# A Thirteenth-Century Latin List of Ptolemaic Coordinates

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*Abstract*

This article makes the argument that a Latin table of geographic coordinates, copied in Italy in the second half of the thirteenth century (MS Florence, Biblioteca Medicea Laurenziana, Ashburnham 211, fol. 260r), is derived from a list excerpted from a Greek manuscript of the Κανὼν πόλεων ἐπισήμων (« Table of important cities ») contained in Ptolemy's *Handy Tables*. Other sources that appear to bear witness to a thirteenth-century dissemination in Italy of geographic data from the Κανὼν include the *Summa de astris* of Gerard of Feltre (1264/65) and some later coordinate lists contained in fourteenth-century manuscripts.

*Key Words*

Ptolemy, *Handy Tables*, Gerard of Feltre, Greek-to-Latin translation, geographic coordinates.

Florence, Biblioteca Medicea Laurenziana, Ashburnham 211 (hereafter cited as *F*), is a parchment codex of *c.* 310 folios devoted entirely to mathematical astronomy. Its individual units include a copy of the so-called Toledan Tables (fol. 196r–265v), which were the dominant set of astronomical tables in Latin Europe between the middle of the twelfth century and *c.* 1320.[1] *F*'s rendition of these tables uses a simplified *littera textualis* that points to an origin in Italy in approximately the mid-to-late thirteenth century.[2] The hypothesis of an Italian origin receives some

[1] These tables and their canons are comprehensively surveyed and edited in *The Toledan Tables*, ed. Fritz S. Pedersen, 4 vol., C. A. Reitzel, København 2002 (Det Kongelige Danske Videnskabernes Selskab, Historisk-filosofiske Skrifter, 24.1–4). For an earlier description of the manuscript, see Cesare Paoli, *I Codici Ashburnhamiani della R. Biblioteca Mediceo-Laurenziana di Firenze*, vol. I.3, Presso i principali librai, Rome 1891 (Ministero della Pubblica Istruzione: indici e cataloghi, 8), p. 227–228.

[2] A dating of the main hand to the mid-thirteenth century was suggested in *The Toledan Tables*, ed. Pedersen, vol. III, p. 780.

support from the fourteenth-century notes on the verso-side of the front flyleaf, which mostly deal with astrology. They *inter alia* mention the books owned by Jacobus Baronis, a surgeon from Bologna, and the opinion of a certain 'magister Thadeus'. It is tempting to identify the latter with Thaddeus of Parma, who taught at Bologna in 1318–1321.[3]

A regular element of the Toledan Tables was a table showing the geographic coordinates of originally 62 localities, most of them situated in the Islamic world.[4] *F* preserves this table in something close to its standard form (fol. 250v) but juxtaposes it with a second tabular list of coordinates on the facing recto-page (fol. 251r). The first entry on this page is for Cremona (longitude 31°, latitude 45°), which is a commonly attested addition to the preceding Toledan coordinate table in manuscripts of the thirteenth and fourteenth centuries.[5] It is different with most of the localities that follow, which do not normally appear in this context. The list ranges from Great Britain (*Britania maior*) to Babylon/Babylonia (*Babilonia*) but is weighted primarily towards cities in Italy and surrounding Mediterranean regions.

Tab. 1 below reproduces this second coordinate list in accordance with the sequence and layout observed in *F*, fol. 251r. Omitted from this representation are certain notes in the left margin as well as additions from much later hands (s. XV or XVI), such as an entry for Paris (longitude 30;48°, latitude 42;50°) below the final line of the second column.

[3] GIANFRANCO FIORAVANTI, « La *Quaestio de mixtione elementorum* di Taddeo da Parma », *Archives d'histoire doctrinale et littéraire du Moyen Âge*, 83 (2016), p. 149–210, at p. 150.

[4] See the edition of this table with discussion of its offshoots and variants in *The Toledan Tables*, ed. PEDERSEN, vol. IV, p. 1509–1518 (MA11–13). For another version, see Raymond of Marseilles, *Liber cursuum planetarum*, in *Opera omnia*, vol. I, ed. and trans. MARIE-THÉRÈSE D'ALVERNY, CHARLES BURNETT, EMMANUEL POULLE, CNRS Éditions, Paris 2009 (Sources d'histoire médiévale, 40), p. 198–199. For discussion, see G. J. TOOMER, « A Survey of the Toledan Tables », *Osiris*, 15 (1968), p. 5–174 (134–139); ROLANDO A. LAGUARDA TRÍAS, *La ciencia española en el descubrimiento de America (las tablas de coordenadas geográficas compiladas en la España medieval)*, Casa–Museo de Colon y Seminario Americanista de la Universidad de Valladolid, Valladolid 1990 (Cuadernos Colombinos, 16), p. 64–73 (with Tab. 1 and 2); PATRICK GAUTIER DALCHÉ, *La Géographie de Ptolémée en Occident (IV$^{e}$–XVI$^{e}$ siècle)*, Brepols, Turnhout 2009 (Terrarum orbis, 9), p. 101–103.

