Pseudo-Māshā'allāh
On the Astrolabe

Part IV: *Practica*
Critical Edition
with English Translation
by

Ron B. Thomson

Version 1.7

Toronto, 2022

Proper citation of this work:

      Pseudo-Māshāʾallāh, *On the Astrolabe*, ed. Ron B. Thomson, version 1.7 (Toronto, 2022)

Note:
      A printed and bound version of the finished edition, in 2 volumes, is available from Volumes Publishing, Waterloo, Ontario, Canada.

      www.volumesdirect.com

      ISBN: 978-1-7782705-2-9

TEXT AND TRANSLATION

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Sigla

Aα   Assisi, Biblioteca del Sacro Convento, Fondo Antico Communale, ms. 174, ff. 105^r-113^v

Bβ   Bamberg, Staatsbibliothek., ms. Class. 84, ff. 121^r-125^r

Bγ   Berlin, Staatsbibliothek zu Berlin - Preussischer Kulturbesitz, ms. lat. fol. 610, ff. 63^r-82^r

Bδ   Berlin, Staatsbibliothek zu Berlin - Preussischer Kulturbesitz, ms. lat. fol. 192, ff. 29^r-32^r

Bε   Berlin, Staatsbibliothek zu Berlin - Preussischer Kulturbesitz, ms. lat. fol. 246, ff. 32^r-38^v

Bε$_1$ Berlin, Staatsbibliothek zu Berlin - Preussischer Kulturbesitz, ms. lat. fol. 246, f. 59^r

Bζ   Basel, Öffentliche Bibliothek der Universität Basel, ms. F-III-25, ff. 26^v-40^r, 41^r

Bη   Bernkastel-Kues, St. Nikolaus-Hospetals, Bibliothek, ms. 212, ff. 118^r-122^r; 124^r-126^v

Bθ   Bologna, Biblioteca Universitaria, ms. 132 (154), ff. 98^r-119^v

Bι   Brugge, Openbare Bibliotheek Biekorf, ms. 522, ff. 60^r-74^r

Bκ   Brno, Moravká zemská knihovna v Brně, ms A 64, ff. 406^v-420^r

Cα   Cambridge, St John's College Library, ms. 155 (*olim* F.18), ff. 50^r-55^v

Cγ   Cambridge, Trinity College Library, ms. 567 (R.2.86), ff. 26^r-32^r

Cδ   Cambridge, University Library, ms. Hh.6.8, ff. 185^r-190^v; 193^r-196^v; 199^v

Cε   Cambridge, University Library, ms. Ii.1.13, ff. 84^v-94^v (*olim* 75^v-85^v)

Cζ$_{1,2}$ Cambridge, University Library, Additional ms. 6860, ff. 66^v-76^r; 76^r-77^r

Cη   Cambridge, University Library, ms. Ii.3.3, ff. 61^r-79^r

Cι   Cambridge, Gonville and Caius College Library, ms. 174/95, pp. 24^a-53^b

Dγ   Darmstadt, Universitäts- und Landesbibliothek, ms. 2661, ff. 146^r-168^r

Dδ   Douai, Bibliothèque Municipale, ms. 715, ff. 9^r-14^r

Dη   Dublin, Trinity College Library, ms 403 (D.2.29/502), ff. 57^r-78^r

Eα   Edinburgh, Royal Observatory, Crawford Library, ms 3.12, ff. 4^r-10^r

Eβ   Eger, Föegyházmegyei Könyvtár, ms U^2 VI 1, ff. 79r-97^v

Eγ   Edinburgh, Royal Observatory, Crawford Library, ms 5.14, ff. 8^r-8^v

Eδ   Einsiedeln, Stiftsbibliothek, ms 29 (878), pp. 103-136

Eζ   Erfurt, Universitäts- und Forschungsbibl. Erfurt/Gotha, ms Amplon. F^o 376, ff. 82^v-95^v

Eη   Erfurt, Universitäts- und Forschungsbibl. Erfurt/Gotha, ms Amplon. F^o 394, ff. 60^r-67^r

Eκ   Erfurt, Universitäts- und Forschungsbibl. Erfurt/Gotha, ms Amplon. Q^o 349, ff. 163^r-171^v

Eλ   Erfurt, Universitäts- und Forschungsbibl. Erfurt/Gotha, ms Amplon. Q^o 351, ff. 34^r-36^v

Eμ   Erfurt, Universitäts- und Forschungsbibl. Erfurt/Gotha, ms Amplon. Q^o 355, ff. 49^r-62^r

Eo   Erfurt, Universitäts- und Forschungsbibl. Erfurt/Gotha, ms Amplon. Q^o 369, ff. 184^r-190^v

Eϱ   Erfurt, Universitäts- und Forschungsbibl. Erfurt/Gotha, ms Amplon. Q^o 382, ff. 18^v-20^v

Eσ   Erfurt, Universitäts- und Forschungsbibl. Erfurt/Gotha, ms Amplon. Q^o 385, ff. 147^r-151^r

Eτ   Erfurt, Universitäts- und Forschungsbibl. Erfurt/Gotha, ms Amplon. Q^o 386, ff. 130^r-150^v

Eυ   Erlangen, Friedrich-Alexander-Universität Erlangen-Nürnberg, Universitätsbibliothek, ms. 665, ff. 9^r-26^v

Fα   Firenze, Biblioteca Nazionale Centrale, ms. II.III.24, ff. 189^r-198^r

Fβ   Firenze, Biblioteca Nazionale Centrale, ms. Con. Sop. J.II.10 ff. 197^r-216^r (189^r-208^r)

Fγ	Firenze, Biblioteca Riccardiana, ms. 689, ff. 41^r-46^v
Fε	Firenze, Biblioteca Riccardiana, ms. 868, ff. 34^r-35^v
Fζ	Firenze, Biblioteca Medicea Laurenziana, ms. Plut. XVIII sin. cod. 3, ff. 68^v-90^r
Gα	Göttingen, Niedersächsische Staats- und Universitätsbibl., ms. Theol. 124, ff. 145^r-147^v, 143^r
Kα	Karlsruhe, Badische Landesbibliothek, ms. EM 32, ff. 111^r-117^v
Kγ	Kraków, Biblioteka Jagiellońska, ms 551 (*olim* DD.III.62), ff. 30^v-32^r
Kδ	Kraków, Biblioteka Jagiellońska, ms 601 (*olim* DD.IV.5), ff. 57^v-60^v
Kε	Kraków, Biblioteka Jagiellońska, ms 715 (*olim* DD.III.11), ff. 28^v-31^r (*olim* pp. 56-64)
Kθ	Kraków, Biblioteka Jagiellońska, ms 1915 (*olim* BB.XXV.2), ff. 53^v-57^v (*olim* pp. 106-114).
Kι	Kraków, Biblioteka Jagiellońska, ms 1970 (*olim* BB.XXIII.13), ff. 1^r-6^v (*olim* pp. 1-12)
Lβ	London, British Library, ms. Arundel 268, ff. 49^r-61^r
Lγ	London, British Library, ms. Egerton 844, ff. 58^r-77^r
Lδ	London, British Library, ms. Egerton 2622, ff. 169^v-173^v
Lε	London, British Library, ms. Harley 3647, ff. 63^r-81^r
Lζ	London, British Library, ms. Royal 12.C.ix, ff. 38^r-49^v
Lη	London, British Library, ms. Royal 12.C.xvii, ff. 95^r-118^r
Lι	London, British Library, ms. Sloane 513, ff. 16^r-19^v
Lκ	London, Middle Temple, ms. 75, ff. 132^v-133^r, 136^r-140^r
Lλ	London, Wellcome Library, ms. 19, ff. 104^v-107^v (*olim* 94^v-97^v)
Lμ	Lüneburg, Ratsbücherei, ms. Misc. D.2°.11, ff. 69^v-73^v
Mα	Madrid, Biblioteca Nacional, ms. 10009, ff. 20^r-23^r
Mγ	Mantova, Biblioteca Comunale Teresiana, ms. 125, ff. 13^r-21^v
Mδ	Manchester, University of Manchester, John Rylands Library, ms. 67, ff. 218^r-231^r
Mη	Milano, Biblioteca Pinacoteca Accademia Ambrosiana, ms. H.75.Sup., ff. 34^r-51^v
Mι	Milano, Biblioteca Pinacoteca Accademia Ambrosiana, ms. M.28.Sup., ff. 92^v-97^r
Mκ	Milano, Biblioteca Pinacoteca Accademia Ambrosiana, ms. R.47.Sup., ff. 126^r-132^v; 119^v; 112^r-117^v
Mλ	Montpellier, Bibliothèque Interuniversitaire, Section Médecine, ms. H 323, ff. 74^r-98^v
Mμ	München, Bayerische Staatsbibliothek, Clm 372, ff. 227^r-235^v
Mν	München, Bayerische Staatsbibliothek, Clm 353, ff. 41^r-54^r
Mo	München, Bayerische Staatsbibliothek, Clm 572, ff. 1^r-27^v
Mπ	München, Bayerische Staatsbibliothek, Clm 588, ff. 137^v-141^r
Mτ	München, Bayerische Staatsbibliothek, Clm 10664, ff. 16^v-26^v
Mυ	München, Bayerische Staatsbibliothek, Clm 14583, ff. 410^r-425^r
Mφ	München, Bayerische Staatsbibliothek, Clm 14684, ff. 82^v-98^r
Nα	Napoli, Biblioteca Nazionale "Vittorio Emanuele III", ms. VIII-C-36, ff. 29^r-36^r
Nγ	Napoli, Biblioteca Nazionale "Vittorio Emanuele III", ms. VIII-G-86, ff. 120^r-126^r
Nδ	Napoli, Biblioteca Nazionale "Vittorio Emanuele III", ms. VIII-C-42, ff. 1^r-12^v
Nε	Napoli, Biblioteca Nazionale "Vittorio Emanuele III", ms. VIII-C-46, ff. 43^r-58^r

Nζ   New Haven, Yale University, Cushing/Whitney Medical Library – Medical Historical Library, ms. 25, ff. 109^r-114^v

Oβ   Ottobeuren, Bibliothek der Benediktinerabtei, ms. O. 86 (*olim* II 319 / F 319), ff. 143^v-149^v
Oγ   Oxford, Bodleian Library, ms. Ashmole 340, ff. 29^r-38^r
Oζ   Oxford, Bodleian Library, ms. Ashmole 1522, ff. 80^r-101^v
Oη   Oxford, Bodleian Library, ms. Ashmole 1796, ff. 40^v-55^v
Oι   Oxford, Bodleian Library, ms. Bod. 464, ff. 134^r-139^v
Oν   Oxford, Bodleian Library, ms. Digby 38, ff. 73^r-76^v
Oξ   Oxford, Bodleian Library, ms. Digby 207, ff. 16^r-24^v
Oϱ   Oxford, Bodleian Library, ms. Savile 17, ff. 11^v-21^v
Oσ   Oxford, Bodleian Library, ms. Savile 21, ff. 104^r-115^r
Oτ   Oxford, Bodleian Library, ms. Selden Supra 78, ff. 51^r-70^r
Oυ   Oxford, Bodleian Library, ms. Tanner 192, ff. 76^v-95^v (*olim* pp. 156-194)
Oφ   Oxford, Magdalene College, ms. 182, ff. 103^r-109^r (*olim* ff. 48^r-54^r)
Oχ   Oxford, Merton College, ms. 259, ff. 90^v-91^v

