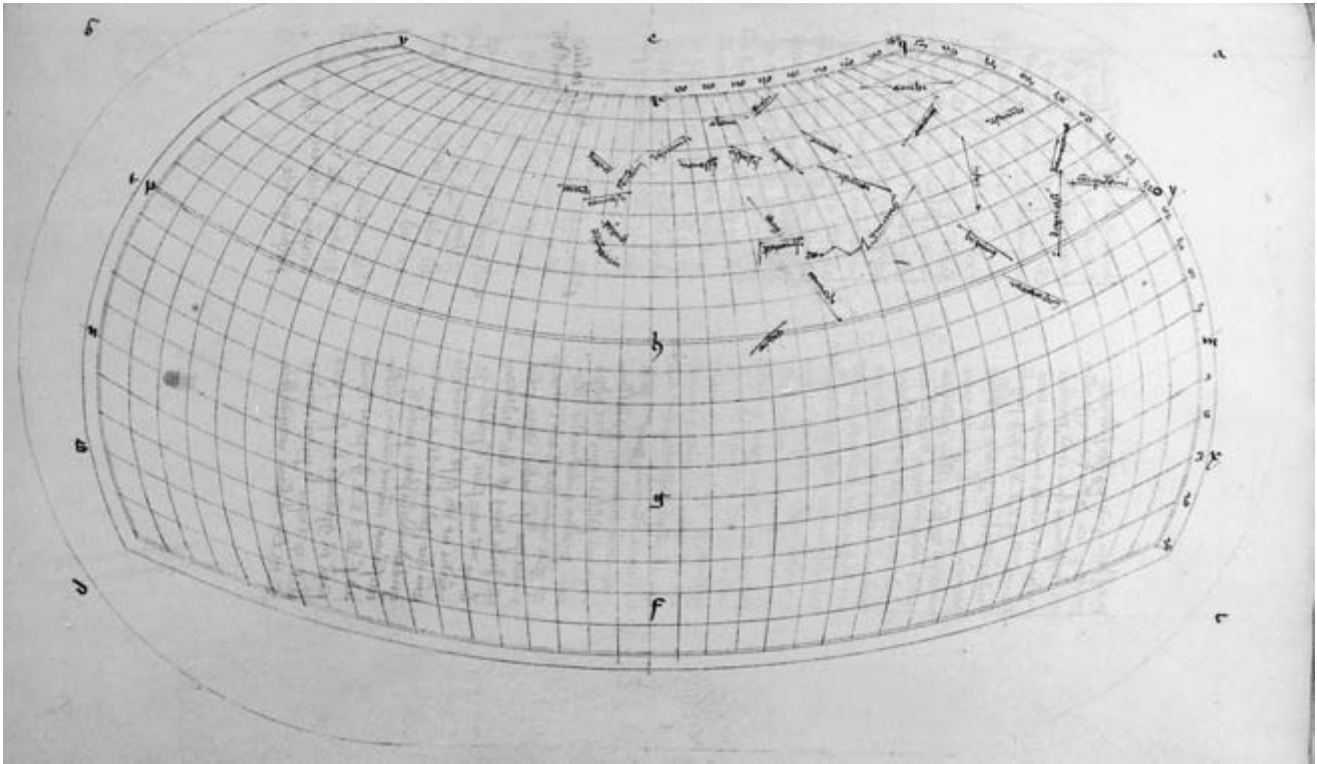


FIG. 9.7. TRACES OF GEOGRAPHIC INFORMATION ON A PROJECTION GRID. A schematic map, probably by Regiomontanus, to whom the manuscript belonged.

Size of the original: ca.  $26.9 \times 41.3$  cm. Photograph courtesy of the Bildarchiv, ÖNB (5266, fol. 92r).

the coordinates for the cities outside Germany taken from Ptolemy.<sup>382</sup> As in the case of Toscanelli, these distinctly astrological motivations for Regiomontanus's work (particularly the exact calculation of locations) have often been glossed over by historical research dominated by the nineteenth- and twentieth-century dogma of the "triumphant progress of science."

Nevertheless, Regiomontanus took things a decisive step further. During his years in Vienna, he may have copied Jacopo Angeli's translation of the text of the *Geography*.<sup>383</sup> A Nuremberg manuscript contains a careful copy of the *Geography*, accompanied by notes in Regiomontanus's characteristic handwriting (some in Greek); notes relating to the first book deal with the relation between degrees of longitude, and another note is a commentary on a "projection" using trigonometric development. On another manuscript owned by him, he annotated the *Geography* as well as drew a world map using the second "projection" and showing—indicated by only lines and their names—the mountains of Asia (fig. 9.7).<sup>384</sup>

Regiomontanus's stay in Italy (from 1460 onward), together with his contacts with the humanist elite, had opened his mind and also resulted in his learning Greek. The errors in the version of the *Geography* available meant that astrologers could not use that work as efficiently as they would have liked; it was as a result of

comparison of that text with the Greek original that Regiomontanus had the idea of producing a new translation. One should see this project in the context of his overall vision of his scientific activity—as revealed, for example, in the preface to his *Tabulae primi mobilis*, written after his return from Italy, when he was teaching at the recently founded University of Presburg. This preface is a veritable manifesto in favor of the union of mathematics (the highest form of which was then astronomy) and humanist studies. Regiomontanus argues that the *artes* should be based on sure principles, which only mathematics could provide. However, due to the errors in manuscripts and the arbitrary nature of some commentaries, these principles have to be reformulated on the basis of two complementary methods: direct observation and comparative study of the works of the ancients.<sup>385</sup>

382. Lucien Gallois, *Les géographes allemands de la Renaissance* (Paris: Ernest Leroux, 1890), 8.

383. This would be the Seitenstetten manuscript, Stiftsbibliothek, fol. 56, which I have not been able to consult (Zinner, *Regiomontanus*, 48).

384. The Nuremberg manuscript is Stadtbibliothek, Cent. V 55; Regiomontanus's notes on the first book are on fols. 19r, 20r, 25r, and 27r. The note on a "projection" is on fol. 26r. On the other manuscript owned by Regiomontanus, see Grössing, *Humanistische Naturwissenschaft*, 138.

385. Rose, *Italian Renaissance of Mathematics*, 100.

Therefore, this is the first formulation of a project that comprised both philology and critical assessment. The unadulterated versions of the fundamental texts had to be restored, and then these texts had to be used, when necessary, to correct existing traditions.<sup>386</sup> With regard to the *Geography* itself, Regiomontanus detailed his critical assessment in a letter that appears at the opening to his *Dialogus adversus Gerardum Cremonensem in planetarum theoricis deliramenta*, under the general heading “Universis bonarum artium studiosis”:

What will happen if the first copy has been rendered obscure by a careless translator, or transformed by the first starving copyist who happens along? Both of these things can be seen in the work that today is passed off as being Ptolemy’s *Geography*, in which the literal structure intended by the Greek author does not correspond to the phrases written by Jacobus Angelus the Florentine, who mistakes the meaning of words; and in which the maps of the specific provinces do not preserve the appearance intended by Ptolemy, but have undergone frivolous transformations at the hands of a starving man [*homo famelicus*]. As a result, a person who thinks he has Ptolemy’s *Cosmography* at his disposal could not even bring forward the palest shadow of that great work; and, without exception, the entire world will believe me when I say that, in effect, this work has not yet been handed down to the Latins.<sup>387</sup>

This was the first criticism of a version of the *Geography*, a text that, at the time, passed for the very pinnacle of cartography. In fact, every single aspect of the *Geography* then available was vitiated in some way. The schema for cartographic construction given in books 1 and 2 were full of mistakes and discrepancies with the text; the actual values of the coordinates varied from one copy to the next; the maps had been changed arbitrarily (that is, non-mathematically) by that *homo famelicus* Nicolaus Germanus. It should also be added that the maps varied from one manuscript to another because they were copied without reference to the text.

The admiration for the scientific approach adopted by Regiomontanus rests, among other things, on the tenacity with which he pursued the program implicit in these criticisms. Returning to Nuremberg in 1474, he set up a small print shop and published a single-sheet list of the works he intended to produce.<sup>388</sup> A new translation of Ptolemy came third in his list of scientific works (mainly by classical authors), after Peurbach’s *Theorice novem planetarum* and Manilius’s *Astronomica*, both of which had already been printed; this fact alone reveals the importance attributed to the book as a current reference work. The reason for this new translation was that Jacopo Angeli knew neither Greek nor mathematics. Two men would be called on to judge Regiomontanus’s new version: “Theodore Gaza . . . and Paul the Florentine

(Toscanelli), who is not ignorant in Greek and is excellent in mathematics.” The 1512 and 1522 inventories of the material left at Regiomontanus’s death include a “cosmographia Ptolomei scripta Incompleta” (incomplete text of Ptolemy’s cosmography) (1512), which may be identifiable with the “Ptolomei geographia et chorographia. Scripte et juxta Latinum Grecum ipsum” (Ptolemy’s geography and chorography. Written in Latin and Greek, side by side) mentioned in 1522. The manuscript described as incomplete may be that in Basle, which is a working copy of the Latin text alone, with numerous erasures and often very full marginalia that offer comparisons with the Greek text and the maps.<sup>389</sup>

A second section of Regiomontanus’s list, dealing with illustrated works, contains a schema of Ciceronian rhetoric (already produced) and maps yet to be drawn up. This grouping may strike us as bizarre, but there is a logic behind it. The maps included a world map plus *tabulae particulares* (of Germania, Italia, Hispania, Gallia, and Graecia).<sup>390</sup> For each of the latter, a complementary text was envisaged with comments by the ancients concerning mountains, seas, lakes, rivers, and other features. So these regional maps are to be seen as resulting from the collation of ancient written descriptions, which would be appended to the finished work of cartography to justify its veracity. In effect, this was a philological reconstruction of the geography of classical antiquity, which was the premise for further steps forward. The presence of the schema of Ciceronian rhetoric, therefore, can be explained by the fact that they were part of the same project of critical philology but were applied in a different domain of knowledge.

386. Grössing, *Humanistische Naturwissenschaft*, 119–20.

387. Latin edition reproduced by Grössing in *Humanistische Naturwissenschaft*, 226.

388. Johannes Regiomontanus, *Hec opera fient in oppido Nuremberga Germanie ductu Ioannis de Montereio* (Nuremberg, 1474); reproduction in George Sarton, “The Scientific Literature Transmitted through the Incunabula,” *Osiris* 5 (1938): 43–245, esp. 163, fig. 42; partial transcription in Gentile, *Firenze*, 162–63.

389. Basle, Universitätsbibliothek, O IV 32; see Zinner, *Regiomontanus*, 208–9. The first folio reads: “The Geography of Ptolemy—in composition and numbers and as to the Greek (and Latin added in the margins) editions—edited by Jo[hannes] Regiomontanus [and] written by his hand”; then, in the hand of Johannes Schöner: “I bought [it] at Nuremberg from a Pircckheimer from the library of Jo[hannes] Regiomontanus.” One example of the collations can be found on fol. 122a, where the coordinates of the five cities of Bithynia are given from three sources: “from Ferrara” (in Greek), “Nicolaus Germanus,” and “from Ia [no doubt Jacobus Angeli] Latin [codices?]” with the comment on the latter that “these two correspond.” It is astonishing that the annotations in this manuscript have not been studied more thoroughly.

390. According to Bagrow, Nicolaus Germanus’s maps are the work of Regiomontanus; see Leo Bagrow, “The Maps of Regiomontanus,” *Imago Mundi* 4 (1947): 31–32. This is a gratuitous theory, given the judgment expressed on Nicolaus Germanus (*homo famelicus*) in a passage quoted earlier.



A third section occupies the entire second column of the list and covers all Regiomontanus's own works. Following the same organization as in the first column, first come two almost completed works ("Kalendarium" and "Ephemerides") and then several works connected with the *Geography*. The way in which these are presented casts light on the intellectual project Regiomontanus was pursuing:

A "Great Commentary" of Ptolemy's *Cosmography*, including a description of the manufacture and use of the instrument, the Meteoroscope, by means of which Ptolemy himself obtained nearly all the figures in his work. It is, in effect, a mistake to believe that such a number of values for longitude and latitude were obtained by observing the heavens. What is more, the description of the armillary sphere with all the inhabitable world shown on a plane surface is made clear, so that all—or almost all—can understand it, which up to now has been impossible from the Latin version because of the translator's mistakes. A "Small Specific Commentary" against the translation by the Florentine Jacopo Angeli, which will be sent to two referees [i.e., Theodore Gaza and Toscanelli].<sup>391</sup>

The main subject matter of the "Great Commentary," therefore, was the technical content of the *Geography*.<sup>392</sup> Regiomontanus wanted to address the essential problem: if one was to improve the maps, one had to increase the number of coordinates measured; yet it was impossible to increase the number of astronomical measurements. It was the technical bent of Regiomontanus's genius that led to the development of the meteoroscope, an instrument that provided an easy way of establishing coordinates. His treatise "De compositione metheoroscopii" has come down to us in the form of a letter to Bessarion.<sup>393</sup> In effect, this instrument was an armillary sphere with a movable horizon and meridian (so that the pole could be raised or lowered), within which moved the hour ring and the equator. A moving quarter circle ran from the horizon to the zenith of the meridian, all of the circles and rings were graduated in degrees, and two openings were made on opposite sides of the hour ring.<sup>394</sup> This instrument made it possible to determine the latitude and longitude of one place with respect to another whose coordinates and distance in miles were known. We do not know if Regiomontanus actually constructed and used a meteoroscope; the important point is that its design is an adaptation of that for the astrolabe given in Ptolemy's *Almagest*. Thus this meteoroscope was the concrete result of the philological method Regiomontanus followed, involving the comparison of classical texts in order to improve the design and manufacture of instruments.<sup>395</sup>

It is most probable that Regiomontanus intended to produce outlines of the different modes of cartographic representation. In fact, the other point that he judges wor-

thy of mention here is an explanation of the third method of "projection," which had been made totally incomprehensible due to mistakes in the translation.

Thus the humanist scholar Regiomontanus had a very clear idea of how his project of work would proceed. Philology would establish an unadulterated text that would be understandable and thence put to further use; reflection would focus on that text's scientific and technical content regarding modes of representation and the measurement of coordinates, and maps could be drawn that took into account all that could be learned from classical literature on the subject. It is significant that Regiomontanus did not specify whether he was talking about ancient or modern maps. As far as he was concerned, they were to be *correct* maps, ancient and yet renewed by the modern discipline of humanism.

Unfortunately, this admirable project was left unfinished and then, later, subject to tardy completion. The translation and the "Great Commentary" were never completed, though a new translation of the *Geography* by Willibald Pirckheimer did appear in Strasbourg in 1525 (complete with a "Fragmenta quaedam annotationum in errores quos Iacobus Angelus in translatione Ptolemei commisit," which is probably the "Small Commentary" mentioned in Regiomontanus's list).<sup>396</sup> In 1514, Johannes

391. Reproduced in Sarton, "Scientific Literature," and quoted in Gentile, *Firenze*, 162–63.

392. The inventories of 1512 and 1522 perhaps make reference to this "Great Commentary": "Commentarium In Cosmographiam ptolemei et emendationes Incompletus" (1512) is probably the same as the "Liber super cosmographiam Ptolomei" (1522) (Zinner, *Regiomontanus*, 208).

393. Edition from an undated incunabulum by Karl Bopp, "Ein Sendschreiben Regiomontans an den Cardinal Bessarion," in *Festschrift Moritz Cantor*, ed. Siegmund Günther (Leipzig: Vogel, 1909), 103–9. See also Wattenberg, "Johannes Regiomontanus," 353–54.

394. Description in Zinner, *Regiomontanus*, 86; see Ernst Zinner, *Deutsche und niederländische astronomische Instrumente des 11.–18. Jahrhunderts* (Munich: Beck, 1956), 202–3, 481–82, pl. 63, no. 1, reproduction of the woodcut from the Johannes Werner edition, *In hoc opere haec continentur . . .* (Nuremberg, 1514), which is less faithful to the text than the drawing in the incunabulum (Bopp, "Ein Sendschreiben Regiomontans," 104). Zinner did not know the latter.

395. Durand, not seeing the Ptolemaic origin of the meteoroscope, assumes it was of Arabic origin—or a product of the "first Vienna School" learned through Peurbach (Durand, *Vienna-Klosterneuburg Map Corpus*, 178). See also John David North, "Werner, Apian, Blagrove and the Meteoroscope," *British Journal for the History of Science* 3 (1966–67): 57–65, esp. 58.

