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The Art of Cartography in Fifteenth-Century Florence¹

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Most art historians practising today were trained in schools which emphasized the primacy of Florence. Florentine art and culture were seen as the yardstick against which all other achievements were measured. More recently, however, a number of scholars have been questioning this ideal, demonstrating how Florence, for all her glories, was not the only place in Europe where the intermingled strands of humanism, prosperity and optimism led to the cultural phenomenon we call the Italian Renaissance. Florence, they argued, was not the shining beacon that all the other Italian city-states were trying to trace.

In particular, Florence during the late Quattrocento and early Cinquecento seemed notably lacking in her contributions to scientific learning. *Prima facie*, it appeared that the neo-Platonic sort of humanism popular in Florence during the fifteenth century was antithetical to scientific progress. Syncretism, under any guise, tends to undermine the discrete type of enquiry most often associated with scientific thought. Indeed, most of what we see as 'innovative' during the period seems due to technical advances made by artisans rather than to theoretical advances made by humanist scholars.

Nevertheless, and despite this seemingly barren terrain, Florence was the centre of one very specific type of 'scientific' endeavour. In this, she was unique in Italy, if not Europe; and, intriguingly, the pre-eminence of Florence in this field was the direct result of the happy marriage between humanist philhellenism and the manual and intellectual dexterity of Florentine craftsmen. The discipline in question was cartography.

In order to put Florence's contributions to cartography into proper perspective, it might be wise to say a few words about map-making before 1400.² Very briefly, during the Middle Ages, there were essentially three kinds of maps. The first, and most basic, were the schemata representing the world as a whole, divided either according to continents, such as in the familiar Isidorian or T-O shaped world map, showing the three continents of Asia, Europe and Africa—a formula that remains popular well into the fifteenth century³—or a map dividing

¹ I wish to thank Tony Campbell for his comments and suggestions.

² The two standard reference works on cartography are L. Bagrow, *History of Cartography*, revised and enlarged by R. A. Skelton, London 1964 (hereafter, Bagrow/Skelton) and, for the period, *The History of Cartography*, I, *Cartography in Prehistoric, Ancient and Medieval Europe and the Mediterranean*, eds J. B. Harley and D. Woodward, Chicago and London, 1987.

³ On the T-O map, see D. Woodward, 'Medieval Mappaemundi' in *The History of Cartography*, I (n. 2 above), pp. 286–370 (296–7, 301–4 and 343–4); and T. Campbell, *The Earliest Printed Maps, 1472–1500*, Berkeley and Los Angeles, 1987, pp. 1–4.

the worlds into climes, often called the Macrobian world map, since it is a regular feature in manuscripts and early printed versions of Macrobius's *Commentarii in somnium Scipionis*.⁴

The second type of map represented the essential structure of the Christian universe. The Mediterranean is usually placed at the centre, with north located on the left-hand side. Often, the most prominent or noteworthy features of these images are those sites connected with events described in the Bible, such as the Red Sea or the Garden of Eden. Although several versions of these Christian maps appear in manuscript form, accompanying tracts of Biblical exegesis by such authors as Bede and Beatus of Liebana, it seems, from the few examples which survive, that the format may have been quite popular as a self-sufficient didactic medium. The large-scale parchment maps in Vercelli and Hereford attest to a life quite separate from the text.⁵ One can only surmise how these grand creations were actually used, but certain pictorial elements seem vital to the medieval Christian's understanding of the world. Whereas they do not provide a trustworthy record of geographical features, they do illustrate the geography of contemporary Christian mythology. For example, they regularly include the sort of information a Christian pilgrim or traveller thought he might need—such as where one might encounter satyrs, *cynocephali* or the mythical Christian king, Prester John.⁶

The third type of map, like the T-O and Macrobian world-views, is also adapted from an antique model. Evidence suggests that the earliest Greco-Roman maps were the *periploi*, narrative descriptions of the landmarks one might encounter on a voyage.⁷ A few examples of these written itineraries survive from the middle ages, showing the longevity and tenacity of the tradition.⁸ It is not

⁴ See Woodward, 'Medieval Mappaemundi' (n. 3 above), pp. 300 and 353 and T. Campbell, *The Earliest Printed Maps* (n. 3 above), pp. 2–3 and 114–17. See also Macrobius, *Commentary on the Dream of Scipio*, ed. and English transl. W. H. Stahl, New York, 1952, pp. 208–13 and W. H. Stahl, 'Astronomy and Geography in Macrobius', *Transactions and Proceedings of the American Philological Society*, 35, 1942, pp. 232–8.

⁵ Since the destruction of the Ebsdorf Map during World War II, the only large-scale early maps to survive are those in the Archivio Capitolare del Duomo, Vercelli, in Hereford Cathedral, and in the so-called 'Duchy of Cornwall' map. For illustrations and discussion, see Woodward, 'Medieval Mappaemundi' (n. 3 above), pp. 306–12.

⁶ For a good summary of the monstrous races, see R. Wittkower, 'Marvels of the East: a Study in the History of Monsters', *Journal of the Warburg and Courtauld Institutes*, 5, 1942, pp. 159–97. On Prester John, see Woodward, 'Medieval Mappaemundi' (n. 3 above), p. 333 and A. Cortesão, *History of Portuguese Cartography*, Coimbra, 1961–71, I, pp. 255–75. The earliest travel map to include what we might recognize as 'practical data' is the Ertzlaub *Rom-Weg* map of 1500. I thank Tony Campbell for bringing this point to my attention.

⁷ See the convenient summary in E. G. R. Taylor, *The Haven-Finding Art. A History of Navigation from Odysseus to Captain Cook*, London, 1971, pp. 49–60. See also the comments by L. de Albuquerque, 'Portuguese Navigation: Its Historical Development,' in *Circa 1492. Art in the Age of Exploration*, ed. J. L. Levenson, Washington DC, 1991, pp. 35–9.

⁸ For example, the 11th-century manuscript listing the places visited in 990 by Archbishop Sigeric of

clear if the ancients ever developed the narrative *periplus* into a graphic medium, but isolated examples of what one could call 'journey line' maps do survive from the middle ages.⁹ One such example is the manuscript itinerary by Matthew Paris, where the journey is pictorially described as a strip-map.¹⁰ The voyage to Calais becomes a line of place-names with thumbnail sketches of each of the major cities one will encounter (Fig. 1).