Pα   Paris, Bibliothèque Sainte-Geneviève, ms. 1043, ff. 65^r-80^r
Pβ   Paris, Bibliothèque nationale de France, ms. fr. 12481, ff. 78^v-82^v
Pγ   Paris, Bibliothèque nationale de France, ms. lat. 7194, ff. 46^r-62^v
Pδ   Paris, Bibliothèque nationale de France, ms. lat. 7195, ff. 44^r-61^r
Pε   Paris, Bibliothèque nationale de France, ms. lat. 7196, ff. 34^v
Pζ   Paris, Bibliothèque nationale de France, ms. lat. 7198, ff. 8^r-10^v
Pθ   Paris, Bibliothèque nationale de France, ms. lat. 7280, ff. 73^r-82^r
Pι   Paris, Bibliothèque nationale de France, ms. lat. 7292, ff. 296^v-300^v
Pκ   Paris, Bibliothèque nationale de France, ms. lat. 7294, ff. 30^r-30^v, 4^r-7^v
Pμ   Paris, Bibliothèque nationale de France, ms. lat. 7298, ff. 61^v-75^v
Pν   Paris, Bibliothèque nationale de France, ms. lat. 7336, ff. 307^r-326^v
Pξ   Paris, Bibliothèque nationale de France, ms. lat. 7378A, ff. 86^r-89^v
Po   Paris, Bibliothèque nationale de France, ms. lat. 7413(1), ff. 1^r-18^v
Pϱ   Paris, Bibliothèque nationale de France, ms. lat. 7414, ff. 9^r/1^r-[48^v]/40^v
Pσ   Paris, Bibliothèque nationale de France, ms. lat. 7416, ff. 1^r-7^v
Pτ   Paris, Bibliothèque nationale de France, ms. lat. 7416B, ff. 75^v-86^r
Pυ   Paris, Bibliothèque nationale de France, ms. lat. 7421, ff. 62^r-89^v (*olim* 61^r-88^v)
Pχ   Paris, Bibliothèque nationale de France, ms. lat. 16649, ff. 181^v-189^v
Pω   Paris, Bibliothèque nationale de France, ms. n.a.l. 595, ff. 27^r-39^r

Qα   Paris, Bibliothèque nationale de France, ms. n.a.l. 693, ff. 9^r-14^r
Qβ   Paris, Bibliothèque nationale de France, ms. n.a.l. 1893, ff. 48^v-65^r
Qγ   Paris, Bibliothèque de la Sorbonne, ms. 595, ff. 68^r-88^r
Qδ   Parma, Biblioteca Palatina, ms. 984 (*olim* HH.III.17), ff. 115^r-130^v
Qε   Pommersfelden, Gräflich Schönbornsche Schlossbibliothek ms. 66 (2640), ff. 109^r-113^v
Qζ   Praha, Knihovna Metropolitní Kapituli, ms. L.29, ff. 63^v-65^v
Qη   Praha, Národní Knihovna České Republiky, ms. V.G.18, ff. 6^r-11^r

Qθ   Praha, Národní Knihovna České Republiky, ms. X.A.23, ff. 63ʳ-68ʳ
Qι   Praha, Národní Knihovna České Republiky, ms. XIII.F.24, ff. 90ʳ-91ᵛ
Qλ   Princeton, Princeton University Library, ms. Garrett 99, ff. 180ʳ-198ʳ
Qμ   Private Collection, ff. 133ʳ-157ᵛ

Rα   Ravenna, Biblioteca Classense, ms. 269, ff. 1ʳ-24ᵛ
Rγ   Roma, Biblioteca Vallicelliana, ms. F 37, ff. 74ʳ-77ʳ
Rδ   Roma, Biblioteca Vallicelliana, ms. D 40, ff. 88ʳ-104ᵛ
Rε   Roma, Osservatorio Astronomico, Biblioteca, ms. III C.14, ff. 160ʳ-171ᵛ

Sα   Saint-Omer, Bibliothèque municipale, ms. 374, ff. 137ᵛ-139ᵛ
Sβ   Salamanca, Universidad de Salamanca, Biblioteca, ms. 2353, ff. 4ᵛ-12ʳ
Sδ   Salamanca, Universidad de Salamanca, Biblioteca, ms. 2662, ff. 67ʳ-84ᵛ
Sη   Schlägl/Aigen-im-Mühlkreis, Bibliothek des Praemonstratenserstiftes, ms. Plagens [824] 236, ff. 158ʳ-172ʳ
Sθ   Sevilla, Biblioteca Capitular y Colombina, ms. 7-6-2, ff. 121ʳ-140ᵛ
Sι   Sevilla, Biblioteca Capitular y Colombina, ms. 7-7-2, ff. 43ʳ-49ʳ, 51ʳ-55ʳ
Sκ   Stams, Stiftsbibliothek, ms. 13, ff. 78ʳ-101ʳ
Sλ   Sankt-Peterburg, Rossijskaja Nacionalnaja Biblioteka, ms. Lat O.v.IX nᵒ. 2, ff. 6ᵛ-25ʳ

Tβ   Toruń, Uniwersytetu Mikołaja Kopernika, Biblioteka Główna, ms. 74, ff. 200ʳ-204ᵛ
Tδ   Trier, Stadtbibliothek, ms. 1074/1271 (8ᵒ), ff. 49ʳ-81ᵛ (*olim* 50ʳ-82ᵛ)

Vα   Vatican, Biblioteca Apostolica Vaticana, ms. Barb. lat. 156, ff. 198ʳ-214ʳ
Vβ   Vatican, Biblioteca Apostolica Vaticana, ms. Barb. lat. 276, ff. 41ʳ-50ᵛ/91ʳ-109ʳ, 57ʳ-71ᵛ
Vγ   Vatican, Biblioteca Apostolica Vaticana, ms. Barb. lat. 303, ff. 79ᵛ-81ʳ
Vη   Vatican, Biblioteca Apostolica Vaticana, ms. Pal. lat. 1373, f. 11ᵛ-18ʳ
Vθ   Vatican, Biblioteca Apostolica Vaticana, ms. Pal. lat. 1391, ff.
Vι   Vatican, Biblioteca Apostolica Vaticana, ms. Pal. lat. 1376, ff. 335ʳ-342ᵛ
Vμ   Vatican, Biblioteca Apostolica Vaticana, ms. Reg. lat. 1241, ff. 171ʳ-178ʳ
Vν   Vatican, Biblioteca Apostolica Vaticana, ms. Pal. lat. 1414, ff. 179ᵛ-189ᵛ
Vo   Vatican, Biblioteca Apostolica Vaticana, ms. Pal. lat. 1435, ff. 268ʳ-271ᵛ
Vξ   Vatican, Biblioteca Apostolica Vaticana, ms. Pal. lat. 1416, ff. 214ʳ-221ᵛ
Vπ   Vatican, Biblioteca Apostolica Vaticana, ms. Rossiano 732 (*olim* X,112), ff. 47ᵛ-66ᵛ
Vϱ   Vatican, Biblioteca Apostolica Vaticana, ms. Urb. lat. 1399, ff. 27ʳ-29ʳ
Vσ   Vatican, Biblioteca Apostolica Vaticana, ms. Urb. lat. 1408, ff. 7ʳ-20ʳ
Vτ   Vatican, Biblioteca Apostolica Vaticana, ms. Vat. lat. 1108, ff. 162ᵛ-164ʳ
Vυ   Vatican, Biblioteca Apostolica Vaticana, ms. Vat. lat. 3099, ff. 28ʳ-33ᵛ; 35ʳ-38ᵛ
Vφ   Vatican, Biblioteca Apostolica Vaticana, ms. Vat. lat. 3127, ff. 13ʳ-17ᵛ
Vψ   Vatican, Biblioteca Apostolica Vaticana, ms. Vat. lat. 4037, ff. 168ʳ-186ʳ

Wα   Wien, Österreichische Nationalbibliothek, ms. Palatinus 2367, ff. 77ʳ-92ᵛ, 184ʳ, 196ʳ
Wβ   Wien, Österreichische Nationalbibliothek, ms. Palatinus 2386, ff. 1ʳ-6ᵛ
Wγ   Wien, Österreichische Nationalbibliothek, ms. Palatinus 3105, ff. 73ᵛ-76ʳ
Wζ   Wien, Österreichische Nationalbibliothek, ms. Palatinus 5337, ff. 116ᵛ-120ʳ
Wθ   Washington, Library of Congress, Rare Book and Special Collections, ms. 95, ff. 75ʳ-76ʳ

Wι   Wolfenbüttel, Herzog August Bibliothek, Cod. Guelf. 76.1 Aug. 2º, ff. 2^r-22^v

Wλ   Wien, Österreichische Nationalbibliothek, ms. Palatinus 5145, ff. 5^v-10^v

Wμ   Wrocław, Biblioteka Uniwersytecka, ms. IV F 19, ff. 218^v-220^r

Xα   Venezia, Biblioteca Nazionale Marciana, ms. VIII.33 (= 2499), ff. 92^r-99^v

Xβ   Venezia, Biblioteca Nazionale Marciana, ms. VIII.33 (= 2499), ff. 100^r-115^v(?)

Xγ   Venezia, Biblioteca Nazionale Marciana, ms. VIII.77 (=3223), ff. 18^r-19^v

Xδ   Venezia, Biblioteca Nazionale Marciana, fondo antico 343 (= Z[anetti] 343) (=1877) ff. 2^v-6^r

Zα   Zurich, Zentralbibliothek, ms. C 364, ff. 5^r-8^v

Note: the page numbering (with occasional blank pages) is designed to display the Latin on the left and the corresponding English on the right when printed as a book.

[De practica astrolabii]

[On the Use of an Astrolabe]

The following manuscripts begin with the Prologue, line 1:

Bβ Bγ Bδ Bε Bε₁ Bζ Bη Bθ Bι Bκ Cγ Cδ Cε Cζ Cη Cι Dγ Dδ Dη Eα Eβ Eγ Eδ Eζ Eη Eκ Eμ Eϱ Eτ Eυ Fα Fβ Fζ Gα Kα Kγ Kδ Kε Kθ Lβ Lγ Lδ Lε Lζ Lη Lκ Lλ Lμ Mα Mδ Mη Mι Mκ Mλ Mμ Mν Mo Mτ Mυ Mφ Nα Nγ Nδ Nε Nζ Oβ Oγ Oζ Oη Oι Oν Oξ Oϱ Oσ Oτ Oυ Oχ Pα Pβ Pγ Pδ Pε Pζ Pθ Pι Pκ Pμ Pν Po Pϱ Pσ Pτ Pυ Pχ Pω Qβ Qγ Qδ Qε Qθ Qι Qλ Qμ Rα Rγ Rδ Rε Sα Sβ Sδ Sη Sθ Sι Sκ Sλ Tβ Tδ Vα Vβ Vγ Vη Vι Vμ Vν Vo Vπ Vϱ Vτ Vυ Vφ Vψ Wα Wβ Wγ Wζ Wθ Wι Wλ Wμ Xα Xβ Xγ Xδ

NOTE: Any irregular ordering of the capitula of the *Practica* in the various manuscripts is noted in the Introduction, "E. The Manuscripts of each Section".

