

Definitions of cosmography and geography in the wake of fifteenth- and sixteenth-century translations and editions Ptolemy's *Geography*.

In Shalev, Z. & Burnett, C. (eds.), *Ptolemy's Geography in the Renaissance*, Warburg Institute, 2011, pp. 51-69.

Dario Tessicini, Durham University

The aim of this paper is to examine the ways in which the terminological and disciplinary distinction between cosmography and geography was understood by Renaissance and early modern editors, translators, and commentators of Ptolemy's *Geography*. Throughout the period under examination (roughly, 1400 – 1600), cosmography was often connected to practical enterprises such as navigation, or cartographical surveys, as well as being variously intertwined with, or linked to traditional disciplines such as geography and astronomy¹. Yet, it was not intended as a united body of knowledge: its content varied from navigation to mining surveys, mathematics, astronomy, geography, even including practical travel guides, such as a 1637 survey of the inns and lodgings of London.² Notable items comprise the historical and geographical account by Enea Silvio Piccolomini, the biblical interpretations of Guillaume Postel, the geographical descriptions of Thomas Munster, the mathematical and geometrical problems of Francesco Maurolico, and, last but not least, the astronomical speculations of Johannes Kepler's *Mysterium cosmographicum*.³ In fact, Kepler was involved in a curious incident regarding the status and boundaries of cosmography when his work was included in the book dealers' catalogues alongside Sebastian Münster's geography. In the second edition (1621) of the *Mysterium*, Kepler complained: 'Thus the word cosmography is commonly used to mean geography; and that title, though it is drawn from the universe, has induced bookshops and those who compose book catalogues, to include my little book under geography. Nevertheless I have taken the mystery as a secret, and marketed this discovery as such'.⁴ This example suggests that at least up until 1600 different notions of cosmography coexisted, interacted and eventually collided.

This investigation will focus on the theoretical debate over the definition of 'cosmographia' as it emerged in relation to Ptolemy's *Geography*. In turn, it will examine how the *Geography* is linked to the cosmographical debate, firstly because Ptolemy's book circulated under the title of *Cosmographia* for the greatest part of the fifteenth century, and secondly because definitions of the aim and method of cosmography were often, though not exclusively, discussed within editions of the *Geography*. Commentaries,

prefaces, dedicatory letters and the editing of the Latin translations thus shaped the debate over cosmography and influenced its reception.

1. Cosmography as geography in Jacopo Angeli's translation

The rediscovery of Ptolemy's *Geography* in the Latin West began at the end of the fourteenth century in connection with the arrival in Italy of the Greek scholar and diplomat Emanuel Chrysoloras. He brought with him a Greek manuscript of the *Geography* (the MS Urbinate greco 82 in the Vatican Library) and once in Florence he started to translate it, though he did not finish his task.⁵ Eventually, between 1406 and 1410 the translation was completed in Rome with the title of *Cosmographia* by his former student Jacopo Angeli. Yet, Chrysoloras's merits far exceed the introduction of the *Geography*'s manuscript in the West. In Florence, his teaching were highly influential, as his students produced a number of translations of Greek works. In principle, these were meant as an integral part of the learning process, and were aimed at improving the student's literary skills. As for the method, Chrysoloras introduced the translation 'ad sententiam', refusing the medieval 'conversio ad verbum' or 'verbum de verbo', that is, the technique of translating the text 'word by word', so as to preserve not only the content, but also the stylistic features of the Greek original. According to Chrysoloras, the 'intention' of the author would have been better and more faithfully represented if also the 'form' of their language was translated into Latin. Translators had to preserve the style and the 'copia dicendi' of the Latin. Whenever it was not possible to 'servare sententia', the translator intervened with corrections aimed to avoid absurdities and inconsistencies.⁶ Yet, the theoretical principle of translating 'ad sententiam' was applied by the humanist translators according to the practices adopted by each translator. The context and the final purpose of the translation had a great part in shaping the method: when translating was part of the teaching, the translation 'ad verbum' would fit in better with the purpose, though the result would not be according to the highest literary style. On the other hand, a translation commissioned by or dedicated to an influential personality, and meant to be public, required a style according to the highest linguistic standards. In this case, the final result was probably more important than a close adherence to the Greek text.⁷

As far as the first translation of Ptolemy's *Geography* is concerned, Jacopo Angeli too learned Greek from Chrysoloras, adopting his methods and theoretical principles.⁸

Stylistically, though, his translation of Ptolemy seems to adhere quite closely to the Greek text and it seems that, at times, some passages have challenged the ability of the translator. For the purpose of this investigation, we will focus on the rendering of the Greek word 'gewgrafiva' with 'cosmographia' rather than more general literary aspects of Jacopo's translation. The most obvious choice in this respect would have been to use the corresponding Latin transcription 'geographia'. In fact, Jacopo's dedicatory letter hints that this solution was adopted by Chrysoloras in his partial translation⁹. Although later editors of the printed editions of the *Geography* would restore the original title, it is not immediately clear why Jacopo adopted the word 'cosmographia' in the first place. Reading his dedicatory letter to Pope Nicholas V, this choice seems to be supported by two converging arguments. The first one is based on the use of the term 'cosmographia' and on the literary tradition of works dealing with (approximately) the same subjects as Ptolemy's *Geography*. The second argument refers to the methods used by Ptolemy to pursue his goals. Together, the two arguments form the final passage of the dedicatory letter.

The first section of the passage, corresponding to Jacopo's first argument, centres on the assumption that Ptolemy's *Geography* deals with the same subject as the cosmographies of the Latin West, and since the term 'cosmographia' is used in both Greek and Latin, it is an appropriate one for the title of Ptolemy's work. Incidentally, Jacopo remarks that Chrysoloras would have agreed with him if he had finished his translation - a consideration that, together with the information that Chrysoloras's translation was 'ad verbum' rather than 'ad sententiam', alludes to its provisional character, hence Jacopo's confidence in second-guessing the work of his master. In his words:

But we translate it as 'cosmography', for this word, though it belongs to the Greek language, is so common among Latin authors that it could be ours. And we believe that he [i.e., Emanuel Chrysoloras], had he amended what he had translated, would certainly have changed it to 'Cosmography'. For, if Pliny and the other Latin authors who have described the situation of the Earth, call their works 'Cosmography', and the authors are called cosmographers, I do not see why Ptolemy's work, which deals with the same subject, should not be described among us by the same term.¹⁰

At the origin of Jacopo's argument is the use of the word 'cosmographia', interpreted as a transcription of the Greek. 'Cosmographi' are called its practitioners. This terminology is supported by Pliny and other authors, whose example illustrates how Ptolemy's *Geography* can be inserted in the existing intellectual tradition of descriptions of the world. Since these are called 'cosmographies', Ptolemy's title too can be translated with 'Cosmographia'. The argument does not introduce theoretical considerations on the nature of cosmography as a discipline. Instead, it draws on the authoritative value of tradition. Pliny's name was certainly a well-known reference: four books of the *Naturalis historia* (III – VI) are especially dedicated to geographical descriptions, while at least another one (bk. II) dealt with topics closely connected to cosmography. But although the *Naturalis historia* provided an extensive knowledge on both astronomy and geography, and Pliny was widely regarded as an authority on these matters, the terms 'cosmographia' and 'cosmographi' never occurred in the entire *Naturalis historia*.