[5] For these coordinates for Cremona, see *The Toledan Tables*, ed. PEDERSEN, vol. II, p. 434–435 (canons Cb140); vol. III, p. 1004 (BD20), 1109 (BH13), 1213 (CF11.A); *Liber erarum* (appendix), ed. and trans. in C. PHILIPP E. NOTHAFT, *Medieval Latin Christian Texts on the Jewish Calendar: A Study with Five Editions and Translations*, Brill, Leiden 2014 (Time, Astronomy, and Calendars: Texts and Studies, 4), p. 124–125.

| Tabula longitudinum civitatum ab occidente et latitudinum earum ab equatore | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Nomina civitatum | longitudo | | latitudo | | | Nomina civitatum | longitudo | | latitudo | |
| | gradus | minuta | gradus | minuta | | | gradus | minuta | gradus | minuta |
| Cremona | 31 | 0 | 45 | 0 | | Babilonia | 78 | 0 | 32 | 0 |
| Pise | 33 | 30 | 42 | 30 | maior | Armenia | 71 | 30 | 39 | 0 |
| Reate | | | 41 | 30 | | Mesopotamia | 72 | 30 | 37 | 30 |
| Tarrachina | 37 | 30 | 41 | 20 | | Arabia deserti | 73 | 6 | 35 | 12 |
| Neapolis | 43 | 20 | 40 | 0 | | Bassus | 64 | 3 | 35 | |
| Tarentum | 41 | 30 | 40 | 0 | insula eq[i] | Cesaria Capadocia | 66 | 30 | 39 | 30 |
| Brundisium | 42 | 30 | 39 | 0 | | Barut | 67 | 30 | 33 | 0 |
| Ancona | 36 | 30 | 43 | 1 | in Francia | Forum Iulii | 26 | 6 | 42 | 30 |
| Ravenna | 34 | 44 | 44 | 0 | | Sualterra | 21 | 30 | 43 | 30 |
| Aquilegia | 34 | 0 | 45 | 0 | | Valentia | 23 | | 44 | |
| Beneventum | 41 | 0 | 41 | 20 | | Tolosa | 26 | | 41 | 4 |
| Capua | 41 | 0 | 41 | 20 | Yspanie | Malachi | 8 | 30 | 37 | 6 |
| in Sicilia Liliunio | 37 | 0 | 36 | 0 | maior | Britania | 19 | 30 | 53 | |
| Siragusia | 39 | 20 | 37 | 0 | Dalmazie | Epidauros | 44 | 3 | 42 | 0 |
| Messana | 39 | 30 | 38 | 20 | | Antiochia | 68 | 30 | 35 | 30 |
| Catania | 39 | 30 | 37 | 0 | Germania | Mezza | 31 | 30 | 51 | 30 |
| Centorbium | 38 | 30 | 37 | 30 | | Vienna | 23 | 4 | 45 | |
| Segesta | 37 | 12 | 36 | 30 | | Petto | 37 | | 45 | 30 |
| Doracium | 45 | 0 | 40 | 0 | | | | | | |
| Salonichium | 49 | 30 | 43 | 0 | | | | | | |
| Athena | 52 | 30 | 37 | 0 | | | | | | |
| Corinthium | 51 | 4 | 36 | 30 | | | | | | |
| Lacedemonia | 53 | | 35 | 30 | | | | | | |
| Corcina | 54 | 15 | 34 | 30 | | | | | | |
| Alexandria Egipti | 60 | 30 | 31 | 0 | | | | | | |
| Napata | 63 | 0 | 24 | 0 | | | | | | |
| Nicomidia | 57 | 0 | 42 | 30 | | | | | | |
| Nichea | 57 | 0 | 41 | 0 | | | | | | |
| Ephesus | 57 | 30 | 37 | 0 | | | | | | |
| Constantinopolis | 56 | 0 | 43 | 0 | | | | | | |

Tab. 1: table of geographic coordinates in MS Florence, Biblioteca Medicea Laurenziana, Ashburnham 211, fol. 260r

In order to facilitate further analysis, Tab. 2 reorders the localities in Tab. 1 alphabetically—with the aforementioned exception of Cremona, which is omitted—and compares their coordinates with those in Ptolemy's *Geography* as well as in the Κανὼν πόλεων ἐπισήμων (« Table of important cities ») included in the Ptolemaic *Handy Tables* (Πρόχειροι κανόνες).[6] It also includes the Greek names these Ptolemaic sources use for the same localities and adds to them modern place names for the sake of identification. In a number of cases, the coordinates in *F* are

[6] For the *Geography*, I rely on Claudius Ptolemy, *Handbuch der Geographie*, ed. Alfred Stückelberger, Gerd Graßhoff, 2 vol., Schwabe, Basel 2006. For the Κανὼν, I have used the edition and German translation by Lutz Koch and Florian Mittenhuber included in Alfred Stückelberger, Florian Mittenhuber (eds.), *Klaudios Ptolemaios: Handbuch der Geographie; Ergänzungsband mit einer Edition des* Kanons bedeutender Städte, Schwabe, Basel 2009, p. 152–215.

accompanied by italicized capital letters. These are there to indicate parallel attestations in the following Latin manuscripts, to which I shall return later:

*M* = Montpellier, Bibliothèque Interuniversitaire, Section Médecine, H 323, fol. 1v (s. XIV$^{1/2}$)

*P* = Paris, Bibliothèque de l'Arsenal, 877, fol. 75r (s. XIII/XIV; Italian)

$V_1$ = Vienna, Österreichische Nationalbibliothek, 2288, fol. 37v (s. XIV; Italian)

$V_2$ = Vienna, Österreichische Nationalbibliothek, 5311, fol. 131v–132r (s. XIV)

| | | *F* | | *Geography* | | Κανὼν | |
|---|---|---|---|---|---|---|---|
| 1 | Alexandria Egipti (Ἀλεξάνδρεια/Alexandria) | 60;30° | 31° | 60;30° | 31° | 60;30° | 31° |
| 2 | Ancona (Ἀγκών/Ancona) | 36;30° *MPV*$_1$ | 43;1° *MPV*$_1$ | 36;30° | 43;40° | 36;30° | 43;20° |
| 3 | Antiochia (Ἀντιὸχεια/Antakya) | 68;30° *MP* | 35;30° *MP* | 69° | 35;30° | 69° | 35;30° |
| 4 | Aquilegia (Ἀκυληία/Aquileia) | 34° *MPV*$_1$*V*$_2$ | 45° *MPV*$_1$*V*$_2$ | 34° | 45° | 34° | 45° |
| 5 | Arabia deserti (Θάψακος/Thapsacus) | 73;6° *V*$_2$ | 35;12° (25;12° *V*$_2$) | 73;10° | 35;05° | 73;30° | 35;05° |
| 6 | Armenia maior (Κολχίς/Kolchis) | 71;30° | 39° | 75;30° | 39° | 71;30° | 39° |
| 7 | Athena (Ἀθῆναι/Athens) | 52;30° *V*$_2$ | 37° *V*$_2$ | 52;45° | 37;15° | 52;40° | 37;15° |
| 8 | Babilonia (Βαβυλών/Babylon) | 78° | 32° | 79° | 35° | 79° | 35° |
| 9 | Barut (Βηρυτός/Beirut) | 67;30° | 33° | 67;30° | 33;40° | 67;30° | 33;20° |
| 10 | Bassus (Πάφος/Paphos) | 64;3° | 35° | 64;20° | 35;10° | 64;20° | 35;10° |
| 11 | Beneventum (Βενεβέντον; Benevento) | 41° *MPV*$_1$*V*$_2$ | 41;20° *PV*$_1$*V*$_2$ (41° *M*) | 41° | 41;20° | 41° | 41;20° |
| 12 | Britania (maior) (Νοιόμαγος/Chichester) | 19;30° | 53° | 19;45° | 53;25° | 19;45° | 53° |
| 13 | Brundisium (Βρεντέσιον/Brindisi) | 42;30° *PV*$_2$ (42;3° *M*) | 39° *PV*$_2$ (30° *M*) | 42;30° | 39;40° | 42;30° | 39;50° |
| 14 | Capua (Καπύη/S. Maria Capua Vetere) | 41° *MPV*$_1$*V*$_2$ | 41;20° *MPV*$_1$*V*$_2$ | 40° | 41;10° | 40° | 41;20° |
| 15 | Catania (Κατάνε/Catania) | 39;30° *MPV*$_2$ | 37° *MPV*$_2$ | 39;35° | 37;40° | 39;55° | 37;25° |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 16 | Centorbium (Κεντούριπαι/Centuripe) | 38;30° *MP* | 37;30° *MP* | 38;30° | 37;45° | 38;30° | 37;50° |
| 17 | Cesaria Capadocia (Μάζακα ή και Καισάρεια/Kayseri) | 66;30° | 39;30° | 66;30° | 39;30° | 66;30° | 39;30° |
| 18 | Constantinopolis (Βυζάντιον/Istanbul) | 56° | 43° | 56° | 43;5° | 56° | 43;5° |
| 19 | Corint (Κόρινθος/Corinth) | 51;4° $V_2$ | 36;30° (30;30° $V_2$) | 51;15° | 36;55° | 51;15° | 36;50° |
| 20 | Doracium (Δυρράκιον/Durrës) | 45° | 40° | 45° | 40;50° | 45° | 40;35° |
| 21 | Ephesus (Ἔφεσος/Ephesus) | 57;3° (57;30° $V_2$) | 37° | 57;40° | 37;40° | 57;40° | 37;40° |
| 22 | Epidaurus (Ἐπίδαυρος/Cavtat) | 44;3° | 42° | 44;40° | 42;20° | 44;20° | 42;20° |
| 23 | Forum Iulii (Φόρος Ἰούλιος/Fréjus) | 26;6° | 42;30° | 26;30° | 42;45° | 26;10° | 42;45° |
| 24 | Gortina (Γόρτυνα/Gortyn) | 54;15° | 34;30° | 54;15° | 34;50° | 54;15° | 34;20° |
| 25 | Lacedemonia (Λακεδαίμων/Sparta) | 53° | 35;30° | 50;15° | 35,30° | 50;15° | 35;15° |
| 26 | Liliunio (Λιλύβαοιν/Marsala) | 37° *MP* | 36° *MP* | 37° | 36° | 37° | 36° |
| 27 | Malachi (Μαλάχη/Málaga) | 8;30° | 37;6° | 8;50° | 37;10°[7] | 8;50° | 37;30° |
| 28 | Mesopotamia (Ἔδεσσα/Edessa) | 72;30° $V_2$ | 37;30° $V_2$ | 72;30° | 37;30° | 72;30° | 37;30° |
| 29 | Messana (Μεσσήνη; Messina) | 39;30° *MP* | 38;20° *MP* | 39;30° | 38;30° | 39;30° | 38;20° |
| 30 | Mezza (Ἄμισα/Ameisia) | 31;30° *MP* | 51;30° *MP* | 31;30° | 51° | 31;30° | 51;30° |
| 31 | Napata (Νάπατα/Napata) | 63° | 24° | 63° | 20;15° | 63° | 20;15° |
| 32 | Neapolis (Νεάπολις/Naples) | 43;20° $MV_1$ (36° $PV_2$) | 40° $MPV_1V_2$ | 40° | 40;30° | 40° | 40;35° |
| 33 | Nicaea (Νίκαια/Iznik) | 57° | 41° | 58° | 42;15° | 57° | 41;35° |
| 34 | Nicomedia (Νικομήδεια/Izmit) | 57° | 42;30° | 57;20° | 42;30° | 57° | 44;30° |
| 35 | Petto (Ποτοούιον/Ptuj) | 37° | 45;30° | 37;40° | 45;30° | 38;20° | 45;30° |
| 36 | Pise | 33;30° *MP* | 42;30° *MP* | 33;30° | 42;45° | 33;10° | 42;45° |