1   INCIPIT PRACTICA ASTROLABII

[*For mss* Mμ Nζ Pκ Pχ Tβ Vη Vμ Vo Wζ, *see Proemium B beginning on p. 38*]

1   Incipit ... astrolabii] *om.* Bβ Bδ Bε₁ Bζ Bθ Cγ Cε Cη Eα Eγ Eζ Eυ Gα Kγ Kε Lβ Lδ Lζ Lκ
         Mα Mλ Mτ Nα Nγ Oγ Oη Oυ Oσ Pβ Pγ Pι Pμ Po Pτ Qε Qθ Qι Rγ Sα Sβ Sη Sι Sλ Vα Vυ
         Vφ Vτ Wγ Wθ Wλ Xγ; *faded* Eδ; Canones de usu et operatione astrolabii Rε; Capitulum
         preambulum in usum astrolabii Bθ; Capitulum primum Vι; De nominibus eorum que in
         astrolabio continentur Mκ(*add. in marg.* In nomine patris et f[ilii] et s[piriti] s[ancti].
         Amen); De nominibus instrumentorum astrolabii Kθ Oχ Pζ Qμ Rα Xα; De nominibus
         variorum instrumentorum Cδ; De usu astrolabii et primo epilog[*illeg.*] partes Pε; De usu
         astrolabii et primus de nominibus instrumentorum eius Dγ; De utilitate astrolabii et
         primo epilogus. Rubrica Qδ; De utilitatibus astrolabii et usu eius Bι; Epylogatio nominum
         instrumentorum Bγ; Epilogus in usum et operationes astrolabii Wβ; Incipit canones
         astrolabii Cζ; Incipit epilogus in usum et operationes astrolabii Messehalle Eκ(Mesalle)
         Eτ Vβ(*add.* et aliorum); Incipit instrumenta et utilitas astrolabii Pω; Incipit lectura
         astrolabii Sθ; Incipit liber de operatione astrolabii Lλ Vγ(*add.* De nominibus); Incipit opus
         astrolabii ad inveniendum gradum solis per diem mensis vel diei gradus circa primum
         huius secunde partis Eϙ; Incipit practica astrolabii Mι(*much later hand*) Oϙ(*add. in marg.* C.
         1ᵐ) Oυ; Incipit practica astrolabii capitulum primum de nominibus instrumentorum
         astrolabii Fβ(*different hand*); Incipit practica astrolabii sive rememoratio Xδ; Incipit
         practica astrolabii sive(et primo Bε Wμ) rememoratio partium(instrumentorum Pν; *add.*
         eiusdem Rδ) astrolabii Bε Dη Eβ Eη Fα Fζ Lγ Lη Lε Lμ Mδ Mo(*add. different hand*
         secundum Pthol' al') Mφ Nδ Oζ Oι Oξ Oτ Pα Pν Pϙ Qγ Qλ Rδ(*add.* feliciter etc.) Sδ Tδ
         Wα Wμ; Incipit practica astrolabii sive rememoratio partium astrolabii sive prologus in
         usum et operationem astrolabii Mυ(*later hand*); Incipit practica astrolabii sive
         re[memoratio] p[ar]ciu astrolabii Pθ; Incipit practica astrolabii (*add.* cum re) sive
         reme(*add.* memoratio)moratio par(*add.* ne parti)tium astrolabii(*add.* um ipsi astrolabii)
         Qβ[1]; Incipit usus astrolabii Vν; Incipit utilitatis astrolabii Mν; Incipiunt canones astrolabii
         Eμ Kα; Incipiunt canones astrolabii et sunt 36. Et primo de nominibus instrumentorum
         eius Bη; Incipiunt utilitates tractatus astrolabii Messallat Dδ; Pri[mo] pemoracio(*!*) in
         usum astrolabii Pυ; Prohemium Messehallath in practicam astrolabii feliciter incipit Kδ;
         Rememoratio(*add.* a Xβ) partium astrolabii Cι Mη Nε Pδ Xβ; Seuitur astrolbium; Bκ
         Seq[uit]ur de usu astrolabii primo [*illeg.*]gat partes Wι; Sequitur modo tractatus et de
         utilitatibus astrolabii et de practica eius et primo de nominibus partium ipsius astrolabii
         Eυ; Sequitur nomina instrumentorum astrolabii cum ipsius usu et practica Pσ; Utilitatis
         astrolabii Vϙ; [*illeg.*] astrolabium componedi primo [*illeg.*] nomina Oβ

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[1] This odd title in ms Qβ stems from the fact that the normal title is repeated but intertwined.

THE USE OF AN ASTROLABE BEGINS

Nomina² instrumentorum sunt hec. Primum est armilla suspensoria ad

2   Nomina] Bγ Bδ Bε Bε₁ Bη Bθ Bι Cζ Cη Cι Dγ Dδ Eβ Eδ Eη Eκ Eμ Eϱ Eτ Fα Gα Kα Lβ Lγ Lε Lζ Lη Lκ Lλ Lμ Mδ Mη Mι Mλ Mν Mo Mυ Mφ Nγ Oβ Oγ Oζ Oη Oι Oϱ Oτ Oυ Pα Pβ Pδ Pζ Pμ Po Pϱ Pσ Pτ Pυ Pω Qθ Qι Qλ Sα Sι Sκ Sλ Vϱ Vφ Vψ Wα Wι Wμ; Comina Fζ; [ ]mina Vτ; [ ]omina Bζ Cδ Cε Dη Eζ Eυ Fβ Mα Mτ Oσ Pθ Qβ Rα Sδ Sη Tδ Vα Vβ Vι Vν Vπ Wλ Xα Xγ; [N]omina Bκ Eα Kε Lδ Nα Oν Oξ Pε Pι Pν Qγ Qδ Sβ Sθ Vυ Wβ Wθ Xδ; Oi'a Oχ; Oiā Kθ; [O]mina Eγ; [O]mnia Pγ; Omnia Cγ Oomina Bβ Vγ; Oomina *corr. to* Nomina Qε; *add. in marg.* Incipit practica astrolabii Fβ; *add.* igitur Bι Vϱ   Nomina ... hec] Instrumentorum astrolabii prima sunt nomina et ideo, ut cognitionem eorum habeamus, singula a parte tractare decrevi. Qua propter, si quis cupit ad perfectam astrologie scientiam devenire, omnia que in hoc parvo libello dixero peroptime perscrutetur. Quoniam scriptum est: non potest quis nisi per magnos labores ad magna premia devenire Kδ; Omnia instrumentorum nomina astrolabii Cγ; Omnia instrumentorum nomina astrolabii Wγ   instrumentorum] hocabulorum(?) Kγ; *corr. from* signorum Rα; *add.* astrolabii Bη Eζ(*interlin.*) Eκ Eμ Lβ(*interlin.*) Lδ Lλ Oγ Oη Oχ Pζ Pι Qι Sα Sβ Vβ Vγ Xγ; *add.* astronomi Rγ; *add.* in astrolabio Kγ Oν   sunt] *interlin.* Eζ; est Nε   sunt hec] [*illeg.*] astrolabii Eγ; astrolabii et eorum que in eo continentur Mκ   hec] *om.* Oσ Vυ; *interlin.* Pτ   Primum] *om.* Xβ; De armilla. Primum igitur instrumentum astrolabii Kδ   Primum est] *om.* Kα; Primo Kγ   Primum ... armilla] *om.* Bβ   est] *om.* Cγ Sι   armilla] *and elsewhere* armila Cγ Wγ   suspensoria] per qua suspenditur astrolabium Mκ; suspensora Cδ Wθ; suspensola Eυ; *add.* per quam suspendatur seu suspenditur astrolabium Xβ; *add. in marg.* id est pars qua suspenditur astrolabium Oι; *add.* per quod tenetur astrolabium Pι   ad] *add.* aliquam Bκ Mλ Vν Vτ

2-3   ad ... altitudinem] et ex ea altitudo solis capitur Kδ

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² While in many cases the opening word is quite clear, either as "Nomina" or "[N]omina" (with a space for a rubricated first letter and the "N" noted in the margin), some scribes seemed to have had problems and wrote "Omnia". The writing of "nomina" is also susceptible to minim corruption. In some instances the initial "N", written as an enlarged "lower case" character with a rounded top and possibly an added base-line, could have led later readers to interpret it, and copy it, as an "O".

The names of the "instruments" [i.e., parts of the astrolabe] are these. First is the suspending ring[3] for

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[3] See *Comp.*, Fig. 1; Cap. 2, note 3.

capiendam altitudinem, et dicitur arabice "alhantica." Secundum est alhabor, id est,

3   capiendam] *add*. aliquam Eυ   altitudinem] *add. interlin.* solis in die et stellarum in
           nocte Lβ   et ... arabice] *om.* Eη Sα; *marg.* Bε   et ... alhantica] *om.* Mκ
                dicitur] *om.* Bε₁; notatur Rγ; *add.* in Nε; *add.* tunc Bκ   arabice] adrabite *corr. in*
           marg. to arabice Sι   alhantica] illeg. Eγ; abuachia Mν; alachacia Bθ Vπ; alachcia Eυ;
           alahahuacea Pγ; alahancia Eα Oη; alahnacia Cζ Oν Po Pτ Rε Qμ Vϱ; alahicacia Sλ;
           alahuacia Bζ Bη Bι Dγ Eζ Lζ Eμ Eϱ Gα Oσ Pυ Qδ Sθ Vα; alahuatia Bε₁ Bκ Rα Vυ Xα;
           alahucia Mτ Oϱ; alalontia Sι; alathnacia Cδ; alauacia Eκ; albariacha Cγ; albaricha Wγ;
           alcantica Rδ(alcancia?) Sκ; alchantica Lκ; alchantita Bδ; alhahuacia Bγ Eτ Mλ Pε Wβ;
           alhahuatia Rγ: alhahucia Cη; alhanacia Mo; alhanca Pβ; alhancia Cε Kδ Pδ Pθ; alhancica
           Kθ Qι; alhannca Fβ; alhantbica Xδ; alhantia Pν; alhantica Bε Cι Dη Eβ Fα Fζ Kε Lβ Lγ Lδ
           Lε Lη Lμ Mδ Mη Mι Mυ Mφ Nγ Nδ Nε Oγ Oζ Oι Oξ Oτ Oυ Pα Pμ Pϱ Pσ Pω Qβ Qγ Qθ
           Qλ Sδ Sη Tδ Vι Wα Wλ Wμ Xβ Xγ; alhantita Vψ; alhatita Dδ; alhauaga Vν; alhaunca Eη;
           alhuatia Eδ; alhucia Oβ; allahiraacha Mα; allahirac Wθ; allahiraca Vγ; allahiracca *corr. to*
           allahiracha Vβ; allahiracta Pζ; allahiraeca Lλ Oχ Qε; allahu[*illeg.*] Sβ; allantacica Nα;
           alphaitia Vφ; alphancia Kα; arathacia Vτ; alruana Pι; halhantica Kγ] in alhanthabuth Bβ;
           add. interlin in al' alahuacia Vβ   *before* Secundum] *add.* De ansa Kδ; *add. in marg.* 2ᵐ
           Wα   Secundum est] Deinde Cγ Wγ   Secundum ... alhabor] Post hanc altera
           armilla reflexa Mκ   est₁] *om.* Bη Oχ Qε Vν Vτ; dicitur Vφ   alhabor] illeg. Eγ;
           alaahoraa Wθ; alabor Bζ Bκ Eα Lζ Mλ Qδ Vτ; alacora Wγ; alahabor Mo; alahoi Bη Eμ;
           alahor Oη Oϱ Oσ Vα Vυ; alahoy Cζ; alanoy Sι; alantabor Mτ; alathora Cγ; albahor Wλ;
           alcantabor Nα; alchabor Rδ; alhab9 Oβ; alhabor Bβ Bθ Cε Cη Cι Dδ Eδ Gα Kγ Kδ Kθ Mη
           Mν Mυ Mφ Oν Pγ Pδ Pε Pθ Pι Po Pυ Pτ Sκ Vι Vπ Vφ Vψ Wβ Wι Xγ; alhabos Eτ; alhaboz
           Bγ; alhalka Vν; alhancabor Fβ Qθ; alhaniabor Xβ; alhantaboe Pα; alhantabor Bδ Bε Dη Eβ
           Eη Fα Fζ Lβ Lγ Lδ Lε Lη Lκ Lμ Mδ Mι Nγ Nδ Oγ Oζ Oι Oξ Oτ Oυ Pβ Pμ Pν Pω Qβ Qγ
           Qλ Sδ Tδ Xδ; alhantitabor Wμ; alhantobor Qι; alhatabor Pϱ Sη Wα; alhentabor Kε; allabo
           Bε₁; allabor Bι Dγ Eκ Eϱ Rα Xα; *corr. from* allaboriaa Sβ; allabora Vγ; allahaor *corr. to*
           allahor Sθ; allahor Sλ; allahora Lλ Oχ; allahoraa Mα Pζ Qε Vβ; allator Vϱ; alphabor Eυ;
           alphontabox Kα; alrahor/anahor Cδ; habor *corr. to* ᵃˡˡᵃhabor Eζ; *add. interlin.*
           allachora/allahiora Qμ   alhabor, id est] *om.* Sα   id est] *om.* Vψ; cum Sλ; et Pγ;
           videlicet Pι

3-4   id est ansa] *interlin.* Kε

measuring an altitude, and it is called "the halqa"[4] in Arabic. Second is the habs,[5] that is,

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[4] *Comp.*, Fig. 1. For *al-ḥalqa* see *Comp.*, Cap. 2, note 25.