For the terminology, Jacopo could refer to other works circulating in the fourteenth century and known under the title of 'Cosmography', such as Pomponius Mela's *Cosmographia, sive de situ orbis*. In addition, definitions of cosmography could be gathered through a range of medieval literary works, encyclopedias and theological treatises. For instance, Isidorus of Seville's *Etymologiae* referred to the legend that Moses wrote the Pentateuch as a 'cosmographia divinae historiae', including both the creation of the world and the history of the people of Israel.¹¹ Other sources would have offered a different glimpse. Eustathius of Antiochias (IV century a. C.) provided an example of translating 'gewgrafia' with 'cosmographia': in his version of Basilus of Caesarea's *Hexaemeron*, there are two passages where 'cosmographia' stands both for 'gewgrafia' and 'οἱ ταῖς περι τοῦ κόσμου γραφάντες' ('those writing about the universe'). In a third passage, Eustathius, while reporting a variant of the passage he was commenting on, mentioned 'mult[i] cosmographiae codic[es]'.¹² In all, these passages seemed to consider cosmography both as a description of geographical features, such as the nature of the Caspian sea, and as a physical and philosophical consideration on the shape of the universe. Another, relevant source is the sixth-century *Institutiones* by Cassiodorus, which established a direct connection between the medieval concept of 'cosmographia' (not clearly distinguished from 'geographia') and Ptolemy's *Geography*. In a chapter dedicated to cosmographers monks should know of ('Cosmographos legendos a monachis'), Cassiodorus provided a list of authorities that included Julius Honorius's

Cosmographia (V century a. C.), the sixth-century Marcellinus Comes's descriptions of Hierusalem and Constantinople, and the *Descriptio orbis* by Dyonisius Periegetes (I century b. C.). This canon is meant to provide the monks with a general knowledge of the places mentioned in Scripture. Yet, Cassiodorus continues, should they desire to know more, they could read a 'codex by Ptolemy' ('Ptolomei codicem') that describes all places and regions – i.e, the *Geography*.¹³ Finally, the above mentioned sources are examples of the kind of works that Iacopo had in mind when he referred to the terminological tradition of the Latin authors, on which he bases his choice of the term 'cosmographia' instead of 'geographia'

The second argument seems to be equally relevant. In the dedicatory letter, Jacopo argues that cosmographical knowledge depends 'ex caelestibus' that is on astronomical science and, more precisely, on the determination of terrestrial positions expressed in terms of longitude and latitude. Therefore, 'cosmographia' does not only mean the study of the terrestrial region, but of both the celestial and the terrestrial one.

For in Greek, 'cosmos' means the same as Latin 'mundus', which definitely means the earth and the heavens, which in this work are presented as the basis of the whole business, as it were. And so it is clear that what the Greeks call 'geography' is, following the example of our [= Latin] authors, more correctly called 'cosmography' in all the works of the cosmographers, and especially in this work.¹⁴

Furthermore, Jacopo does not only refer to the contents of the description, that is the different parts of the sky and of the Earth, but also to the method of determining the position of places both in the celestial and the terrestrial regions. This claim can be directly referred to a specific passage in Book I of Ptolemy's *Geography*, dealing with the theoretical fundamentals of geography. Ptolemy argues that mathematical knowledge

[...] takes absolute precedence. Thus the first thing that one has to investigate is the earth's shape, size, and position with respect to its surroundings [i.e., the heavens], so that it will be possible to speak of its known part, how large it is and what it is like, and moreover under which parallels of the celestial sphere each of these localities [...] lies.¹⁵

In practical terms, Ptolemy's *Geography* is based on the assumption that the grid of longitudes and latitudes used to provide the position of the stars on the celestial sphere

could serve a similar purpose when applied to the terrestrial globe, the result being that the Earth could be mapped using same methods and techniques as those used for the heavens. The correspondence between the two spheres is illustrated by Peter Apian in Fig. 1, where the circles of the celestial sphere correlate with those on the Earth.

In turn, the terrestrial globe can be represented as a whole, or, alternatively, in its single parts. This leads to two different representations of geographical space. On the one hand, chorography would deal with the description of cities, mountains, rivers and alike; on the other hand, geography would represent *'unam continuam habitabilem terram'*, that is the Earth *'as a single and continuous entity, its nature and how it is situated, [taking account] only of the things that are associated with it in its broader, general outlines'*.¹⁶ Yet, how did the two representations relate to each other? As Ptolemy pointed out, chorography and geography do not differ regarding the size of their representation, but rather as quality is different from quantity. Chorography thus *'attends everywhere to likeness'*, so that its representation has a physical resemblance to the places portrayed, and it thereof requires skills in *'landscape drawing'*. Geography, in turn, *'gives consideration to the proportionality of distances for all things'* (*'de proportione distantiarum'*, in Iacopo's translation), which requires a mathematical method capable of representing absolute positions.

This distinction is a crucial passage not only for the understanding of the representations of geographical space, but also in view of a more general understanding of the connections between terrestrial and celestial descriptions. In the same chapter, Ptolemy added further considerations, which, again, led to a considerable amount of comments in the sixteenth century, and whose implications are an open question. Ptolemy claimed that, while the goal of chorography is to consider each part of a whole singularly, as if one painted an ear or an eye, the goal of geography, on the other hand, is to look at the whole, as if one portrayed the entire head.¹⁷ What Ptolemy envisaged was not merely a division of a whole into different parts, so as to include more details in its representation. If this was the case, the distinction between chorography and geography would be purely arbitrary and based on the scale of the representation and not on its content. Instead, the difference between geography and chorography is based on the methods and techniques used for the representation of the space. On the one hand, a chorographical representation is drawn regardless of relative positions of places, and it has more to do with the art of painting than it does with mathematics.¹⁸ On the other hand, Ptolemy stressed that the

geographical representation has to be a proportionate one, where the different parts are placed according to a mathematical ratio and the different localities, such as cities, are indicated with conventional signs. Thus, drawing a general map of the world is mainly a matter of proportion, with a view to accounting for the ratio of the relative distances between places.

Finally, Jacopo's use of the term 'cosmographia' is closely connected to Ptolemy's considerations on the difference between chorographical and geographical descriptions. In the *Geography*, the method of determining terrestrial positions was directly derived from a more general knowledge of the terrestrial and celestial world, which was provided by the use of mathematics. Within this context, and at the very end of his dedicatory letter, Jacopo argues against the objection that Ptolemy's *Geography* differs considerably from the Latin cosmographies, since it is based 'ex caelestibus', as opposed to narrative descriptions of places and regions – as it was, for instance, in Cassiodorus's canon of authorities. Jacopo counteracts by avoiding altogether the complex theoretical and historical relations between the two conceptions of geography and cosmography. Instead, he points out the linguistic equivalence between the Greek 'cosmos' and the Latin 'mundus': 'Cosmos enim graece mundus latine' – a definition that can be traced back once again to medieval textbooks and encyclopedias.¹⁹ He also stresses that both terms encompass Earth and heaven ('terr[a] caelumque'), so that the Greek use of 'geographia' corresponds to the activity of the Latin cosmographers. Ultimately, this simplification of the issue and the choice of the term 'cosmographia' reverberate on the history of the reception of Ptolemy's *Geography* in the Latin West, as well as, more generally, on the debate over the boundaries between geography, cosmography, and cognate disciplines, such as chorography and, to some extent, astronomy.

2. Early printed editions and translations

Jacopo's translation of Ptolemy was the one by which several generations of readers were first acquainted with Ptolemy, and it constituted a landmark for fifteenth- and sixteenth-century editors and translators. The circulation of Ptolemy's *Geography* largely benefited from the printing press. Jacopo's translation proved to be quite successful and several of the first printed editions were based on it. Those printed in Vicenza (1475), Bologna (1477), Rome (1478) and Ulm (1482 and 1486) all preserved the title of

Cosmographia and the text by Jacopo. The only exception, until 1490, was the Italian poetic version by Francesco Berlinghieri (Florence, 1482). Until 1525, that is when a new complete translation was published by Willibald Pirckheimer in Strassburg, at least 10 of the 14 editions had Iacopo's translation, although most of them included a number of corrections, most notably by 'restoring' the original Greek term 'geographia' in place of 'cosmographia'. This further change of title from 'Cosmographia' back to 'Geographia' finds a first instance in the colophon of the Rome 1478 edition ("Claudii Ptolemaei Alexandrini Philosophi Geographiam"²⁰), but the first edition to have the correction in the title was the one printed in Rome in 1490 by Pietro della Torre. All other editions of the text followed this one. It must be noted, however, that despite the change in the title and other improvements that were promptly advertised by the editors, most early editions still relied on Jacopo's translation. Moreover, none of them explained why the title of the work had been changed from 'Cosmographia' to 'Geographia', nor is there any reference to Jacopus' dedicatory letter or to his considerations on cosmography and geography in the Latin and the Greek world. It appears that the cosmography/geography terminological alternative was simply not an issue for early Italian editors – at least not one that deserved to be explained to the readers and/or discussed publicly. Only in one case, the Rome edition of 1507 and its 1508 reprint, some thought was apparently given to the issue. In fact, while the title-page and the dedicatory letter have 'Geographia', the *privilegio* granted by Julius II the year before the publication and published in full at the end of the book refers to the work as 'Cosmographia Ptholemaei'.²¹ This might lead to the consideration that the decision to publish Ptolemy's work with the title of 'Geographia' came at a later stage of the book production, and that at first the editors were inclined to adopt the title of the first printed editions. Yet, no further explanation was provided. Similarly, other editions of Ptolemy's *Geography* claiming to improve on Jacopo's translation did not deliver what they promised. Even the 'new translation' by Mathias Ringmann published in Strasburg in 1513 is largely based on Jacopo's text, although the editors claimed their corrections were made on the basis of Greek manuscripts.²²