396. The autograph manuscript of this "Small Commentary" was used by Pirckheimer and is now in St. Petersburg, Library of the Academy of Sciences, MS. IV-1-937. An example of Regiomontanus's criticism: "O stupid and immature translator, and, what is more, suffering from lethargy." See Ernst Zinner, "Einige Handschriften des Johannes Regiomontanus (aus Königsberg in Franken), I: Drei Regiomontanus-Handschriften im Archiv der Russischen Akademie der Wissenschaften," in *100. Bericht des Historischen Vereins für die Pflege der Geschichte des ehemaligen Fürstbistums Bamberg*, by Fridolin Dressler

Werner published a collection of works, including Regiomontanus's treatise on the meteoroscope. Like the other fields in which the genius of Regiomontanus had made itself felt, cartography would undoubtedly have enjoyed more rapid development if it had not been for his premature death in 1476.<sup>397</sup>

#### IN-DEPTH STUDY AND THE MOVE BEYOND THE MODEL (END OF THE FIFTEENTH TO BEGINNING OF THE SIXTEENTH CENTURY)

From the end of the fifteenth century onward, there were notable variations in the reception of the *Geography*. Thanks to the appearance of numerous introductory works, the notions of mathematical geography and the maps themselves became known to an ever-wider public, and the modernization of the map of the world, with the inclusion of the new discoveries in a single coherent image, was a task that exercised various minds.<sup>398</sup> Then, thanks to advances in trigonometry, came a new upturn in reflection upon the modes of representation. These features did not make themselves felt with equal vigor throughout Europe, and it was in German-speaking countries and the nations of central Europe that there were unparalleled levels of activity in an attempt to update the *Geography* and produce commentaries thereon.

#### FRANCE, SPAIN, AND ITALY

In France, before the days of Oronce Fine (that is, the 1530s), there was no follow-up to the interest in the *Geography* shown by Fillastre, d'Ailly, and Fusoris.<sup>399</sup> On the Iberian peninsula, where humanists followed the Italian model of explaining *auctores* by the use of ancient geographies (occasionally compared with marine charts),<sup>400</sup> there were two noteworthy studies of the *Geography* that date from around the same time and yet were clearly inspired by different aims. Jaime Pérez de Valencia used the geographies of classical antiquity in his exegesis of the Psalms. He was familiar with the *Geography* and its maps, using them to show that the ocean was entirely enclosed by mountains (in order to discredit the theories put forward by those who argued for a different center for the sphere of land and the sphere of the waters).<sup>401</sup> Around 1487–90 Antonio de Nebrija drew up an introduction to cosmography, which was published about 1503.<sup>402</sup> According to Nebrija, the humanist judged the method adopted by Ptolemy—who was “*artis princeps*”—as superior to all others, because the location of places in relation “to the circles of the heavens that cannot vary in any way” was definite.<sup>403</sup> However, like many of his contemporaries, Nebrija held that navigation itself—that is, the charts used and produced by navigators—added essential new features to the *imago mundi* inherited from

Ptolemy. He noted, for example, the error regarding a landlocked Indian Ocean, referring to “the authority of Pomponius Mela, Pliny and the voyages of the Portuguese.” Here again we see that balance between classical texts and modern empirical experience.<sup>404</sup> The writings of the *auctores* are given as much consideration as

(Bamberg, 1964), 315–21, esp. 317–18. According to Holzberg, this manuscript is in the Moscow collection of the Academy (*Willibald Pirckheimer*, 321 and 454 n. 277).

397. Thorndike attempts to deny Peurbach and Regiomontanus any role in the move from “medieval science” to “modern science.” This argument is based on the refutation of the legend according to which Portuguese navigators used tables of the solar declination of the Ephemerides prepared by Regiomontanus. His criticism of this point is fair enough; however, Thorndike's overall argument is based on preconceptions that are as harmful as those of Pierre Duhem, whom he is trying to refute; see Lynn Thorndike, *Science and Thought in the Fifteenth Century: Studies in the History of Medicine and Surgery, Natural and Mathematical Science, Philosophy and Politics* (New York: Columbia University Press, 1929), 142–50.

398. Historians' frequent comments on the absence of America in sixteenth-century maps and texts are often tainted with anachronism. With geography as other things, the overall framework of knowledge is more significant than the actual contents. What is more, that absence cannot necessarily be interpreted as revealing ignorance or indifference. The process leading to the inclusion of America in works of cartography has yet to be fully studied and described.

399. Little is known about the cosmographer Louis Boulengier, who between 1515 and 1518 published Martin Waldseemüller's *Cosmographiae introductio* in Lyons, passing himself off as the author. His edition is accompanied by the gores of a globe (Lucien Gallois, “Lyon et la découverte de l'Amérique,” *Bulletin de la Société de Géographie de Lyon*, 1892, 93–114). On the teaching of geography in early sixteenth-century France, see François de Dainville, *La géographie des humanistes* (Paris: Beauchesne et Ses Fils, 1940), 12–16; the author stresses Oronce Fine's admiration for the German masters, especially Peurbach.

400. See Juan Margarit y Pau (discussed earlier); Antonio de Nebrija also uses Ptolemy—alongside Strabo, Pomponius Mela, and Lucan—in his *Dictionarium oppidorum ciuitatum* (1536).

401. Jaime Pérez de Valencia, . . . *Expositiones in centum & quinquaginta psalmos dauidicos* . . . (Paris: Gilles de Gourmont, 1521; the first edition dates from 1484), fols. ccxxiii–ccxxv. Pérez's demonstrations are entirely scholastic and reveal blind respect for Ptolemy; he concludes by insisting on divine omnipotence and providence. It is amusing that he has been taken as a precursor of the idea of a “terraqueous” globe; see Randles, “Modèles et obstacles épistémologiques,” and Victor Navarro Brotóns, “La cosmografía en la época de los descubrimientos,” in *Las relaciones entre Portugal y Castilla en la época de los descubrimientos y la expansión colonial*, ed. Ana María Carabias Torres (Salamanca: Ediciones Universidad de Salamanca, Sociedad V Centenario del Tratado de Tordesillas, 1994), 195–205, esp. 198.

402. Antonio de Nebrija, *Aelii Antonii Nebrissensis grammatici in cosmographiae libros introductorium* (Salamanca, ca. 1503). The date 1498 is sometimes given erroneously; the text just happens—in one copy—to be linked with a 1498 edition of Pomponius Mela. See Virginia Bonmatí Sánchez, “El Tratado de la esfera (1250) de Juan de Sacrobosco en el *Introductorium cosmographiae* de Antonio de Nebrija, c. 1498,” *Cuadernos de Filología Clásica, Estudios Latinos* 15 (1998): 509–13.

403. Rico, “Il nuovo mondo di Nebrija e Colombo,” 596.

404. Rico, “Il nuovo mondo di Nebrija e Colombo,” 594, and idem, *El sueño del humanismo*, 70.

the results of modern voyages of discovery. Moreover, there is an awareness that Ptolemy must be complemented in order to achieve a true map and confidence that this enterprise can be undertaken with success.<sup>405</sup> However, at the beginning of the sixteenth century, neither Duarte Pacheco Pereira (in his “Esmeraldo de situ orbis” of around 1505) nor Martín Fernández de Enciso (in his *Summa de geografia* of 1519) would make use of Ptolemy in any process of critical assessment.<sup>406</sup>

In Italy, the edition of the *Geography* produced by the Celestine monk Marco Beneventano (Rome, 1508) was the first to contain a world map that included the New World. Entitled *Vniuersalior cogniti orbis tabula ex recentibus confecta observationibus*, it used an equidistant polar “projection” that made it possible to show all 360 degrees of longitude (see fig. 42.7). In a letter that appeared after the text of the *Geography*, the promoter of the volume—the Brescian bookseller Evangelista Tosino—recalled the desire expressed by many people for a map of the New World. It is significant that this one was drawn up by a German, Johannes Ruysch. Marco Beneventano added a text of commentary (*Orbis nova descriptio*) that may be full of humanist erudition, but also recognizes that the reform of the world map—which would need to be based on the voyages of Englishmen, Germans, Frenchmen, Spaniards, Genoese, and Venetians—was an essential task of the day. However, though Marco Beneventano is described as a mathematician—he included a corrected text of Ptolemy's *Planisphaerium* in his edition—it does not seem that he played a great part in this “reform.” Ruysch, who had practical experience of navigation, took as his source material not only charts but also the Contarini-Rosselli map drawn up in Venice in 1506 (its influence is particularly clear in the overall form of Ruysch's map).<sup>407</sup>

The conjunction of favorable social and cultural conditions explains why the essential structure of this “true map” should have been sought out in Venice, where an aristocracy enriched by maritime trade comprised an enthusiastic audience for the works of classical antiquity. There the critical assessment of Ptolemy on the basis of contemporary marine charts had a long tradition, stretching back to the second quarter of the fifteenth century. Paolo da Canal, scion of a noble family, friend of Aldus Manutius, and close associate of Pietro Bembo, undertook a new translation on the basis of numerous Greek manuscripts. Application for a license to publish was made in 1506.<sup>408</sup> This concern with the establishment of more accurate texts is a feature of late humanism (particularly in Venice), and it stimulated more rigorous philological work on ancient texts.<sup>409</sup> Certainly it did not conflict with a desire to modernize the Ptolemaic world image, because a better translation necessarily made the developments in the modes of representation more com-

prehensible. However, the premature death of Paolo da Canal—due, it is said, to his intense labors on the *Geography*<sup>410</sup>—meant that this modernizing project was left uncompleted.

It is possible (though so far unproven) that the Rosselli-Contarini world map was intended with this edition of Paolo da Canal in mind.<sup>411</sup> The career of the draftsman and engraver Francesco Rosselli is fairly well known to us.<sup>412</sup> A Florentine, he worked on the illustration of vari-

405. “But just as the boldness of men is a hallmark of our time, it will soon happen that they produce for us a true map [*descriptionem*] of the earth itself, both of islands and also of the continent, a great part of which maritime coast sailors have imparted to us, in particular that [coast] which is located opposite to recently discovered islands—that is Hispana, Isabela and other adjoining islands.” This passage is in Rico, “Il nuovo mondo di Nebrija e Colombo,” 595 n. 40. *Descriptio* here clearly means “map.”

406. Duarte Pacheco Pereira sometimes quotes Ptolemy inaccurately—with regard to the identity of the Mountains of the Moon, the Cape of Good Hope, and the landlocked Indian Ocean—which has led to the undoubtedly overhasty deduction that he knew him only second-hand; see Joaquim Barradas de Carvalho, *A la recherche de la spécificité de la renaissance portugaise*, 2 vols. (Paris: Fondation Calouste Gulbenkian, Centre Culturel Portugais, 1983), 1:426–27. He mentions “Ptolemy in his picture of the ancient tables of cosmography” (bk. 4, chap. 1) and gives *De situ orbis* as the title of the *Geography* (bk. 1, chap. 21); see Duarte Pacheco Pereira, *Esmeraldo de situ orbis*, ed. Damião Peres, 3d ed. (Lisbon: Academia Portuguesa da História, 1988), 75 and 195. It is clear that he knew the Ptolemaic world image through the maps. However, there is no reflection thereon based on a comparison with “experience,” which was so important in Portuguese thought on these matters.

407. According to Armstrong, the Venetian nobleman Giovanni Badoer gave maps to Marco Beneventano, who thanked him in his dedication; see Lilian Armstrong, “Benedetto Bordon, *Miniator*, and Cartography in Early Sixteenth-Century Venice,” *Imago Mundi* 48 (1996): 65–92, esp. 76. However, Beneventano received not maps but a manuscript of the “Planisphaerium,” a treatise on the stereographic projection.

408. Rinaldo Fulin, “Documenti per servire alla storia della tipografia veneziana,” *Archivio Veneto* 23 (1882): 162–63; on his interest in Greek texts—and, most notably, the *Geographi Graeci minores*—see Aubrey Diller, *The Tradition of the Minor Greek Geographers* (Amsterdam: A. M. Hakkert, 1986), 22ff., 48, 98, 100.

409. An example of this philological work, perhaps linked to Regiomontanus's program, is the revision of the entire text of the *Geography* in the edition of 1490 by the humanist Aulo Giano Parrasio, using a Greek manuscript. See Michele Rinaldi, “La revisione parrasiana del testo della ‘Geografia’ di Tolomeo ed il ‘programma’ del Regiomontano,” *Rendiconti della Accademia di Archeologia, Lettere e Belle Arti*, new ser. 68 (1999): 105–25.

410. F. Lepori, “Canal, Paolo,” in *Dizionario biografico degli Italiani* (Rome: Istituto della Enciclopedia Italiana, 1960–), 17:668–73.

411. Armstrong, “Benedetto Bordon,” 76.

412. Sebastiano Crinò, “I planisferi di Francesco Rosselli dell'epoca delle grandi scoperte geografiche: A proposito della scoperta di nuove carte del cartografo fiorentino,” *Bibliofilia* 41 (1939): 381–405; Roberto Almagià, “On the Cartographic Work of Francesco Rosselli,” *Imago Mundi* 8 (1951): 27–34 (the catalog of Rosselli's work—the supposed object of this article—is not presented very clearly); and Campbell, *Earliest Printed Maps*, 70–78.

ous copies of Ptolemy,<sup>413</sup> produced a map of Hungary for Matthias Corvinus, and upon his return to Florence made a group of maps that included a world map modeled on (if not directly copied from) that produced by Henricus Martellus (after 1498), incorporating the latest discoveries made by the Portuguese in their voyages eastward.<sup>414</sup> So far, therefore, there is nothing particularly original about this figure, and certainly the differences in the coastline of southern Africa between the Martellus and the Rosselli maps cannot be interpreted as due to the latter's inclusion of new information. However, it was during his period in Venice that Rosselli acquired a reputation as a cosmographer and produced several more interesting works. In 1506, for Giovanni Matteo Contarini, Rosselli drew the first world map to incorporate Columbus's discoveries, though still representing them as provinces of Asia.<sup>415</sup> The inscriptions on the map reveal the parts played by both Rosselli and Contarini. The particular form resulting from the representation of 360 degrees, doubling the 180 degrees shown by Ptolemy, was due to the "diligentia" of Contarini, which was aided and abetted by Rosselli's "arte et ingenio." Another legend on the map underlines the scientific aspect of the work, which was due to a Contarini "Ptholomea inclytus arte" and the presence of an *orbis recens*.<sup>416</sup> This choice of terms marks a clear distinction between the man who had used his theoretical knowledge to conceive the map and the man who had used his technical mastery to actually draw it.

Two other world maps engraved by Rosselli are known to us in two copies and can be dated around 1508. One is Ptolemaic and oval in form, with straight parallels and curved meridians; the other is a marine chart, with tropics, polar circles, and the equator cut through the middle by a central meridian on which every ten degrees of latitude is marked.<sup>417</sup> The subject matter is the same: the entire world, comprising the new discoveries in the north and south, both still believed to be part of Asia. Two interesting features emerge from these works. One can still see the Venetian practice of comparing Ptolemy with marine charts (for example, the outline of Europe is based on the latter), but the process now seems to involve a greater degree of speculative reflection. The result is that each of the two modes of cartographic representation borrows features that are characteristic of the other. Nevertheless, the point of view in the two maps is different: in the oval world map the central meridian runs through the present-day Gulf of Aden, while in the chart it is off the islands of Cape Verde, making the *Terra sanctae crucis* appear as an island and, at the two ends of the map, making the Asian provinces appear more extended. What we have here are not out-of-date maps but ones that play on modes of representation, aware of their conventional character. These are works that are designed to meet precise purposes of demonstration.

Even if they were engraved and printed in Florence, these maps are Venetian works produced by a Florentine. It is perhaps difficult to reconcile the fact that Rosselli is described as the mere executive technician of the 1506 world map with the reputation he enjoyed in Venice. In his edition of the works of Euclid, Luca Pacioli would, in fact, recall that "Franciscus rosellus florentinus cosmographus" was one of those present at his lectures on book 5 of Euclid's *Elements* held at the church of San Bartolomeo (the audience also included "Sebastianus Leonardus"—that is, Sebastiano Compagni);<sup>418</sup> Marino Sanuto, in verses that were undoubtedly intended to accompany a map, praises the "knowing hand" of Rosselli, who was familiar with the cosmographers and Ptolemy.<sup>419</sup> However, in his *Nova orbis descriptio* Marco Beneventano is undoubtedly referring to the same man when he observes that his world map shows an open Indian Ocean, which "quidam" (a certain person; Contarini?) spoils by adding a quotation from Ptolemy that contradicts such a representation.<sup>420</sup> As a result, Rosselli is defined as a demischolar, a label that better fits him if his status is that of a skillful technician.<sup>421</sup> The issue offers a glimpse of the sort of disputes that Ptolemy's work might have generated among Venetian specialists.