At some point, the literary *periplus* was replaced by the medieval *portolano* or harbour-finder. Solely from an intellectual point of view, the construction of these maps is not unlike their literary forbears. The important information is conveyed in 'narrative' sequence. The coastline, its features and hazards, is described in very much the same way as the literary *periplus*. That which is not vital to the story being told, such as interior landmarks, is not included and that which is important to the sailor is 'writ large'.¹¹ The main difference between the literary *periplus* and the portolan map, however, is the fact that with the portolan, the navigator could sail across open water, since he was given the reference points of distant coastlines which enabled him to 'leave the narrative' whenever he wished.¹²

Essentially, then, this was the state of map-making prior to 1400. As explorers ventured increasingly further from the shelter of the Mediterranean, their *portolani* became filled with new information. But whereas there was the scope for 'scientific advancement' in the refinement of material supplied by new discoveries, map-makers lacked a theoretical framework for their product. They were very quickly reaching the limit of what they could usefully add to the state of human knowledge.¹³ That is not to say that, given time, the portolan chart could not have developed into a sophisticated 'world-view' map. One sees ample

Canterbury, MS London, BL, Cotton Tib. B.V. See P. D. A. Harvey, *Medieval Maps*, London, 1991, pp. 8–9.

⁹ There is absolutely no evidence, however, that the medieval manuscript maps are either a direct inheritance or a development from the classical *periplus*. The claim that an accurate sea-chart can be drawn solely from the information contained in a narrative *periplus* seems difficult to sustain.

¹⁰ MSS London, BL, Royal 14.C.VII and Cotton Nero.D.i and Cambridge, Corpus Christi College, 26 and 16. See R. Vaughan, *Matthew Paris*, Cambridge, 1958, pp. 237–50 and figs 12 and 13; Woodward, 'Medieval Mappaemundi' (n. 3 above), pp. 304, 473, 495 and pl. 38; and Harvey, *Medieval Maps* (n. 8 above), pl. 1.

¹¹ See A. E. Nordenskiöld, *Periplus: An Essay on the Early History of Charts and Sailing Directions*, English transl. F. A. Bather, Stockholm, 1897 and T. Campbell, 'Portolan Charts from the Late Thirteenth Century to 1500', *History of Cartography*, I (n. 2 above), pp. 371–463.

¹² In her history of early navigation, Taylor (n. 7 above) barely discusses the portolan chart, referring the reader to 'pilot books', instead. In making this connection, Taylor seems to discount the significant difference between the two media of the *periplus* and portolan. Perhaps the most interesting question, which lies outside the scope of this paper, is what was the catalyst towards two-dimensional depiction, since it seems unlikely that the navigator's needs would have changed substantially from classical times. We know tantalizingly little about the early history of the portolan chart. See the comments by Campbell, 'Portolan Charts' (n. 11 above), p. 372.

¹³ See W. G. L. Randles, 'From the Medieval Portulan Chart to the Marine World Chart of the Great Discoveries: The Crisis in Cartography in the Sixteenth Century', *Imago Mundi*, 40, 1988, pp. 115–18.

1410. The earliest extant manuscripts are dedicated to Pope Alexander V, and are therefore datable to 1409–1410.¹⁹

The view of the world provided in Ptolemy's text was substantially different from the one inherited from Latin sources. It was the first geographical text to offer a means by which the entire surface of the earth could be depicted in two dimensions. In Book I (chapters 21–24) of the *Geographia*, Ptolemy describes three different ways in which the three-dimensional globe of the Earth can be translated into a two-dimensional format, or projected onto a plane. Ptolemy's first proposed projection showed the sphere superimposed on a conical graticule, with the meridians converging at the north pole and the parallels shown as great arcs.²⁰ The major disadvantage of this system was that all sense of the sphericity of the globe was lost and that there was a vast discrepancy between the scale of the northern and southern coordinates. Ptolemy's second projection proposed curved parallels and meridians. The idea was to reproduce the impression of the curve of the globe in two dimensions (Fig. 2). The most important feature of both of these proposed projections, however, was the graticule itself. For generations, artists and technicians had recognized the convenience of a squared composition. Images could be enlarged or diminished; and, as long as the relative ratios of the grid were maintained, the relative proportions of a drawing, set against this grid, would remain unchanged. What Ptolemy illustrated, however, was a system by which the fabric of the grid itself could be altered radically. As long as the relationship between the drawing and the prime coordinates was kept intact, the information conveyed would remain unchanged regardless of its final appearance. In short, Ptolemy not only offered the Florentines a formula with which they could plot geographical discoveries, but he also provided a system by which they could both describe and recreate convincing illusionistic effects in two dimensions.

As has been argued elsewhere, most notably by Edgerton, the rediscovery of Ptolemy's *Geographia* seems to have played a major role in the development of the visual arts in Florence in the fifteenth century.²¹ Edgerton proposes that all the great perspectival experiments of the early years of the Quattrocento, such as Masaccio's *Trinity* in Santa Maria Novella or Brunelleschi's famous 'perspective picture' of the Florentine Baptistery, show the direct influence of Ptolemy's text.

¹⁹ Fischer proposes MS Vatican, Biblioteca Apostolica, Vat. lat. 2974, which was finished on 22 December 1409, as the oldest extant manuscript (*Claudii Ptolemaei* (n. 16 above), p. 205, n. 2).

²⁰ For the most convenient summary of Ptolemy's projections, see J. Keuning, 'The History of Geographical Map Projections until 1600', *Imago mundi*, 12, 1955, pp. 1–24 and O. A. W. Dilke, 'The Culmination of Greek Cartography in Ptolemy', *The History of Cartography*, I (n. 2 above), pp. 177–200 (185–89).

²¹ Edgerton, 'Florentine Interest in Ptolemaic Cartography' (n. 18 above), and *The Renaissance Rediscovery of Linear Perspective*, New York, 1975. As to whether or not Ptolemaic maps existed during the Middle Ages, see O. A. W. Dilke, *Greek and Roman Maps*, London, 1985, pp. 80–81 and 154.