One major contribution to the editorial history of the *Geography*, and therefore to the diffusion and understanding of the text, came from the humanists, mathematicians, and publishers working in the city of Nuremberg between the end of the fifteenth and the first half of the sixteenth century. The new translation of Ptolemy's *Geography* published by Pirckheimer in 1525 was only a later result of an interest that had started with Johannes

Regiomontanus in the 1460s. Regiomontanus (1436 – 1476) had been a student in Vienna and later a colleague of the eminent astronomer Georg von Peurbach. In 1460, they both met Cardinal Bessarion, the papal legate to the Holy Roman Empire, a scholar and a Greek native-speaker. After the death of Peurbach, Regiomontanus followed Bessarion to Italy and he was quickly able to read and translate from the Greek. From the 1460s onwards, Regiomontanus's activity focused on reintroducing Greek sciences into the Latin world via a programme of new editions, translations and interpretative works. By the end of 1471, after having widely travelled in Italy and a four-year stay in Hungary, Regiomontanus was able to set up a printing press in Nuremberg.²³

A tradelist of Regiomontanus's printing press represents an insight into what a fifteenth-century humanist and a mathematician considered the monuments of Greek science. The single-sheet was published under the title 'Haec opera fient in oppido Nuremberga Germaniae ductum Ioannis de Monteregio' and comprised works already published (the *Theoricae novae* by Peurbach and Manilius's *Astronomica*), forthcoming titles ('iam prope absoluta') or simply plans for future publications. In turn, these comprise works by Aristotle ('Problemata mechanica'), Euclides and other Greek mathematicians, and several of Ptolemy's works, the most notable being the *Almagest*, which was finally published in Venice in 1496, twenty years after Regiomontanus's death. Amongst them, Regiomontanus also recorded a 'Cosmographia Ptolemaei nova traductione' to replace the one by Jacopo Angeli, which he considered wrong and misleading, due to its translator's poor knowledge of Greek and mathematics. Instead, he planned to involve in the enterprise two recognised authorities in both disciplines: the Greek scholar Theodore of Gaza and the mathematician Paolo Dal Pozzo Toscanelli.²⁴

Regiomontanus never published his version of Ptolemy's *Geography*, but he wrote a series of annotations on Jacopo Angeli's translation that influenced later editions and translations, especially that by Pirckheimer (1525). In these, Regiomontanus produced a detailed examination of Jacopo's translation in view of Ptolemy's text. Every Greek passage is compared with its Latin translation and it is followed by Regiomontanus's annotations and explanations. The main focus is on linguistic issues, to trace back Jacopo's misunderstanding, omissions and personal interpretations, and to compare all this material with Ptolemy's original intention. For instance, on the opening lines of Bk. I, Ch. I, Regiomontanus noted that Jacopo did not translate the adjective 'prwvtn' in the expression 'tw'n prwvtn potamw'n' ('of the main rivers'), and had thus failed to

acknowledge that Ptolemy distinguishes between the main and principal rivers ('maiores, nobilioresque [fluvii]') and their tributaries.²⁵ Regiomontanus questioned the choice of technical expressions, such as 'totius orbis' for 'ojvlhç th'ç gh'ç', where, instead, Ptolemy meant 'tota terra', as compared to the celestial region. In a cosmographical context, the first expression is equivocal since it can be intended both as the terrestrial sphere only, and as the entire cosmos. The intention of the author, though, was to consider solely the terrestrial region.²⁶ In addition, Regiomontanus corrected misspelling of places and inaccuracies in geographical descriptions, such as when Jacopo translated 'mevgaç' for 'mevlaç', which resulted in a 'fluvius magnus' in Armenia, instead of a 'niger fluvius', from which the region of 'Melicena' took its name.²⁷

In the course of the analysis of Jacopo's translation, Regiomontanus also dealt with theoretical definitions in Bk. I, Ch. I., and particularly with Ptolemy's distinction between geography and chorography. The question addressed by Regiomontanus concerned the difference between the representation of the parts and of the whole. Although Regiomontanus did not deal in particular with the issue of the term 'cosmographia' in place of 'geographia', his remarks clearly affect the way the representation of the terrestrial and celestial space is conceived. Once again, the argument follows linguistic issues of Jacopo's translation. Jacopo stressed the difference between chorography and cosmography through a careful use of the language: the first one, describes the parts 'sigillatim', 'one by one', and its method is to 'paint' ('pingere') as a painter would paint the single parts of the head. On the contrary, cosmography described the whole according to proportions, using symbols to designate the places ('designaret' in the text)²⁸. The first one aims at the physical resemblance with its object, as a portrait would represent its model; the second one uses geometry and symbolisms (dots instead of cities, lines instead of rivers). As for this crucial distinction, Regiomontanus argued that the expression 'katav d'ajnavlogon' simply means 'similiter', and not 'proportionaliter'. In this way, Regiomontanus deprived the adverb of the theoretical implications it is imbued with in Jacopo's translation.²⁹ The next step of this argument is that chorography cannot be associated with the art of painting, since – as he stresses in several passages – where Jacopo used the words 'pictura' (or 'pingere') Ptolemy simply meant 'similitudo', referring in general to the ability of representing a likeness.³⁰ Yet, geography and chorography are still distinguished by the fact that the first is clearly based on mathematics, while this is not needed by chorography.³¹

A partial translation of the *Geography*, comprising Bk. I only, appeared in Nuremberg in 1514. Its translator was the humanist, mathematician and astronomer Johannes Werner (1468 – 1522), also known for his *De motu octavae sphaerae*, to which Nicolaus Copernicus responded with his *Letter against Werner*, as well as for his work on the cordiform projection.³² This new translation was published along with Werner's annotations on the *Geography* and other appendices, most notably a letter by Regiomontanus to Cardinal Bessarion on an instrument of observation. The publication was inspired by the mathematician and imperial historiographer Johannes Stabius, who, in turn, is praised by Werner in the dedicatory letter. Werner's *Nova translatio* is a collection of different works. Besides Ptolemy's translation, Werner published his commentary, which had the purpose of clarifying several points of Ptolemy's text.³³ The reason why Werner only translated Ptolemy's first book and did not add a single map is that his interests mostly lay in the theory and methods of cartographical representation, rather than geographical descriptions. Yet, Werner's considerations on Ptolemy's text are of some interest to our investigation in so far as they question Jacopo Angeli's method of translation and his approach to geography. Werner's argument is that Jacopo failed to provide an understandable and accurate translation of the author's intention and 'sententia'. This was due to a lack of sound scientific knowledge and to Jacopo's poor skills in Greek and Latin, thus introducing both linguistic and theoretical mistakes. An example is in the very first tense of the *Geography*, which Jacopo had translated as 'Geographia est designatrix imitatio', while Werner argued that the passage should have been translated as 'Geographia imitatio est picturae'. In the first instance, Werner points out that at the basis of Jacopo's faulty translation is the very method of translation 'ad sententiam' proposed by Chrysoloras. Instead, books on mathematics needed to be translated according to the medieval method of the translation 'ad verbum', that could provide a better and more careful explanation of the 'intention' of Greek authors. In turn, the new translation of the passage explained the nature of geography and corresponded to the real intention of Ptolemy, according to which geography is not a 'perfecta pictura', that is an art making use of colours and realism so as to represent its subject to likeness, but something inferior ('eam [geographiam] picturae inferiorem esse'), since it is only concerned with shapes, borders ('lineamenta') and their relation to each other. In this respect, the term 'designatrix' can be intended as 'outline'. Correspondingly, chorography represented a 'complete picture' ('consumata pictura') according to likeness.