413. Gentile, *Firenze*, 229.

414. Florence, Biblioteca Nazionale Centrale, Landau Finaly, Carte Rosselli; see Gentile, *Firenze*, 243–45 and fig. 32. Another reproduction is in *Cristoforo Colombo*, 1:522–23. A cartouche bears a legend that sums up the intentions of the creator of this world map: "A map of the whole world—which is encircled by the ocean-sea with the part of Upper Indian discovered after the time of Ptolemy and with that part of Africa which in our time Lusitanian [Portuguese] sailors have traversed—is thus." Roberto Almagià read 1488 instead of 1498, the date given in a legend mentioning when the extreme point of Africa was reached by Portuguese sailors ("Cartographic Work of Francesco Rosselli," 31). The transcription of the "title" of the map given in Campbell, *Earliest Printed Maps*, 70, is incorrect.

415. BL, Maps C 2 cc. 4. See Edward Heawood, "A Hitherto Unknown Worldmap of A.D. 1506," *Geographical Journal* 62 (1923): 279–93; reprinted in *Acta Cartographica* 26 (1981): 369–85, and Roberto Almagià, "Un planisfero italiano del 1506," *Rivista Geografica Italiana* 31 (1924): 67–72. A recent reproduction appears in Luzzana Caraci, "L'America e la cartografia," 2:614–15.

416. Crinò, "I planisferi di Francesco Rosselli," 401.

417. Florence, Biblioteca Nazionale Centrale, Landau Finaly, Carte Rosselli, and London, National Maritime Museum, G 201:1/53A and G 201:1/53B. For the oval world map, see plate 16 and figure 1.3 in this volume. Reproductions of the Maritime Museum maps are in *Segni e sogni della terra: Il disegno del mondo dal mito di Atlante alla geografia delle reti*, exhibition catalog (Novara: De Agostini, 2001), 147–51, and see also Rodney W. Shirley, *The Mapping of the World: Early Printed World Maps, 1472–1700*, 4th ed. (Riverside, Conn.: Early World, 2001), 32–33 (nos. 28 and 29).

418. Armstrong, "Benedetto Bordon," 74.

419. Quoted in Crinò, "I planisferi di Francesco Rosselli," 389.

420. *Geographia* (Rome, 1508), fol. 10v.

421. Campbell, *Earliest Printed Maps*, 218–19.

In analyzing the 1511 Venetian edition of the *Geography*, one must bear in mind the particular characteristics of the reception of that work within that city. Having first worked in Naples, where his workshop produced a very original version of Ptolemy in 1490 for Andrea Matteo Acquaviva, duca d'Atri,<sup>422</sup> Bernardo Silvano would here produce an edition based on different principles. It is the result of a careful reading of the text, with the results explained in his "Adnotationes in Ptholemai Geographiam cur nostrae tabulae ab iis quae ante nos ad alios descriptae sunt differant, aliarumque erroris causa et demonstratio," that offers the clearest possible explanation of why Ptolemy's world image had to be updated. Silvano notes that Ptolemy used information gleaned from navigators and, moreover, that different *Geography* manuscripts give different figures for the coordinates.<sup>423</sup> Silvano therefore decided to correct the coordinates and redo the ancient maps on the basis of marine charts; thus the regional *tabulae novae* come to be of no use. However, Silvano's aims are not followed in full. The modifications to the regional maps are limited to only a few details, and the edition is known above all for its world map in pseudo-cordiform "projection," in which the New World is shown and both East Asia and the *regalis domus* (the Terra Nueva discovered by Miguel Corte-Real) are given without outline (an indication of the continuing uncertainty as to their real proportions).<sup>424</sup> However, one can see various expectations making themselves felt in this edition. Above all, there is the need to respect Ptolemy, who—thanks to his method—is the only one who offers a general framework within which new discoveries can be incorporated. Then there is the need to correct and complete his work, which requires the cartographer to convince two sorts of adversaries: those who want to keep Ptolemy's image of the world unchanged and those who believe Ptolemy's critics. It would be important to have a more clearly defined picture of the milieu in which these different positions were defended, but unfortunately we only catch glimpses of them intermittently,<sup>425</sup> for example, in a remark in the "Adnotationes" that recalls such debate.<sup>426</sup> In effect, the task Bernardo Silvano set himself reflects conflicting early sixteenth-century reactions to the *Geography* rather more subtly than it is sometimes given credit for.

#### CENTRAL EUROPE: CRITICISM AND MODERNIZATION

The absence of critical discussions of the *Geography* in France during this period is often explained by the fact that the country played little role in the voyages of exploration. How, then, are we to explain what happened in the countries of central and eastern Europe, which certainly played no bigger part in those discoveries?

In southern Germany, for example, the death of Regiomontanus did not mean the end of research into the work of Ptolemy. Research continued in a number of contexts. A late humanism, with a tight-knit circle of scholars animated by the patriotic desire to overcome the dismissive picture of the Germans painted by the ancients; a network of trading cities linked with Italy and northern Europe; centers specializing in the construction of scientific instruments, thus drawing on a whole range of relevant scientific expertise—all of these conditions stimulated the spread and study of Ptolemy's work, and a century after the Florentine "rediscovery" of the *Geography*, one might say this period marked the apogee in its reception.

Since the time of Peurbach, Nikolaus von Heybeck, and Johann Schindel, Nuremberg had been renowned as a center of the manufacture of sundials—most notably traveling models, which were later complete with compass and map.<sup>427</sup> In 1474, the city continued to be a place where several humanists and technicians followed up

422. BNF, Lat. 10764; described by Germaine Aujac in "Le manuscrit d'Andrea Matteo Acquaviva et d'Isabella Piccolomini," in *La Géographie de Ptolémée*, ed. François Robichon (Arcueil: Anthèse, 1998), 84–87.

423. An inadequate translation of this passage is in Codazzi, "Geografia" di Tolomeo, 69. The need for an accurate Greek text as a starting point for a criticism of the translation was already felt at the time: in Rome in 1507 Cornelius Benigno of Viterbo, Zacharias Calliergis of Crete, Carteromachus, and others were revising the *Geography*. See Deno John Geanakoplos, *Greek Scholars in Venice: Studies in the Dissemination of Greek Learning from Byzantium to Western Europe* (Cambridge: Harvard University Press, 1962), 214–15.

424. Reproduction in *Cristoforo Colombo*, 2:728–29. See also David Woodward, *Bernardus Sylvanus Eboliensis de Vniuersali habitabilis figura cum additionibus locorum nuper inventorum, Venetiis MDXI = Bernardo Silvano of Eboli, A Map of the Whole Habitable World with the Addition of Recently Discovered Places, Venice 1511* (Chicago: Speculum Orbis, 1983), and Hans Wolff, "America—Das frühe Bild der Neuen Welt," in *America*, 16–102, esp. 64–65.

425. For example, in a 1516 letter from Andrea Corsali to Giuliano de' Medici there is this criticism of Ptolemy's view of the extension of the *oikoumene*: "Ptolemy did not put this island, and in many things I find him reduced. . . . See, for example, how the navigations of the Portuguese have reduced and falsified his longitudes, beginning from the region of Sinare to the islands which he calls of Good Fortune." Giovanni Battista Ramusio, *Navigazioni e viaggi*, 4 vols., ed. Marica Milanese (Turin: G. Einaudi, 1978–83), 2:33.

426. "In addition it seemed a good idea to add on our own initiative the shape of the inhabitable world with all those [features] that were discovered by the travels of recent [explorers] and passed on to us in our own [time]. You may feel that this outline differs in no measure however from the universal map of Ptolemy provided that those [features] that were unknown to Ptolemy are removed. We made this also so that those who condemned Ptolemy can see that in his work there is nothing against the voyages and the truth of our time, provided that his old coordinates are neglected and his words are seriously considered."

427. Wolfgang von Stromer, "Hec opera fient in oppido Nuremberga Germanie ductu Ioannis de Montereio: Regiomontan und Nürnberg, 1471–1475," in *Regiomontan-Studien*, 267–89, esp. 278–79.

Regiomontanus's ideas regarding the representation of the world, an approach combining practical features (the manufacture of instruments), concern for an unadulterated version of the original Ptolemaic text, and consideration of mathematical (especially trigonometrical) questions.<sup>428</sup> This is the milieu that, in the third quarter of the fifteenth century, must have produced those Ptolemaic maps whose remnants are now in Koblenz and Trier. These attempts to adapt Ptolemaic regional maps are yet to receive the detailed study they deserve, unhindered by preconceived notions.<sup>429</sup>

### The Influence of Conrad Celtis

Given the essential role of German humanism in the spread of the *Geography*, it is fitting that this section open with Conrad Celtis and his circle, even if at first sight it seems strange that so much importance is being attributed here to a figure whose work would seem to justify the traditional historical view of a radical opposition between "humanism" and "science." However, Celtis's writings would make a lasting impression on an entire generation who dedicated themselves, at one and the same time, to mathematics and *studia humaniora*, without seeing any conflict between them.

In Celtis one finds the logical extremes of both late fifteenth-century Italian humanism and the scientific tradition that had flourished in southern Germany, Austria, and eastern Europe. This "Erzhumanist" would early on express his interest in the *Geography*,<sup>430</sup> having a copy of the work made for himself while he was at the Hungarian court of Matthias Corvinus in 1480–81.<sup>431</sup> After completing his studies at Heidelberg, Celtis visited Italy (1487), which brought him into contact with the Platonic Academy of Marsilio Ficino, the context within which Berlinghieri's *Sette giornate* had been composed. Celtis's encounter with Ficino would strengthen his belief that mathematics was the key to understanding the created world governed by numbers and measurement. In 1489–91 he was in Cracow, where he studied mathematics and astronomy with Albert Blar of Brudzewo, a former pupil of Peurbach and Regiomontanus. From 1491/92, during his period in Ingolstadt, which was already the home of Johannes Stabius and Andreas Stiborius, he would implement a program of teaching in which the subjects of the Trivium were united with a natural philosophy in which *cosmographia* played an important role. By *cosmographia* he meant not only the measurement of the physical location of sites by reference to the stars (that is, the establishment of coordinates) but also a description of natural phenomena and chorography.<sup>432</sup> In an academic speech given at Ingolstadt in August 1492, Celtis insisted on the utility of cosmography and geography for his audience of would-be administrators;<sup>433</sup> and one of his odes,

addressed to Sigismund Fusilius of Breslau, contained a discussion of the knowledge a young man should have, listing geography between astronomy and history.<sup>434</sup> It is clear, however, that Celtis's interest in geography, like that of his colleagues Stabius and Stiborius, was largely determined by astrological concerns.<sup>435</sup>

The second important feature of Celtis's didactic program is an exaltation of Germania, in which geography again plays an important role. Following a double model

428. General discussion in Franz Machilek, "Kartographie, Welt- und Landesbeschreibung in Nürnberg um 1500," in *Landesbeschreibungen Mitteleuropas vom 15. bis 17. Jahrhundert* (Cologne: Böhlau, 1983), 1–12, and Ruthardt Oehme, *Die Geschichte der Kartographie des deutschen Südwestens* (Constance: Thorbecke, 1961), 17–27.

429. The Koblenz fragments have been analyzed by Wolkenhauer, who—on the basis of internal factors—convincingly places them in Nuremberg in the years after Regiomontanus's death; see August Wolkenhauer, "Die Koblenzer Fragmente zweier handschriftlichen Karten von Deutschland aus dem 15. Jahrhundert," *Nachrichten von der Königlichen Gesellschaft der Wissenschaften zu Göttingen, Philologisch-historische Klasse*, 1910, 17–47. Durand links them with fragments discovered later at Trier and dates the whole group much earlier (*Vienna-Klosterneuburg Map Corpus*, 145–59). Here it is perhaps useful to give a further example of his method: he recognizes that Wolkenhauer's dating "is buttressed with the best scholarly proofs—orthography, script, internal evidence," but adds that "it completely misses the point," because "the Trier-Coblenz fragments were produced by the same hand which transcribed Ptolemy's *Geographia* in 1437 [ÖNB, 5266], presumably in Klosterneuburg at the instance of Georg Müstinger."

430. For these thoughts on Celtis and his circle, I am indebted to the fine study by Christoph Schöner, *Mathematik und Astronomie an der Universität Ingolstadt im 15. und 16. Jahrhundert* (Berlin: Duncker and Humblot, 1994). For the geographical concerns of Celtis, see also Gernot Michael Müller, *Die "Germania generalis" de Conrad Celtis: Studien mit Edition, Übersetzung und Kommentar* (Tübingen: Niemeyer, 2001).

431. This is the Oxford manuscript, Bodleian Library, Arch. Seld. B. 45; see Dieter Wuttke, *Humanismus als integrative Kraft: Die Philosophia des deutschen "Erzhumanisten" Conrad Celtis, eine ikonologische Studie zu programmatischer Graphik Dürers und Burgkmairs* (Nuremberg: Hans Carl, 1985), 27 and 56. See also Nikolaus Henke, "Bücher des Konrad Celtis," in *Bibliotheken und Bücher im Zeitalter der Renaissance*, ed. Werner Arnold (Wiesbaden: Harrassowitz, 1997), 129–66, esp. 150.

432. Conrad Celtis, *Panegyris ad duces Bavariae* (Augsburg: E. Ratdolt, 1492), v. 103–11.

433. Conrad Celtis, *Oratio in gymnasio in Ingelstadio publice recitata cum carminibus ad orationem pertinentibus*, ed. Hans Rupprich (Leipzig: B. G. Teubner, 1932), 3, l. 31.

434. "Proceed to speak of the peoples spread throughout the world and the languages and customs of men and under which part of the heavens these peoples hold the earth." Conrad Celtis, *Libri odarum quattuor; Liber epodon; Carmen saeculare*, ed. Felicitas Pindter (Leipzig: B. G. Teubner, 1937), 15, ll. 61–64.

435. It is interesting to point out that in a note to a letter to Celtis from Matthias Corvinus's court astrologer, Johannes Tollhopf, the editor refers to the *Geography* in explaining considerations of astrological geography that are, in fact, drawn from the *Tetrabiblos*. See Hans Rupprich, *Der Briefwechsel des Konrad Celtis* (Munich: C. H. Beck, 1934), 111–12.

comprising Tacitus and Flavio Biondo, Celtis aimed to write a “*Germania illustrata*”; he completed the section dealing with Norimberga (Nuremberg) himself, while his pupils would complete the remainder.

We know from his will and his correspondence that Celtis sought out the 1490 Rome edition of the *Geography*;<sup>436</sup> that he possessed a Greek edition, along with maps and globes; and that he had intended to have a Greek edition printed in Venice.<sup>437</sup> After his departure in 1497–98 for Vienna, where he founded the Collegium Poetarum et Mathematicorum, he was commissioned by Emperor Maximilian to set up a library that also contained terrestrial and celestial maps and globes. Some verses he wrote in 1504—around the same time that he made mention of old and new maps, old and new globes<sup>438</sup>—announced that he was to hold lessons, in the learned and vernacular language, on the *Geography*:

Tomorrow, after Apollo has cast the eighth shadow  
[on the sundial],  
And after his brilliant light has spread over the golden  
world,  
Then, in my home will begin the *Cosmography*  
That the great Claudius wrote in eight books,  
Which I, Celtis, will unfold trilingually:  
In Latin, Greek and, at the same time, German.<sup>439</sup>

Ptolemy's *Geography*, based on numbers and showing the parts of the *oikoumene* in a perfect order that corresponded to the regular movement of the heavens, was the ideal teaching manual for what Celtis had in mind.

True, the extant works that bear witness to Celtis's interest in this field are limited. His poetic works, for example, are full of the ancient names of places and peoples also found in Ptolemy's maps. However, his ambitious projects were to have a deep and lasting influence. The first regional maps modeled on the *Geography* were drawn up by his pupils or by those he had influenced. Martin Waldseemüller published three maps (of Switzerland, the upper Rhine, and Lorraine) in the 1513 edition of the *Geography*, Johannes Aventinus published a map of Bavaria in 1523, and Johannes Cuspinianus published a map of Hungary in 1528.