[5] *Comp.*, Fig. 1. For *al-ḥabs* see *Comp.*, Cap. 1, note 14.

ansa que iungitur ei. Postea mater, rotula scilicet, in se continens omnes tabulas cum

4   que] quem Kδ   iungitur] coniungitur Cγ Eγ Oγ; *add*. bii Pυ   ei] *om*. Kθ Oχ Vν;
add. Tertium Mυ Vι; *add. illeg*. Wλ   Postea] Deinde est Kε; Et deinde Kδ; Hanc
sequitur Mκ; Post etiam Kγ; *add. in marg*. 3ᵐ Wα   mater] autem Lλ; in Sθ;
materiorla(?) Pι; matricula Rδ; *add*. id est Nγ; *add*. que Cγ Eγ Mα Oχ Pζ Qε Wγ Wθ
        mater ... scilicet] aca quo(?) Vγ; motrecłans Cδ; mat'cula scilicet Kδ   rotula
scilicet] *om*. Oϱ Pι; que est tabula maior rotulas Mκ; q~ rotulas Kγ; rotoclas Sθ; rotulans
am̄g Sλ; rotulas Bζ Bη Bι Bκ Cζ Eγ Eμ Lζ Lλ Mα Mλ Oη Oν Oσ Oχ Pζ Qε Qι Rε Sα Sβ Sι
Vα Vβ Vγ Vν Vτ Vυ Wγ Wθ; rotulla Dδ; *add*. ōs Qε   scilicet] *om*. Gα Kα Kε Lμ Mτ
Oβ Pϱ Pσ Qθ Sβ Vϱ Wλ Xδ Xγ; que Tδ   in se] *om*. Gα Mτ Pι; *interlin*. Pτ; ansa Pβ; en
se Wλ; iuste Sη   continens] continet Mα Oχ Qε; que continet Rγ   omnes] *om*. Mι
Mo Mτ Nγ Oξ Oχ Sλ; *add*. sive Mκ Vβ(*add. interlin*. ꝓ id est)   tabulas] *om*. Bη Bκ Cδ
Cζ Eγ Eμ Kγ Oη Oχ Pζ Rε Sι Sλ Vγ Vτ Oσ Sα Sβ Sθ Vα Vν Wγ Wθ

the ring which is joined to it.[6] Next the mother,[7] that is a small disk, containing in itself all the plates with

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[6] *Comp.*, Cap. 2, note 3.

[7] *Comp.*, Cap. 1.

5   aranea cui coniungitur margolabrum[8] scilicet in 360 gradus divisum. Tabule autem ab

    5   aranea] *add*. q~ dicitur matris rotula Kγ; *add*. sive reti Mκ; *add. interlin*. id est
               alagacrabuz(*?*) Pτ   cui] *om*. Bη; *interlin*. Qλ; *add*. aranee Mι Nγ   cui ...divisum]
               Iterum vero in circuitu matris est margo sive limbus qui dividitur per CCCLX partes id est
               gradus circuli celi super quod sunt figure descripte designantes ipsum numerum ut
               facilius inveniatur Mκ   coniungitur] adiungitur Cγ Eγ Rγ Wγ; iungitur Bκ Cδ Cζ Dη
               Eμ Kα Kγ Mα Mι Mτ Nγ Oη Oυ Oχ Sα Sβ Sθ Vα Vυ; iungitur *corr. to* coniungitur Mη;
               add. illeg. Xβ   margolabrum] margo.labrum Mα Qε; margo labrum Bκ Cε Oχ Pε Pζ
               Sλ Vα Vγ Vυ Wθ; margo labri Cγ; a margolade Bδ; margo astrolabii Sι; margo astrolabii
               vel margolabium Bη Cζ Eμ Oη; margobabrum Rγ; margolabium Dγ; magrolabrum Mι;
               mugrolabrum Nγ; *add*. id est limbus Oι(*interlin*.) Oξ(*marg*.) Oτ(*interlin*.) Qλ(*interlin*.); *add*.
               add. in marg. al' limbus Oυ   scilicet] *om*. Bη Bι Cζ Dδ Eμ Kα Kγ Kε Pϱ Mτ Vυ; id est
               Kδ; id est librer qui est Mι Nγ; vel limbus Vτ; *add*. limbus Rε; *add*. limbus qui adequatur
               rethi Wλ; *add*. vel labium Sβ; *add. interlin*. limbus Lβ   scilicet ... divisum] divisum in
               360 Sι   in] *om*. Bκ Oβ   360] ccclx Oχ Pζ; 365 *corr. to* 360 Pω; 16 Tδ; 30 Nδ
                    gradus] *om*. Bε Qθ; *interlin*. Kθ; divisiones Bθ Eυ Vπ; gradibus Qδ Tδ; partes Bη Cζ
               Oη; *om*. Nα   divisum] de istis Mι Nγ; divisis Qδ; *add*. super quod figure arisles(*?*)
               descripte designater ipsum numerum ut facilius inveniatur ad item per tabule continetur
               Xβ   Tabule] Que sunt Bζ; Rotulle Cγ   autem] *om*. Bε₁ Nε Vα   ab] *om*. Cζ
               Oη; in Fα Mι Nγ Rε

    5-6   ab hac] *om*. Sα   ab ... contente] *om*. Wγ

    5-7   tabule ... Capricorni] Intra limbum autem sunt tabule in quorum qualibet sunt 3ᵉˢ circuli
               super centrum ipsius descripti, quorum minimus per quam vadit caput Cancri designat
               tropicum estivalem, medius vero per quam currit caput Arietis et Libre significat
               equatorem, sed tercius qui est maior super quam incedit caput Capricorni est tropicus
               hyemalis Mκ

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[8] Most mss write this as one word, although it does not seem to be recorded as such in any
dictionary. Since *margo* and *labrum* are almost synonymous, CJMD suggests that these should be treated
as two words, with *labrum* as a gloss on *margo*.

the rete to which is joined a marginal lip thus divided into 360 degrees.[9] The plates morover

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[9] *Comp.*, Cap. 1.

hac contente signantur tribus circulis quorum minor est circulus Cancri, et medius

6   hac] *om.* Oϱ; *add.* mater Dη Mι Nγ; *add.* scilicet mater Lδ Oγ   contente] *om.* Bη
        signantur] fignarantur Vφ; fignificatur Dγ; figurantur Bβ Bθ Bι Cδ Cη Eγ Kθ Lζ Lλ
        Mα Mλ Nα Oχ Pζ Qε Qθ Sη Vβ Vγ Vν Vπ Vυ Wθ Wι Pε; signatur Kα Lκ Mη Pδ Qι; sigᵃ
        Mν; *illeg.* Lμ Oβ; significatur Dδ; significantur Eδ Mτ Oη Po Qδ Xα; signurentur Pγ
        tribus] 3 *some*; tres Oη   circulis] *add.* ex Sβ   quorum] *om.* Wγ; quibus Kγ
        Mα Oχ; quo|arum Bδ; *add.* ciculorum Dδ   quorum ... circulus₂] *om.* Eτ Pγ
        minor] *illeg.* Eγ; maior Vυ; primus et minimus Bη Cζ Eμ; primus [*illeg.*] Vτ
        minor ... medius] bᵒʳ est Sη   est] *om.* Kε Pϱ Qβ; dicitur Dδ   circulus] *om.*
        Kγ; capitis(?) Eγ; inf(?) capitis Wγ; motus capitis Lλ Mα Oχ Pζ Vγ Qε Sβ Wθ; mtʼ id est
        motus capitis Cγ; tropicus Mτ   Cancri] *interlin.* Vτ   et] id est Qι   medius]
        mediusque Nδ; *add.* est Bγ Bθ Bι Bκ Cη Dδ Eκ Mλ Mυ Nγ Oν Pϱ Rε Vν Vπ; *add. illeg.* Cι;
        add. veo Cγ

6-7   quorum ... Capricorni] quibus mime Sλ

contained by this are inscribed with three circles of which the smaller is the circle of Cancer, and the middle one

circulus equinoctialis, et maximus circulus Capricorni. Postea almucantharat,[10] qui sunt
circuli in medietate superiori descripti quorum quidam sunt integri, quidam apparent

7   circulus₁] *om.* Bκ Eκ Lζ Mλ Mτ Nα Oν Pτ Vτ; vero Arietis et Libre id est Cγ; *add.* eorum
           Bη; *add.* est Sθ; *add.* est circulus Oη; *add. in marg.* id est circulus Arietis et Libre desc'bit
           equinoctial~ Oυ   circulus equinoctialis] vero Arietis Kγ; vero Arietis et Libre Lλ Mα
           Oχ(*om.* vero) Pζ Qε Sβ Vγ Wγ(*om.* vero) Wθ   et] id est Qι   maximus] maior Kγ
           Lλ Mα Oχ Pζ Qε Sβ Vγ Vν; maiorem Cγ; maiorem continet Wγ; *add.* eorum Oβ Oι Oϱ
           Oσ Qμ; *add.* eorum est Bη Bθ Bκ Cζ Eκ Eμ Eυ Lζ Mλ OηbSθ Vα Vπ Vτ Vυ; *add.* est Dδ Mι
           Pδ Vν; *add.* motuum capitis circuli Eγ; *add.* motum vel circuli continet Cγ; *add.* vero Rγ
                   circulus₂] *om.* Eκ Nα; articulus Pγ; motum continet Lλ Kγ Mα Oχ Pζ Qε Sβ Vγ;
           vero tropicus Mτ   Capricorni] *add.* DE ALMUCANTARACH Kδ; *add.* per extremitatem
           tabularum Sι; *add. in marg.* In alio libro: quibus minor est motus capitis Cancri, medius
           vero Arietis et Libre, et maior motum continet Capricorni Vβ   Postea] *interlin.* Qι;
           Deinde Mτ; Post sunt Eα; *add.* circuli Bγ; *add.* circulus Cη Eτ Pγ Wβ; *add.* sequitor Kδ; *add.*
           sequuntur Mκ   almucantharat] *illeg.* Xγ; alhuutatr *corr. to* alhuutantrat Lβ;
           almacantaraz Oσ; almicantarat Bκ Cδ Eγ; almicantarat *corr. to* almicantharath Eδ;
           almicantarath Lδ; almicantaraz Oη; almicanterat Oν; almicantharat Pσ; almicantharath Po
           Rδ; almicanthrat Wλ; almicantrat Kα; almicantrath Kε Mτ; almicantratus Oβ;
           almicatarath Kγ; almicatharath Kθ; alminchantᶜ Lκ; almu~ᵃᵗʰ Pι; almucancarat Wθ;
           almucancharat Bθ Fβ; almucancharath Dγ Pα Pθ; almucantar[*illeg.*] Eκ; almucantarach Eυ
           Sη Sι Vϱ Vτ; almucantarat Cζ Lλ Lμ Oχ Pζ Qε Qθ Vα; almucantarath Bι Cε Eα Eη Gα Nα
           Nε Oγ Oϱ Pδ Pω Qι Sβ Vβ Vγ Wγ Xβ; almucantaraz Lζ Sλ; almucantᵃz Sθ; almucantha'th
           Bβ; almucantharach Qμ Rε Vπ; almucantharaht Bε₁; almucantharak Rγ; almucantharat Bζ
           Lε Mα Oι Pτ Pγ Qβ Sκ; almucantharath Bγ Cη Eβ Eϱ Eτ Fα Fζ Lγ Lη Mo Mυ Mφ Nδ Oζ
           Oξ Oτ Pμ Pν Pϱ Qβ Qδ Qλ Rα Sδ Tδ Vι Vν Wα Wβ Wι Wμ Xα; almucantharatz Dη;
           almucanthrath Eζ; almucantrarach Kδ; almucantrath Sα; almucatatarach Bδ;
           almuchantarath Mκ Pυ Vψ; almuchantaraz Eμ; almuchantharat Oυ Pε Xδ;
           almuhantharath Bε; almuscantarath Pβ; almut' Dδ; almutantarach Mν; almutantaraz Mλ
           Vυ; almutantherach Mι Nγ; almutantharath Mη; almutantrat Cγ; almuthantharad Vφ