[7] This is a variant found in some manuscripts.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | (Πεῖσαι/Pisa) | | | | | | |
| 37 | Ravenna (Ῥάβεννα/Ravenna) | 34;44° $MPV_1$ | 44° $MPV_1$ | 34;40° | 44° | 34;20° | 44° |
| 38 | Reate (?) | 35° *P (om. F)* | 41;30° *P* | | | | |
| 39 | Salonichium (Θεσσαλονίκη/Thessaloniki) | 49;30° | 43° | 49;50° | 40;20° | 49;20° | 40;20° |
| 40 | Segesta (Σεγέστα/Segesta) | 37;12° *MP* | 36;30° *P* (36° *M*) | 37;10° | 36;30° | 37;5° | 36;30° |
| 41 | Sualterra (Βετερραί/Béziers) | 21;30° $V_2$ | 43;30° $V_2$ | 21;30° | 43;30° | 21;30° | 43;30° |
| 42 | Siragusia (Σουράκουσαι/Syracuse) | 39;20° $MPV_1V_2$ | 37° $MPV_1V_2$ | 39;30° | 37;15° | 39;30° | 37° |
| 43 | Tarentum (Τάρας/Tarent) | 41;30° *MP* | 40° *MP* | 42;10° | 40° | 41;30° | 40° |
| 44 | Tarrachina (Ταρρακεῖναι/ Terracina) | 37;30° | 41;20° | 37;45° | 41;15° | 37;45° | 41;15° |
| 45 | Valentia (Οὐαλεντία/Valence) | 23° | 44° | 23° | 44;20° | 23° | 44;20° |
| 46 | Vienna (Οὐίεννα/Viennes) | 23;4° | 45° | 23° | 45° | 23° | 45° |

Tab. 2: the coordinates in *F* compared with Ptolemaic sources

Leaving aside Cremona, which may be considered as still belonging to the preceding table, *F*'s second list of coordinates comprises 46 entries, only 11 of which show a perfect correspondence with the coordinates in one or both of the two Ptolemaic sources.[8] In most of the remaining cases, however, the divergent numbers in *F* are explicable as straightforward corruptions of Ptolemaic data.

A relatively frequent type of error in *F* concerns the minutes of arc, as Ptolemy's multiples of 5 are here repeatedly reduced to low figures such as 3, 4, or 6. These transformations are rooted in the alphanumeric system used in Greek numerical tables, where, for instance, the letter γ ordinarily denotes 3, but in the case of degree values can also be used to indicate 0;20° or 1/3 of a degree. Confusion between these two possible uses of an individual letter offers the best explanation of cases such as *Bassus*/Paphos, to which Ptolemy assigned a longitude ξδ γ′ = 64;20°. The compiler responsible for the data in *F* misread this as meaning 64;3°. In the two cases of the longitude of Segesta and the latitude of *Arabia deserti*, ιβ′ meaning 1/12 of a degree or 0;05°, was misconstrued as 0;12°. Analogous explanations account for discrepancies in *F*'s coordinates for Corinth, Ephesus, *Epidaurus*/Cavtat, and *Forum Iulii*/Fréjus.

[8] These are the entries for Alexandria, Aquilegia, Armenia maior, Beneventum, Cesaria Capadocia, Liliunio, Messana, Mezza, Mesopotamia, Sualterra, Tarentum.