The portion of the “*Germania illustrata*” that Celtis left incomplete comprised further studies of what one might call the historical geography of German-speaking Europe. The correspondence of the humanists of the day was filled with learned discussions of the names of peoples and regions, for which Ptolemy was one of the essential sources. In a 1525 letter to the Alsatian humanist Beatus Rhenanus—himself an important publisher of ancient texts and future author of the *Res Germanicae* inspired by the project outlined by Celtis—Aventinus justifies his own historical works by defining the links between history, geography, and mathematics: “The distinctive fea-

ture of history is the knowledge of great things, of the manners of regions and nations, the quality of lands, of religions, institutions and laws, of the new and ancient inhabitants of a region, and of empires and kingdoms. However, all this can neither be known nor studied without a diligent study of cosmography and mathematics, nor without traveling until you are sick of doing so.”<sup>440</sup>

Another friend of Celtis who followed his lead was the Nuremberg scholar Johannes Cochlaeus. In 1512 he published his *Brevis Germaniae descriptio*, which contains explicit comparisons between data gathered and the maps in the *Geography*.<sup>441</sup> Here, finally, we see the development of the technical aspects of cartographic representation in the work of Werner and Stabius, which were, again, an elaboration of Celtis's teaching. Therefore, it would be absurd to criticize the older scholar for his poetic geography and failure to include echoes of the new geographical discoveries of his era. His modernity lies not in the factual contents of his work but in a research project that was rigorously followed and would have a lasting influence.

#### Modernization: The Editions of Ulm (1482 and 1486) and Strasbourg (1513)

During the period when Conrad Celtis was completing his education in Hungary and Heidelberg, a decisive contribution to the spread of the *Geography* was made in

436. Rupprich, *Der Briefwechsel des Konrad Celtis*, 57–58. He owned an exemplar of the 1482 Ulm edition (now Debrecen, Református Teológiai Akadémia Szemináriuma Könyvtár [Library of the Reformed Church], U45), and put down on it some remarks about the modern names of German cities; see Müller, *Die “Germania generalis,”* 270, 383, and pl. 9.

437. A 1493 letter from Johannes von Reitenau, tutor to the son of Count Georg von Werdenberg, is illuminating both with regard to the attraction exerted by the *Geography* and the influence the “philosophical” teaching of Celtis might have had on his pupils: “So that I could equip my master to be favorable to philosophical precepts, I showed Ptolemy's *Cosmography* to his father and I explained the general position of the world (as I could). After I had mentioned to him the great universal map printed in Italy, which I had seen with you, he desired to have the same [map] and was insistent that I write to you for it.” Rupprich, *Der Briefwechsel des Konrad Celtis*, 115–16.

438. Grössing, *Humanistische Naturwissenschaft*, 196.

439. Conrad Celtis, *Ludi scaenici (Ludus Dianae—Rhapsodia)*, ed. Felicitas Pindter (Budapest: Egyetemi Nyomda, 1945), 20.

440. Beatus Rhenanus, *Briefwechsel des Beatus Rhenanus*, ed. Adalbert Horawitz and Karl Hartfelder (Leipzig: B. G. Teubner, 1886), 345. It is the same project outlined by Pirckheimer in justifying his new translation of the *Geography*.

441. For example, “Its cities are Vienna, in the past Flexum, as long as conjecture is allowed from Ptolemy's position,” Johannes Cochlaeus, *Brevis Germanie descriptio (1512), mit der Deutschlandkarte des Erhard Etzlaub von 1512*, ed., trans., and with commentary by Karl Langosch (Darmstadt: Wissenschaftliche Buchgesellschaft, 1960), 116 (6.12).

Ulm, where two editions appeared that exercised a strong influence on the modes of reading. Judging by the large number of extant copies, both editions must have been very popular. The 1482 edition was printed by Lienhart Holl, clearly without attentive research into the capacity of the local market,<sup>442</sup> though in 1486 the work was reprinted at the workshop of Johannes Reger for the Venetian publisher Justus de Albano.

There are some remarkable additions to this latter work.<sup>443</sup> An index of places by Reger (“Registrum alphabeticum super octo libros Ptolomei”) is much more than a simple alphabetical list. In effect, it gives references to places in the text—for the first time divided into chapters—as well as explaining a method for locating the places on the maps using two threads aligned with the graduations in the margins (Jerusalem is used as an example). Each place-name is given with relevant material drawn from the Church Fathers and, for Europe, from Greek and Latin authors (including Strabo and Pomponius Mela), along with the modern equivalent of the ancient name. However, the essential purpose of this index—and thus of the edition as a whole—may well strike us as “medieval.” These places are given with the saints who graced them with their living presence, martyrdom, or death. In fact, Reger limits himself to simply adapting the French *Mappemonde spirituelle* drawn up in 1449 by Jean Germain, bishop of Chalon-sur-Saône.<sup>444</sup> The second addition to this edition is a “Tractatus de locis ac mirabilibus mundi,” a description of the world—sometimes unjustifiably attributed to Nicolaus Germanus—drawn from medieval encyclopedias (Isidore of Seville’s *Etymologies* and Vincent of Beauvais’s *Speculum*). Though of great interest, this “Tractatus” is often treated as valueless because of an academic prejudice that sees it as solely “medieval” when compared with the “modernity” of Ptolemy.<sup>445</sup> It is therefore amusing to note that, at the time, even humanists of the very highest order considered it interesting enough to copy out in full—thus flying in the face of the rather facile judgment passed on the work since.<sup>446</sup>

All in all, this edition of the *Geography* by Reger is an exceptional indication of the diffusion being enjoyed by this work of Ptolemy. First in importance to Reger was its content, mixing together the encyclopedic tradition, the humanist taste for the classics, and a more widespread taste for edifying works—a combination designed to satisfy a very wide audience. In a certain sense, Ptolemy’s role as a model for the representation of the contemporary world faded into the background. As the “Nota ad inveniendum regiones provincias maria flumina montes et civitates” that precedes the “Registrum” points out, the volume is concerned with informing the reader about the ancient world of Christianity: “The author’s intention is not to show the present state of the Christian religion but what that state was . . . so that the faithful may

set about recovering what has been lost.” However, that this edition enjoyed great vogue and success is proven not only by the great number of extant copies mentioned earlier, but also by the fact that after 1492 Anton Koberger, in Nuremberg, seriously challenged Reger by completing in-stock exemplars of the 1482 edition with the additions of Reger himself.<sup>447</sup>

The 1513 edition marks a much more important step toward the modernization of the *Geography*. There is no point in going over the long process of its gestation here; suffice it to recall that work began around 1505 in the humanist circle of the Gymnasium Vosagense, which brought together in the episcopal city of Saint-Dié such figures as Martin Waldseemüller, the Hellenic scholar Matthias Ringmann, and Walter Lud, secretary to René II, the duke of Lorraine. After Ringmann’s death and a series of economic difficulties, the project was completed by two Strasbourg jurists, Jacob Aeszler and Georg Übelin, who then took full credit for the whole work.<sup>448</sup>

442. On the circumstances in which the edition was produced, see Peter Amelung, *Der Frühdruck im deutschen Südwesten, 1473–1500: Eine Ausstellung der Württembergischen Landesbibliothek Stuttgart* (Stuttgart: Württembergische Landesbibliothek, 1979), 264ff., 279–87, and 329–31. See also Karl-Heinz Meine, *Die Ulmer Geographia des Ptolemäus von 1482: Zur 500. Wiederkehr der ersten Atlasdrucklegung nördlich der Alpen*, exhibition catalog (Weissenhorn: A. H. Konrad, 1982). Contrary to the idea sometimes put forward, Nicolaus Germanus played no part in the preparation of the edition—even if it is based on one of his manuscripts.

443. Michael Herkenhoff has analyzed it in a telling way in his *Die Darstellung außereuropäischer Welten in Drucken deutscher Offizinen des 15. Jahrhunderts* (Berlin: Akademie, 1996), 83–91.

444. The identification of the source was given in 1902 by Fischer in *Die Entdeckungen der Normannen in Amerika*, 80–81 n. 3. This information does not seem to have been absorbed by the subsequent literature.

445. This supposed contradiction is even less convincing at this later date. See, for example, Bonacker and Anliker, “Donnus Nicolaus Germanus,” 111, and Sanz, *La Geographia de Ptolomeo*, 91.

446. The astronomer Johannes Schöner, like many others, made a copy of it in his exemplar of the 1482 edition (ÖNB, Lat. 3292; see Amelung, *Der Frühdruck im deutschen Südwesten*, 329–31). The Rome (1490, 1507, 1508) and Strasbourg (1513) editions reproduce it; the “German Ptolemy” uses it. Herkenhoff points out the fashion enjoyed by this text but finds it difficult to accept its “anachronism,” concluding in rather general terms that the edition did not lead to the rapid disappearance of a theological *imago mundi* because of the presence within it of old scientific methods—a verdict that is in itself anachronistic (Herkenhoff, *Die Darstellung außereuropäischer Welten*, 90–91). The significance of these “medieval” texts in the process of the reception of Ptolemaic science is thoroughly and rightly reassessed in Margriet Hoogvliet, “The Medieval Texts of the 1486 Ptolemy Edition by Johann Reger of Ulm,” *Imago Mundi* 54 (2002): 7–18.

447. Amelung, *Der Frühdruck im deutschen Südwesten*, 274–77; an exemplar of that reshaped edition is in Munich, Bayerische Staatsbibliothek, 2° Inc. c.a.1817; see Lindgren, “Die *Geographie* des Claudius Ptolemaeus in München,” 164–65.

448. M. d’Avezac, *Martin Hylacomylus Waltzemüller, ses ouvrages et ses collaborateurs: Voyage d’exploration et de découvertes à travers quelques épîtres dédicatoires, préfaces et opuscules en prose et en vers du commencement du XVI<sup>e</sup> siècle* (Paris: Challamel Ainé, 1867;



From the very start of this work in 1505, the members of the Gymnasium had been interested in comparing the writings of Vespucci with the contents of the *Geography*. In a letter to his friend Jacques Braun, later published in his edition of the *Mundus novus* under the title of *De ora antarctica per regem portugallie pridem inuenta* (Strasbourg, 1505), Ringmann said that he compared almost every part of Vespucci's accounts with Ptolemy, whose maps he was studying with care.<sup>449</sup> Even though the two jurists would later try to suppress all evidence of the work of their predecessors, the edition clearly reflects these concerns of the Vosges scholars. Two fundamental features stand out. First, this is a philological work of critical assessment that is both well thought out and thoroughly coherent. The principles behind the work are expressed not only in the general title but also in the address that appears on the back of the title page in the second part. Waldseemüller and Ringmann improved the translation using good Greek manuscript copies. We know, for example, that the former applied to the Dominican monastery of Basle for the loan of such a manuscript in 1507,<sup>450</sup> and Ringmann was in Italy the next year looking for another manuscript that was part of the collection of Giovanni Francesco Pico della Mirandola (a letter from whom is in the book). Thus Jacopo Angeli's translation was reworked in parts, and place-names were given in their Greek form. The visual, material aspect of the edition accentuates the separation that the editors wanted to draw between the text itself, accompanied by its old maps, and a second part comprising not only modern maps but also the "Tractatus de locis ac mirabilibus mundi" from the 1486 edition. This reveals a critical approach to the work of the *geographiae princeps*, which had turned into a "monstrous chaos" due to the fact that it had become impossible to distinguish what was part of the original work and what was due to the changes of place-names and the inclusion of modern discoveries.<sup>451</sup> Hence the editors' decision to separate the two parts: "If then one looks for the more modern positions, the [routes of] voyages or changes of name, a second Ptolemy in the form of maps—as if born out of the first—will give them in their most complete form. This edition, which contains the voyages of this century, has been drawn up as a most perfect manual of geography and hydrography."<sup>452</sup> The twenty *tabulae modernae* that followed began with the *Orbis typus universalis iuxta hydrographorum traditionem* and included maps of Switzerland and the region of the upper Rhine, and one map of Lorraine.

This "doubling" of Ptolemy—in effect, producing a second *Geography*—was intended to clarify the data that had figured in a debate that dated from the very earliest days of the voyages of discovery. By recording the information gleaned from those voyages on modern maps and then presenting both the modern and the ancient maps in two separate sections of the atlas, the editors offered the

reader the task and opportunity to adjust the modern to the ancient. This is, in fact, the first modern atlas. Its very structure reveals that the *Geography* has from then been conceived as both the textbook of a technically unsurpassable method and a dated monument of *antiquitas* whose original, noncorrupt, form was to be reestablished. In effect, this edition was the realization of the project Reiomontanus had undertaken himself.

#### The Increasing Circulation of the Ptolemaic World Image

There is other evidence that reveals the increasing circulation of the Ptolemaic world image. In Italy, from the middle of the fifteenth century onward, in both manuscripts and printed editions of non-Ptolemaic works, Ptolemy's world map served as an illustration of the *oikoumene*—thus indicating that this image was received as the norm. Similarly, in Hartmann Schedel's extremely popular *Liber chronicarum*, printed by Anton Koberger in both Latin and German editions in 1493, there is a simplified version of the Ptolemaic world map copied from a printing of Pomponius Mela by Erhard Ratdolt (Venice, 1482).<sup>453</sup> The map in Schedel's book is not graduated in degrees, and the three sons of Noah are depicted in three of the corners, with the fourth occupied by a discussion of the winds taken from Isidore of Seville (the bottom of the page gives a description of the tripartite world taken from the same author).<sup>454</sup> Given its position in the text, the map can be seen as using different ingredients to express that mix of humanism and an encyclopedic exposition of Christian history characteristic of the 1486 Ulm edition. Some years later, an encyclopedia that enjoyed great success, the *Margarita philosophica* by Gregor Reisch, a Carthusian and professor at the University of Freiburg (where his pupils included Waldseemüller and

reprinted Amsterdam: Meridian, 1980), and Albert Ronsin, *La fortune d'un nom: America, Le baptême du Nouveau Monde à Saint-Dié-des-Vosges* (Grenoble: J. Millon, 1991), 56–60.

449. D'Avezac, *Martin Hylacomylus Waltzemüller*, 91–92.

450. It comes from the Cardinal of Dubrovnik, Jean Stojkovič, who died in Basle in 1443; see Franz Grenacher, "The Basle Proofs of Seven Printed Ptolemaic Maps," *Imago Mundi* 13 (1956): 166–71.

451. Herein is a criticism of earlier editions in which modern and old maps were mixed together. Particular criticism is leveled at the 1511 Venice edition, which altered the old maps.

452. From the 1513 edition, fol. 60v; see d'Avezac, *Martin Hylacomylus Waltzemüller*, 230.

453. Fols. XIIv–XIIIr; see Campbell, *Earliest Printed Maps*, 152–54, and Herkenhoff, *Die Darstellung außereuropäischer Welten*, 119–21. A color reproduction is in Wolff, "America," 26.

454. The presence of a description of the world after a mention of the Deluge is a commonplace of medieval universal chronicles. According to Grafton, who describes it as "an eclectic map," Jerusalem stood in the middle, "as it did in medieval schematic T-O maps" (*New Worlds, Ancient Texts*, 20), but the holy city was not at the center of the map, however one chooses to define that center.

Ringmann), would include discussions of geographical themes in “De principiis astronomiae” (book 7, tractatus 1) that came before the book dedicated to astrology. These discussions covered notions regarding the spherical form of the earth, the zones and the *climata* (in longitude and latitude), and a description of the habitable regions based on Pomponius Mela, Pliny, Strabo, and Ptolemy. Thus the division of the *cosmographiae scientia* into two parts—one theoretical, the other descriptive—is justified by the contribution it makes to the study of both sacred and profane history. The framework of reference here is the *Geography*—first, because it is the source of the names of the regions in Asia and Africa (those in Europe are modernized), and second, because it provides the world map. At the same time, however, the inadequate points in the model are not passed over in silence. At the land link between Africa and Asia, the map bears an inscription that contradicts the image: “Here, there is no earth, but a sea containing islands of astonishing size which were unknown to Ptolemy.”<sup>455</sup> Additions and modifications were made to later editions of the *Margarita*. The 1515 edition, for example, contains a woodcut map, the *Orbis typus universalis juxta hydrographorum traditionem*, from the 1513 edition of the *Geography*, but with the following differences: the landmasses (above all, South America and Africa, but also Asia) are shown extended in longitude; Japan is added at the eastern extremity; the network of lines of the wind rose is not shown, even if the names of the winds added are those of a nautical wind rose; and no scale is given.<sup>456</sup> The nature and the function of the map are indicated by a separated heading “Typus universae terre juxta modernorum distinctionem et extensionem per regna et provincias” (A plan of the whole earth according to modern division and extension of kingdoms and provinces). The longitudinal extension is perhaps the result of a compromise between the two possibilities that position the *novus mundus* within the *oikoumene*: it was a continent or a part of Asia. Whatever the explanation, it is clear that the principal quality of this Ptolemaic world map is the ease with which it can be adapted to various goals and purposes. With its focus on *cosmographiae scientia*, the *Margarita philosophica* is part of a general movement toward the constitution of geography as a distinct discipline—something in which Ptolemy’s work played an essential role.