It is an intriguing thesis, but perhaps there is a slightly larger story to be told here.

The rediscovery of Ptolemy's text was certainly regarded as a major event by the Florentine humanists. We have ample evidence of manuscripts being copied and recopied for notable members of the Florentine Academy. We know that the text was repeatedly the subject of debate and discussion.²² The earliest versions of Jacopo Angeli's translation are not illustrated, fully coinciding with what we assume to be a general characteristic of philologists: that few are interested in pictures.²³ Surprisingly, however, within ten years of its first translation, it was realized that the illustrated maps in the *Geographia* were as important a discovery as the content of the text. Their importance lay not in the precise information conveyed, but in the matrix they provided. Ptolemy's maps served as a template upon which more accurate information could, in theory, be overlaid in order to create a reliable, modern map. Ptolemy offered a way past the conceptual barrier that had been set by the *portolano*. Or to quote Ptolemy's own words: 'We are able therefore to know the exact position of any particular place; and the position of the various countries, how they are integrated in regard to one another, how situated in regard to the whole inhabited world'.²⁴

Two aspects of this development are particularly interesting. First, the decision to recreate Latin versions of Ptolemy's maps was instigated and carried out not by a hired artisan, but by a pair of young, aristocratic academicians—Francesco di Lapacino and Domenico di Lionardo Boninsegni.²⁵ In essence, they copied their Latinised maps from extant Greek sources—not a terribly significant cartographic advance, save that it made the otherwise largely unintelligible series of place-names available to a Latin-based culture (Fig. 3). More importantly, the impetus towards a Latin Ptolemy was both generated and executed by a sector of society not normally associated with the production of maps and charts. By extension, one could argue that the illustrated Latin *Geographia* can be used to support the contention that the Florentine interest in the rationalization of space

²² See Goldstein, 'Geography' (n. 16 above), esp. pp. 16–22 and Rose, 'Humanist Culture' (n. 16 above), esp. pp. 55–6 and 102.

²³ The first edition of the *Geographia*, printed by Hermann Liechtenstein in Vicenza (1475) also was not illustrated. For similar attitudes amongst contemporary Ferrarese humanists, see K. Lippincott, 'The Iconography of the *Salone dei Mesi* and the Study of Latin Grammar in Fifteenth-century Ferrara', in *La corte di Ferrara e il suo mecenatismo, 1441–1598*, eds M. Pade, L. Waage Petersen and D. Quarta, Modena, 1990, pp. 93–109 (96–7).

²⁴ Ptolemy, *Geography*, Bk. I, ch. 19.

²⁵ See Vespasiano da Bisticci, *Vite di uomini illustri del secolo XV*, eds P. d'Ancona and E. Aeschlimann, Milan, 1951, pp. 405 n. 3, and 530–32. Vespasiano says: '... e de' primi iscrivesse di sua mano la *Cosmografia* di Ptolomeo fu Domenico, e fe' la pittura e ogni cosa di sua mano con una grande diligenza: in prima ella non c'era, se non in greco la pittura, bene che la scrittura fusse in latino tradotta da Jacopo d'Agnolo, ma la pittura eraci nomi co' greci: durò Domenico la fatica a recarla in latino come sta oggi' (p. 531). See also Fischer, *Claudii Ptolemaei* (n. 16 above), I, pp. 191 and 290–335.

was a cultural constant. It was something in which several layers of Florentine society were interested; it was something with which several strata were conversant.²⁶ Exactly how this common interest was manifested must remain in the realm of speculation. One anecdote seems, however, worth retelling.

Paolo del Pozzo Toscanelli, reputed by his contemporaries to be one of the greatest mathematicians of his age, needs no introduction.²⁷ Amongst his closest friends, the man whom he is recorded as calling 'the greatest association of my life', was the artist and architect Filippo Brunelleschi.²⁸ Vasari records how Brunelleschi came upon Toscanelli and his learned friends, who were discussing mathematics late one evening after supper: 'e sebbene Filippo non aveva lettere, gli rendeva sì ragione di tutte le cose con il naturale della pratica esperienza, che molte volte lo confondeva'.²⁹

The story is possibly a bit more Vasarian than factual. Brunelleschi seems not to have been quite as unlettered as Vasari presents him and both his abilities and achievements certainly won him the admiration and friendship of many of the leading humanists of the day. Nevertheless, if we may use the story as a starting point, what Florence seems to have possessed during the early years of the fifteenth century were those two ingredients essential to any great age of technological discovery—theory and practical ability.

The characterization of the Florentines as particularly remarkable for this potent combination of skills and interests during the middle years of the Quattrocento is not a twentieth-century one. The predilection for and ability to construct illusionistic space was seen by contemporaries as a peculiarly Florentine trait; and Florence was regarded by all as one of the most important map-making centres in Europe.³⁰ Non-Florentines could copy the method; but they could not master the craft involved in producing credible, or even legible maps. The

²⁶ This point is also made by Martin Kemp in *The Science of Art: Optical Themes in Western Art from Brunelleschi to Seurat*, New Haven and London, 1990, p. 14: 'Specifically in Florence, the more abstract aspects of humanist learning were being brought into especially fruitful conjunction with the practical requirements of civil life. ... [whereas] I distrust explanations based on simple mechanisms of social causation—there is little doubt that Brunelleschi's measured representation of these two revered buildings [the Baptistery and Palazzo della Signoria] was deeply locked into the system of political, religious and intellectual values shared by those who exercised the greatest influence on Florentine civic life in this period.'

²⁷ The bibliography on Toscanelli is extensive, but generally disappointing. In the context of this paper, one might start with E. Garin, 'Ritratto di Paolo dal Pozzo Toscanelli', *Belfagor*, 3, 1957, pp. 241–57; Goldstein, 'Geography' (n. 16 above), esp. pp. 11–16; Rose, 'Humanist Culture' (n. 16 above), esp. pp. 59–70; Edgerton, 'Florentine Interest in Ptolemaic Cartography' (n. 18 above), p. 275; and G. Abetti, 'Paolo dal Pozzo Toscanelli', *DSB*, 13, 1976, pp. 440–41.