In the case of the longitude of Napata, the letter-number representing the minutes of arc was misinterpreted as being part of the full number of degrees, thus turning Ptolemy's κ δ′ = 20;15° into 24°. The same happened with the letter γ in the case of the latitude of *Salonichium*/Thessaloniki, occasioning a change from 40;20° to 43°. A similar mistake may have occurred in the case of *Lacedemonia*/Sparta, where the longitude in *F* is shown as 53° instead of 50;15°. Here the original reading of ν δ′ was perhaps mis-transcribed as ν γ′ and then interpreted as νγ = 53°. Another special case is *Neapolis*/Naples, where *F* swaps the Ptolemaic coordinate values for longitude and latitude. The Κανὼν's latitude of 40;35° here reappears as a longitude of 43;20°, which may have been the result of reading or mistranscribing μ γδ′ as μγ γ′.

A second class of variants that is rooted in Greek alphanumeric notation is exemplified by the reduction of the latitude of *Forum Iulii*/Fréjus from 42;45° to 42;30°. This is the result of omitting the final letter in μβ Lδ′ (i.e., 42 ½ ¼), shortening the value to just μβ L′ (i.e., 42 ½). By the same token, the longitude of Athens was diminished from 52;40° (νβ Lς′) to 52;30° and that of Ephesus from 57;40° (νζ γο′) to 57;3°. Further examples of this general pattern are the alteration of the longitude of *Malachi*/Málaga from 8;50° to 8;30°, that of *Terrachina*/Tarracina from 37;45° to 37;30°, and that of *Britania maior* from 19;45° to 19;30°. Likewise, the latitude of *Centorbium*/Centuripe changed from 37;50° to 37;30°, that of Corinth from 36;50° to 36;30°, that of *Gortina*/Gortyn from 34;50° to 34;30°, that of Pisa from 42;45° to 42;30°. There is one instance, Catania, where the change from 39;55° (λθ Lγιβ′) to 39;30° would have required dropping three letters. In numerous other cases (latitudes or longitudes of Athens, Beirut, Paphos, Brindisi, Catania, Constantinople, *Doracium*/Durrës, Ephesus, *Epidaurus*/Cavtat, Naples, Nicaea, *Petto*/Ptuj, and Valence) the minutes of arc have been dropped entirely.

A singular type of discrepancy occurs in the case of *Babilonia*, where *F* decreases Ptolemy's 79° (long.) and 35° (lat.) to 78° and 32°. The resulting values are equal to those listed in al-Battānī's *Ṣābi' Zīj* for the region of Babylonia, which may suggest contamination.[9] Otherwise, the various errors exhibited by *F*'s coordinates can be taken as cumulative evidence that the list in question was compiled from a Greek source by a scribe not wholly at home in the notation used. The most likely candidate overall for this Greek source would seem to be a copy of the Κανὼν, presumably (but not necessarily) included in a manuscript of the *Handy Tables*. A check of the 46 localities in Tab. 2 against the 2009 critical edition of the Κανὼν by

[9] AL-BATTĀNĪ, *Opus astronomicum*, ed. CARLO ALFONSO NALLINO, 3 vol., Hoepli, Milan 1899–1907 (Pubblicazioni del Reale osservatorio di Brera in Milano, 40), vol. II, p. 35 (no. 67). Al-Battānī's entry for the city of Babylon (as opposed to the region) retains Ptolemy's coordinates. See ibid., vol. II, p. 43 (no. 171).

Koch and Mittenhuber has left only a single entry, that for *Reate*, unidentified and unaccounted for.

In the remaining four cases where entries in our list concern a region rather than a city/town – *Britania maior*, *Armenia maior*, *Arabia deserti*, and *Mesopotamia* – the compiler appears to have taken the corresponding coordinates from one of the cities that Ptolemy's Κανὼν assigns to the region in question. Thus, *Arabia deserti*'s coordinates in *F* match those of Thapsacus, which is indeed the first entry under this region in the Κανὼν. The same conflation between the region and its first sub-entry arose in the case of *Mesopotamia*/Edessa. A trickier case is *Britania maior*, as none of the places assigned to this island in the Κανὼν have the specified coordinates of 19;30° (long.) and 53° (lat.). The closest candidate is Noviomagos/Chichester, whose longitude is 19;45° could have been reduced to 19;30° by omitting a final δ.

Overall, the entries in Tab. 2 include ten cases where the numbers in *F* agree with the current critical edition of the Κανὼν against the *Geography*. This figure includes instances where reversing a transcription error in *F*'s data along the lines suggested above leads to a value attested in the Κανὼν rather than the *Geography*. For example, the faulty longitude for *Forum Iulii*, 26;6° is more easily explained as deriving from 26;10° (κς ς'), as attested in the Κανὼν than from the *Geography*'s value of 26;30°.