In the years from about 1495 to 1525, in Poland and German-speaking nations a significant number of introductions to geography were published (table 9.1), though, as I shall show, there were also manuscript versions. This phenomenon, in which the influence of the project outlined by Celtis is clearly evident, makes these approximately thirty years very important in the development of geography and cartography. The work known

as the “German Ptolemy” was published in Nuremberg around 1495. Its author is unknown but seems to have been a native of Silesia who studied at Cracow. We know that Laurentius Corvinus studied and taught in that city, but his work was published by the Basel humanist Heinrich Bebel and by Hartmann of Eptingen. John of Glogow and Johannes de Stobnicza were also professors in Cracow. Johannes Schöner and Peter Apian worked in Nuremberg and Ingolstadt. Ringmann and Waldsemüller worked in Alsace and Lorraine after studying under Gregor Reisch at Freiburg, as would Lorenz Fries after completing his studies in Vienna. Thus both audience and publishers of the works listed in table 9.1 were found between Poland, Bavaria, and the Middle Rhine region.

This is not the place to describe these works in detail but simply to highlight what they had in common and thus define the role they played in the reception of the *Geography*. As in other analogous studies, a methodological caveat is appropriate at the outset. An analysis that focuses solely on the “medieval” aspects of these texts, contrasting them with the supposedly “modern” and underlining the absence of “new input,” would entirely miss the interest in and meaning of these works,<sup>457</sup> which reflected a very particular intellectual climate. In this sense, we cannot talk here of “commentaries” on the *Geography*. The “German Ptolemy” constituted an autonomous geographical work,<sup>458</sup> a characterization inconceivable without the *Geography* of the man considered the very prince of cartographers. As the Swiss humanist Henricus Glareanus (Heinrich Loriti of Glaris) said, “No one surpassed him [Ptolemy] in genius or painstaking care.”<sup>459</sup>

The texts bear witness to the university teaching of geography, something that had become widespread by the end of the fifteenth and the beginning of the sixteenth century. It is likely that Italian humanists were, by the second half of the fifteenth century, already teaching geography as an independent subject. Meanwhile, in Vienna, Cracow, Ingolstadt, Nuremberg, and other schools and universities, the teaching of geography took Ptolemy’s book as its core material.<sup>460</sup> Konrad Pellikan, the first teacher

455. Reproduction in Grafton, *New Worlds, Ancient Texts*, 57.

456. Uta Lindgren, “Wege und Irrwege der Darstellung Amerikas in der frühen Neuzeit,” in *America*, 145–60, esp. 153 and 156–57. The map is reproduced in Wolff, “America,” 65.

457. For example, Franz Wawrik refers to Glareanus’s *De geographia* as a “little book with little new to offer.” See “Glareanus,” in *Lexikon zur Geschichte der Kartographie*, 2 vols., ed. Ingrid Kretschmer, Johannes Dörflinger, and Franz Wawrik (Vienna: Franz Deuticke, 1986), 1:268.

458. Herkenhoff, *Die Darstellung außereuropäischer Welten*, 133.

459. Henricus Glareanus, *D. Henrici Glareani poetae laureati De geographia liber unus* (Basle, 1527), G3r.

460. For example, in 1467 the Faculty of Arts of the Vienna University purchased the “*Cosmographia Claudii Ptolomei*” among twenty-seven books “concerning the humanities and histories of the whole

TABLE 9.1 Introductions to Geography, ca. 1495–1525

Author	Title	Description and References
Unknown	“German Ptolemy” (Nuremberg: Georg Stuchs, n.d. [ca. 1495])	Detailed analysis in Michael Herkenhoff, <i>Die Darstellung außereuropäischer Welten in Drucken deutscher Offizinen des 15. Jahrhunderts</i> (Berlin: Akademie, 1996), 133–43.
Laurentius Corvinus	<i>Cosmographia dans manuductionem in tabulas Ptholomei</i> (Basle: Nicolaus Kesler, 1496)	Detailed analysis in Herkenhoff, <i>Die Darstellung außereuropäischer Welten</i> , 125–33.
Matthias Ringmann and Martin Waldseemüller	<i>Cosmographiae introductio</i> (St. Dié, 1507)	Reproduction, with French translation by Pierre Monat, in Albert Ronsin, <i>La fortune d’un nom: America, le baptême du Nouveau Monde à Saint-Dié-des-Vosges</i> (Grenoble: J. Millon, 1991), 101–81.
Henricus Glareanus	<i>D. Henrici Glareani poetæ laureati De geographia liber vnvs</i> (Basle, 1527; text written shortly after 1510)	Original manuscript at the John Carter Brown Library; Walter Blumer, “Glareanus’ Representation of the Universe,” <i>Imago Mundi</i> 11 (1954): 148–49, and Edward Heawood, “Glareanus: His Geography and Maps,” <i>Geographical Journal</i> 25 (1905): 647–54; reprinted in <i>Acta Cartographica</i> 16 (1973): 209–16.
Johannes Cochlaeus	<i>Compendium in geographiae introductorium</i> (Nuremberg, 1512)	The text is in the edition of his commentary to Pomponius Mela and his <i>Brevis Germaniae descriptio (1512), mit der Deutschlandkarte des Erhard Etzlaub von 1512</i> , ed., trans., and with commentary by Karl Langosch (Darmstadt: Wissenschaftliche Buchgesellschaft, 1960), F1a–G4a. The complete title is <i>De quinque zonis terrae compendium Jo. Coclei Norici in geographiae introductorium in X capitibus conflatum</i> .
Johannes de Stobnicza	<i>Introductio in Ptholomei Cosmographiam</i> (Cracow: Florian Ungler, 1512)	Description of content in Uta Lindgren, “Die <i>Geographie</i> des Claudius Ptolemaeus in München: Beschreibung der gedruckten Exemplare in der Bayerischen Staatsbibliothek,” <i>Archives Internationales d’Histoire des Sciences</i> 35 (1985): 148–239, esp. 181–83; the work is sometimes presented as a Cracow edition of the <i>Geography</i> , which is false; see, e.g., Hans Wolff, “Martin Waldseemüller: Bedeutendster Kosmograph in einer Epoche forschenden Umbruchs,” in <i>America</i> , 111–26, esp. 124, and also Henry Newton Stevens, <i>Ptolemy’s Geography: A Brief Account of all the Printed Editions down to 1730</i> , 2d ed. (1908; reprinted Amsterdam: Theatrum Orbis Terrarum, 1973), 13–14, 44, 46, and Carlos Sanz, <i>La Geographia de Ptolomeo, ampliada con los primeros mapas impresos de América (desde 1507): Estudio bibliográfico y crítico</i> (Madrid: Librería General Victoriano Suárez, 1959), 260.
Johannes Schöner	<i>Luculentissima quaedam terrae totius descriptio</i> (Nuremberg: Johannes Stuchs, 1515)	On the career of Schöner, see Franz Wawrik, “Kartographische Werke in der Österreichischen Nationalbibliothek aus dem Besitz Johannes Schöners,” <i>International Yearbook of Cartography</i> 21 (1981): 195–202.
Peter Apian	<i>Cosmographicus liber</i> (Landshut, 1524)	
Lorenz Fries	<i>Uslegung der mercarthen oder Cartha marina</i> (Strasbourg: Johannes Grüninger, 1525)	Various editions up to 1531; modern German translation in Meret Petrzilka, <i>Die Karten des Laurent Fries von 1530 und 1531 und ihre Vorlage, die “Carta Marina” aus dem Jahre 1516 von Martin Waldseemüller</i> (Zurich: Neue Zürcher Zeitung, 1970), 116–61.

of Sebastian Münster at Rufach in the Vosges, based his course on the *Margarita philosophica*, among other material. He studied at Tübingen under Paul Scriptoris, who undoubtedly taught a course on the *Geography*, and Sebastian Münster's own teacher and colleague at Tübingen, Johannes Stöffler, left various volumes of university course material, the only extant part of which is a commentary on the first two books of the *Geography*.<sup>461</sup> As for John of Glogow, we have several copies of his lessons, and the Cracow manuscript is a preparatory work comprising a commentary on Ptolemy's world map.<sup>462</sup> Glareanus's own thoughts on the *Geography* can be read not only in his *De geographia* but also in a number of earlier manuscript texts dating from his teaching at Cologne around 1510. For his part, Johannes Cochlaeus, who would play an important role in the circulation of new teaching methods and materials, took geography and cartography as subjects that sought to understand the histories of classical antiquity.<sup>463</sup>

Sebastian Münster's "Kollegienbuch" is a document that reveals the full range of this scholarly interest in the *Geography*. Dating from his years of study at Tübingen (1515–18), it contains not only transcriptions of sections of the text in his own hand but also his copies of the maps from the 1486 and 1513 editions and a *mappamundi* that includes the new geographical discoveries. The content of the book, together with the subjects that are associated with geography and cartography, provides us with clear information regarding the intellectual environment within which these disciplines were practiced. Included are a calendar accompanied by astronomical illustrations; mathematical, astronomical, and geographical extracts from the *Margarita philosophica*; notes regarding the calculation of distances and the manufacture of astronomical instruments; astronomical tables; extracts from the *Geography*; developments of ideas concerning astrology, physiology, and bloodletting; and a chronicle. Here again is seen a continuing relation between the Ptolemaic text and maps, theoretical astronomy, astrology, medicine, and the construction of astronomical instruments.<sup>464</sup>

The introductions all have the same characteristics, whatever the part of the *Geography* extracted and the sometimes different purposes the authors have set themselves. Both Laurentius Corvinus and Henricus Glareanus point out that these introductions are very clearly addressed to students,<sup>465</sup> and these authors—together with Schöner—outline the ultimate aims of such teaching: knowledge of geography facilitates the reading of classical authors and Holy Scripture, and it prepares the future statesmen to tackle tough questions of territorial sovereignty (this latter point is an indication of the link between the spread of Ptolemy and what has been called the birth of the modern state). Moreover, geographical knowledge makes it possible to understand astrological

influences. Emphasized by both Corvinus and Schöner, this motivation is clear in the manuscript course left by John of Glogow, whose works are essentially astronomical and astrological in content,<sup>466</sup> and in Münster's "Kollegienbuch." Astrology should never be overlooked in a study of the reception of Ptolemy's *Geography*.

All the works listed in table 9.1 comprise a theoretical and a descriptive part. The theoretical is almost always the same: definitions and descriptions of the prominent circles (equator, tropics, zodiac), meridians and parallels, geographical coordinates, variations in degrees of longitude, local spheres, *climata* and differing lengths of day-time, how to find a place on a Ptolemaic map by using two intersecting threads running from the marginal graduations, accounts of the winds, and, sometimes, the procedure for transforming angular distance into linear distance. What is important here is not the more or less detailed nature of this theoretical part, but rather the close link that the authors see between it and the descriptive section. Theory is seen as enabling the layman to understand the maps—the main objective of these texts. Moreover, it is the textual description of the maps in the

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world"; see *Mittelalterliche Bibliothekskataloge Österreichs*, 5 vols. (Vienna, 1915–71), 1:481–82. At Freiburg, in 1495 the faculty purchased a *mappamundi* (not Ptolemaic), and in 1499 a "cosmographia Ptolemei"; see Paul [Joachim Georg] Lehmann, *Mittelalterliche Bibliothekskataloge Deutschlands und der Schweiz*, 4 vols. (Munich: Beck, 1918–62), 1:45.

461. This commentary on the *Geography* comes from a course conducted from 15 March 1512 to 18 July 1514 (Tübingen, Universitätsbibliothek, Mc 28); see Johannes Haller, *Die Anfänge der Universität Tübingen, 1477–1537: Zur Feier des 450 jährigen Bestehens der Universität im Auftrag ihres Grossen Senats dargestellt*, 2 vols. (Stuttgart: Kohlhammer, 1927–29), 1:272ff. and 2:104–7, and August Wolkenhauer, "Sebastian Münsters handschriftliches Kollegienbuch aus den Jahren 1515–1518 und seine Karten," *Abhandlungen der Königlichen Gesellschaft der Wissenschaften zu Göttingen, Philologisch-historische Klasse* 11, no. 3 (1909): 1–68, esp. 21–22 and 24.

462. Cracow, Biblioteka Jagiellońska, 2729; see Franciszek Bujak, "Wykład geografii Jana z Glogowy w. r. 1494," in *Studja geograficzno-historyczne*, by Franciszek Bujak (Warsaw: Nakładgebethnera i Wolffa, 1925), 63–77, esp. 65–66 and 75–76, and Mieczysław Markowski, "Die mathematischen und Naturwissenschaften an der Krakauer Universität im XV. Jahrhundert," *Mediaevalia Philosophica Polonorum* 18 (1973): 121–31, esp. 131. John of Glogow also annotated a copy of the *Geography* (1486 edition); see Ludwik Antoni Birkenmajer, *Stromata Copernicana* (Cracow: Polnische Akademie der Wissenschaften, 1924), 105ff.

463. See the preface to his *Quadrivium grammatices*, quoted in Cochlaeus, *Brevis Germanie descriptio*, 18.

464. Münster's "Kollegienbuch" is Munich, Bayerische Staatsbibliothek, Clm 10691, 346A; see Wolkenhauer, "Sebastian Münsters handschriftliches Kollegienbuch," 13–14.

465. The intended public of Corvinus's *Cosmographia* was those of "adolescent age" (a5r); according to Glareanus, geography was to be learned "from tender childhood" (*De geographia*, [Freiburg im Breisgau, 1530], A1v).

466. Mieczysław Markowski, *Astronomica et astrologica Cracoviensia ante annum 1550* (Florence: L. S. Olschki, 1990), 50–79.

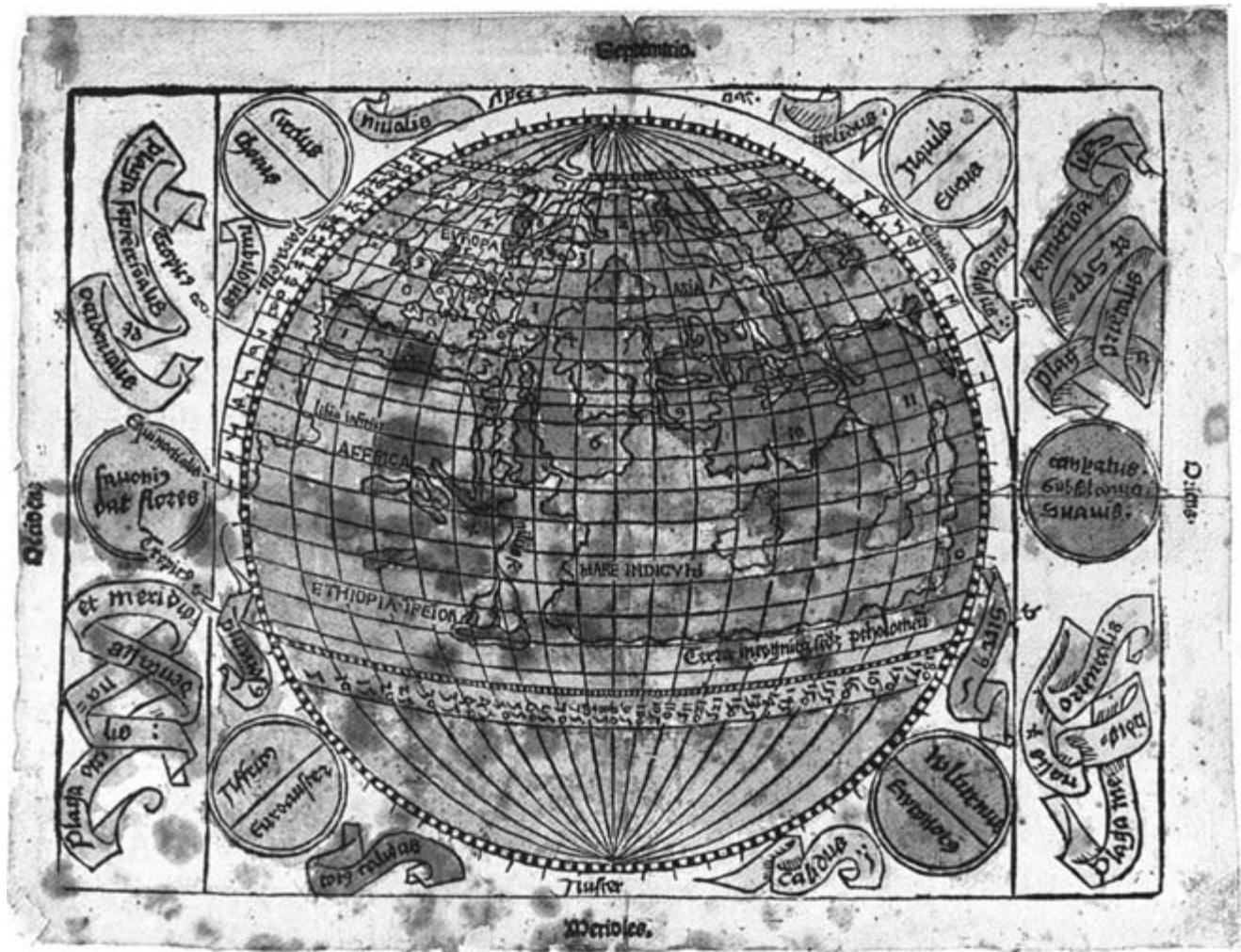


FIG. 9.8. WORLD MAP IN GLOBULAR PROJECTION. From the so-called German Ptolemy, ca. 1495. Photograph courtesy of the Rare Books Division, New York

Public Library, Astor, Lenox and Tilden Foundations, New York.