²⁸ G. Uzielli, *La vita e tempi di Paolo dal Pozzo Toscanelli*, Rome, 1894, pp. 37–40. Cited by Rose, 'Humanist Culture' (n. 16 above), p. 60, n. 55.

²⁹ G. Vasari, *Le Vite de' più eccellenti architetti, pittori, et scultori*, ed. G. Milanesi, Florence, 1878, II, p. 333.

³⁰ See Bagrow/Skelton (n. 2 above), pp. 77–8 (fig. 12). By way of example, one might compare virtually any Florentine product with a contemporary Swedish 'Ptolemaic' map by the Danish navigator Claudius Clavius.

Portuguese (certainly the greatest practical sailors of the fifteenth century under Henry the Navigator), the Spanish and the French came to Florence in droves to secure maps.³¹ The German printers came to learn the secrets of map-making. Indeed, the most important developments of the Renaissance *Geographia* for the next thirty years are due to Germans who had come to Florence during the early decades of the Quattrocento to study cartography.

One such German was the Benedictine from Reichenbach, cited variously as Dominus Nicolaus Germanus, Nicolaus Donis or Donnus Nicolaus Germanus, who had settled in Florence sometime around 1456 to learn the art of cartography.³² Cosmographer and illuminator—again, the peculiar blend of the visual and the mathematical—Donnus soon realized that whereas Angeli's original Latin translation had been a monumental achievement, the Latin itself was stilted, inelegant and, at times, inaccurate. Donnus finished his edition of the *Geographia* in 1466, dedicating it to Borso d'Este.³³ Donnus's edition not only represented a cleaner Latin text, it also provided a startling new vision of Ptolemy's original maps. In the earliest manuscripts (c. 1460–66) and in the first edition of Donnus's version of the *Geographia*, all the maps are presented according to Ptolemy's first conic projection, with the meridians all converging at the north of the map and with the lines of latitude slightly curved (Fig. 4).³⁴

In the majority of the later manuscripts and in all the subsequent printed editions, however, Donnus modified this projection into a trapezoidal format—the so-called 'Donis projection'—in which both the parallels and meridians are conveyed as straight lines, the meridians still converging towards the north pole. During his later career (approximately 1466–68), Donnus returned once again to Ptolemy's text to take up a new challenge. In Chapter XXIV of Book I, Ptolemy had urged all his readers to prepare their maps according to his third proposed system of rendering, a modified spherical projection. Evidence suggests that no

³¹ Goldstein notes that Henry the Navigator's brother, Don Pedro, seems to have travelled to Florence expressly to collect maps for his brother's Academy at Sagres. See Goldstein, 'Geography' (n. 16 above), p. 17. See also G. Uzielli, *Paolo del Pozzo Toscanelli iniziatore della scoperta d'America*, Florence, 1892, esp. p. 73 and D. Peres, *A History of Portuguese Discoveries*, Lisbon, 1960, pp. 24–5.

³² See Bagrow/Skelton (n. 2 above), p. 78–9; L. A. Brown, *The Story of Maps*, Boston, 1949, pp. 154–5; and Campbell, *The Earliest Printed Maps* (n. 2 above), pp. 123–4 (with additional bibliography). See also the recent monograph on MS Naples, Biblioteca nazionale, V.F.32, *Claudii Ptolemaei Cosmographia Tabulae*, introd. by L. Pagani, Torriana, 1990. Fischer assigns this manuscript to the hand of Donnus (*Claudii Ptolemaei* (n. 16 above), p. 215).

³³ MS Modena, Bibl. Estense, lat. 463 (α.X.1.3). See D. Fava, *La Biblioteca Estense nel suo sviluppo storico*, Modena, 1925, p. 66. The manuscript is dated 1466.

³⁴ For a convenient resumé of the differing kinds of projection used in Donnus's manuscripts, see *Die Ulmer Geographia des Ptolemäus von 1482. Zur 500. Wiederkehr der ersten Atlasdrucklegung nördlich der Alpen*, exh. cat. Ulm, Schwörhaus, 11. Oktober bis 30. November 1982, ed. K.-H. Meine, Ulm, 1982, esp. pp. 19–20. See also I. Babicz, 'Donnus Nicolaus Germanus—Probleme seiner Biographie und sein Platz in der Rezeption der ptolemäischen Geographie', *Wolfenbütteler Forschungen*, 7, 1980, pp. 9–42.

reader, prior to Donnus, had been able to reconstruct Ptolemy's homeotheric projection. Donnus's manuscript world-maps, however, break through this barrier, in depicting the sphere of the earth with curved lines of both longitude and latitude (Fig. 5). He began simply, by redrawing Ptolemy's maps leaving the information and the coordinates provided in earlier maps unchanged; but soon he progressed towards adding all the geographical information mentioned in the text, which had previously been deleted, thereby creating the first truly faithful Latin rendering of Ptolemy's *Geographia*. Although Donnus's *oikumene* served as the basis of the world maps in the well-known Ulm editions of Ptolemy's *Geographia*, no complete version of Donnus's 'Recension B' manuscripts was ever printed.³⁵ It is perhaps difficult for modern readers, accustomed to all sorts of different maps, to appreciate how difficult the task confronting early map-makers was. But, taxing as the process of creation may have been, the education of the reader was equally daunting. In his dedicatory preface to his earlier recension, Donnus apologizes to both Ptolemy and his patron, Borso d'Este, for the liberty he has taken in following Ptolemy's own prescriptions. He beseeches the Duke: 'Non me fugit, Illustrissimus Princeps'—'if any man familiar with maps would only care to meet this new edition with a calm mind, and compare the maps described by Ptolemy with those that I, Donnus, have drawn, he would certainly find no little merit in the new ones'.³⁶

Another German active in Florence during the second half of the fifteenth century was Henricus Martellus Germanus.³⁷ Working from Donnus's example, Martellus added twelve new maps to the canonical twenty-seven ancient ones, thereby expanding the range of Ptolemy's text by nearly fifty per cent. Furthermore, new cartographic information, gleaned from contemporary voyages, was added to the classical maps. It is really at this point that the Florentine *Cosmographia* began to take on what one might call a more 'Renaissance' form: the

³⁵ Campbell also notes the rarity of the Bologna *editio princeps*. Only 25 copies have been traced. Campbell, *The Earliest Printed Maps* (n. 3 above), p. 130.