This same point was later stressed further by Michael Servetus in his edition of the *Geography* (Lyon 1535), where a marginalia asserts that ‘imitation is not a perfect image, as in chorography, but locations are indicated by thin lines and small dots [...] that is, chorography does not retain the proportion of the quantity of the whole with [its] parts’.³⁴ Finally, Werner aimed at producing a new translation of the *Geography* according to what he believed was the only method of accounting for the peculiarities of mathematical texts. In his commentary, Werner further stressed the distinction between literary and scientific texts and the need to adjust methods of translation to the specific needs of their subject. Translators of mathematical texts should care, above all, for the ‘intelligentia authoris’, which is best achieved by translating word by word. In addition, Werner added a commentary to the first book to clarify those passages of the *Geography* that he still considered obscure.³⁵

A complete new translation of the *Geography*, based on the Greek manuscript, appeared in Strasbourg in 1525. Its editor and translator was the German humanist Willibald Pirckheimer, and his translation soon substituted Jacopo’s as the preferred choice of publishers and editors. Pirckheimer’s text was later used for at least another nine editions: the Lyon 1535 and Vienne 1541 editions by Michael Servetus, the five Basle editions (1540, 1541, 1542, 1545, 1552) by Sebastian Münster, and the two Venice editions by Giacomo Gastaldi. Pirckheimer’s translation was based on Greek manuscripts and it certainly improved on Jacopo’s version in many ways, not least in the elegance of his Latin. In the prefatory letter, Pirckheimer questioned Jacopo Angeli’s knowledge of both the Greek language and mathematics, and criticised Johannes Werner for failing to provide a clear Latin translation.³⁶ Yet, these considerations were based on Regiomontanus’s annotations and suggestions, which were included in Pirckheimer’s edition of Ptolemy.³⁷

Considerations over the status of cosmography, geography and chorography can also be found in Peter Apian’s *Cosmographicus liber*. First published in 1524, it was one of the most successful cosmographical works of the sixteenth century. It was conceived as a brief textbook on the subject, comprising general information on spherical geometry, astronomy and geography.³⁸ Its first chapter is dedicated to ‘what is cosmography and how it is different from geography and chorography’. To Apian, cosmography was the description of the four terrestrial elements and their disposition, along with the Sun, the Moon and the celestial bodies. The *Cosmographicus liber* also dealt with the circles that

can be drawn on the sphere and with the position of places according to the symmetry and the measure of distances. Cosmography differed from geography since it dealt with the Earth only in so far as the celestial circles could be drawn on its surface. Instead, geography was concerned with natural features such as mountains, seas, and rivers.³⁹ Moreover, Apian offered visual examples of his definition of cosmography and of his interpretation of Ptolemy's metaphor. In Fig. 1, where he represents the 'typus cosmographiae', the circles of the celestial sphere are projected on the surface of the Earth in order to define a grid from which it becomes possible to find geographical localities and distances. But it is also to be stressed, as shown by the globe on the right-hand side, that cosmography also deals with some features that can be considered part of a geographical investigation, such as climates, length of day and night, and seasons.

The illustrations (Fig. 2 and 3) following the 'typus cosmographiae', show Apian's interpretation of the roles of geography and chorography. In this case, he followed a more traditional approach, defining geography and chorography in similar terms to the ones used in Ptolemy's translation. In the *Introductio geographica*, published in 1533, however, Apian included Johann Werner's translation of Book I, published in 1514.⁴⁰ According to Apian, who depended largely on Werner, geography and chorography differed since geography aimed at a general description according to symmetry ('symmetriae ratio'), and because it dealt with quantities and symmetries. Chorography, in turn, described single parts with no comparison to one another, and its subject are qualities and likeness ('similitudo'). Moreover, chorography depended on the 'ars pingendi', which is described as a 'mechanical art' corresponding to landscape drawing, as is implied in Apian's illustration. Geography, instead, required a 'scientia mathematica', thus constituting a very different field of investigation, which found its best expression in Ptolemy's catalogue of longitude and latitude of places. Finally, Apian suggests that cosmography is a discipline whose content is different and independent from both geography and astronomy, since it mostly deals with the theoretical aspects involved in the determination of celestial and terrestrial positions as projected on a sphere or on a plane.

3. Later Italian editions and translations

In terms of editions and reception of the *Geography*, Italy was the country claiming the lion's share. More than two thirds of the overall number of editions was printed in Italy, and by the end of the sixteenth century, the *Geography* had been translated into Italian three times. First, there was the poetic translation by Francesco Berlinghieri in 1482. Then, in 1548 the vernacular translation by Pier Andrea Mattioli, followed by Girolamo Ruscelli's work in 1561. This last edition, published by the Venetian printing press of Vincenzo Valgrisi, also comprised 64 maps, a nautical chart and its instructions, a mathematical *discorso*, and an index of ancient and modern geographical names. It was published a further four times before the end of the sixteenth century, and Valgrisi also published a Latin translation in 1562, that was intended for the wider European market.⁴¹ Its maps are almost all enlargements of the 1548 Gastaldi maps. According to Ruscelli, Valgrisi also commissioned four new maps in Rome and he had the old ones corrected. These new ones were a Ptolemaic world map, a map of Tuscany, one of Brazil from Ramusio's *Navigazioni e viaggi*, and a so-called *Septentrionalium partium*, showing Scandinavia and Greenland (incidentally, this is the map used to forge *I commentarii* of Nicolò e Antonio Zeno, published by Nicolò Zeno the Younger in 1558). Besides Valgrisi and Ruscelli, the other professional involved in the production of the book was Giuseppe Moletto (or Moletti). Born in Messina in 1531, Moletto was Galileo Galilei's predecessor in the chair of mathematics at Padua, that he occupied in the period 1577-1588, and he lectured on optics, mechanics, astronomy, geography and cosmography.⁴² Moletto was hired by Ruscelli and Valgrisi in order to write a *Discorso* on the terminology and techniques of geography, and a general introduction to the doctrine of the sphere. He also explained how to read the geographical maps, and intervened in the text, correcting latitudes and longitudes.

As for Ruscelli's role, he provided the translation that, he claimed, was made from Greek, most likely using Erasmus's edition published in Basel in 1533 and reprinted in Paris in 1546. He could also benefit from Pirckheimer's Latin translation. In the prefatory letter, Ruscelli expressed his dissatisfaction with previous editions, because of the corruption of Greek manuscripts and the mistakes made by recent translators and commentators. In the annotations, Ruscelli commented extensively on different linguistic aspects and on the theoretical consequences of Ptolemy's definitions. The result was an explicative commentary on the *Geography* and on methods of representing the geographical space.⁴³ Ruscelli offered an original reading of the relationship between geography and

chorography. Unsatisfied with the kind of representation provided by chorography and geography, he argued that while geography would represent only a general outline of the world, with the principal parts denoted by conventional signs, chorography, on the other hand, would represent the single parts well, but not their proportionate arrangement.⁴⁴

What Ruscelli envisaged in his commentary was a relationship between geography and chorography based on the scale of their representation. This is the opposite of what most earlier commentators since Jacopo Angeli had implied. Ruscelli's concern was how to reduce to scale without losing details, that is the connection between the regional maps and a general overview of the Earth's surface. The metaphor of the world as a living body (in the first book of the *Geography*) is not stressed on the ground of opposition between drawing and mathematics, but instead on the possibility of closing the gap between geography and chorography, in so far as they represented the same space on different scales. From this point of view, the role of cosmography can only be marginal: at first, Ruscelli seems to rely on Apian's definition of cosmography, but he also accounts for another definition, corresponding to Strabo's geography, that, in turn, described the 'qualities' of different countries and populations, without dealing with the distances between localities.⁴⁵ From this angle, cosmography should correspond to what would later be defined as 'historical geography', a literary genre very popular in the sixteenth century, but at the same time quite different from the idea of cosmography as we have seen so far. It is also worth noting that even within this new definition, Ruscelli granted cosmography its role in showing the 'true symmetry' of the world represented by the different habits and populations.

4. Conclusions

Throughout the sixteenth century, different definitions and evaluations of the role of cosmography were circulating, stressing at times varying aspects. With the notable exception of Regiomontanus, one common feature is the role of the proportionate arrangement of the parts. In turn, what cosmography aimed to represent was the harmony, and the proportion that bound the world together. As far as Ptolemy's *Geography* is concerned, its first chapter on the difference between geography and chorography conveyed the idea that geographical and astronomical space could be represented according to the principle of proportion, that is the possibility of reproducing the ratio between relative distances, which in a well-ordered cosmos are fixed once and for all.

The principle had to be valid for celestial bodies as well as for terrestrial localities, thus establishing a strong connection between astronomical and geographical disciplines. Despite the fact that Regiomontanus questioned this interpretation of Ptolemy's *Geography*, basing his remarks on textual analysis, late Renaissance interpreters, such as Apian and Ruscelli, continued to promote cosmography as a discipline aimed at discovering the proportion and the harmony between the celestial and the terrestrial sphere.