*Geography* that opens the way for student and reader to come to understand the world and its diversity. This concern is reflected by Corvinus's choice of the rare word *manuductio* in the full title of his work *Cosmographia dans manuductionem in tabulas Ptolomei* (which undoubtedly influenced the choice of the title "Instructio manuductionem praestans in cartam itinerariam" for the presentation to Waldseemüller's *Carta itineraria Europae*). One simple teaching strategy used in these works involves comparison of the outlines of continents with animals or everyday objects. Corvinus compares Europe to a cone (c3v), while John of Glogow describes Europe as a dragon and Asia as a bear, with the lands shown in regional maps seen as the different parts of their bodies. Yet the didactic method achieves much more than simple understanding; the comparisons help the reader to grasp complex scientific realities. For example, the "German Ptolemy" describes the regional maps with reference to

the numbers that correspond to them on the overall map (fig. 9.8), on which the differences with the Ptolemaic world map are noted (2v–3r).<sup>467</sup>

Corvinus, for his part, describes not all the parallels but only those "that Ptolemy records in the world map of his geography" (a8r), and Glareanus explains why the parallels are inscribed in the margins, not on the map itself.<sup>468</sup> Ringmann and Waldseemüller's *Cosmographiae introductio* is accompanied by a map and globe gores, as are Johannes de Stobnicza's *Introductio* (here, the two hemi-

467. This map is the first example of so-called globular projection. There is only one printed example.

468. "There are duplicate parallels in the sphere. Some indeed mark degrees of latitudes and they are painted on the map, being separated—sometimes by five degrees, sometimes by ten—going from equator to pole. Others mark differences in the hours of the artificial day. . . . These parallels however are not painted on the map but are placed alongside in the margins" (Glareanus, *De geographia*, D11r).

spheres of the *Universalis cosmographia*) and Lorenz Fries's *Uslegung*. And in the letter the humanist Hartmann of Eptingen wrote thanking his printer, Heinrich Bebel, a former student of Corvinus at Cracow, the maps are described as an aid to knowledge of the world as a whole: ". . . for one could see the names, characteristics, and wonders of marvelous things, diverse regions, islands, seas, mountains, rivers, [and] animals, [and] one could believe that nothing more could be found elsewhere than in this one book, which reveals the whole content of the Ptolemaic maps and instructs us quite well in these things."<sup>469</sup> The description of the regions often conforms to a schema that is occasionally defined as "traditional." Each is defined by its limits, topography, the manners of its inhabitants, occasionally by the etymology of its name, and—as in the "German Ptolemy"—by coordinates and the average length of the longest day. In discussing each region, these learned humanists quote not only classical and medieval geographers but also poets and historians. To criticize the presence of these abundant quotations as a sign of blind respect for the authority of the classical is tantamount to expecting these humanists to abandon one of the very deepest reasons for an interest in the *Geography*, and their presence does not prevent the increasingly noticeable modernization of the Ptolemaic world image. The "German Ptolemy" points out shortfalls in knowledge—especially with regard to Africa,<sup>470</sup> but also Asia and Europe—and is more interested in contemporary states than in the ancient names of regions, as we can see from these lines of verse from the Latin prologue:

Claudius taught the art of painted maps  
in which he brought together the names of kingdoms  
known in his own time.  
He supplies the names that we use in our generation  
together with peoples and known rivers.

Here the text seems to conflict with Laurentius Corvinus, who not only takes many quotations from Solinus, Strabo, Dionysius Periegetes, Virgil, Ovid, Lucan, and others, but also restricts his modern descriptions (in verse, no less) to the territories of which he has direct experience: Poland, Silesia, and Neumarkt. This is an active intellectual choice, not the sign of a benighted scholar. Corvinus says, for example, that he has omitted mention of numerous islands, including those situated "around the coast of Europe and farther into the ocean itself," because "those [islands], being unworthy of attention, are not sufficiently surveyed by us," a comment that probably reveals awareness of recent oceanic discoveries.<sup>471</sup>

From the 1507 *Cosmographiae introductio* onward, there was insistence on the need to add to Ptolemy. The last chapter of Glareanus's *De geographia* is entitled "De regionibus extra Ptolemaeum."<sup>472</sup> And, in the marginal comments on the manuscript maps he added to his copies

of Ptolemy and the 1507 *Cosmographiae introductio*, Glareanus noted what things were unknown to Ptolemy: the fact that the Indian Ocean was not land-locked and the regions beyond the 180 degree meridian and the seventeenth parallel.<sup>473</sup> All of this is to be taken as symptomatic not of an opposition between the ancient and the modern, but of an awareness of the need not to use a solely Ptolemaic method in perfecting the overall image of the globe.<sup>474</sup> Similarly, in the title of his work Johannes Schöner underlines that the ancient place-names "are mixed together with more recent terms." Schöner's preface says that one must set one's sights more "on the new contributions of our own age," taking up a phrase that occurs in the address to Maximilian in the 1513 edition.

There is no better example of this method of confronting Ptolemy and the results of modern voyages of discovery—or the results such a comparison could achieve—than the large map that accompanies *Cosmographiae introductio* (fig. 9.9).<sup>475</sup> This map's overall structure was designed to communicate the need for this collation. The title in the

469. Glareanus, *De geographia*, G6v.

470. Examples quoted in Herkenhoff, *Die Darstellung außereuropäischer Welten*, 141.

471. Corvinus, *Cosmographia*, e4r; the "Summarium in cosmographia Ptholomaei" added to the *Cosmographia* (fols. 53v–55v), undoubtedly due to Hartmann of Eptingen, describes the world map and the regional maps and replaces the ancient place-names with the modern—above all, in the ten maps of Europe (Herkenhoff, *Die Darstellung außereuropäischer Welten*, 129).

472. Transcription in A. Elter, "Inest Antonii Elter P.P.O. de Henrico Glareano Geographo et antiquissima forma 'America' commentatio," *Natalicia regis Augustissimi Guilelmi II*, 1896, 5–30, esp. 17–18; reprinted in *Acta Cartographica* 16 (1973): 133–52, esp. 139.

473. Eugen Oberhammer, "Zwei handschriftliche Karten des Glareanus in der Münchener Universitätsbibliothek," *Jahresbericht der Geographischen Gesellschaft in München* 14 (1892): 67–74, esp. 69–70 and 73–74; reprinted in *Acta Cartographica* 7 (1970): 313–24. One of the two maps is reproduced in Wolff, "Martin Waldseemüller," 123.

474. "Since, however, no one has surpassed Ptolemy's genius and effort in mapping the world, it seemed worthwhile to us to steer young people to him, as if to the source and to the complete creator of this enterprise. And so we have touched on the general outlines of the regions according to his method, casting aside very few things, whether of old or of our own age" (chap. 23 in Glareanus's *De geographia*). And later: "Regions not included in Ptolemy's map were not transmitted by so many reliable authorities, and they were not even described with such great diligence and art . . . all of which things are easy to see in Ptolemy's general map" (chap. 40). It is ironic that Glareanus added to his manuscript an image that could be qualified as "medieval" and at the same time casts some doubts on theories regarding the clash between different "models"; the image, in fact, shows the city of Glaris at the center of a universe composed of perfectly concentric Aristotelian spheres extending from the terrestrial elements up to the empyrean. Walter Blumer, "Glareanus' Representation of the Universe," *Imago Mundi* 11 (1954): 148–49, esp. 148.

475. Martin Waldseemüller, *The Oldest Map with the Name America of the Year 1507 and the Carta Marina of the Year 1516*, ed. Joseph Fischer and Franz Ritter von Wieser (Innsbruck: Wagner, 1903; reprinted Amsterdam: Theatrum Orbis Terrarum, 1968).

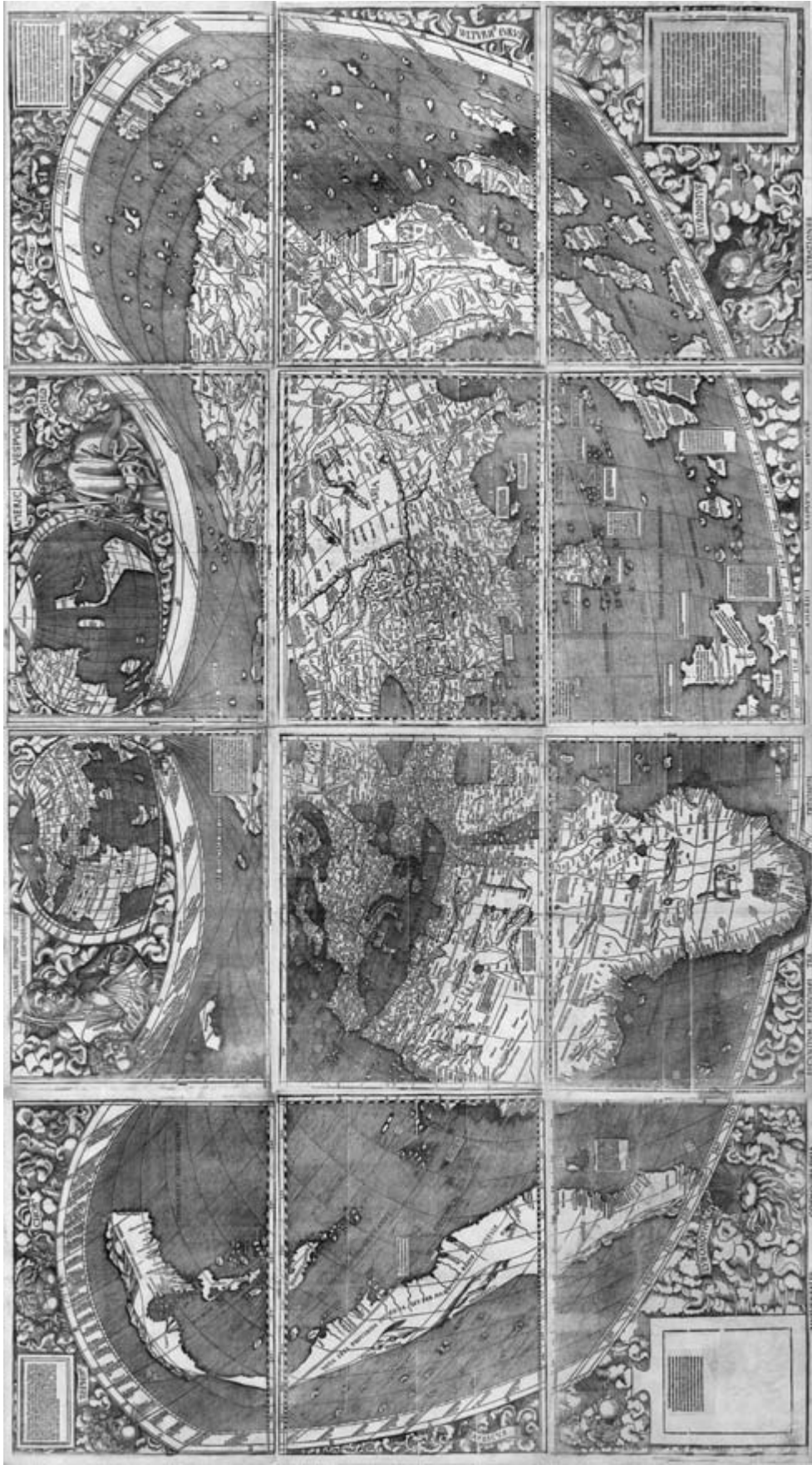


FIG. 9.9. WORLD MAP ACCOMPANYING WALDSEEMÜLLER'S COSMOGRAPHIAE INTRODUCTIO, 1507.

Size of the original: 128 × 233 cm. Photograph courtesy of the Geography and Map Division, Library of Congress, Washington, D.C. (G3200 1507.W3).

lower margin puts Ptolemy and modern navigators on the same level—“Vniversalis cosmographia secundum Ptholomaei traditionem et Americi Vespuccii aliorumque lustrationes”—and the map is crowned with two hemispheres: on the left, the Orient, with Ptolemy holding a quadrant (the instrument used in measuring the elevation of the stars); on the right, the West, with Vespucci holding a compass.<sup>476</sup> The choice of instruments is far from accidental; the two figures are shown on an equal footing, each with an implement that best symbolizes his work. Ptolemy established his method by measuring coordinates and inscribing them on a map; Vespucci, using the compass of the navigator, applied that same method of measurement to a practical purpose. However, in the information included in the map about new discoveries, as well as in the regional maps and the descriptions of chorographies, it is clear that Ptolemy is not the only source being taken into account. Although Ptolemy’s method remains unsurpassed, there was an ever-increasing awareness that what he produced was limited by the means of discovery and measurement actually available in his day. In the dedication of his *Res Germanicae* (1531), Beatus Rhenanus outlined his intention of elucidating German antiquities, but cast scorn on those “of the sort who still dream of the old state of things, who hold tenaciously onto Julius Caesar and Ptolemy and who cannot be persuaded differently from what is handed down by those [writers].”<sup>477</sup> The most advanced and original minds already believed that Ptolemy possessed an outmoded picture of the world that one had to move beyond.

#### The Renaissance of Ptolemy: A New Translation and New “Projections”

Errors in the translation of the *Geography* had hindered a clear understanding of theoretical parts that dealt with modes of representation and the geometrical procedures necessary in the construction of maps. Interest in the new geographical discoveries—and the concomitant concern about modernizing the image of the world produced by the ancients—naturally led to a desire for a synthesis of contemporary knowledge with Ptolemy. In a 1524 letter to Willibald Pirckheimer, Glareanus describes Ptolemy as “a very eminent author, without whom all geography remains blind.”<sup>478</sup> Yet the need for a new translation was being pressed with ever more insistence. Waldseemüller and Ringmann, for example, had already consulted original Greek texts to correct the text as they saw fit. In 1514, Johannes Werner published a new translation of book 1 in a collection of texts that focused mainly on the “scientific” aspects of the *Geography*. It was another member of the Nuremberg circle of humanists, Pirckheimer, who produced the new translation that appeared in Strasbourg in 1525, published by Johann Grüninger (Grieninger), with twenty-four maps supplementing the

original twenty-six.<sup>479</sup> The editor’s aim was to meet standards of philological rigor and mathematical competence: “I know,” he wrote in a letter of 1511/12, “that it cannot be well translated unless by someone who is not only thoroughly well-versed—indeed imbued—in Greek letters, but learned in mathematics, because I have seen many who have ventured into this area, but whose daring efforts have ended pitifully.”<sup>480</sup>

Pirckheimer’s translation follows in the vein set by Regiomontanus. Among other additions to the text, there are fragments taken from notes of Regiomontanus commenting on Jacopo Angeli. So far, there has yet to be a detailed comparison of this work with the two previous translations. Holzberg, however, does make some points, which reveal that Pirckheimer certainly possessed the two indispensable qualifications—unlike Jacopo Angeli, who knew neither enough Greek nor enough mathematics, and Werner, who sometimes had difficulty with the language.<sup>481</sup> Pirckheimer’s work would be the basis for all subsequent translations up to that of Charles Müller (1883–1901).