³⁶ Citing from the incipit of Florence, Laurenziana MS Plut. 30,3: 'Illustrissimo Principi ac Domino Domino Borsio Duci Mutinae ac Regii, Marchioni Estensi Rhodigique Comiti Donnus Nicolaus Germanus. Non me fugit, Illustriss[imus] Princeps, quum quae summo ingenio exquisitaque doctrina Ptolemaeus Cosmographus pinxisset, in his aliquid novare attentaremus, fore ut hic noster labor in multorum reprehensiones incurreret. Omnes enim qui hanc nostram picturam, quae in his tabulis, quas ad Te misimus, continetur viderint, geometricae praesertim rationis ignari, ab ea, quam Ptolemaeus edidit paullulum abhorrentem, certe nos, vel imperitiae, vel temeritatis arguent. Nam plane nos aut ignorasse quid egerimus, aut temere ausos esse tantum opus contaminare affirmabunt, quum aliqua ex parte illud immutatum cernent. ... Sin autem nos in communem omnium utilitatem non frustra in hac ipsa re laborasse comperies, rogamus Te etiam atque etiam, ut in multis aliis, quae adhuc intacta supersunt diversarum artium nobis per tuam beneficentiam ac liberalitatem vires ingenii liceat exercere. Vale.' Reproduced by A. M. Bandini, *Catalogus codicum latinorum bibliothecae medicae laurentianae*, Florence, 1775, II, cols. 69–70.

³⁷ See Bagrow/Skelton (n. 2 above), pp. 81–2 and the bibliography in Campbell, *The Earliest Printed Maps* (n. 3 above), pp. 77–8.

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³⁵ Campbell also notes the rarity of the Bologna *editio princeps*. Only 25 copies have been traced. Campbell, *The Earliest Printed Maps* (n. 3 above), p. 130.

³⁶ Citing from the incipit of Florence, Laurenziana MS Plut. 30,3: 'Illustrissimo Principi ac Domino Domino Borsio Duci Mutinae ac Regii, Marchioni Estensi Rhodigiique Comiti Donnus Nicolaus Germanus. Non me fugit, Illustriss[imus] Princeps, quum quae summo ingenio exquisitaque doctrina Ptolemaeus Cosmographus pinxisset, in his aliquid novare attentaremus, fore ut hic noster labor in multorum reprehensiones incurreret. Omnes enim qui hanc nostram picturam, quae in his tabulis, quas ad Te misimus, continetur viderint, geometricae praesertim rationis ignari, ab ea, quam Ptolemeus edidit paullulum abhorrentem, certe nos, vel imperitiae, vel temeritatis arguent. Nam plane nos aut ignorasse quid egerimus, aut temere ausos esse tantum opus contaminare affirmabunt, quum aliqua ex parte illud immutatum cernent. ... Sin autem nos in communem omnium utilitatem non frustra in hac ipsa re laborasse comperies, rogamus Te etiam atque etiam, ut in multis aliis, quae adhuc intacta supersunt diversarum artium nobis per tuam beneficentiam ac liberalitatem vires ingenii liceat exercere. Vale.' Reproduced by A. M. Bandini, *Catalogus codicum latinorum bibliothecae medicae laurentianae*, Florence, 1775, II, cols. 69–70.

³⁷ See Bagrow/Skelton (n. 2 above), pp. 81–2 and the bibliography in Campbell, *The Earliest Printed Maps* (n. 3 above), pp. 77–8.

classical format and vocabulary had been sufficiently well-revived to begin creating a new generation. The parallels with the similar 'renaissances' in the visual arts and in literature are worth noting.

A final, native-born Florentine must also be counted in any history of fifteenth-century cartography. Francesco Rosselli spent his early years in Siena and Hungary, returning to Florence some time during the early 1480s.³⁸ He specialised in copper-engraving and seems to have established a lucrative market in maps. Bagrow and Skelton have named him as 'the earliest commercial mapseller known to us'.³⁹ Extant works attributed to him include the well-known 'Map with a Chain' of c. 1485, the homeotheric projection World Map in the Biblioteca Nazionale Centrale in Florence, and the signed and dated World Map in the British Museum, bearing the inscription '... cognosces diligentia joanni mathei Contarini Arte et ingenio francisci Rosellj florentin. 1506 notu'.⁴⁰ The inventory of Rosselli's shop in 1525 tells us that amongst his unsold stock were a number of world maps,⁴¹ globe gores, sea charts and local maps. The volume of different map-related products attests not only to a flourishing market, but highlights the amount of cartographic material we have lost through the ages. How much of the history of cartography might have to be rewritten if the contents of this humble *bottega*, trading during the most exciting period of discovery for the Europeans, had survived?

There were other catalysts towards the development of the world map, some of which were not wholly connected with this great age of discovery. As Benedetto Soldati has argued in his *Poesia astrologica*, the most notable effect of the rediscovery of the astrological poem, the *Astronomicon*, of Marcus Manilius, was as a spur to the humanist poets of the mid-fifteenth century to create anew the genre of scientific verse.⁴² Both Pontano's *Urania* and Basinio da Parma's *Astronomica* are based, in spirit, on Manilius's exemplar. As we have seen, the content of Ptolemy's *Geographia* seems to have sparked major advancements in cartography and perspectival rendering, but there were other developments from its text, similar to those generated by the discovery of the *Astronomica*.

³⁸ See A. M. Hind, *Early Italian Engraving. I. Catalogue*, London, 1938, pp. 10–11, 297–8 and 304–09; J. A. Levenson, K. Oberhuber and J. L. Sheenan, *Early Italian Engravings from the National Gallery of Art*, Washington DC, 1973, pp. 47–62; Bagrow/Skelton (n. 2 above), pp. 93–4 and Campbell, *Earliest Printed Maps* (n. 3 above), pp. 70–78.

³⁹ See Bagrow/Skelton (n. 2 above), p. 94.

⁴⁰ British Museum Maps C.2.cc.4. See Hind, *Early Italian Engraving* (n. 38 above), I, p. 297 and Bagrow/Skelton (n. 2 above), fig. 23 and pl. LX.