Conversely, there are eight instances where *F*'s data conform to the *Geography* rather than the Koch/Mittenhuber edition of the Κανὼν. In the case of *Nicomedia*/Izmit, it is not surprising that *F* agrees with the *Geography*'s 42;30° rather than with the 44;30° marked as corrupt by Koch/Mittenhuber. There are also matches between *F* and the *Geography* when it comes to the latitude of *Lacedemonia*/Sparta and Pisa. Moreover, the erroneous longitudinal coordinate of *Arabia deserti*, 73;6°, is more plausibly explained as an error for 73;10°, as in the *Geography*, than 73;30°. An analogous case can be made for *Malachi*/Málaga, where *F*'s latitude of 37;6° points to an original value of 37;10°, which is attested as a variant in the transmission of the *Geography*. *Gortina*/Gortyn has a latitude of 34;30°, which could have arisen more easily from 34;50° (*Geography*) than from 34;20° (Κανὼν).[10] The same applies to the latitude of *Salonichium*/Thessaloniki, which *F* gives as 49;30° compared to the *Geography*'s 49;50° and the Κανὼν's 49;20°. Finally, *Petto*/Ptuj's longitude of 37° looks like a corruption of the *Geography*'s 37;40°, more so than the Κανὼν's 38;20°.

Although worth noting, these examples are by themselves insufficient to support the conclusion that the list in *F* was extracted directly from the *Geography*. Reasons for discounting the *Geography* as a source are provided by its history of

[10] As the variant noted by the editors suggests, however, 34;50° (λδ Lγ') was probably found in at least one manuscript of the Κανὼν. See p. 71 in the edition by Koch/Mittenhuber (see fn. 6).

transmission. According to our present state of knowledge, the earliest extant Greek copies of the *Geography* were made in the 1290s, following a 're-discovery' of Ptolemy's work by Maximus Planudes.[11] But it was not until 1397, or shortly thereafter, that the first Greek manuscript of the *Geography* arrived in Florence, thus paving the way for its Latin reception.[12] *F* is about a century too early to be explicable by this particular act of transmission.

The situation looks somewhat more promising if we assume that the compiler behind *F*'s second list used the Κανὼν originally contained in the *Handy Tables*, the earliest Greek copy of which dates from the mid-eighth century.[13] This manuscript, which is now MS Vatican City, Biblioteca Apostolica Vaticana, Vat. gr. 1291, arrived in Italy at some unknown point before 1465, as documented by an owner's note on fol. 4v.[14] While the *Vaticanus* contains an unmutilated copy of the Κανὼν (fol. 17v–21v), it does not list all of the places found in *F*.[15] Missing from it are *Arabia deserti*/Thapsacus, *Armenia maior*/Kolchis, Béziers, Beirut, *Britania maior*/Chichester, *Epidaurus*/Cavtat, Fréjus, Pisa, and Valence, which represent later additions to the Κανὼν's core list of 367 localities.

Most of these missing entries are present in a ninth-century copy of the *Handy Tables*, MS Leiden, Universiteitsbibliotheek, BPG 78, fol. 66r–73v (*c.*820), which omits some sections of the Κανὼν owing to an incomplete exemplar.[16] Two entries not found here are *Armenia maior*/Kolchis and *Arabia deserti*/Thapsacus, which instead appear in MS Florence, Biblioteca Medicea Laurenziana, Plut. 28.26,

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11 On the Greek manuscript transmission, see Renate Burri, *Die ›Geographie‹ des Ptolemaios im Spiegel der griechischen Handschriften*, de Gruyter, Berlin 2013 (Untersuchungen zur antiken Literatur und Geschichte, 110); Olivier Defaux, *The Iberian Peninsula in Ptolemy's Geography: Origins of the Coordinates and Textual History*, Edition Topoi, Berlin 2017 (Berlin Studies of the Ancient World, 51), p. 57–126.

12 On the arrival of the first Greek manuscript of the *Geography* in Florence, see Patrick Gautier Dalché, « The Reception of Ptolemy's *Geography* (End of the Fourteenth to Beginning of the Sixteenth Century) », in David Woodward (ed.), *The History of Cartography*, vol. III: *Cartography in the European Renaissance*, University of Chicago Press, Chicago 2007, p. 285–364 (287–290); Gautier Dalché, *La Géographie*, p. 145–160.

13 Florian Mittenhuber, Lutz Koch, « Der handschriftliche Bestand des ptolemäischen *Kanons bedeutender Städte* und sein Verhältnis zur *Geographie* », *Museum Helveticum*, 66 (2009), p. 29–58. See also Anne Tihon, « Les *Tables faciles* de Ptolémée dans les manuscrits en onciale (IX$^{e}$–X$^{e}$ siècles) », *Revue d'histoire des textes*, 22 (1992), p. 47–87.

14 David H. Wright, « The Date of the Vatican Illuminated Handy Tables of Ptolemy and of its Early Additions », *Byzantinische Zeitschrift*, 78 (1985), p. 355–362; Dieter Blume, Mechthild Haffner, Wolfgang Metzger, *Sternbilder des Mittelalters: Der gemalte Himmel zwischen Wissenschaft und Phantasie*, vol. I: *800–1200*, Akademie-Verlag, Berlin 2012, p. 469–476.

15 A transcription is found in Ernst Honigmann, *Die sieben Klimata und die ΠΟΛΕΙΣ ΕΠΙΣΗΜΟΙ: Eine Untersuchung zur Geschichte der Geographie und Astrologie im Altertum und Mittelalter*, Winter, Heidelberg 1929, p. 193–208.