8   circuli] *om.* Kα Mλ   medietate] parte tabule Mκ   descripti] *om.* Mυ Mφ Oχ Vι
           Wα Wθ; scripti Qι   quidam₁] *add.* autem Bζ   quidam ... integri] *om.* Bδ Fζ
                   sunt] *om.* Bη Cγ Cδ Cζ Eγ Eκ Eμ Lζ Mα Mλ Oβ Oη Oϱ Oχ Pζ Qε Sα Sθ Sι Sλ Vα Vγ
           Vν Wγ Wθ; *twice* Eβ; *interlin.* Vβ   integri] perfecte/perfecti Dδ; *add.* apparent Vν
                   quidam₂] *marg.* Eζ; *rep.* Vψ; quedam Bδ; qui Lκ; quid Nδ; *add.* autem Bζ Eδ Oχ; *add.*
           ut Vγ; *add.* vero Qε Pζ Wθ   quidam ... integri] aqliqui de maioribus sunt imperfecti
           et designant circulos nostro emisperio descriptibiles per circuitum quos quidam
           Latinorum progressiones solis appellant Mκ   apparent] *om.* Dδ Lμ Vν; vero Kγ

8-9   quibus ... emisperii] quorumprimus scilicet maior disignat circulum emisperii scilicet
           orizontem Mκ

the equatorial circle [i.e., the celestial equator], and the greatest the circle of Capricorn.[11] Next the almucantars, which are circles drawn in the upper middle of which some are complete, others appear

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[11] *Comp.*, Cap. 7.

imperfecti quibus prior est orizon, et dividit duo emisperia. Centrum autem inferioris

9   imperfecti] imfecti Nα; perfecti Vϱ; *add*. de Vγ; *add*. ex Mι Nγ Sβ; *add. illeg*. Kγ
         quibus] quilibet Sι; quorum Kγ Mτ; *add*. circulis Dδ   quibus ... emisperia] *om.*
Pι   prior] primam Kγ; primus Mλ   est] *om.* Bη Bκ Cγ Cδ Cζ Eμ Lζ Lλ Mα Mλ
Mυ Mφ Oη Oϱ Oχ Pζ Qε Sα Sβ Sθ Sλ Vα Vι Vν Vϱ Vτ Wγ Wθ; scilicet Vγ; *add*. in Lμ
         et] *om.* Vι Wθ; *interlin*. Lβ; in duo Wγ; qui Eζ(*marg.*) Eυ Gα Kγ Rε Vπ Vφ   et ...
emisperia] *om.* Wλ   dividit] *illeg*. Xγ; dividerit Mη; dividens Oβ Oγ Xα; dividu Vϱ;
add. enim Bδ Bε Cε Dδ Dη Eβ Eη Fα Fβ Fζ(?) Kα Kδ Lγ Lε Lη Lκ Lμ Mδ Mo Mτ Mφ Nδ
Oζ Oξ Oυ Pα Pβ Pδ Pμ Pν Pϱ Pσ Pω Qβ Qγ Qθ Qλ Rδ Sδ Tδ Vι Vψ Wα Wμ Xδ
         duo] *om.* Kγ Wγ; ii/2 *some*; 20 Qθ; enim Qδ; *add*. enim Mι Nγ Xβ; *add. interlin*. id est
nocte et die Kε   emisperii] *add*. A Dγ; *add. in marg./interlin*. id est tantum cclorum in
duo cungena Kθ   autem] *rep*. Cγ; vero Kγ Mκ   inferioris] inferius Mτ; in
superiori Oι; interioris Bβ Bγ Bε Cη Eτ Kθ Mκ Pγ Pε Wβ Wι; *add. interlin*. interioris Lβ
Oυ; *add*. partis Mι Nγ

incomplete;[12] the first of them is the horizon,[13] and it divides the two hemispheres.[14] The centre, moreover, of the lowest

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[12] *Comp.*, Cap. 13.

[13] *Comp.*, Cap. 13.

[14] I.e., above the horizon and below the horizon.

10   almucantharat cenith capitum nominatur. Deinde sunt azimuth, qui sunt partes

10   almucantharat] *om.* Oχ; abnitarath/abnutarath Vτalmi^ath Kε; almicantarat Bκ Cδ;
          almicantarath Lδ Rδ; almicantaraz Oη; almicanterath Oυ; almicantharat Eδ Pσ;
          almicantharath Po; almicanthrat Wλ; almicantrath Kγ; almicantrat Kα; almichant′ Lκ;
          almichantharach Kθ; almu˜^ath Pι; almucancarath Gα; almucancarat Qθ; almucanchar~ Bη;
          almucancharath Pα Pθ; almucant^ah Sα; almucant^az Sθ; almucantarat Cζ Eγ Eκ Lλ Lμ Oϱ
          Oσ Pζ Qε Vα; almucantarach Nα Sη Sι Vϱ; almucantarath Bθ Bι Eα Eη Eυ Kδ Mδ Oγ Qγ
          Qι Qμ Sβ Vβ Vγ Wγ Wι Xβ; almucantaraz Mλ Lζ Oσ Sλ; almucanth Cε Pγ Pω;
          almucantharach Rε; almucantha^h Xα; almucantharaht Bε₁; almucantharak Rγ;
          almucantharat Bζ Eβ Lγ Lη Mα Oι Sκ Xδ; almucantharath Cη Cι Dγ Eζ Eϱ Eτ Fβ Lβ Lε
          Mo Mυ Mφ Nδ Oζ Oξ Oτ Pδ Pμ Pν Pϱ Pτ Pυ Qβ Qδ Qλ Rα Sδ Tδ Vι Vν Vπ Wβ Wμ Xγ;
          almucantharatz Dη; almucanthath Bβ Bγ; almucantroch Oβ; almucatarach Bδ;
          almucatarat Wθ; almucatarath Nε; almuchancharaz Eμ; almuchantarath Mκ Vψ;
          almuchantharat Oυ Pε; almuha[nthara]th Bε; almui′ Mτ; almuscantarath Pβ; almut′ Dδ;
          almutantarach Mν; almutantaraz Vυ; almutanterach Mι Nγ; almutantrat Cγ; almuthan
          Mη; almuthantharat Vφ; *add.* dicitur esse Cδ; *add.* est Sι; *add.* est zenith regionis et Bε; *add.*
          scilicet minimis Mκ; *add. in marg.* almicantha′t arabice dicitur. Latine autem
          progressiones solis in hore Kε   cenith] cenit Bη Cη Dγ Eγ Eϱ Fα Kκ Kα Nγ Pβ Pζ Pθ
          Pμ Pυ Qι Sι Qε Sβ Vυ Wι; cen^c Fζ; cent Lγ Mα; cenyth Kε; chenith Xγ; coanch Bδ; zenith
          Dδ Pϱ Pσ Sα Vφ; zenich Lκ; zenit Cγ Wθ; zenith *many*   cenith capitum] *twice* Tδ
               cenith ... nominatur] *9 extraneous lines* Xβ   capitum] capitis Mτ; captio Mη; *add.*
          sive Sι   nominatur] *om.* Cd; *rep.* Bζ; dicitur Eκ Sλ; vocatur Rδ; *add. 5-line gloss* Mκ
               Deinde] Postea Mτ   sunt₁] *illeg.* Eγ; *om.* Cγ Cδ Eκ Mν Oχ Pε Pτ Qε Sι Sλ Wγ
          Wλ; est Bε₁ Bξ Bι Cη Dγ Eδ Eζ Eμ Eϱ Eτ Gα Mκ Mo Nα Oν Oσ Pγ Po Pυ Qδ Rα Sβ Sη Sθ
          Vγ Vϱ Vτ Wι Xα; etiam Bη Bθ Bκ Cζ Lζ Lλ Oη Mα Mλ Oβ Pζ Rε Sα Vα Vβ Vν Vπ Vυ
          Wθ; super Mδ Nδ   azimuth] alsumuth *and add. interlin.* vel azimuth Sβ;
          alzemut Cγ; asimut Qε; asimuth Oϱ Vτ; assumucht Mι Nγ; assumut Oχ Wθ; atimuth Vυ;
          atzemutz Pβ; azim′ Oν; azimuch/açimuch Bβ Bδ Cε Rε; azimud Eκ; azimut Bζ Bκ Cδ Kα
          Lβ Lε Lζ Lκ Lμ Oη Oσ Pω Qι Sλ Vα; azinn^t Oξ Pζ; azmut Mτ; azymuth Kγ; *add.* vero
          he′mns(?) Cγ   qui] que Oη Rε   qui sunt] *om.* Eκ Mι Nγ Nδ Rδ; *illeg.* Xβ; circuli
          Nε; *add.* etiam Wθ   sunt₂] *om.* Bζ Pι Rγ; sibi Dγ Qδ

10-11   cenith ... almucantharat] *om.* Eυ   nominatur ... intersecantes] *marg.* Nγ   qui sunt
          partes circulorum] circuli Kε; circuli partes Bδ Bε Cε Cι Dδ Dη Eβ Eη Fα Fβ Fζ Kα Kδ Lγ
          Lδ Lε Lη Lκ Lμ Mδ Mη Mτ Mυ Mφ Oγ Oζ Oξ Oτ Oυ Pα Pβ Pδ Pθ Pμ Pν Pϱ Pσ Pω Qβ
          Qγ Qθ Qι Qλ Sδ Sκ Tδ Vι Xδ Vψ Wα Wμ   partes circulorum] per Cζ Oη

almucantar is called the overhead zenith.[15] Next are the azimuths which are parts

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[15] *Comp.*, Cap. 13.

circulorum almucantharat intersecantes. Post quas sunt hore, in medietate inferiori