⁴¹ For example, the '... forma de l'appamondo [*sic*] grande nuovo, lavor da ogni banda, di rame'. See Hind, *Early Italian Engraving* (n. 38 above), I, p. 307. See also J. del Badia, 'La bottega di Alessandro di Francesco Roselli merciaio e stampatore (1525)', *Miscellanea fiorentina di erudizione e storia*, 2, no. 14, 1894, pp. 24 ff. and C. Hülsen, 'Die alte Ansicht von Florenz im Kgl. Kupferstichkabinett und ihr Vorbild,' *Jahrbuch der preussischen Kunstsammlungen*, 35, 1914, pp. 90 ff.

⁴² B. Soldati, *La poesia astrologica nel Quattrocento. Ricerche e studi*, Florence, 1906.

Francesco di Niccolò Berlinghieri (1440–1501) is what one might consider the epitome of the Laurentian humanist.⁴³ Castasto records show that he was born into a wealthy Florentine family, which had been established in the city at least since the early years of the Dugento. Amongst his teachers we find Giovanni Argyropoulos and Cristoforo Landino. He was extremely close not only to Lorenzo himself, but also to Giuliano and Piero de' Medici. Marsilio Ficino refers to him as 'academicus Berlingherius noster'.⁴⁴ Berlinghieri had a certain amount of success in public life as well: he was elected *priore* in 1471; ambassador or *oratore* to the court of Mantua in 1479–80; *conservatore delle legge* in 1482; and one of the twelve *buonumini* in 1493. He was also the man, incidentally, who along with Filippo Valori, financed the publication of Ficino's *Opera Platonis*.⁴⁵

Berlinghieri's greatest literary contribution was a translation of Ptolemy's *Geographia* into Italian *terza rima*: 'La Geographia di Francesco Berlinghieri fiorentino in terza rima et lingua toscana distincta con le sue tavole in varii siti et provincie secondo la Geographia et distinctione dele tavole di Ptolomeo'. There are four extant manuscripts of the text, two of which are sumptuously illustrated. The first seems to be the dedication manuscript. From the change of dedication in this manuscript from Federico da Montefeltro to his son, Guidobaldo, one can tentatively date the completion of Berlinghieri's poem to 1480–82.⁴⁶ A second luxurious manuscript, now in the Brera, was made for Lorenzo de' Medici and dates from the same period.⁴⁷

Berlinghieri's printed version of the *Geographia* is noteworthy on several counts. First, from the point of view of early book illustration, the maps are remarkably fine. Dating from 1482, the unique edition⁴⁸ contains the first series

⁴³ See F. Rödiger, 'La Geografia del Berlinghieri, rarissimo cimelio dell'arte tipografica fiorentina', *Il Bibliofilo*, 5, no. 1, 1881, pp. 7–9; A. Mori, 'Un geografo del Rinascimento (Francesco di Niccolò Berlinghieri)', *Archivio storico italiano*, 5 ser., 13, 1894, pp. 341–8; G. Uzielli, 'Sulla "Geografia" in terza rima di Francesco Berlinghieri', in *Paolo del Pozzo Toscanelli* (n. 31 above), pp. 133–48; Brown, *The Story of Maps* (n. 32 above), esp. p. 152; Goldstein, 'Geography' (n. 16 above), esp. p. 9; B. Maracchi Biagiarelli, 'Niccolò Tedesco e le carte della Geografia di Francesco Berlinghieri autore-editore', in *Studi offerti a Roberto Ridolfi*, eds B. B. Maracchi and D. Rhodes, Florence, 1973, pp. 377–97; Campbell, *The Earliest Printed Maps* (n. 3 above), pp. 124–5 and 133–5; and A. Codazzi, 'Francesco Berlinghieri', *DBI*, IX, 1967, pp. 121–4.

⁴⁴ Cited by Codazzi, 'Francesco Berlinghieri' (n. 43 above), p. 121.

⁴⁵ See Mori, 'Un geografo' (n. 43 above), p. 345.

⁴⁶ MS Vatican, Biblioteca Apostolica, Urb. lat. 273. Most scholars date the composition of the manuscript to c. 1455–65.

⁴⁷ MS Milan, Biblioteca nazionale Braidense (Brera), AC.XIV, 44. A. C. de la Mare tells me that she doubts the often-repeated proposal that this manuscript was made for Lorenzo on the occasion of his marriage to Clarice Orsini (cited as such by Codazzi, 'Francesco Berlinghieri' (n. 43 above), p. 123). See also the recent study by A. Dillon Bussi, 'Aspetti della miniatura ai tempi di Lorenzo il Magnifico', in *All'ombra del lauro. Documenti librari della cultura in età laurenziana*, exh. cat. Florence, Biblioteca Medicea Laurenziana, 4 maggio–30 giugno 1992, ed. A. Lenzoni, Florence, 1992, pp. 141–60 (153–5).

⁴⁸ Campbell notes that, strictly speaking, there was a second re-issue of Berlinghieri's text c. 1500–02, when an unknown publisher gathered-up some remainder sheets from the 1482 issue, adding his own title to the recto

of maps produced from copper plates, which means that their quality and detail are much finer than anything else being produced during the period (Fig. 6).⁴⁹ Berlinghieri adds four new maps (Italy, Spain, Gaul, and Palestine) and updates nearly all of the existing Ptolemaic maps; but, oddly, all of the illustrations to Berlinghieri's text seem to be derived from much earlier, mid-century sources, with square-grid meridians and parallels—the same sort of projection used in the earliest illustrated manuscripts of Angeli's translation of the *Geographia*.⁵⁰ This either supports the suggestion that Berlinghieri composed his poem during the middle years of the century, when these earlier projections were the only type available, or it hints at the uncomfortable possibility that the later, more sophisticated projections were beyond his talents.⁵¹

Second, from the point of view of intellectual history, Berlinghieri's *Geographia* is a fascinating product. It is not a direct translation of Ptolemy's text; but a conflated and versified text-cum-commentary. Traces of Strabo, Pomponius Mela, Pliny, Flavio Biondo, Cristoforo Buondelmonte and contemporary nautical and cartographic records can be found subtly interwoven into the text. And what might have been the premise or impetus behind wanting to render Ptolemy's *Geographia* into *terza rima*? Was it intended to be merely clever or stylish; or was it meant to reflect serious ambitions towards the creation of a new literary genre? Did this urge towards versification stand as a self-conscious nod towards the eagerly-acknowledged local genius for rhyming; or were difficult texts turned into poems as mnemonics? To what degree and in what way is

of the first leaf. See Campbell, *The Earliest Printed Maps* (n. 3 above), p. 134. See also the valuable preface to the Berlinghieri volume of R. A. Skelton, *Theatrum Orbis Terrarum*, Amsterdam, 1966.