On thirty-four unnumbered pages, Pirckheimer’s edition included appendixes covering two areas that greatly interested the humanists. It met the needs of those who were keen on modern geography by offering an “*Explanatio quorundam locorum, qua vulgus nostra aetate uti solet, et maxime ex coniecturis*” that gave modern equivalents of ancient names (but only for central and eastern Europe: for example, “Würtzburg Herbipolis Artaurum”). Finally, it also explained how to use coordinates to calculate distances and gave two conversion tables to facilitate calculations of spherical trigonometry, which thus makes a “mathematical” use of the *Geography* possible. Unlike his predecessors, Pirckheimer did not hesitate to correct the text, especially the figures, “from true mathematical calculations,” in order to respect the full intentions of the original work.<sup>482</sup>

At the beginning of the sixteenth century there was undoubtedly a shift in focus in readings of the *Geography*, at least within the more advanced intellectual circles,<sup>483</sup> with Ptolemy seen above all as an exponent of *mathematicae rationes*. As a result, there was much more detailed study of the modes of representation (what the

476. Reproduction of the detail of the two hemispheres in Hans Wolff, “Das Weltbild am Vorabend der Entdeckung Amerikas—Ausblick,” in *America*, 10–15, esp. 12–13.

477. Rhenanus, *Briefwechsel des Beatus Rhenanus*, 385.

478. Holzberg, *Willibald Pirckheimer*, 321.

479. Ultimately there are two world maps from the 1522 Strasbourg edition; one is like that placed before the old maps, the other is the *Orbis typus universalis iuxta hydrographorum traditionem*.

480. Holzberg, *Willibald Pirckheimer*, 319.

481. Holzberg, *Willibald Pirckheimer*, 323–25.

482. Holzberg, *Willibald Pirckheimer*, 326.

483. In his letter of dedication to Sebastian Sperantius, Bishop of Brixen and a former pupil of Celtis at Ingolstadt, Pirckheimer replies to those who criticize his scientific activities.



moderns call “projections”) and of the mathematics behind them. Evidence of this can be seen, for example, in the book Johannes Werner published in Nuremberg in 1514.<sup>484</sup> A friend of Pirckheimer and an acquaintance of Celtis,<sup>485</sup> Werner produced a collection of texts including, as has already been noted, Amiroutzes's explanations of how to calculate the distance between places whose spherical coordinates are known and Regiomontanus's writings on the meteoroscope. The collection as a whole is concerned with mathematical geography, and Werner's own works on the subject have pride of place. They include a new translation of book 1 of the *Geography* (together with a paraphrase and notes), a commentary on Amiroutzes's treatise, and a *Libellus de quatuor terrarum orbis in plano figuracionibus* dedicated to Pirckheimer. Clearly revealing the influence of Celtis, the texts as a whole are intended to meet a didactic purpose and are aimed at a public of “young scholars” (hence the recourse to paraphrasing). Johannes Stabius, who had been a colleague of Celtis at Ingolstadt and Vienna, encouraged the publication. In all these works, the basis and the form of Werner's exposition were determined by mathematics. He used Euclid's *Elements* and opted for a mode of demonstration and presentation that drew on theorems. The precise calculation of coordinates was an important element. Werner mentioned various instruments and methods: the meteoroscope and also a *radius observatorius* to measure the angle between two places “from the place where the geographer makes his observation.”<sup>486</sup>

The treatise on the four depictions of the earth *in plano* was Werner's first essay to investigate and develop the mathematical bases of Ptolemaic “projections.” Three of the depictions are modified versions of Ptolemy's second “projection”; they differ only in that the pole is the center of the parallels and the correct proportions between the lengths of degrees as shown on the parallels is preserved throughout (whereas Ptolemy made the arbitrary decision to respect them only on three parallels).<sup>487</sup> The aim of the so-called cordiform projection—no doubt worked out in collaboration with Stabius, who visited Nuremberg several times—was to produce an overall sphere on a plane surface; the fact that this projection is equivalent was not noticed in the sixteenth century.<sup>488</sup>

Werner's interest in these matters seems to have been purely theoretical; he did not draw up maps using these procedures (the cordiform projection was used for the first time in 1530 by Peter Apian, then in 1531 by Oronce Fine). Thus one should avoid seeing this Nuremberg mathematician as a witness to the “progress” being made in methods of “projection.” More important than progress was the mathematical thought behind it,<sup>489</sup> with the multiplication of different points of view representing a spatially enlarged world whose actual content was seen as undergoing radical transformation. Considered from this point of view, the German scholars of the early six-

teenth century were actually playing on different modes of representation. I have already mentioned various examples, to which I will add those provided by the essays in Glareanus's working manuscripts. The manuscript in the John Carter Brown Library contains seven pages of maps that include a copy of Ruysch's world map (fig. 9.10), a reduced-size version of Waldseemüller's *Universalis cosmographia*, and constructions that present different points of view. They make clear that Glareanus actually took up the Ptolemy and Vespucci hemispheres that surmounted Waldseemüller's work, but extended the hemisphere of the ancient world to include the *mundus novus* to the west. The northern and southern hemispheres are shown in equidistant polar projection.<sup>490</sup> The world map in the “German Ptolemy” and the 1515 world map constructed by Stabius (and said to have actually been drawn by Albrecht Dürer) are other examples of this playing with modes of “projection,” the purpose of which was to depict the sphere as a whole in various and perhaps unusual ways.<sup>491</sup>

This experimentation with different modes of representation could lead to a well-founded critique of Ptolemy's maps. According to Cochlaeus, the map of Germany drawn by yet another inhabitant of Nuremberg, Erhard Etzlaub, famous as both a cartographer and a

484. Werner, *In hoc opere haec continentur . . .* On Werner's geographical work, see Siegmund Günther, “Johann Werner aus Nürnberg und seine Beziehungen zur mathematischen und physischen Erdkunde,” in *Studien zur Geschichte der mathematischen und physikalischen Geographie*, by Siegmund Günther (Halle: L. Nebert, 1879), 277–407, esp. 313–15, and Karl Schottenloher, “Der Mathematiker und Astronomer Johann Werner aus Nürnberg, 1466–1522,” in *Hermann Grauert: Zur Vollendung des 60. Lebensjahres*, ed. Max Jansen (Feiburg: Herder, 1910), 147–55.

485. The “Erzhumanist” tried to get him to go to Vienna to teach Greek, but Werner refused. In the same letter he informs Celtis of the progress on his translation of book 1 and of the key points in the building of a meteoroscope (Werner to Celtis, 7 December 1503, in Rupprich, *Der Briefwechsel des Konrad Celtis*, 548–49).

486. Johannes Werner, *Nova translatio primi libri geographiae . . . In eundem . . . argumenta, paraphrasis*, in *In hoc opere haec continentur . . .*, by Johannes Werner, dii recto.

487. O. Neugebauer, *A History of Ancient Mathematical Astronomy*, 3 vols. (Berlin: Springer, 1975), 2:885–88.

488. Keuning, “History of Geographical Map Projections,” 12.

489. Technical considerations regarding modes of projection in the sixteenth century are to be found in Rüdiger Finsterwalder, “Die Erdkugel in ebenen Bildern: Projektionen von Weltkarten vor 1550,” in *America*, 161–74.

490. The same sketches can be found in a copy of *Cosmographiae introductio* now in Munich and in the Bonn copy of the 1482 Ulm edition (see earlier). On the Ruysch world map, see Donald L. McGuirk, “Ruysch World Map: Census and Commentary,” *Imago Mundi* 41 (1989): 133–41, esp. 134.

491. See figure 9.8 for the map of the “German Ptolemy,” and see also Günther Hamann, “Die Stabius-Dürer-Karte von 1515,” *Kartographische Nachrichten* 21 (1971): 212–23. The Indian Ocean is at the center of the map, so Eurasia occupies the entire surface of the circle; one cannot understand why an exhibition catalog refers to this

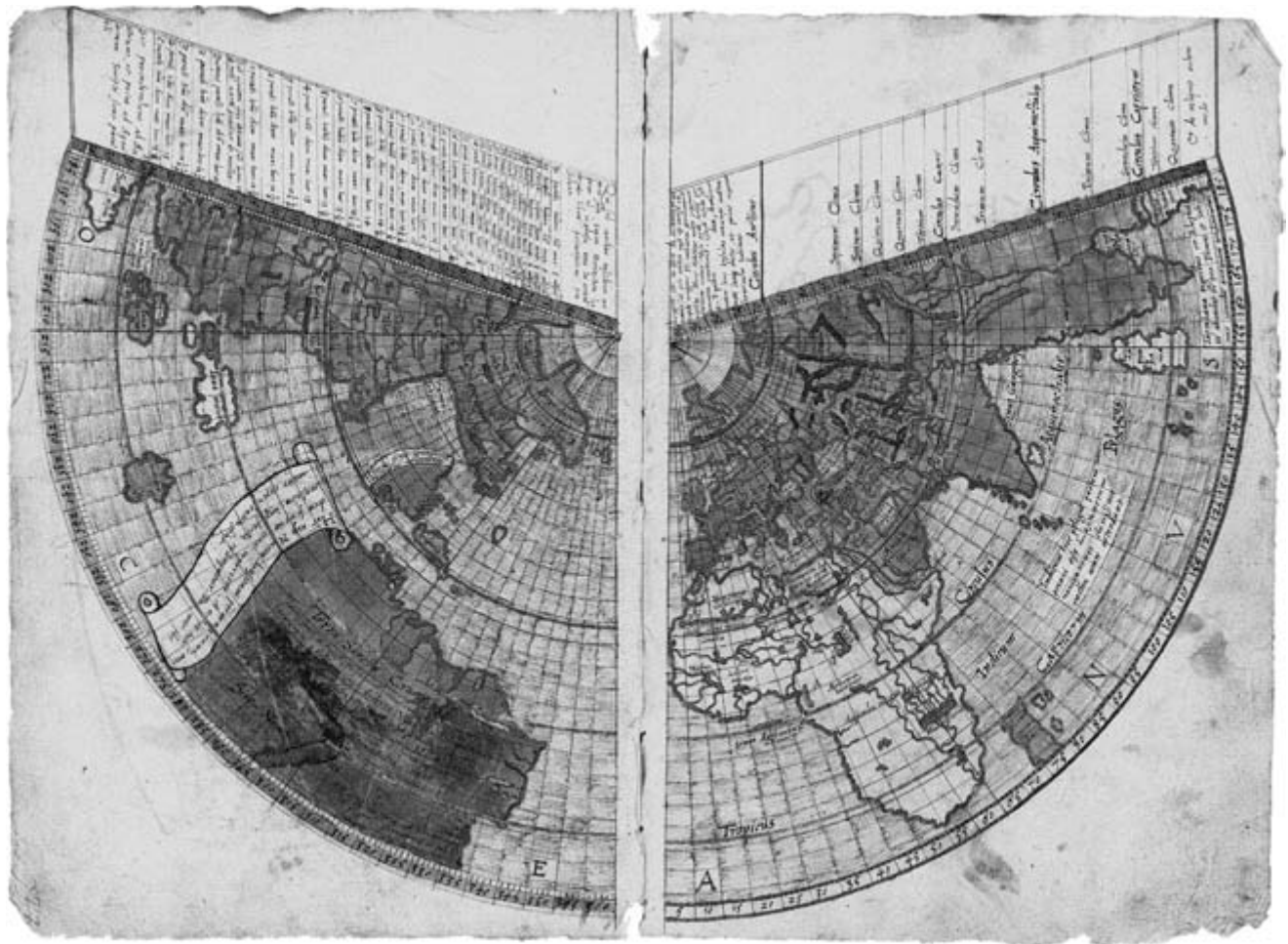


FIG. 9.10. COPY OF RUYSCHE'S WORLD MAP IN GLAREANUS'S "DE GEOGRAPHIA," CA. 1510–20. Manuscript.

Photograph courtesy of the John Carter Brown Library at Brown University, Providence (Codex/Latin 1/2-Size).

maker of instruments, showed the distances between cities and the course of rivers "more accurately than even in Ptolemy's maps." He was undoubtedly talking of Etzlaub's *Rom Weg*.<sup>492</sup> This critique of Ptolemy went even further. As early as 1511 and 1513, Etzlaub had drawn on the lids of two sundials two maps depicting Africa and Europe from the equator to the Arctic polar circle, giving 132 place-names with very slight errors in latitude. The scale of latitude shown at the borders was, in fact, progressive, and these two maps thus contained all the essential features of the Mercator projection.<sup>493</sup> From what Pirckheimer said in the letter of dedication to the 1525 edition of his own work, he seems to have been planning a new edition in which all the maps would be drawn using the principle of progressively scaled latitudes.<sup>494</sup>

## CONCLUSION

To a large extent, the rest of the story is one of a move beyond Ptolemy, who was destined to become a monument

of ancient geography. The next step in this process was the critical edition of the Greek text published by Desiderius

attempt as "somewhat unsuccessful" (*Focus Behaim Globus*, 2 vols. [Nuremberg: Germanisches Nationalmuseums, 1992], 2:671, with reproduction).

492. "Who finally does not have praise for the genius of Erhard Etzlaub, whose sundials were also requested at Rome? To be sure he is an industrious craftsman, remarkably learned in the principles of geography and astronomy; he fashioned a very beautiful map of Germany, in which one can see the distances between cities and the course of rivers more accurately than even in Ptolemy's maps" (Cochlaeus, *Brevis Germanie descriptio*, 90). See Campbell, *Earliest Printed Maps*, 59–67; Fritz Schnellbögl, "Life and Work of the Nuremberg Cartographer Erhard Etzlaub (†1532)," *Imago Mundi* 20 (1966): 11–26, esp. 13; and plate 44 in this volume.

493. Englisch, "Erhard Etzlaub's Projection," 104–6, and see the color reproduction in *Focus Behaim Globus*, 2:670.

494. A. E. Nordenskiöld, *Facsimile-Atlas to the Early History of Cartography*, trans. Johan Adolf Ekelöf and Clements R. Markham (1889; New York: Dover, 1973), 22 and 96; see Max Weyrauther, *Konrad Peutinger und Wilibald Pirckheimer in ihren Beziehungen zur Geographie* (Munich: T. Ackermann, 1907), 23–25.

Erasmus (Basel, 1533), and its culmination would be the appearance of Ortelius's *Theatrum orbis terrarum*.<sup>495</sup>

But the reception of the *Geography* also offers an opportunity to discuss methodological questions connected to intellectual history—indeed, the very question of what we understand by such a history. To reiterate what I have already stressed, it would be false to talk here in terms of progress beyond a “medieval” conception of space, to see the leading figures in the story told here as progressive intellectuals challenging traditionalists. Things are much more complex. In the first half of the fifteenth century, Ptolemy's *Geography* was appreciated by Italian humanists for features other than those we see as constituting the originality of his work. First and foremost, the *Geography* was seen as a compendium of ancient place-names, and Ptolemy's astronomical and geometrical method were appreciated only insofar as they guaranteed the truth and exactitude of the representation he offered. It seems that there was no great interest in his method in the Italy of that day.

Another milieu—overlapping in part that of the humanists—was that of astrologers and physicians, who played a fundamental role in the reception of the *Geography* as a source of material that could be used in calculating the position of the stars, eclipses, and the trajectory of comets.<sup>496</sup> Such information was considered essential in drawing horoscopes and in guaranteeing the efficacy of medical treatments. In effect, what we take as astronomical theory was, in fact, just a cover for interests that incline much more toward the astrological—something that has often been deliberately overlooked by a positivist bias against anything that does not lie within the domain of “science,” in the modern sense of the word. Clearly, we would like to have more direct information regarding how the lists and maps in the *Geography* were used to this end.

As the fifteenth century progressed, two distinct attitudes emerged. Certain scholars considered the *Geography* as a “given,” an insuperable model; others were aware that the excellence of Ptolemy's method necessarily required an attempt to improve the Ptolemaic world image. However, this phase in the reception of the text is not to be seen as the gradual improvement of Ptolemy by means of Ptolemy. The “modern” maps were the fruit of knowledge generated outside the *Geography*, and throughout the fifteenth century, regional and local maps were drawn up that in no way reflected the principles Ptolemy laid down. The first stage in the reflection on Ptolemaic cartography was based on comparison with other existing cartographies—primarily marine cartography (considered to be the closest relatives), but also the *mappaemundi* whose malleability had been confirmed by a centuries-old tradition.