16 For a transcription, see Honigmann, *Die sieben Klimata*, p. 209–224.

fol. 51r–54r, an incomplete fourteenth-century copy of the Κανὼν inserted into a ninth-century codex. It gives the same corrupt value for the longitude of Kolchis (71;30° instead of 75;30°) as found in *F*. It would appear, then, that the second coordinate table in *F* ultimately stems from a Greek copy of the Κανὼν that was related to a shared ancestor of the *Leidensis* and *Laurentianus*.

The transfer of Ptolemaic geographic data from Greek into Latin that gave rise to *F*'s second list has left traces also in some other astronomical manuscripts of the later Middle Ages, as seen from the sigla added in Tab. 2. A particularly extensive selection from *F*'s Ptolemaic coordinates can be encountered in *P*, where they were added by a contemporary hand to a late thirteenth-century copy of the familiar Toledan coordinate list. These additions comprise 19 consecutive entries, the first 17 of which represent a continuous block from the left column of Tab. 1, from Pisa to Segesta. The scribe added two more entries from the second column, *Antiochia* and *Mezza* (which is here spelled *Metza*). A noteworthy feature of *P*'s list is that it supplies the longitude of *Reate* (here spelled *Reace*) that is missing from *F*, giving it as 35;0°. In the case of *Neapolis*/Naples, the original longitude was erased and replaced with 36°.

*M* is a coordinate table from the first half of the fourteenth century recording a total of 39 localities. Its first 19 entries differ from the additions in *P* only insofar as *Reate* and *Tarrachina* are omitted and *Antiochia* and *Mezza* are separated from the rest by two intruders stemming from the conventional Toledan list (*Tyrus* and *Karmelus*).

*F*'s coordinates for Ancona, Naples, Ravenna, Benevento, Aquileia, Syracuse, and Capua are all preserved identically in $V_1$, an eclectic fourteenth-century list of geographic coordinates boasting 51 entries. A large share of its entries refers to localities in Italy, which matches this manuscript's likely region of origin.[17]

The tables in $V_2$ assemble over 150 sets of coordinates copied in the mid-to-late fourteenth century.[18] Coordinates identical or close to those in *F* are here offered for Antioch, Aquileia, A*rabia deserta*, *Armenia maior*, Athens, Benevento, Brindisi, [Cesaria] *Capadocia*, Capua, Catania, Corinth, Ephesus, Mesopotamia, and *Sualterra*/Béziers. For Naples, we find the same altered longitude as in *P* (36°).

[17] This table is reproduced in José Chabás, Bernard R. Goldstein, *A Survey of European Astronomical Tables in the Late Middle Ages*, Brill, Leiden 2012 (Time, Astronomy, and Calendars: Texts and Studies, 2), p. 202.

[18] Brief remarks on fol. 132r appear in Fuat Sezgin, *Geschichte des arabischen Schrifttums*, vol. 10, *Mathematische Geographe und Kartographie im Islam und ihr Fortleben im Abendland: Historische Darstellung, Teil 1*, Institut für Geschichte der Arabisch-Islamischen Wissenschaften, Frankfurt am Main 2000, p. 248. For a description of the codex, see David Juste, « MS Vienna, Österreichische Nationalbibliothek, 5311 » (update: 24.01.2022), Ptolemaeus Arabus et Latinus. Manuscripts, URL = http://ptolemaeus.badw.de/ms/237.

While *F* preserves a much fuller set of Ptolemaic coordinates than any of the other manuscripts just mentioned, there are no good reasons to consider this manuscript the point of origin of the Latin list reproduced in Tab. 1. Circumstantial evidence pointing towards an earlier archetype is offered by the *Summa de astris*, a lengthy treatise on astronomy and astrology in three books by the Italian Dominican Gerard of Feltre. The work contains a description of the great comet of July/October 1264 (bk. 1, dist. 23, c. 2) and repeatedly refers to 1264 as the present year (bk. 1, dist. 2 and 11). A reference to the beginning of the Arabic lunar year on 12 October 1265 in the future tense (bk. 1, dist. 1: *incipiet annus Arabum*) indicates that Gerard had finished writing before this date.[19]

The first book includes a section on geographic latitude (bk. 1, dist. 8), to which Gerard added a tabular list of the coordinates of *c.*40 localities, apparently drawn from a variety of sources. In most copies, this list concludes with Antioch, Brindisi, Syracuse, Ravenna, and Ancona.[20] The longitude is in each instance the same as in *F*, even in the case of Ravenna, where Gerard's list reproduces the conspicuously erroneous value of 34;44°. His latitudes, however, are different. According to the thirteenth-century copy of the *Summa* in MS Milan, Biblioteca Ambrosiana, C 245 inf., fol. 7r, Antioch is at 51;30° (here corrected from 53;30°; *F*: 35;30°), Brindisi at 43° (*F*: 39°), Syracuse at 38;20° (*F*: 37°), Ravenna at 45° (*F*: 44°), and Ancona at 44° (*F*:

[19] The *Summa de astris* is extant in the following MSS: Bologna, Biblioteca Universitaria, A 593, fol. 1r–96v (bk. 1–3.23; s. XIII$^{2/2}$); Kraków, Biblioteka Jagiellońska, 610, fol. 295r–311r (bk. 1; s. XV); London, Wellcome Library, 308, fol. 1r–115v (bk. 1–2; s. XV$^{2/2}$); Milan, Biblioteca Ambrosiana, C 245 inf., fol. 1ra–45rb (bk. 1–2.6, 3.10–end; s. XIII$^{ex}$); Paris, Bibliothèque nationale de France, lat. 7434, fol. 1r–12v (bk. 1.12 [end]–2.3 [beginning]; s. XIII$^{2/2}$); Vatican City, Biblioteca Apostolica Vaticana, Vat. lat. 3097, fol. 23r–50v (bk. 3; s. XIV$^{2/2}$); Vatican City, Biblioteca Apostolica Vaticana, Pal. lat. 1388, fol. 37r–110r (bk. 1–2; a. 1478). The two prologues and dist. 19 of bk. 3 are reproduced and discussed in Martin Grabmann, « Die 'Summa de astris' des Gerhard von Feltre O.P. », *Archivum Fratrum Praedicatorum*, 11 (1941), p. 51–82, repr. as chapter 13 in idem, *Mittelalterliches Geistesleben: Abhandlungen zur Geschichte der Scholastik und Mystik*, vol. 3, Hueber, Munich 1956, p. 254–272. Dist. 23 of bk. 1 is edited in Lynn Thorndike, *Latin Treatises on Comets between 1238 and 1368 A.D.*, University of Chicago Press, Chicago 1950, p. 190–195. The contents of bk. 3 are summarized in Thorndike, « A Hitherto Unnoticed Criticism of Astrology: *Liber de reprobatione iudiciorum astrologiae* », *Isis*, 31 (1939), p. 68–78 (without knowledge of Gerard's authorship); Maria Sorokina, « Un tournant dans la critique de l'astrologie? La *Summa de astris* de Gérard de Feltre », *Philosophical Readings*, 7 (2015), p. 71–92. Further discussions of this work appear in Thorndike, *Latin Treatises*, 185–190; Paola Zambelli, *The* Speculum Astronomiae *and Its Enigma: Astrology, Theology and Science in Albertus Magnus and his Contemporaries*, Kluwer, Dordrecht 1992 (Boston Studies in the Philosophy of Science, 135), p. 51–59; Maria Sorokina, « Une source inconnue de la *Disputatio contra iudicium astrologorum* de Marsile Ficin: la *Summa de astris* de Gérard de Feltre », *Bruniana & Campanelliana*, 21 (2015), p. 169–189; Sorokina, *Les sphères, les astres et les théologiens: l'influence céleste entre science et foi dans les commentaires des Sentences (v. 1200–v. 1340)*, 2 vol., Brepols, Turnhout 2021 (Studia Sententiarum, 5), vol. I, p. 398, 440–444, 450.

[20] MSS Milan, Biblioteca Ambrosiana, C 245 inf., fol. 7r; Cracow, Biblioteka Jagiellońska, 610, fol. 301v; London, Wellcome Library, 308, fol. 30r–v; Vatican City, Biblioteca Apostolica Vaticana, Pal. lat. 1388, fol. 56v.

43;1°). Gerard's list also includes the coordinates of Pisa, for which it gives the same latitude as *F* but shortens the longitude to 33° (*F*: 33;30°). Another noteworthy item on this list is Zaragoza (*Cesaraugusta*), which according to Gerard has a longitude of 14;30° and a latitude of 41;30°. These values correspond exactly to those in the Ptolemaic Κανὼν, which raises the possibility that they were also included in the archetype that preceded *F*.

A possible sign of Gerard's influence on later geographic lists is the inclusion of the same set of Zaragoza coordinates in $V_2$. One can also find stand-alone copies of his list in two Italian manuscripts: Vatican City, Biblioteca Apostolica Vaticana, Barb. lat. 303, fol. 4v (s. XIV) and Vienna, Österreichische Nationalbibliothek, 3124, fol. 148r (s. XV). The latter codex offers an augmented rendition of Gerard's list, whose additions include Naples, Capua, and Catania. In each case, the coordinates given here are identical to those in *F*.

To summarize: the tables of geographic coordinates in *F* (fol. 250v–251r) confront us with a hitherto unknown case of a medieval Greek-to-Latin transfer of material stemming from the Κανὼν πόλεων ἐπισήμων in Ptolemy's *Handy Tables*. This transfer appears to have taken place before 1264 and continued to influence Latin coordinate tables and lists well into the fourteenth century. The Ptolemaic Κανὼν would have been of interest to Latin astronomers for covering far more of the (Greek and Latin) Christian world than did the Islamic list known from the Toledan Tables, which may explain the juxtaposition of Toledan and Ptolemaic data one witnesses in *F*. At the same time, one should consider the possibility that the second list in *F* descends from a more extensive Latin list of Ptolemaic coordinates that originally circulated independently from the Toledan Tables. The presence of Zaragoza in a geographic table compiled by Gerard of Feltre in 1264/65 would seem to point in this direction. Whether this larger list was itself assembled for astronomical purposes, or for some other reason (possibly cartographic), remains a matter of speculation.

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