⁴⁹ On the technique behind Berlinghieri's maps, see Brown, *The Story of Maps* (n. 32 above), p. 155. As Campbell points out, however, 'finer' does not always mean 'better', as this method also had rather serious disadvantages. Mistakes in inscriptions or titles could not be remedied easily, hence many of Berlinghieri's titles are nearly illegible. From the point of view of lettering, Campbell chooses the 1478 Rome edition of Donnus's translation as the most accurate, since the editor used punches for its letters, rather than relying solely on engraving. See Campbell, *The Earliest Printed Maps* (n. 3 above), p. 13.

⁵⁰ See pp. 138–40 above.

⁵¹ The edition was printed by a certain 'Maestro Nicolo Tedesco' (Hain 2825: 'Impresso infrenze per Nicolo Todescho & emendato con somma diligentia dallo auctore'), leading numerous scholars to conflate what appear to be two separate persons: Nicolaus Laurentii, a printer, and Donnus Nicolaus Germanus, a cartographer. Nicolaus, the printer, studied with Francesco Squarcione (Mantegna's infamous master), was in Ferrara from 1451 to 1456, and seems to have been friendly with Taddeo Crivelli. See P. d'Ancona and E. Aeschlimann, *Dictionnaire des miniaturistes du moyen âge et de la renaissance dans les différentes contrées de l'Europe*, Milan, 1940, p. 139. The waters are muddied, however, because two payments to 'Nicolaus de Alemania' have been uncovered in the Este Archives. See Pagani (*Cosmographia Tabulae*, p. xi: Modena, Archivio di Stato, Camera ducale, Reg. Mandati, 1466, f. 89' (8 April 1466, to pay 30 florins for 'illud excellens cosmographiae opus') and f. 125" (30 March 1466, to pay 100 florins 'dandos venerabili et excellentissimo cosmographo domino Nicolao Germano, in signum gratitudinis ...'). These must be payments to Donnus for his manuscript of the *Geographia* (see n. 36 above), but it does seem awkward that there might be two Germans, named Nicolaus, who both have contacts first with the Estensi in Ferrara and later go one to make great contributions to cartography in Medicean Florence.

Berlinghieri's *Geographia* specifically Florentine? As Basinio's *Astronomica* or Pontano's *Urania* record the response of an earlier generation of humanists to Latin scientific verse, should Berlinghieri's poem be seen as the response of the typical 'Laurentian' humanist?⁵²

Berlinghieri's illustrated geographical poem raises more questions than can be answered here, but one stylistic parallel, albeit in another medium, does come to mind as being somehow structurally analogous. For example, it might be fruitful to consider what could be seen as the stylistic parallel between Berlinghieri's poem and the mythological paintings of Sandro Botticelli. Both are the product of Medicean—and specifically Laurentian—Florence. Both tread the very fine line between yearnings for the classical and pride in the contemporary. Aesthetically and conceptually they reflect the same set of cultural values and ideas as to what constitutes a work of art. And, to a certain extent, both are exercises in a very specific kind of *maniera*. Both reflect a particular sort of learning which has been translated into a delicate and attractive medium. Finally, one has the sense with both that there is more in the process of their making than meets the eye—or (for that matter) than is ever likely to be uncovered by academic speculation.

Sadly, whereas Botticelli's work has reaped great praise throughout the centuries, Berlinghieri's did not. The attempt to render Ptolemy's *Geographia* into Tuscan was either ill-timed or ill-conceived. Very few of his contemporaries were interested in this display of skill and learning. Those who were interested in cartography wanted the original text of the master, unfettered by contemporary overlay and interpretation. In short, there was little call for this particular sort of *invenzione* outside a somewhat select circle of Florentine academicians and their friends.

The unique nature of the Florentine contribution to the disciplines we band together as 'science' lies in the close correspondence between theoretical speculation and the desire to create tangible models. The Florentines, for whatever reason, seem to have broken down both intellectual and social barriers between the philosopher and the artisan, in the pursuit not of knowledge *per se*, but of the elusive art of representation. Nowhere is this pursuit seen more clearly than in the history of the rediscovery and renaissance of Ptolemy's *Geographia*. For this achievement alone, Florence fully merits her much-prized title of 'Athens on the Arno'.

⁵² The translation of scientific texts into verse, of course, has an illustrious history, one of the earliest examples being the versification of Eudoxos's stellar catalogue in Aratos's *Phaenomena* (see D. R. Dicks, *Early Greek Astronomy to Aristotle*, Ithaca NY, 1970, pp. 153–54), but a close study of the genre and Berlinghieri's place within it would be welcomed.