11   circulorum] *om.* Nε Xβ; *del.* Eμ; circuli Nδ Rδ; circulos Bη   almucantharat] almi^ath Kε; almicangtarach Kθ; almicantarat Bκ Cδ; almicantarath Lδ Rδ; almicantaraz Oη; almicanterath Oν; almicantharat Eδ Pσ; almicantharath Pο; almicanthrat Wλ; almicantrat Kα; almicantrath Kγ; almicantrech Oβ; almichant' Lκ; almucancarath Gα Qμ; almucancharath Pα; almucantarach Bδ Sη Sι Vϱ Vτ; almucantarak Rγ; almucantarat Cζ Eκ Lλ Oχ Pζ Qε Wθ; almucantarath Bζ Bι Eα Eη Kδ Lμ Mδ Nα Oγ Pδ Pω Qδ Qι Sβ Tδ Vα Vβ Wα Wγ Xβ; almucantaraz Lζ Mλ Oσ Sλ; almucant^az Sθ; almucanterath Eα; almucanth Fα Oζ Pγ; almucanthar~ Bη; almucantharach Pτ Rε; almucantharaht Bε₁; almucantharat Fβ Lβ Lγ Lη Mα Oι Oτ Oυ Pυ Xδ; almucantharath Bβ Bγ Cη Dγ Eβ Eζ Eϱ Fζ Lε Mκ Mo Mυ Mφ Oξ Pμ Pν Pϱ Qβ Qγ Qλ Rα Sδ Vγ Vι Vπ Wβ Wι Wμ Xα Xγ; almucanthartz Dη; almucan^ut Qθ; almucatarath Nε; almuchantarath Pε Vψ; almuchantaraz Eμ; almuchantharath Pθ; almuhan^th Bε; almui~Mτ; almu^rat Eγ Vν; almuscantarath Pβ; almut'Dδ; almutantarach Mν; almutantarat Oϱ; almutantaraz Vυ; almutanterach Mι Nγ; almutantrat Cγ; almuthan^a Sα; almuthanth' Mη; almuthantharat Vφ; mucantharat *corr. to* [*illeg.*]cantarath Pι   intersecanates] *add. 3.5-line gloss* Mκ; *add. 5-line gloss* Xβ   Post quas] Deinde Mτ; Postea Pι Wλ; Primum quod Eα   quas] hoc Bε Dδ Mκ; quos *many*   sunt hore] super hec Cγ   hore] qdic Oβ; *add.* inequales Xβ; *add.* inequales 12 plarum (?) Nα; *add. interlin.* id est linee horaire Kε   in] *om* Bζ   medietate] medi.... Vψ; mediate Bδ Mo Pδ; *add.* plarum Sη; mediate *corr. to* medietate Oι; *add. interlin.* id est in nocte Kε   inferiori] *om.* Bβ Kδ Kγ; in superiori Eυ Pγ Vπ; *add.* interiori Xδ; *add.* parte Cζ Pι; *add.* parte tabule Sι

11-12   in ... descripti] inequalis descripte in inferiori parte tabule per quam designatur inferius emisperium Mκ

of the circles intersecting the almucantars.[16] After these are the hours, marked in the lower middle area.[17]

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[16] *Comp.*, Cap. 15.

[17] *Comp.*, Cap. 16.

descripte. Inter horas vero due sunt crepusculorum linee. Postea linea medii celi que est linea descendens ab armilla per centrum in oppositam partem astrolabii, cuius medietas a centro in armillam dicitur "linea meridiei"; et alia dicitur "angulus terre" et "medie

12   descripte] *om.* Vφ; *add.* Inter has sunt due linee que ostendunt ortum aurore in matutino et occasum luminis in nocte. Sed iste due linee in quibusdam astrolabii ponuntur inferiori quadam parte in quibusdam in superiori. Mo; *add.* sive distincte Wγ   Inter] *om., add. in marg.* post Nε; In Kα; *add.* has Mo   Inter ... linee] *om.* Kδ Wβ   horas vero] quas Oβ; quas vero Bδ; horas 15 Lε; quas horas vero Mη   horas vero due] vero duas(*expunged*) horas Rα   vero] *om.* Bβ Bδ Bε₁ Bκ Cη Dη Eτ Kθ Lζ Mη Mλ Mo Nα Oβ Oν Rα Pγ Pε Qθ Qι Sβ Sη Vν Wι; *illeg.* Tδ; *interlin.* Bγ; autem Eκ; 15 Pβ   vero due] *om.* Kγ; et Mτ   due] 2 *many*; *om.* Bζ Eρ Gα Wθ Xα; *interlin.* Vφ; duas Pυ; duo Mι; side Kα   sunt] *om.* Cε Mη Nε Pτ   Postea] Deinde Mτ   linea] *om.* Oβ; alinea Nα; est linea Eκ; medii Sα   celi] *marg.* Oζ   que est] *om.* Eκ

12-13   est linea] *om.* Bδ

12-15   Inter ... noctis] Sunt etiam in tabula due lineeintersecantes se orthogonaliter super centrum et dividentes tabulam in 4ᵒʳ quartas equales quarum una descendit ab armilla per centrum in partem oppositam cuius medietas a centro in armillam vocatur linea medii diei et linea recessionis; dicitur quoque medium celum. Reliqua vero medietas que sub emisperio nostro est dicitur linea anguli terre et linea medie noctis et etiam linea recessionis. Reliqua autem linea protenditur ab oriente per centrum tantum in occidente et eius medietas versus orientem dicitur linea orientalis, alia vero dicitur linea occidentalis. Mκ

13   linea] *om.* Bε Cε Dδ Dη Eβ Eκ Fα Fβ Fζ Kα Lγ Lδ Lη Mτ Mυ Mφ Nδ Oζ Oξ Oτ Oυ Pα Pβ Pμ Pν Pρ Pω Qβ Qι Sδ Tδ Vι Wα Wμ Xβ Xδ; ʟ.ᴍ.ᴀ.ᴀ. Vψ; *interlin.* Lβ   descendens] ascendens Bδ   ab] *om.* Oξ; de Kα   armilla] armirla Sη   per centrum] *twice* Mν; *om.* Kγ Qβ; per medium centri Eδ   in] ad Sκ(*interlin.*)   oppositam] positam Vψ   partem astrolabii] *om.* Pω   astrolabii] *om.* Bη Bκ Cγ Cδ Cζ Eγ Eμ Lζ Lλ Mα Mι Oη Oν Oρ Oχ Pζ Qε Sα Sβ Sθ Sι Sλ Vα Vν Vτ Vυ Wγ Wθ   astrolabii cuius] *om.* Nγ   medietas] *add.* est Sι

14   a] ad Vτ; in Pρ   a centro] *interlin.* Rε   centro] polo Oγ; *add.* scilicet Vγ   in] *om.* Pρ; versus Wλ   dicitur₁] *twice* Eυ; *om.* Cε; *add.* medii celi Pι   linea] medii celi hoc est Qθ; *add.* medii celi id est Lμ; *add.* sunt Pι   linea meridiei] medii celi linea sive meridiei Qβ   meridiei] meridionalis Oγ; medii celi Cζ Eγ Eμ Mτ; medii celi hoc est in meridiei Kε Po(*om.* in); medii diei Bη Bκ Cγ Cδ Eκ Lλ Mα Mι Oρ Nγ Oσ Oχ Pζ Qε Rε Sι Sλ Vβ(*add. interlin.* al' meridiei) Vγ Vν Vυ Wθ; *add.* vel linea ecessionis vel angulus Qμ; *add.* vel medii celi Kγ Oι(*marg.*)   alia] aliud Eα; aliter autem Kε; *add.* linea Kγ; *add.* medietas Dδ Sα Sλ; *add.* medietas vero Mτ; *add. interlin.* modiens Cδ; *add. interlin.* scilicet medietas Vβ   alia dicitur] almuri Oρ   dicitur₂] *om.* Cγ Eκ Kε; *add.* linea Eγ; *add. interlin.* linea scilicet Vβ   angulus] anguli Rγ Sλ Vβ Wθ   terre] *om.* Nδ; *add.* scilicet linea sub clavo vesus erram Qμ   et₂] sive Vγ; vel Mτ Pι Qμ Wγ; *add.* linea Cζ Eμ Vτ; *add.* vel linea Kγ

Within the hours are indeed the two twilight lines.[18] Afterwards the line of the middle of the sky[19] which is the line descending from the ring through the centre to the opposite part of the astrolabe, of which the half from the centre to the ring is called the "midday line" and the other is called "the angle of the earth"[20] and "midnight

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[18] *Comp.*, Cap. 21.

[19] *Comp.*, Cap. 12.

[20] In the sphere, the angle (along the midday colure through the poles) between the plane of the horizon (through the centre of the earth) and the opposite (the south) pole is equivalent to the latitude ("angle of the earth") of the observer, that is, the latitude of the astrolabe plate.

15   noctis." Post hec et sequitur alhantabuz, id est aranea, in qua sunt signa cum zodiaco
      constituta, stelle quoque fixe, in quo via dicitur esse solis. Et quicquid fuerit infra

15   Post hec] Postea Bθ Cγ Eζ Lζ Mτ Oη Rγ Rε Vν Vπ Vτ Wγ   Post ... et] *om.* Mκ
              Post ... sequitur] Deinde est Mτ   et] *om.* Bζ Bθ Bι Bκ Cγ Lζ Pζ Rε Vν Vϱ Vτ Vφ;
          est Wλ; etiam Bβ Lλ Mα Mo Oβ Oϱ Pδ Rα Vα Vβ Vυ Wθ; vero Bη Cζ Eμ Oη   et
          sequitur] *om.* Bε Bη Dη Eβ Eη Fα Fβ Kε Kδ Lβ Lγ Lε Lη Lκ Lμ Mα Mo Mυ Mφ Nδ Oγ Oζ
          Oξ Oτ Oυ Pα Pβ Pδ Pθ Pμ Pν Pϱ Pσ Pω Qβ Qγ Qθ Qι Sδ Sκ Tδ Vι Vπ Wα Wμ Xβ Xδ;
          interlin. Lβ Oι; etiam Cι Nε Pτ Qδ Rδ Vψ Xγ   et ... est] *om.* Bδ Dδ   alhantabuz]
          Bε Cε Eβ Eη Fα Lγ Lδ Lη Lμ Mδ Mη Oγ Oζ Oτ Pθ Pμ Pω Qβ Qι Wμ; *illeg.* Xγ;
          abhantabuz Mυ; alabanthabuth Vπ; alacabut Cδ; alacaburz Sλ; alagagabuch Dγ Qδ;
          alagagaburth Bε₁; alagagbuch Pτ; alahancabut Mκ; alahantabuth Bθ Kγ Qμ; alancabut Mα
          Oχ Vυ Wθ; alancabuth Vβ; alanchabuz Oσ; alangabut Oϱ; alanganbut Vα; alanhabuz Cγ;
          alankabuz Vν; alantabach Nα; alantabuch Bζ Vτ; alantabunt Mι Nγ; alantabuth Cζ Oη Pυ
          Sι; alantanith Mτ; alanthabuth Eμ; alatabus Kε; alaucabud Eκ; albantabuch Mν;
          alcantabuth Eα Rδ; alcauabuz Sθ; alhancabuch Gα Oβ; alhancabut Eγ; alhancabuz Qθ;
          alhanchaboth Kθ; alhanchabuth Oυ; alhantab' Xβ; alhantabor Lκ; alhantabuch Kδ Pε Rγ;
          alhantabum Pϱ Vψ; alhantabur Pν; alhantaburz Oυ; alhantabus Pσ; alhantabut Wα Po Sη;
          alhantabuth Dη Eδ Eζ Eτ Lβ Oι Pι Rα Vφ Wβ Xα; alhantabutz Fβ Fζ Lε Mφ Oξ Rα Rβ Qγ
          Qλ Tδ Vι ; alhantarbuch Eυ; alhantbuz Sκ; alhanthabuch Rε; alhanthabuth Bβ Bγ Cη Eϱ
          Mo Wι Pγ; alhanthabuz Cι Xδ; alhantibus Wλ; alhathabuz Pδ; alhuscabuch *and add.*
          interlin. alagagabuth Sβ; allanancabuz Pζ; allancabut Lγ Qε; allancibut Vγ; allantabuz Bι
          Vϱ; almutantabuz Bκ Lζ Mλ; al°arzabut Wγ; alphantaboc Kα   alhantabuz ... est] *om.*
          Sα   id est] *om.* Pγ; dicitur Pσ; et Vϱ; mediu Pε(*and del.*); sive Mτ   id est aranea]
          om. Eγ Lλ Mα Mι Nγ Oχ Vγ Qε Wγ Wθ; *interlin.* Sβ; *marg. later hand* Pζ   aranea]
          recte scilicet Cγ; *add.* que etiam dicitur rethe Mκ(*add. in marg. et volvellum*)   qua]
          quibus Gα; quo *some*   signa] *om.* Lκ   cum] *om.* Bθ Pμ; in Bβ Cγ Eγ Wγ
              zodiaco] zodiatho Cγ; zodyac Bβ Fβ