This picture would radically change from the end of the seventeenth century, when geography began to be considered as the branch of knowledge dealing with the surface of the Earth. It then took the meaning **of [typo da correggere, manca of]** a description and a representation of the physical features of our surrounding space, including the disposition of seas, rivers, and continents, as well as human settlements, such as countries, cities, roads and harbours. On the other hand, the term cosmography is then related to a general description of the universe, and is thought to deal with the mapping of the skies, the classification of stars, planetary systems and celestial bodies. As such, cosmography has a more general meaning, encompassing both the study of the sky and of the Earth, that is the fields of astronomy and geography. Such broad definitions are very common in the scientific literature from the seventeenth century onwards, for instance, in Jean Blaeu, *Grand Atlas, ou Cosmographie* (1663), where cosmography, astronomy and geography are organized in a strict, hierarchical order, and astronomy and geography appear to be two separate branches of cosmography.⁴⁶ Similar definitions can be found in the related articles of the *Encyclopédie* (1751-1773) by Diderot and d'Alembert, where cosmography is defined as a description of the world, meaning the shape, disposition, and mutual relation between all parts of the universe. Accordingly, astronomy and geography divide the physical space into two distinct and independent regions, the celestial and the terrestrial. At the time, these definitions aim to find a systematic organisation of a wide range of notions and knowledge.⁴⁷ In turn, the emergence of modern cartography and of new ways of organising the geographical knowledge coincided with the loss of interest for Ptolemy's *Geography*.

¹ A general outline of Renaissance and early modern cosmography is provided by K. Vogel, *Cosmography*, in *The Cambridge History of Science*, III, *Early Modern Science*, ed. by K. Park – L. Daston, pp. 469-96, Cambridge University Press, Cambridge 2006. A more specific overview on the *fortuna* of Ptolemy's *Geography* is in J. A. May, 'The Geographical Interpretation of Ptolemy in the Renaissance', *Tijdschrift voor Economsche en Sociale Geografie*, 73 (1982), 6, pp. 350 – 361.

² See John Taylor, *The Carriers Cosmographie. or A Briefe Relation, of The Innes, Ordinaries, Hosteries, and other lodgings in, and neere London where the Carriers, Waggon, Foote posts and Higglers, doe usually come [...]* With nomination of what daies of the weeke they doe come to London, and on what daies they returne, London 1637.

³ See Pius II, [Enea Silvio Piccolomini], *Cosmographia [...]* in Asiae et in Europae, Venice 1477; Guillaume Postel, *Cosmographicae disciplinae compendium*, Basle 1561; Francesco Maurolico, *Cosmographia in tres dialogos distincta, in quibus de forma, situ, numeroque tam caelorum quam elementorum, aliisque rebus ad astronomica rudimenta spectantibus satis disseritur*, Venice 1543; Sebastian Münster, *Cosmographia universalis* Lib VI, Basle 1544; Johannes Kepler, *Prodromus dissertationum cosmographicarum, continens Mysterium cosmographicum, De admirabili proportionem orbium coelestium, demonstratum*, Tübingen 1596.

⁴ J. Kepler, *Mysterium Cosmographicum. The Secret of the Universe*, tr. (English) A. M. Duncan, New York 1981, p. 51. On Kepler's interpretation of the term 'cosmographia', see also, J. Kepler, *Le secret du monde*, ed. and tr. (French) A. Segonds, Paris 1984, p. 11, and p. 239, n. 7.

⁵ On Emanuel Chrysoloras and his teaching, see G. Cammelli, *I dotti bizantini e le origini dell'Umanesimo*. I. Manuele Crisolora, Firenze 1941 (chapters I–III); Manuele Crisolora e il ritorno del greco in Occidente. Atti del Convegno Internazionale (Napoli, 26–29 giugno 1997), ed. R. Maisano and A. Rollo, Napoli 2002; Nigel G. Wilson, *Da Bisanzio all'Italia. Gli studi greci nell'Umanesimo italiano*, edizione italiana rivista e aggiornata, Alessandria 2000, pp. 8-29. On Chrysoloras and the MS. Urbinate greco 82, see S. Gentile, *Manuele Crisolora e la 'Geografia' di Tolomeo*, in *Dotti bizantini e libri greci nell'Italia del XV secolo*. Atti del Convegno Internazionale. Trento 22 – 23 ottobre 1990, ed. M. Cortesi and E. V. Maltese, Napoli 1992, pp. 291-308.

⁶ On the techniques, practices and methods of translating in the Renaissance, see P. Botley, *Latin translation in the Renaissance: the theory and practice of Leonardo Bruni, Giannozzo Manetti and Desiderius Erasmus*, Cambridge 2004; R. Weiss, 'Traduzioni oratorie fedeli', *Medioevo e Rinascimento*, II, 1988, pp. 245-66; M. Cortesi, 'La tecnica del tradurre presso gli umanisti', in *The Classical Tradition in the Middle Ages and the Renaissance*, Proceedings of the first European Science Foundation Workshop on 'The Reception of Classical Texts (Florence, Certosa del Galluzzo, 26-27 giugno 1992), ed. C. Leonardi

and B. Munk Olsen, Spoleto 1995, pp. 143–168. Chrysoloras's theoretical principle is best summarised in Leonardo Bruni, *Epistolarium*, ed. L. Mehus, 2 vols, Florence 1741, I, p. 17: 'Primo igitur sententias omnes ita conservo ut ne vel minimum quidem ab illis discedam; deinde si verbum verbo sine ulla inconcinnitate aut absurditate reddi potest, libentissime omnium id ago; sin autem non potest, non equidem usque adeo timidus sum, ut putem me in crimen lesae maiestatis incidere, si servata sententia, paulisper a verbis recedo, ut declinem absurditatem. Hoc enim in ipse Plato praesens me facere iubet, qui cum elegantissimi oris apud Graecos sit, non vult certe apud Latinos ineptus videri'.

⁷ See R. Sabbadini, *La scuola e gli studi di Guarino Guarini Veronese (con 44 documenti)*, Catania 1896, p. 135. For a reassessment of this interpretation, considering single personalities, cf. M. Cortesi (as in n. 6), p. 148.

⁸ On Jacopo Angeli da Scarperia, see R. Weiss, *Jacopo Angeli da Scarperia*, in *Medioevo e Rinascimento. Studi in onore di Bruno Nardi*, 3 vols, Firenze 1955, II, p. 805–27. On geography and cartography in fifteenth-century Florence and Rome, see L. 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. L. Rombai, Firenze 1993, pp. 29–69; N. Swerdlow, 'The recovery of the exact sciences of Antiquity: mathematics, astronomy, geography', in *Rome Reborn. The Vatican Library and Renaissance Culture*, ed. A. Grafton, Washington 1993, pp. 125–167.

⁹ Jacopo also claimed that Chrysoloras translated 'ad verbum', at least in this case. See Claudius Ptolemaeus, *Cosmographiae [libri octo]*, Vicenza 1475, f. Aa2r: 'Geographiam, hoc est terrae descriptionem, auctor hic noster hoc omne opus graece nuncupat, quam appellationem vir saeculi nostri eruditissimus Manuel Constantinopolitanus suavissimus literarum graecarum nostri saeculi apud nos praeceptor, dum in latinum eloquium id transferre ad verbum licet pariter incipit non mutavit (my italics).' I am indebted to Peter MacArdle for his help with the translation and edition of this and following passages from Jacopo's dedicatory letter.

¹⁰ Ibid.: 'Sed nos in Cosmographiam id vertimus, quod vocabulum licet etiam graecum sit, tamen apud latinos ita usitatum est ut iam pro nostro habeatur, credamusque virum eum, si id quod transulit emendasset, omnino illud in Cosmographiam mutaturum fuisse. Nam si Plinius caeterique latini, qui terrae situm descripserunt, opus suum Cosmographiam appellant et auctores ipsi Cosmographi dicuntur, nescio cur Ptolemaei opus, quod idem tractat, eodem vocabulo apud nos appellari non debeat'.

¹¹ Isidorus Hispalensis, *Etymologiarum sive originum libri XX*, ed. W. M. Lindsay, 2 vols, Oxford 1911, II, VI, II, 5–7: 'Primum Moyses divinae historiae cosmographiam in quinque voluminibus edidit, quod Pentateichum nominatur'.