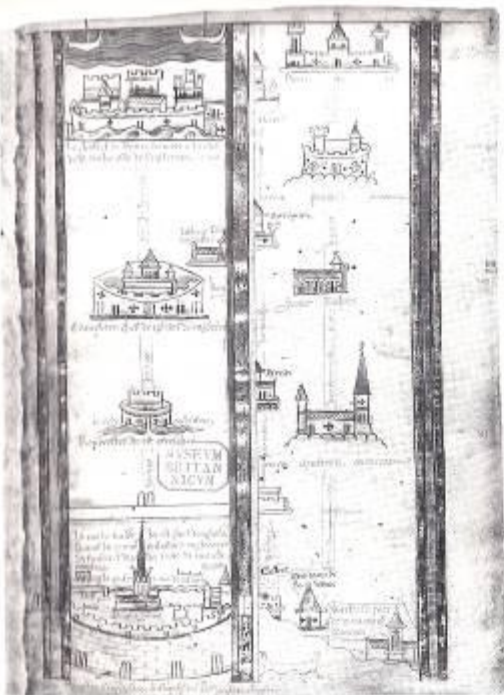


Fig. 1 Itinerary by Matthew Paris, from London to Dover.
British Library, MS Royal 14.C.VII, f. 2^r



Fig. 2 Ptolemy's second projection. From *History of Cartography*, I, Fig. 11.5



Fig. 3 England, from Jacopo Angelo's Latin translation of Ptolemy's *Geographia*.
Paris, Bibliothèque nationale, MS lat. 4802, f. 76^r



Fig. 4 The British Isles from the first printed Latin translation of Ptolemy's *Geographia* with maps by Donus (Bologna, 1477)

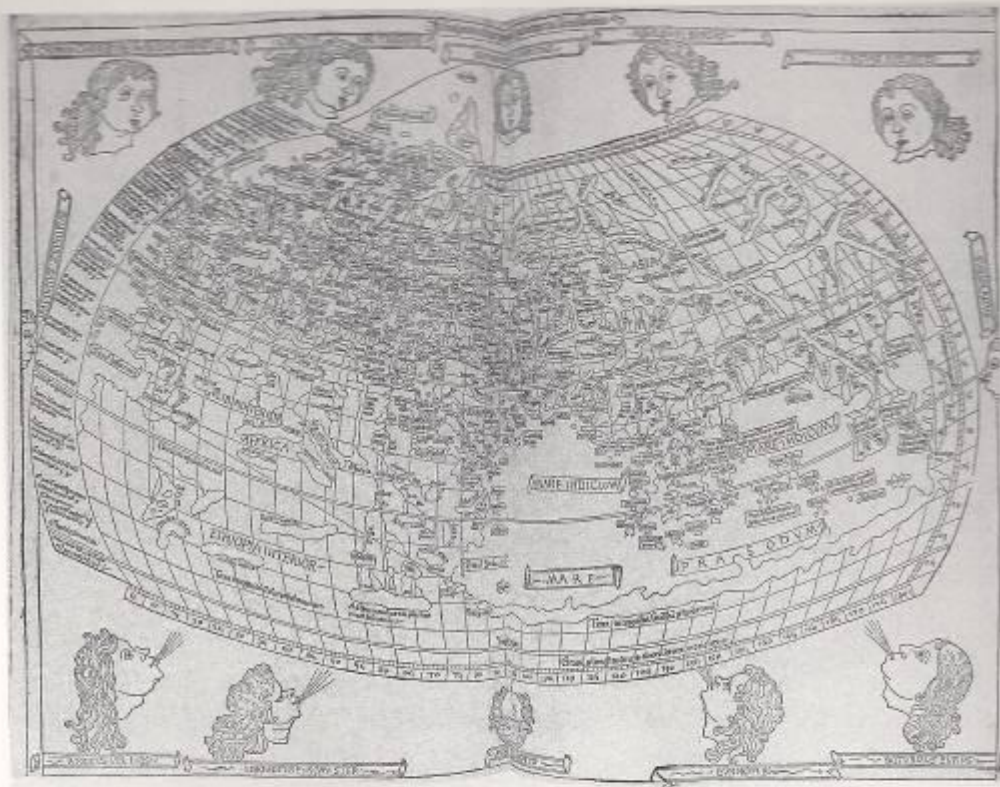


Fig. 5 Ptolemaic homeotheric projection, inspired by Donnus (Ulm, 1486)

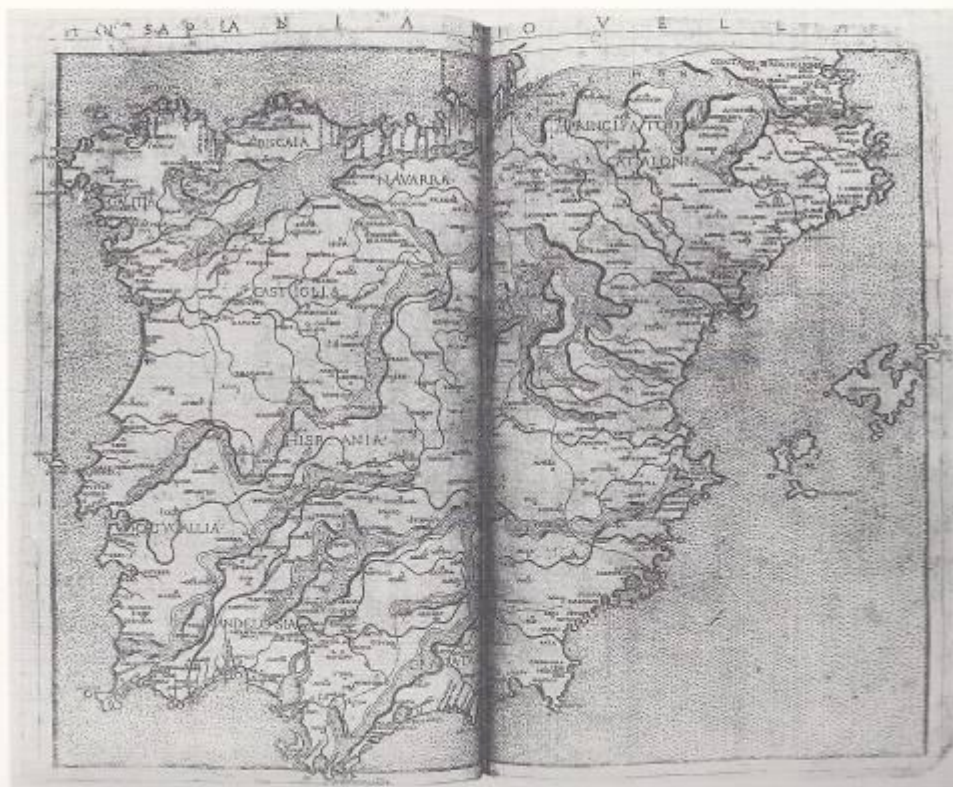


Fig. 6 Spain from Francesco di Nicolò Berlinghieri's *Geographia* (Florence, 1482)