Questions regarding the contradictions between the *imago mundi* presented in Ptolemy's maps and the other

images implicit in the various ancient and medieval traditions, together with the first considerations of the structure of terrestrial space and the extension of the *oikoumene*, appeared very early in a milieu influenced by university teaching in France and Germany. It was not the new information produced by the voyages of discovery that gave rise to these comparisons, but rather the anxieties caused by the advance of Islamic Turkey, by crusade plans that came to nothing, and by an awareness of the limited extent of the Christian world. Later, Portuguese progress southward along the coast of Africa and thence toward India, together with the search for the islands of the Atlantic and a western route to Asia, caused the need for modernization to be even more urgently felt.

However, such modernization was hindered by two factors. Due to the poor quality of Jacopo Angeli's translation, it was difficult to understand the theoretical explanations in the text, and from copy to copy the figures given for specific coordinates seemed to vary. Ptolemy's work may have been an indispensable tool for the study of the geography of the ancient world, but stylistically it did not have the eloquence that the humanists so appreciated in the work of Pomponius Mela. And it is this deficiency that explains why, throughout the fifteenth century, Ptolemy would be read in tandem with other writers, whether Pomponius Mela, Solinus, and Pliny or, later, Strabo and Diodorus Siculus. In the dedication to his translation, Jacopo Angeli says that the works of these authors were all texts amid which the *Geography* took pride of place, and yet for a long time that work would serve mainly as a reservoir from which historians would glean the numerous ancient names with which to fill their own introductions and texts. Nevertheless, it is true that all historical geography rests, in part, on a knowledge of contemporary geography; the identification of the ancient name of a city involves the comparison of texts, maps, and actual geographical space. And so it can be argued that the adaptation of the maps in the *Geography* to the modern world was, in part, inspired by solely antiquarian concerns.

The decisive phase in the modernization did not come until the third quarter of the fifteenth century, and it was the result of the synthesis proposed by Regiomontanus—a *humanistische Naturwissenschaft* (to quote Grössing)

495. Milanese, *Tolomeo sostituito*, 18.

496. Kästner drew attention to the part played by German physicists in the development of geography and cartography in the period under examination, contrasting the empirical natural science of the Renaissance with what he termed a “sterile” medieval “credence in authority”; see Hannes Kästner, “Der Arzt und die Kosmographie: Beobachtungen über Ausnahme und Vermittlung neuer geographischer Kenntnisse in der deutschen Frührenaissance und der Reformationzeit,” in *Literatur und Laienbildung im Spätmittelalter und in der Reformationzeit*, ed. Ludger Grenzmann and Karl Stackmann (Stuttgart: J. B. Metzler, 1984), 504–31.

that saw the establishment of unadulterated texts no longer as a gratuitous game of erudition but as an indispensable contribution to the advancement of science. There had already been some attempts in this direction in Germany, but they are still partly unexplored. Only an unbiased study of the material that Durand used to construct the historiographical fiction of the “Vienna-Klosterneuburg map corpus” will cast new light on this area.

One can daydream about what might have been achieved if a premature death had not prevented Reiomontanus from putting his program of study into effect. This is not to say that his work came to nothing. Under the influence of Conrad Celtis and his followers, it would bear fruit—above all, in Nuremberg and the German area of the Rhine. Here, the facts enable us to contradict those historians who, on the basis of insufficient information and positivistic prejudice, propose some sort of contrast between science and humanism, arguing that the two “developed separately, without any real reciprocal action on each other.”<sup>497</sup> All the great achievements that one sees at the end of the fifteenth and in the first quarter of the sixteenth century were due to minds that were deeply imbued in classical culture. In other words, the “archaic” and the “progressive” uses of Ptolemy were part of one and the same cultural movement: humanism. The emergence of new ways of looking at a writer or at the world does not necessarily mean that previous ways of seeing simply wither away. Although some scholars were striving for exactitude and accuracy in maps, others were still copying the work of Pomponius Mela, Solinus,

Pliny, and Ptolemy in the geographical introductions to their national histories or universal chronicles. Yet there were others who were engaged in both activities—without creating any of the contradictions that rather blinkered historians have argued for.

The modernization of the *imago mundi* and the work on modes of representation that developed during the early years of the sixteenth century should not be seen as either more or less successful attempts to integrate new information into existing geographical pictures. Nor should they be seen as steps toward a more “correct” representation, that is, toward conforming to our own notion of correct representation. They were exploratory games played with reality that took people in different directions. In all of this, the *Geography* was a starting point that was gradually left behind. The *Geography*, properly understood at last—thanks to a correct translation, soon to be followed by a critical edition of the Greek text—was seen in perspective and then overtaken. Ptolemy was not so much the source of a correct cartography as a stimulus to detailed consideration of an essential fact of cartographic representation: a map is a depiction based on a problematic, arbitrary, and malleable convention.

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497. Lucien Febvre, *Le problème de l'incroyance au XVI<sup>e</sup> siècle: La religion de Rabelais* (Paris: A. Michel, 1962), 414. He adds: “[There was] little or no contact between learning drawn from books and learning drawn from experience”; such distinctions are simplistic and anachronistic. One need only think of Aventinus’s map of Bavaria, intended as a historical illustration of the past of the duchy and yet drawn up after repeated research “on the ground.”

APPENDIX 9.1 PTOLEMY'S *GEOGRAPHY*, EDITIONS FROM 1475 TO 1650

Year	Place	Language	Editors, Engravers, Promoters, etc.	Printer	Leaves	Maps <sup>a</sup>	Reference <sup>b</sup>
1475	Vicenza	Latin	Barnabas Picardus	Herman Levilapis	142	None	A, no. 1; N, no. 2; S, no. 1; L, pp. 154–55
[1477]	Bologna	Latin	Text corrected by Hieronymus Manfredus, Petrus Bonus, Galleottus Martius, Colla Montanus, and Filippo Beroaldo; promoters: Filippo Baldinini, Giov. degli Accursi, and Ludovicus and Dominicus de' Ruggieri	Domenico de' Lapi	112	26 cp	A, no. 2; N, no. 1; S, no. 1; L, pp. 156–58
1478	Rome	Latin	Domitius Calderinus	Arnold Buckinck and Konrad Sweynheim	123	31 cp	A, no. 3; N, no. 4; S, no. 3; L, pp. 158–59
[1482]	Florence	Italian	Francesco Berlinghieri	Nicolo Todescho	182	31 cp	A, no. 4; N, no. 3; S, no. 4
1482	Ulm	Latin	Johann Schnitzer engraver	Lienhart Holl	183	32 wc	A, no. 6; N, no. 5; S, no. 5; L, pp. 159–65
1486	Ulm	Latin	Justus de Albano	Johannes Reger for Justus de Albano	204	32 wc	A, no. 7; N, no. 6; S, no. 6; L, pp. 165–68
1490	Rome	Latin	Reedition of Rome 1487	Petrus de Turre	169	27 cp	A, no. 8; N, no. 7; S, no. 7; L, pp. 168–70
1507	Rome	Latin	Marco Beneventano and Giovanni Cotta	Bernardinus de Vitalibus for Evangelista Tosino	193	34 cp	A, no. 9; N, no. 8; S, no. 8; L, pp. 170–73
1508	Rome	Latin	Marco Beneventano and Giovanni Cotta	Bernardinus de Vitalibus for Evangelista Tosino	209	34 cp	A, no. 10; N, no. 9; S, no. 9; L, pp. 173–75
1511	Venice	Latin	Bernardo Silvano	Jacobus Pentius de Leucho	92	28 wc	A, no. 11; N, no. 10; S, no. 10; L, pp. 175–78
1513	Strasbourg	Latin	Martin Waldseemüller, Matthias Ringmann, Jacob Aeszler, and Georg Übelin	Johannes Schott	180	47 wc	A, no. 12; N, no. 11; S, no. 11; L, pp. 183–88
1514	Nuremberg	Latin	Johannes Werner	Johannes Stuchs	68	None	A, no. 13; N, no. 12; S, no. 12; L, pp. 178–81

APPENDIX 9.1 (*continued*)

Year	Place	Language	Editors, Engravers, Promoters, etc.	Printer	Leaves	Maps <sup>a</sup>	Reference <sup>b</sup>
1520	Strasbourg	Latin	Martin Waldseemüller, Matthias Ringmann, Jacobus Aeszler, and Georg Übelin Reedition of Strasbourg 1513	Johannes Schott	151	47 wc	A, no. 14; N, no. 13; S, no. 13; L, pp. 188–90
1522	Strasbourg	Latin	Lorenz Fries	Johann Grüninger	194	50 wc	A, no. 15; N, no. 14; S, no. 14; L, pp. 190–93
1525	Strasbourg	Latin	Willibald Pirckheimer and Johannes Regiomontanus	Johann Grüninger and Johannes Koberger	228	50 wc	A, no. 16; N, no. 15; S, no. 15; L, pp. 193–96
1533	Ingolstadt	Latin	Johannes Werner Reedition of Nuremberg 1514	Petrus Opilio	88	None	N, no. 18; S, no. 18
1533	Basel	Greek	Desiderius Erasmus	Hieronymus Froben	276	None	A, no. 17; N, no. 17; S, no. 17; L, pp. 196–97
1535	Lyons	Latin	Miguel Servet; used Strasbourg 1522 woodblocks	Melchior Trechsel and Gaspard Trechsel	212	50 wc	A, no. 19; N, no. 19; S, no. 19; L, pp. 197–200
1540	Basel	Latin	Sebastian Münster (maps only)	Henricus Petrus (Heinrich Petri)	221	48 wc	A, no. 21; N, no. 22; S, no. 22; L, pp. 203–6
1540	Cologne	Latin	Joannes Noviomagus	Joannes Rudemundanus	247	None	A, no. 20; N, no. 21; S, no. 21; L, pp. 201–3
1541	Vienne	Latin	Miguel Servet Reedition of Lyons 1535	Gaspard Trechsel	222	50 wc	A, no. 22; N, no. 23; S, no. 23; L, pp. 200–201
1542	Basel	Latin	Sebastian Münster Reedition of Basel 1540	Henricus Petrus	220	48 wc	A, no. 24; N, no. 25; S, no. 25; L, pp. 206
1545	Basel	Latin	Sebastian Münster Reedition, augmented, of Basel 1540	Henricus Petrus	223	54 wc	A, no. 25; N, no. 26; S, no. 26; L, pp. 207–8
1546	Paris	Greek	Desiderius Erasmus Reedition Basel 1533	Chrétien Wechel	222	None	A, no. 26; N, no. 27; S, no. 27; L, pp. 210–11
1548	Venice	Italian	Pietro Andrea Mattioli; maps engraved by Giacomo Gastaldi	Nicolò Bascarini for Giovanni Battista Pedrezano	407	60 cp	A, no. 28; N, no. 28; S, no. 28; L, pp. 211–14

APPENDIX 9.1 (*continued*)

Year	Place	Language	Editors, Engravers, Promoters, etc.	Printer	Leaves	Maps <sup>a</sup>	Reference <sup>b</sup>
1552	Basel	Latin	Sebastian Münster Reedition, augmented, of Basel 1540	Henricus Petrus	311	54 wc	A, no. 29; N, no. 29; S, no. 29; L, pp. 208–10
1561	Venice	Italian	Girolamo Ruscelli; maps engraved by Giacomo Gastaldi	Vincenzo Valgrisi	128	64 cp	A, no. 30; N, no. 30; S, no. 30; L, pp. 215–19
1562	Venice	Latin	Giuseppe Moleti	Vincenzo Valgrisi		64 cp	A, no. 31; N, no. 31; S, no. 31; L, pp. 219–22
1564	Venice	Italian	Reedition of Venice 1561	Giordano Ziletti		64 cp	A, no. 33; N, no. 33; S, no. 33
1564	Venice	Latin	Giuseppe Moleti Reedition of Venice 1562	Giordano Ziletti		64 cp	A, no. 32; N, no. 32; S, no. 32
1574	Venice	Italian	Giovanni Malombra Reedition of Venice 1561	Giordano Ziletti		65 cp	A, no. 34; N, no. 34; S, no. 34; L, pp. 222–24
1578	Cologne	Latin	Maps by Gerardus Mercator, without text	Gottfried von Kempen		28 cp	A, no. 35; N, no. 35; S, no. 35; L, pp. 224–25
1584	Cologne	Latin	Arnold Mylius; maps by Gerardus Mercator, with text	Gottfried von Kempen		28 cp	A, no. 36; N, no. 36; S, no. 36; L, pp. 226–27
1596	Venice	Latin	Giovanni Antonio Magini; maps engraved by Girolamo Porro	Heirs of Simon Galignani de Karera		64 cp	A, no. 37; N, no. 37; S, no. 37
1597	Cologne	Latin	Giovanni Antonio Magini; maps engraved by Girolamo Porro Reedition of Venice 1596	Peter Keschedt		64 cp	A, no. 38; N, no. 38; S, no. 38; L, pp. 228–31
1598	Venice	Italian	Leonardo Cernoti	Giovanni Battista Calignani and Giorgio Calignani		64 cp	A, no. 39; N, no. 39; S, no. 39?
1598	Venice	Italian	Girolamo Ruscelli and Giuseppe Rosaccio	Heirs of Melchior Sessa		69 cp	A, no. 40; N, no. 40; S, no. 40
1599	Venice	Italian	Girolamo Ruscelli and Giuseppe Rosaccio Reedition of Venice 1598	Heirs of Melchior Sessa		69 cp	A, no. 41; N, no. 41; S, no. 41
1605	Frankfurt/ Amsterdam <sup>c</sup>	Latin/ Greek	Petrus Montanus and Gerardus Mercator	Jan Theunisz. (?) for Jodocus Hondius the Elder and Cornelius Nicolai		28 cp	A, no. 42; N, no. 43; S, no. 43; L, p. 237

APPENDIX 9.1 (*continued*)

Year	Place	Language	Editors, Engravers, Promoters, etc.	Printer	Leaves	Maps <sup>a</sup>	Reference <sup>b</sup>
1608	Cologne	Latin	Giovanni Antonio Magini	Peter Keschedt		64 cp	A, no. 43; N, no. 44; S, no. 44
1616	Venice	Latin	Giovanni Antonio Magini	Heirs of Simon Galignani de Karera		64 cp	A, no. 44; N, no. 44
1617	Arnhem	Latin	Gaspar Ens	Johannes Janssonius		64 cp	A, no. 45; N, no. 45; S, no. 45
1618	Leiden	Latin/ Greek	Petrus Bertius Reedition of Mercator's edition in vol. 1 of the <i>Theatrum geographiae veteris</i>	Issac Elsevier for Jodocus Hondius Jr.			A, no. 46; N, no. 46; S, no. 46
1621	Padua	Italian	Translation by Leonardo Cernoti from Giovanni Antonio Magini's Latin text	Paolo Galignani and Francesco Galignani		64 cp	A, no. 47; N, no. 47; S, no. 47; L, pp. 235–37
1624	Frankfurt		Gerardus Mercator			28 cp	S, no. 48

<sup>a</sup>cp = copperplate; wc = woodcut.

<sup>b</sup>A = Charles E. Armstrong, "Copies of Ptolemy's Geography in American Libraries," *Bulletin of the New York Public Library* 66 (1962): 65–114; N = A. E. Nordenskiöld, *Facsimile-Atlas to the Early History of Cartography*, trans. Johan Adolf Ekelöf and Clements R. Markham (1889; reprinted New York: Kraus, 1961, Dover, 1973); S = Carlos Sanz, *La Geographia de Ptolomeo* (Madrid: Libreria General Victoriano Suarez, 1959); L = Uta Lindgren, "Die *Geographie* des Claudius Ptolemaeus in München," *Archives Internationales d'Histoire des Sciences* 35 (1985): 148–239. See also Angela Codazzi, *Le edizioni quattrocentesche e cinquecentesche della "Geografia" di Tolomeo* (Milan: La Goliardica Edizioni Universitarie, 1950), and Henry Newton Stevens, *Ptolemy's Geography: A Brief Account of All the Printed Editions Down to 1730*, 2d ed. (1908; reprinted Amsterdam: Theatrum Orbis Terrarum, 1973).

<sup>c</sup>Some copies show Frankfurt, some Amsterdam, some both.