16   constituta] posita Mκ   stelle quoque fixe] *om.* Cγ Dη Kγ Vγ; cum stellis fixis Eκ; et
          aliqua stelle fixe Mκ; stelle [*illeg.*] Oβ; et stella fixe Sλ   quoque] a Kα   fixe] *marg.*
          Sκ; *add.* zodiaci Cδ   quo] qua Kε Mτ Nα Vν; quibus Vφ; *add.* etiam Kγ; *add. interlin.*
          zodiaco Lβ   in quo] in qua esse Bε   in quo ... solis] circulus signorum
          distinguens gradus ipsorum signorum divisionde(diversionde?) in diviseris astrolabiis
          secundum diversitatem quantitatis ipsorum circulorum Mκ   in quo ... fuerit] ei
          quoque sint Bδ   via] *om.* Qι Wλ; viam Cζ; etiam Oη; *add.* etiam Eμ   via ... esse]
          dicitur cendia/rendia/tendia Xβ   dicitur esse] est Vτ   esse] *om.* Cγ Eγ Kγ Oβ Sι
          Vγ Vν Wγ; via Cζ Oη   solis] *add.* et stelle fixe Dγ; *add.* scilicet extremitas exterior
          zodiaci Qμ; *add.* stelle quoque fixe Cγ Kγ Vγ   Et] Etiam Mτ; Item Pι; *add.* infra Nα
              quicquid] quidquot Bβ   fuerit] sit Dη   fuerit infra] *illeg.* Wλ   infra] in
          Xα; intra Cγ Nδ; inter Oη Sι Vπ; intus(!) Wγ; *add. interlin.* id est in [*illeg.*] Kθ

16-17   Et ... septentrionale] *marg.* Oυ

[line]." After this there also follows the hantabuz,[21] that is the spider [i.e., the rete] in which the signs are set in order with the zodiac, likewise the fixed stars, in which the path of the sun is said to be.[22] And whatever

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[21] For *alhantabut* (or *alhanthabuth*), العنكبوت (al-ʿankabūt) – spider-web, i.e., rete – see *Comp.*, Cap. 11, line 14 and note, and Kunitzsch, *Glossar*, no. 1, pp. 515-517.

[22] *Comp.*, Cap. 10 and 11.

motum capitis Arietis et Libre, ex hoc zodiaco, dicitur esse septentrionale; quod autem extra meridianum dicitur. Sequitur almuri, quod "ostensor" dicitur latine, denticulus

17   motum] locum Kγ; *corr. to* locum Lβ; medius Mτ; *add. interlin.* id est circulum Oτ
          motum capitis] circulum Dη   Arietis] *om.* Vι   et] in Bβ   Libre] *add.*
scilicet ab Ariete per Taurum usque in finem Virginis Mκ; *add.* usque ad finem Virginis et
dicitur signa septentrionalia. Meridionalia vero a principio Libre usque ad finem Piscium
Mo   ex hoc] ex horrum Vψ; in Mτ; in hoc Pι   ex hoc zodiaco] *om.* Pσ Rγ;
secundum meridionem infra sub dictum Kα   ex ... esse] dicitur [*illeg.*] zodiaco Wλ
          hoc] *om.* Oη   zodiaco] zodiatho Cγ; zodyaco Lκ   dicitur esse] *om.* Cη Eκ
Eτ Eυ Pγ Pυ; *add. interlin.* Bγ; *add.* sol Pβ   esse] *om.* Bζ Bη Bι Cγ Cζ Dγ Eα Eγ Eδ Eζ
Eμ Eϱ Gα Kγ Kε Kθ Lλ Lζ Mα Mι Mκ Mλ Mν Mτ Nγ Oβ Oη Oν Oϱ Oσ Oχ Pε Pζ Pι Po
Pω Pτ Qε Qμ Rα Rε Sα Sθ Sλ Vα Vν Vβ Vγ Vπ Vϱ Vυ Vφ Xα Xδ Xγ Wγ Wθ Wι; *add.*
interlin. Sβ   septentrionale] *add.* eam Eυ   septentrionale ... autem] *om.* Mι Nγ
          quod] ex Oν   quod autem] et quidquid Eκ; qui autem est Nα   autem] *om.*
Bι Vϱ Vτ; *add.* est Mυ Mφ Wγ; *add.* ex alia parte Oβ; *add.* fuerit motum Dδ

18   extra] supra Mκ; *add.* dicitur Bε Eγ; *add.* circulum Capricorni Vι; *add.* dicitur esse Dη
          meridianum] meridionale Rε; *add.* applicatur Cδ; *add.* appuarsi(?) Oσ   dicitur₁]
om. Bβ Bγ Bζ Bε₁ Bη Bι Cγ Cζ Cη Dγ Eδ Eζ Eκ Eϱ Eτ Eμ Eυ Gα Kθ Lζ Lλ Mα Mι Mλ Mν
Mo Nγ Oη Oν Oϱ Oσ Oχ Pγ Pε Po Pτ Pυ Qε Rα Rε Sβ Sθ Sι Sλ Vα Vβ Vγ Vν Vπ Vϱ Vτ
Wθ Wι Xα Xγ Xδ; *later hand in marg.* Pζ; appellatur Cδ Vυ; fuerit dicitur Oβ; *add.* esse
meridianale Xβ; *add. in marg.* id est a capite Libre in finem Piscum dicitur meridiana pars
Kε   Sequitur] *om.* Eϱ; Deinde Mo; Deinde est Mτ Vι; Post hoc Mκ; Postea Oξ; Postea
cum Nε; Postea est Bδ Bε Bη Cε Cι Dδ Dη Eβ Eη Fα Fβ Fζ Kα Kδ Kε Lβ Lγ Lδ Lε Lη Lκ
Lμ Mδ Mυ Mφ Nδ Oγ Oζ Oι Oτ Oυ Pα Pβ Pδ Pθ Pν Pϱ Pσ Pω Qβ Qγ Qθ Qι Qλ Rδ Sδ Sι
Sκ Tδ Vι Wα Wμ Xβ Xδ   Sequitur ... dicitur₂] *om.* Pμ   almuri] abmiuri / abmuiri
Sι; azimuth Pϱ   quod] id est Eκ; qui Bθ Cγ Mι Wγ Wθ; vel Mτ; *add.* est Eα Xα
          ostensor] *add.* gradus Sλ   dicitur₂] *om.* Eκ; dici potest Mκ; *add.* est Cδ; *add.* et
Mτ   latine] *om.* Eγ; *twice* Xδ; *add.* quem quidam Latinorum alculatorem appellaverit
Mκ; *add.* sive Dη Kθ; *add.* vel Pζ; *add.* vel meridtor Vτ; *add.* videlicet Pι   denticulus]
centiculus Mι Nγ; deciculus Pβ

18-19   sequitur ... relictus] *om.* Vψ   denticulus ... relictus] et est ille denticulus qui in rethi in
capite Capricorni est positus sive relictus ad numerandos gradus tibi Mκ   denticulus
... est] Deinde Sα

18-Cap. 2: 3   quod ... et] *missing* Rγ (*the bottom half of fol. 74 has been torn out, although a few of the
missing lines can be found on a wedge, now fol. 73bis, as restored in 1974*)

from the zodiac[23] would be within [the circle] of the beginning of Aries and of Libra is said to be to the north; what, however, [would be] outside is called southern. There follows the muri,[24] which is called "the indicator" in Latin,

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[23] Again, we should really be referring to the ecliptic (a circle) rather than the zodiac (a band).

[24] *Comp*. Cap. 1 and 11. For *almuri* see note to *Comp*., Cap. 1, line 5.

scilicet, extra circulum Capricorni, in alhantabuz relictus. Deinde almehaur, id est,

19   scilicet] *om.* Bδ Kε Mτ Pι Pϱ; *superscr.* Cδ; graduum Nα; id est Bζ Oη Pβ Vα
         circulum] tiens(?) a capite Eδ   Capricorni] *add.* extra Xδ   In] *om.* Eδ Oβ Po
Wβ   In alhantabuz] *om.* Pϱ   alhantabuz] *illeg.* Eκ Mα Mη; agen alengabuth/ageu
aleugabuth Bε₁; ahangabuth Pτ; alaacabut Qε; alahantabuth Bθ Vπ; alaiancia Sθ;
alancabuch Nα; alancabut Wθ; alancabuth Mτ Vβ; alancabuz Pζ Vν; alanchabuc Bη;
alanchabuz Oσ; alanganbut Oϱ Vα; alaniabuz Bδ; alantabut Vυ; alantabuth Cζ Eυ Oη Sι;
alantabuz Bκ Cδ Lζ Mλ; alanthabuth Eμ; alanthabuz Cγ; alantibut Sλ; alcanbut Eγ;
alcantabuth Rδ; alchanthabuth Pγ; alegabuth Gα; alengabuth Eϱ Qδ Rα Xα; alentabuch
Vτ; aleu|gabuch Dγ; aleugabut Bζ; alhancabuc Sβ; alhanfabuch Sη; alhantabor Tδ;
alhantabu' Xβ; alhantabur Pν; alhantabus Wλ; alhantabut Pσ; alhantabuth Bβ Dη Eα Eδ
Eτ Kγ Kδ Lβ Mν Oν Pι Po Qλ Qμ Vφ; alhantabutz Qι; alhantabuv Lδ; alhantabuz Bε
Eβ Fα Fβ Fζ Lγ Lε Lη Lμ Mδ Nδ Nε Oγ Oζ Oι Oξ Oτ Oυ Pβ Pμ Pω Qβ Qγ Qθ Sδ Sκ Wμ
Xδ; alhant[?]buz Cε; alhanthab Lκ; alhanthabuch Rε; alhanthabuth Bγ Cη Mo Wι Pε;
alhanthabutz Pα; alhanthabuz Cι Pδ; alhantibz Dδ; alhantibz *corr. to* alhantibiz Kε;
alhatabuz Pθ; allancaburh Vϱ; allancabut Lλ Oχ Vγ; allancabuzh Bι; alliancabuth Oβ;
almthaur Vψ; almuthabuth Wβ; alphantaboc Kα; altabubuth Mυ Mφ Vι; altabuth Wα;
alzabut Wγ; anantabut Mι Nγ; hathantibuz Eη; *add. interlin.* id est aranea Oι; *add. interlin.*
id est in rethe Kθ; *add. interlin.* id est rethe Wβ   relictus] de relictus *or* derelictus Mτ;
lictus Oν; *add.* que Vτ   deinde] postea Eκ; *add.* est Dη   almehaur] *illeg.* Mα Sη;
abmehaur Po; abnehaur Eζ; ahmehaur Pτ; ahnehair Lμ; albutair Sι; almahahun Qδ;
almahau' Oβ; almachicam Kγ; almahir Pϱ; almanuch Eυ; almathaur Sθ; almauach Vτ;
almauhar Mκ; almcaur Bη; almchaur Mη; almeahir Xδ; almear Mτ; almeaur Eα Eκ;
almeauth Vα; almebaur Bδ; almebuara Wθ; almechuar Nγ; almedir Oγ; almehae Bζ;
almehahur Kδ; almehair Bε Eη Fα Lβ Lγ Lδ Lε Lη Lκ Mδ Nδ Oζ Oι Oξ Oτ Oυ Pα Pβ Pμ
Pν Pσ Pω Qβ Qγ Qλ Sδ Tδ Xγ; almeham Cε Dγ Dδ Dη; almehant Mν; almehar Fβ Vϱ;
almehatur Gα; almehaur Cδ Eδ Eϱ Mι Mo Nε Oσ Pδ Pθ Pι Pυ Qθ Rα Rε Sκ Vυ Vφ Vψ
Wα Xα Xβ; almehaut Bε₁; almehayr Mυ Mφ Vι; almehuar Bι Pζ Qε Sβ Vβ(*add. interlin.* al'
almehaur); almehuhar Lλ Vγ; almehur Eβ; almena^{bu}th Bγ; almenar Oν Wγ; almenat Cζ;
almenath Bθ Cη Eτ Vπ Wι; almenhar Eγ; almeriar Bβ; almeris Nα; almethan Kα;
almethaur Qι; almeuach/almenach Pγ Wβ; almeuair *or* almenair Oχ; almeuar Kθ;
almeuath Pε; almeur Sλ; almhaur Cι; almicur Eμ; almihair Wμ; almohayr Kε;
almtebachur(?) Rδ; almthaur Oϱ Wλ; almumchache Bκ; almumehaur Lζ Mλ;
almumehaura Vν; alnehair Fζ; alnithnar Cγ; alnitur Oη; *add. in marg.* almenath Lβ
         id est] *om.* Vν Wθ; quod est Pϱ; scilicet id est Sι

that is a small tooth, outside the circle of Capricorn, extending from the hantabuz.[25]
Next [is] the mehaur,[26] that is,

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[25] The rete (see above, note to line 15). See *Comp.*, Cap. 11.
in alhantabuz relictus: As Laird and Fischer point out in their edition of the text of Pèlerin de
Prusse, this phrase makes more sense modifying the muri, indicating that the muri is on the rete, rather
than modifying the mehaur in the next sentence, although it too can be said to be in the rete. *Pèlerin de
Prusse on the Astrolabe*. Text and translation of his *Practique de astrolabe*, ed. Edgar Laird and Robert Fisher,
Medieval and Renaissance Texts and Studies 127 (Binghamton: Medieval and Renaissance Texts and
Studies, 1995), p. 84.