¹² Eustathius, *Ancienne version latine des neuf homélies sur l'Hexaéméron de Basile de Césarée*, ed. E. Amand de Mendieta and S. Y. Rudberg, Berlin 1958, IV, 4, 10, p. 51: 'Sed Hircanium Caspiumque lacum quidam in semetipsos circumscriptos esse pronuntiant. et sane, quoniam oportet nos historicorum

cosmographiam diligentius intueri, quid de his relatum sit audiamus'; IV, 5, 4, p. 52: '*Et factum sit. sufficit igitur adiectio ista declarans vocem conditoris effectui emancipatam, licet relatum sit in multis cosmographiae codicibus [...]; IX, 1, 7: 'Nam, licet hi qui de mundo plura scripserunt certa de terrae schematibus disputarint, modo eam sphaerae, modo cylindro, modo circulo similiter et aequalibus undique collectam partibus designantes, et in medio esse cavam (ad omnes enim huiusmodi opiniones scriptores cosmographiae prolapsi sunt, alter alterius dogmata rescindendo), ego tamen non adducor'. For the Greek text, I have used Basilio di Cesarea, *Sulla Genesi (Omeliæ sull'Esamerone)*, ed. and tr. (Italian) M. Naldini, Milano 1990. The *Hexhaemeron* is also published in *Patrologia graeca*, vol. 29, cols 4A–208C (Eustathius's translation is in *ibid.*, vol. 30, coll. 869–968). Some remarks on the reception of Eustathius's translations during the Humanism are in A. Perosa, 'Un codice della Badia Fiesolana con postille del Poliziano', *Rinascimento*, seconda serie, XXI, 1981, pp. 29–51.*

¹³ Cassiodorus, *Institutiones*, ed. R. A. B. Mynors, Oxford 1937, I, 25, p. 66: 'Cosmographiae quoque notitiam vobis percurrendam esse non immerito suademus, ut loca singula, quae in libris sanctis legitis, in qua parte mundi sint posita evidenter cognoscere debeatis [...] habetis Ptolomei codicem, qui sic omnia loca evidenter expressit, ut eum cunctarum regionum paene incolam fuisse iudicetis, eoque fiat uno loco positi, sicut monachos decet, animo percurratis quod aliquorum peregrinatio plurimo labore collegit'. For this reference and on Ptolemy's *Geography* in the Latin Middle Ages, see P. Gautier-Dalché, 'Le souvenir de la *Géographie* de Ptolémée dans le monde latin médiéval (VI-XIV siècles)', *Euphrosyne*, XXVII, 1999, pp. 79-106. A list of medieval treatises referring to Ptolemy's *Geography* can be found in *ibid.*, pp. 105-06.

¹⁴ Cf. the entire passage in C. Ptolemaeus, *Cosmographiae* (as in n. 9), f. Aa2v: 'Si vero velint Ptolemaeum ipsum, ut diximus longe a nostris differre Cosmographis, nam assertio[n]es huius operis quam maxime ex caelestibus sumit tum magis nobiscum sentiunt cum in Cosmographiae vocabulo plus quidem quam ipsa notetur terra, quae geographiae nome[n] tribuit. *Cosmos enim graece mundus latine, qui terram caelumque ipsum, quod per totum hoc opus tanquam rei fundamentum adducitur, plane significat. Quod ergo geographiam dicunt graeci in omnibus Cosmographorum operibus exemplo nostrorum hoc maxime in opere Cosmographiam visum est proprius dici.* Sed de his satis (Translated passage in italics)'.
Cosmos enim graece mundus latine, qui terram caelumque ipsum, quod per totum hoc opus tanquam rei fundamentum adducitur, plane significat. Quod ergo geographiam dicunt graeci in omnibus Cosmographorum operibus exemplo nostrorum hoc maxime in opere Cosmographiam visum est proprius dici.

¹⁵ *Ptolemy's Geography. An annotated translation of the theoretical chapters*, ed. and tr. J. L. Berggren and A. Jones, Princeton-Oxford 2000, p. 58.

¹⁶ *Ibid.*, p. 57.

¹⁷ Claudius Ptolemaeus, *Cosmographiae* (as in n. 9), f. Aa3r: 'Cosmographiae vero proprium est, unam continuam habitabilem terram nobis cognitam ostendere, quo modo natura situsque se habeat, circaque ea tantum intendit, quae per descriptiones orbis magis generales sibi iunguntur. [...] Finis chorographiae est partem totius sigillatim animadvertere, ut si quis aurem tantum: aut oculum pingat. Cosmographiae autem totum inspicere, ut si integrum quis caput designaret.'

¹⁸ In the fifteenth and sixteenth centuries, chorography was mostly intended as a depiction of a local area, typically a city, portrayed from a chosen point of view. See Th. Frangenberg, 'Chorographies of Florence. The use of city views and city plans in the sixteenth century', *Imago Mundi*, XLVI, 1994, pp. 41-64; L. Nuti, *Ritratti di città. Visione e memoria tra Medioevo e Rinascimento*, Padova 1996, pp. 23-29; L. Nuti, 'Misura e pittura nella cartografia dei secoli XVI-XVII', *Storia urbana*, LXII, 1993, pp. 5-34. See also M. Milanesi, 'Geography and cosmography in Italy from XV to XVII century', *Memorie della Società astronomica italiana*, LXV, 1994, pp. 443-68.

¹⁹ Among those I was able to consult, the closer to Jacopo's text is Lucius Ampelius, *Liber memorialis*, / *Aide-mémoire*, ed. and transl. (French) Marie-Pierre Arnaud-Lindet, Paris 1993, p. 1: '[De Mundo] Mundus est universitas rerum, in quo omnia sunt et extra quem nihil; qui Graece dicitur kovsmoō'. But for other comparisons, cf. Hugh of Saint Victor's *Didascalicon de studio legendi*, ed Charles Henry Buttimer, Washington 1939, II, XIII, 'De geometria', 757A: 'cosmos mundus interpretatur, et inde dicta est cosmimetria, id est mensura mundi'; and, for the inclusive denotation, Isidorus Hispalensis, *Etymologiarum* (as in n. 11), III, XXIX, 'De Mundo et eius nomine': '[1] Mundus est is qui constat ex caelo, [et] terra et mare cunctisque sideribus'.

²⁰ For a reproduction of the colophon, see C. Sanz, *La Geographia de Ptolomeo ampliada con los primeros mapas impresos de América, desde 1507: estudio bibliográfico y crítico, con el catálogo de las ediciones aparecidas desde 1475 a 1883, comentado e ilustrado*, Madrid 1959, p. 79 and p. 76, for the dedicatory letter.

²¹ Cfr. C. Ptolemaeus, *Geographia [...] a plurimis viris utriusque linguae doctissimis emendata, & cum archetypo graeco ab ipsis collata* [Rome 1507], dedicatory letter (unpaginated): 'tum in primis dignitatae tuae reverendissimae Ptolemaei nuper impressi Geographiam magno volumine dedicandam putavi'. And later on in the same letter, after introducing the collaborators to the work (among them Fabrizio da Varano, bishop of Camerino, as an expert in Greek and Latin, and the mathematicians Marco Benevanto, of the order of the Celestines, and Johannes Cotta of Verona): 'ut a quibus Geographia haec Claudii Ptolemaei cum Archetypo graeco collata'. By contrast, the *privilegium* by Julius II, published in full at the end of the book, states: 'Hinc est quam cum dilectus filius Evangelista Tosinus laycus Brixien. Diocesis in urbe hanc alma nostra, iam integrum decemniū assiduus bibliopola ad communem studiosorum omnium utilitatem, Cosmographiam Ptolemaei variis codicibus undecumque quaesitis [...] emendatam'; and 'inhibemus, ne praedictum Cosmographia Ptolemaei opus [...] imprimere, vendere, vel imprimi facere'.

²² See C. Ptolemaeus, *Geographiae opus novissima traductione e Greco archetypis castigatissime pressum*, Strasbourg 1513. This edition was reprinted in Strasbourg in 1520 with the title *Ptolemaeus auctus restitutus, emaculatus, cum tabulis veteribus ac novis*.

²³ On Johannes Regiomontanus and the establishment of his printing press, see E. Zinner, *Leben und Wirken des Johannes Müller von Königsberg genannt Regiomontanus*, München 1938, repr. Osnabrück

1968, pp. 163-85. According to a catalogue of books and manuscripts ('Reliquia e Bibliotheca Regiomontanae Collectae Anno Domini 1563'), quoted *ibid.*, pp. 250-58, Regiomontanus owned both a printed and a manuscript copy of Ptolemy's *Geography* (records 68 and 69).

²⁴ See J. Regiomontanus, *Opera collectanea*, Osnabrück 1949, repr. 1972, p. 513: 'Cosmographia Ptolemaei nova traductione. Nam vetula ista Iacobi Angeli florentini quae vulgo habetur viciosa est: interprete isto (bona venia dictum fuerit) neque linguae graecae satis neque mathematicae noticiam tenente. Qua in re summis arbitris fidem haberi fas erit: Theodoro Gazae clarissimo viro ac graecae latineque doctissimo, et Paulo Florentino graecarum quidem haud ignaro, in mathematicis autem plurimum excellenti.'

²⁵ J. Regiomontanus, *Fragmenta quaedam annotationum in errores quos Iacobo Angelus in translatione Ptolemaei commisit*, in C. Ptolemaeus, *Geographicae enarrationis libri octo ex Biblibaldi Pirckeymheri tra[ns]latione*, sed ad Graeca et prisca exemplaria a Michaelae Villanovano iam primum recogniti, Lyon 1535, f. Pir: 'adiectivique nominis prwvwtwn, non expressit, vitio exemplari graeci partim imputari potest, quamquam illud in primis perspicere debet interpret idoneus, ut exemplar habeat quam emendatissimum'.

²⁶ *Ibid.*, f. Piir: 'Nam si appellationem totius orbis, intelligi voluit totam terram, sicuti Ptolemaeus dixit oյvλhς th'ς gh'ς ostendat quaeso vir iste bonus, quomodo huiusmodi totius orbis situs ad eundem totum orbem coelestem denotavit, propria fateatur necesse est infantiam atque caecitatem, authore ipso tam clare et significanter diversis rebus diversa vocabula accommodante.'

²⁷ *Ibid.*, f. Qiiijr: 'Verum fluvius ille mevlaς hoc est niger fluvius appellatur, unde et Melicena pars Armeniae parvae dicta esse videri potest. Iacobus autem pro mevlaς legit mevgας. Deinde non apparet in traductione Iacobi duae postremae Civitates Cappadociae et praeturae Tyanidis.'

²⁸ C. Ptolomaeus, *Cosmographiae*, Vicenza 1475 (as in n. 9): 'Finis chorographiae est partem totius sigillatim animadvertere ut si quis aurem tantum aut oculum pingat. Cosmographiae vero totum inspicere iuxta proportionem ut si integrus quis caput designaret. Integris enim imaginibus cum oporteat potiora membra primum adhiberet. Deinde ea quae imagines picturasque suscipiunt ita equa dimensione inter sese locari, ut ex iusta distantia visu possint discerni, an totum vel pars sint illius quod pingitur.'

²⁹ See J. Regiomontanus, *Fragmenta* (as in n. 25), f. Piv: 'Pro genere mimoi'to speciem pingat absque ulla necessitate posuit, et katav d'ajnavlogon prioribus construxisse videtur, quum ad posteriora spectet. Non enim proportionem in toto observandam esse Ptolemaeus insinuat, sed totius considerationem proportionaliter aut similiter fieri, iis qui integrum describunt caput.'

³⁰ *Ibid.*, f. Piir: 'vocabulum pingendi, de suo apposuit interpret, quum author circumspexitissimus non picturam sed similitudinem significaverit, animadvertens chorographi munus, absque pictura etiam etiam absolvi, nisi qui velit pictores etiam appellare omnes eos artifices qui imagines in planicie qualibet efficiunt,

sive sint phrygiones acu et filo utentes, sive sint fabri lignarii multicoloribus ligniculis quicquid volunt imitantes.’

³¹ Ibid., f. Piir: ‘Deinde author infert chorographiam mathematica institutione non egere, geographiae autem illam esse praecipuam partem.’

³² For biographical information on Johannes Werner, see *Dictionary of Scientific Biography*, 18 vols, New York 1976, XIV, pp. 272-77. On Werner’s activity as astronomer and cartographer, see E. Rosen, *Three copernican treatises*, New York 1939, repr. 1959, pp. 7-9; L. Bagrow, *History of cartography*, revised and enlarged by R. A. Skelton, London 1964, pp. 127-30; G. Kisch, ‘The cosmographic heart: cordiform maps of the 16th century’, *Imago mundi*, XVIII, 1965, pp. 13-21.

³³ J. Werner, *Nova translatio primi libri geographiae Cl. Ptolemaei*, Nuremberg 1514, f. b.vir: ‘Huic deinde traductioni opereprecium ratus fui, subnectere paraphrasim, quae eiusdem traductionis illustraret obscuritates, in quibusdam enim locis tam alta existit sententia paucis admodum comprae-hensa verbis, quam nisi latior expositio abundiorque oratio explicaverit: lectoris animum et intelligentiam preteribit latebitque.’ Werner’s *Nova translatio* was reprinted in Peter Apian, *Introductio geographica*, Ingolstadt 1533.

³⁴ C. Ptolemaeus, *Geographicae enarrationis* (as in n. 25), f. A2r: ‘Imitatio non quidem perfecta est pictura, ut in Chorographia, sed per tenues lineas et exiles punctos, quibus loca significemus. [...] Id est, in Chorographia non servatur proportio quantitatis totius ad partes’.

³⁵ J. Werner, *Nova translatio* (as in n. 33), f. b.vir: ‘Hunc denique primum geographiae Cl. Ptole. librum e graeco in latino traducens: imprimis ita converti ut verbum reddere verbo, ne sententias tantum vertendo, ab auctoris intelligentia excidere mihi numquam contigisset. Animadverti nanque priscos artium inventores: praesertim graecos in commendando tradendoque recentia philosophia artiumque commenta, litterarum memoria, summa fuisse usus sermonis parsimonia, quam nisi interpret in mathematicis praecipue scientiis traducendis p[er] virili parte fuerit emulatus, graeci auctoris, intelligentia periclitabitur ac pene deperire videbitur’.

³⁶ C. Ptolemaeus, *Geographicae enarrationis libri octo*, Strasbourg 1525, f. Ir: ‘Etenim cum duo (quantum scio) exiterint, qui librum hunc vertere sunt ausi, Iacobus nempe Florentinus, et Ioannes Berenherus conterraneus noster, Italus tamen, licet graeca aliquantulum calluisse videri possit, disciplinas tamen mathematicas ita ignoravit, ut plerumque neque semetipsum intellexerit. Germanus vero, tametsi in Mathesi admodum excelluerit, in graecis tamen adeo aliquando hallucinatus est, ut rebus potius caliginem obfuderit, quam luminis aliquid attulerit’.

³⁷ For instance, Pirckheimer followed Regiomontanus in translating ‘a primaribus fluminibus divertigia’ (it was ‘fluviorum scissiones’ in Jacopo). He also corrected the ‘totius orbis’ in ‘totius terrae figura’, and acknowledged the ‘fluvius Melas appellatus’. See C. Ptolemaeus, *Geographicae enarrationis* (as in n. 25), f. 3r and 47v.

³⁸ Born in 1495, in Leisnig, Saxony, Peter Apian studied at the University of Vienna, where he came into contact with the German mathematical tradition of the late fifteenth century, most notably with the works of Peurbach and Regiomontanus. In 1523/24, Apian started publishing his first works in the city of Landshut, where also the *Cosmographicus liber* appeared. In 1525, he was hired by the University of Ingolstadt as mathematician and publisher. In Ingolstadt he established his own printing press and initially his publications were mainly works by the theologian Johannes Eck. In 1527 Apian became lecturer of mathematics at Ingolstadt. The most successful work published by Apian is probably the *Astronomicum Caesareum*, dedicated to Charles V, for which Apian received 3000 ‘goldgulden’ from the emperor. On Apian and his activity as cosmographer, see *Peter Apian: Astronomie, Kosmographie und Mathematik am Beginn der Neuzeit*, ed. Karl Röttel, Bruxheim 1995; and F. G. van Ortroy, *Bibliographie de l'oeuvre de Pierre Apian*, Amsterdam 1963.

³⁹ Peter Apian, *Cosmographicus liber*, Landshut 1524, p. 1: ‘Cosmographia (ut ex etymo vocabuli patet) est mundi (qui ex quattuor elementis, Terra, Aqua, Aere, et Igne, Sole quoque Luna et omnibus stellis constat, et quicquid coeli circumflexu tegitur) descriptio. Imprimis enim contemplatur circulos, ex quibus illa supercoelestis sphaera componi intelligitur. Deinde ex ipsorum distinctione, terrarum illis subiectarum situs, et locorum symmetriam seu commensurationem, rationem insuper climatam, dierum noctiumque diversitates, quattuor mundi cardines, stellarum quoque fixarum necnon errantium motus, ortus, et occasus, et quibus verticales moventur, et quaecunque ad coeli rationem pertinent, ut poli elevationes, parallelos, meridianos circulos, etc. iuxta mathematicas ostensiones demonstrat. Et a Geographia differt, quia terram distinguit tantum per circulos coeli, non per montes, maria, et flumina etc.’

⁴⁰ P. Apian, *Introductio geographica Petri Apiani in doctissimas Veneri annotationes*, [...] Huic accedit *Translatio nova primi libri Geographiae Cl. Ptolemaei*, Translationi adiuncta sunt argumenta et paraphrases singulorum capitum, libellus quoque de quatuor terrarum orbis in plano figurationibus Authore Venero, Ingolstadt 1533.

⁴¹ See *La Geografia di Claudio Tolomeo* [...] nuovamente tradotta di Greco in Italiano da G. Ruscelli, con esposizione del medesimo [...] et con figure in istampe [...] ove, oltre alle XXVI antiche di Tolomeo, se ne son’ aggiunte XXXVI altre delle moderne. Con la carta del navigare, etc. Aggiuntovi un pieno discorso di M. Gioseppe Moletto, Venice 1561. A second edition bearing the same title was published in 1564 by Giordano Ziletti, son-in-law of Valgrisi. In 1574, Ziletti published a revised edition (by G. Malombra) of the *Geografia*. A fourth edition was published in 1598 by the printing press of the heirs of Melchiorre Messa and edited by G. Rosaccio. It should also be noted that Ruscelli’s translation was published, probably illegally, in an edition printed by the Galignani brothers in 1598 (also Venice), although they advertised it in both the title and the dedicatory letter as a new translation by Leonardo Cernoti. See *Geografia* [...] nuovamente con singolare studio rincontrati, & corretti da G. A. Magini [...] Dal Latino nell’Italiano tradotta dal R. D. Leonardo Cernoti, Venice 1598, and the (unpaginated) dedicatory letter by

the printers to the bishop of Padua: 'Consacriamo al glorioso nome di V. S. Illustris. questo libro della nuova Geografia da noi ultimamente fatto tradurre.'

⁴² On G. Moletto, see A. Favaro, *Amici e corrispondenti di Galileo*, ed. P. Galluzzi, 3 vols, Firenze, 1983, III, pp. 1585-656.

⁴³ See Ruscelli's definitions of cosmography and geography in *La Geografia*, Venice 1561 (as in n. 41), p. 4: 'Cosmografia sia quella, che descrive tutto l'universo, cioè così questo mondo inferiore, come il celeste; et Geografia sia quella, che descrive solamente questa nostra terra abitabile.'

⁴⁴ Ibid., p. 8-9: 'Con questa comodissima simiglianza dell'animale, et della dipintura, o disegno, ch'io ho qui fatta, intenderà pienamente tutta la sentenza di Tolomeo in quelle parole, delle quali disopra ho posto il principio, et di tutto questo suo Capitolo, nella differenza fra la Geografia, et Corografia, intenderà (dico) pienamente, chi per l'animale grandissimo prenderà tutto questo nostro mondo. Il quale non potendosi da alcuno vedere tutto, come pur Tolomeo afferma con l'ultime parole di questo Capitolo, al Geografo, o Cosmografo volendolo in una sola tavola rappresentar tutto in un tratto a gli occhi altrui, converrebbe avere un foglio, o una tavola, o un muro grande almeno quanto è tutta Roma, o Milano, perchè vi potessero ne i luoghi loro con misure et proportioni star che tutte, ma mediocre parte delle provincie, o città, et mari, et fiumi del mondo, se si volesser quivi disegnare, o dipingere con la forma loro. Et però mettendosi solamente con minuti segni et lettere, che dimostrino il sito, et il luogo delle provincie, o altre parti principali, che sono i principali membri di esso mondo, si viene con questo ad haver'un ritratto della forma universale del tutto, et di ciascuno di tai suoi membri misurati et proportionati fra loro. Et per haverne poi la sembianza et la forma vera, s'è fatto, che in altra parte si disegnino, o dipingano le città con la forma o figura loro. Questo dunque è, che con quelle parole in sostanza dice Tolomeo, cioè, che in qualasivoglia cosa, che con pittura, o disegno si voglia ritrarre, convenendosi fare, che primieramente si ponga la dispositione del tutto, et delle parti sue principali.'

⁴⁵ Ibid., pp. 4-5: 'Et altri, guidandosi dal ristretto et proprio significato della parola, Cosmos, che propriamente significa ornamento, vogliono che Cosmografia sia quella che senza curarsi della particolar quantità ò misura delle lontananze de' luoghi, attenda à descrivere et narrar le nature et proprietà dei paesi, et delle cose, che in esse sono, i costumi, i popoli, le cose notabili accadute di tempo in tempo, et tutte l'altre tali, che vengono à finir la vera simmetria del meraviglioso ornamento di questa maravigliosissima fabrica, ove noi siamo. Et Geografia vogliono poi che s'abbia da chiamar quella particolarmente, che tratta solo della terra, ò del mondo, in quanto alla sola dispositione, alle misure, et al sito suo. Et in questo si fondano principalmente dal vedere, che Tolomeo à questo suo volume, che così tratta delle sole misure et siti mai nome di Cosmografia, ma Geografia la chiama sempre.'

⁴⁶ J. Blaeu, *Le Grand Atlas, ou Cosmographie Blaviane, en laquelle est exactement descritte la Terre, la Mer, et le Ciel*, 12 vols, Amsterdam 1663, I, ch. I (De la difference de la Cosmographie, Geographie, et Chorographie): 'Le Grecs ont donné au Monde, c'est à dire, à ces vastes corps du Ciel et de la Terre qui

sont exposez à nos yeuz, le nom de Cosmos; et ont appelé sa description Cosmographie. Ceste science a deux parties, à sçavoir l'Astronomie et la Geographie. L'Astronomie est la description des cieux et des corps celestes, et des diverses mouvemens qu'on y observe: ou, pour le dir plus brievement, elle propose et explique tout ce qui se void au ciel. La Geographie, c'est a dire, la description de la terre, expose la situation de toute la terre en general, et de ces principales parties en particulier, comme sont le Pays, les Royaumes, les plus celebres villes, le mers, le rivières, le caps renommez, le Isles: et le fait tant au regard de leur situation mutuelle les unes avec les autres, que de celle où elles se treuben comparées avec le ciel, qui les environne des tous costez. La Geographie est derechef distinguée en deux parties, à sçavoir, Chorographie et Topographie. Lesquels mots combien qu'ils ayent une mesme signification, toutesfois communement par la Chorographie on entend la description particuliere de quelque pays, comme de l'Espagne, de l'Italie, de l'Allemagne, &c. avec toutes les villes, villages, forests, montagnes et rivières qui y sont contenues, sans avoir aucun esgard aux regions voisines, ny à l'enceinte de toute la terre: mais par la Topographie, la description particuliere des parties de la Chorographie, comme de quelque ville, village, chasteau, tout ou autre petite parcelle, où on considere exactement jusque aux moindres choses.'

⁴⁷ *Encyclopédie, ou dictionnaire raisonné des sciences, des arts et des métiers*, ed. D. Diderot and J. Le Rond d'Alembert, 35 vols, Paris 1751-1780, IV, p. 293: 'Cosmographie, description du monde, ou science qui enseigne la construction, la figure, la disposition, & le rapport de toutes les parties qui composent l'Univers [...] La Cosmographie dans sa définition générale embrasse, comme l'on voit, tout ce qui est de l'objet de la Physique. [...] En ce sens la Cosmographie a deux parties: l'Astronomie, qui fait connoître la structure des cieux & la disposition des astres [...] & la Geographie, qui a pour object la description de la Terre.'