[26] The centre of the rete and plates: *al-miḥwar* / المحور. See Kunitzsch, *Glossar*, no. 28 (pp. 533-
534/79-80).

20   foramen quod est in medio rethis, in quo est axis retinens tabulas climatum, in quam
          intrat alferaz, id est, "equus" restringens araneam cum rotulis, quasi cuneus. Et in alia

     20   foramen] *add.* in medio rethe et climatum Sκ   quod est] *om.* Bε₁ Kε Lμ Qθ   est₂]
               om. Vα   in₁] *om.* Eυ Oχ   rethis] *twice* Lμ; arietis Wθ; rectic Cγ; rectis Mα Vϱ; rete
               Pζ; retis Cδ Eκ Eϱ Lζ Lλ Mλ Nα Nγ Oϱ Sι Sκ Sλ Vγ Vν Vτ Vψ; rhethis Kα; *add.* et
               tabularum Mκ; *add.* relictus Kε Qθ   axis] assis Mι Nγ; axila Oξ; clavus Vγ; pars Mλ;
               add. id est alihitop Dη; *add. interlin.* id est clavus Oτ   retinens] continens Bβ
                    retinens … climatum] restringens araneam tabulas ipsas et rethe Mκ(restringens
               araneam] *del. and add. in marg.* qui etiam dicitur clavus et cauilla arabice a' alchithop
               retinens)   tabulas] tabellas Bε₁ Eμ Eϱ Kγ Lλ Mo Oη Oϱ Pζ Pυ Sβ Vβ Vϱ Vφ; rolulas
               Cγ   climatum] circuli malułi Bβ   in quam] *om.* Wθ; quod Sα; *corr. to* quot Lβ
                    quam] qua Kα Vν; quem Bη Bι Cι Nε Oη Pγ Pζ Po Qβ Qδ Sι Vβ; quod Bβ; quo Bθ
               Cγ Dη Kε Mδ Nδ; *add.* axem Wγ

     21   intrat] ingrat Mτ; intret Cδ; net~ia est Vν   alferaz] alfarast Gα; alfarat Cγ Eγ Mα;
               alfarum Pγ; alfat Oβ; albebach Eδ; alferac Po; alferae Eζ; alferam Bη Eυ Vϱ Wθ; alferas
               Bε₁ Oη Rα Xα; alferase Eϱ Vφ; alferat Wγ; alferatz Vν; alferaz Bθ Bι Bκ Cδ Cζ Eμ Eτ Lζ
               Lλ Mι Mλ Nγ Oι(*add. interlin*) Oν Oσ Pζ Qε Sθ Sλ Vα Vγ Vπ Vυ; alferax Vτ; alfezar Oϱ;
               alforas Eα; alforase Pι; alforath Dη Nα; alphaeraz Cη; alpharam Kγ; alpharat Mν;
               alpharich Kθ; alphera Rε; alpheras Sβ; alperat Dγ Sη; alperath Bβ; alpheraz Bγ Oχ Pε
               Pυ Vβ Wβ Wι; alphoras Sι; *corr. to* apharas Bζ; *corr. to* alphera Lβ   alferaz id est] *om.*
               Bε Dδ Eκ Kε Sα; unus Bδ Cε Cι Eβ Eη Fα Fβ Fζ Kα Kδ Lγ Lδ Lε Lη Lκ Lμ Mδ Mη Mo Mτ
               Mυ Mφ Nδ Nε Oγ Oζ Oξ Oτ Oυ Pα Pβ Pδ Pθ Pμ Pν Pϱ Pσ Pτ Pω Qβ Qγ Qδ Qθ Qι Qλ
               Rδ Sδ Sκ Tδ Vι Vψ Wα Wλ Wμ Xβ Xγ; *add in marg.* alfaram Xδ; *add. interlin.* id est
               alpheras arabice Kε   id est … restringens] *obliterated by repair* Pε   equus] *om.* Eκ;
               equs *many*; *add.* T uneq Eυ; *add.* id est caballus Kα; *add.* retinens et Qθ; *add.* vel cuneus Bθ
               Vπ Vτ   restringens] *marg.* Mτ; destringens Mι Nγ; retringens Oη   araneam] *add.*
               restringens Kε Lμ Pσ   cum] *om.* Kα   rotulis] *om.* Dδ; totulis Vυ   quasi] *om.*
               Nα; id est Sη Vν; *add.* tenens Qδ   quasi cuneus] *om.* Mλ Vτ; .q. Sι   cuneus] *om.*
               Xδ; chuneus Wγ; omeus Bζ; tunes Pε; tenens Oϱ; tuneus Vφ; *add.* Item equum etiam et
               araneam ponitur iam 9ⁱt'(convenitur?) in axe lingula quedam scilicet regula que ab ipso
               axe usque ad extremium tibi pertensa per eundem limbum circumducitur Mκ(*add. in*
               marg. et quibusdam vocatur novella)   Et] *add. in marg.* DE DORSO ASTROLABII Fβ; *add.*
               interlin ex Sκ   alia] altera *many*   ille Cη Pε

     21-22   Et … matris] Super dorsum vero astrolabii, scilicet in exteriori parte matris que etiam
               valzagora dicitur Mκ

a hole which is in the middle of the rete, in which is the axis [i.e., pin] holding the plates of the climates [i.e., the various latitudes], into which the faraz,[27] that is, the "horse," like a wedge, enters fastening the rete with the plates.[28] And on the other

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[27] *al-faras* [the wedge]: see *Comp.*, Cap. 6, line 1 and note.

[28] See *Comp.*, Cap. 6.

parte matris sunt duo circuli equationis solis quorum unus continet numerum dierum anni 365, et scribentur sub eo nomina mensium. Et alius circulus gradus signorum et

22   parte] *om*. Pγ; *add*. walzathore id est Dη   matris] *add*. in dorso Mτ; *add*. scilicet in dorso Vτ   sunt] rep. Rδ;   duo] *om*. Sλ; 2 *many*; 20 Kγ; 360 Kα   equationis] equatoris Wθ   solis] *om*. Lκ; ☉ Vι; *add*. exterius Bβ Bγ Cη Eα Eδ Eζ Eτ Kθ Lβ(*interlin*.) Mν Oβ Pγ Qμ Wι   quorum] *om*. Eκ; maior Mτ   unus] *add*. interlin. circulus Oτ

22-23   unus ... mensium] interiori sunt nomina mensium. Super quod sunt ccclxv divisiones secundum numerum dierum anni. Si in quibusdam astrolabiis dividuntur si pluraliter(?); in quibusdam vero duo et duo ponuntur. Iuxta quam continetur eiusdem numeri descriptionum facilius possit dies inveniri. Mκ   numerum ... circulus] *om*. Wλ

23   anni] *add*. scilicet Cζ Dη Eκ Eμ Kγ Kθ Lζ Mτ Oη Oσ Rε Sλ Vα Vν Vυ; *add*. scilicet inferior Cγ Eγ; *add*. scilicit inferior sui interioris Wγ; *add*. solaris Cδ   365] *om*. Pι; CCCLXV Lκ Oχ Qε Sβ; 36 et dies Bβ; 305 Oβ; *add*. dies Bη Cζ Eμ Kθ Oη   scribentur] inscribuntur Eγ Wγ; scribunter Bη Bθ Cι Dδ Fα Mδ Qδ; scrubambtur Mo   sub eo] *om*. Bδ Cζ Wθ; super eo Wγ; *add*. latinorum Eγ   eo] *om*. Cε; hoc Dη Mτ   nomina] *add*. latinorum Lλ Mι Pζ Nγ Wγ Wθ   mensium] *om*. Sλ; signorum Eα Eδ Mν Oβ
          alius circulus gradus signorum] *om*. Bη Cδ Cζ Eα Eμ Lζ Mλ Nγ Oη Oϱ Oσ Sα Sθ Sι Vα Vν Vϱ Vυ; alius circulus enim graduum signorum Pϱ; alius circulus(*add*. etiam Lδ; *add*. est Oγ) continens gradus signorum Dη Lδ Oγ; alius circulus continet gradus signorum Lβ; alius circulus graduum signorum Nδ Rδ; alius continet signorum gradus Kγ Kθ Pι; alius continet numerum graduum signorum 360 Cγ Eγ; alius signorum gradus Bβ Bγ Bε₁ Bθ Bι Cη Dγ Eδ Eζ Eκ Eτ Eυ Gα Mν Pγ Pε Po Pτ Pυ Vβ Vπ Vτ Wι Xα Xγ; alius signorum gradus 360 Lλ Mα Mι Nα Oχ(ccclx) Pζ Qε(ccclx) Sβ(ccclx) Sη Vγ Wθ; alius signorum graduum Eϱ Mo Qμ Vψ; aliorum signorum gradus Bζ Rα; alius signorum super/supra Oν; circulus graduum signorum Kε   et] *om*. *many*[29]; *add*. etiam Lλ

23-24   nomina ... eum] *om*. Mτ; continet numerum graduum signorum 360 et ita Wγ   Et₂ ... signorum] *om*. Bκ Sλ; In maiori autem circulo sunt nomina XII signorum supra quo est descriptus uniuscumque signi graduum numerus per 5ᵉ vel 6 divisus Mκ   alius ... nomina] *om*. Oβ

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[29] Generally "et" is missing when "quem" is substituted for "eum" in line 24; "and within it are written..." becomes "within which are written...".

side of the mother [i.e., the back of the astrolabe] are two circles for the equation of the sun,[30] one of which contains the number of the 365 days of the year, and the names of the months will be written below it.[31] The other circle [contains] the degrees of the signs, and

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[30] "Equation of the sun" (also known as the "equation of time"): the relating of the position of the sun along the ecliptic to the day of the year. This not the meaning of the phrase in more technical astronomy where "the equation of the sun" means converting the sun's mean motion to true motion. See Franicis S. Benjamin, jr. and G. J. Toomer, eds., *Campanus of Novara and Medieval Planetary Theory. Theorica planetarum* (Madison: University of Wisconsin Press, 1971), pp. 41-42.

[31] *Comp.*, Cap. 2.

infra eum scribuntur nomina signorum. Postea quarta capiende altitudinis. Postea
25   quadrans, cuius latera in 12 puncta divisa sunt. Sequitur regula, que circumvoluitur in

24   infra eum] *om.* Vτ; in quo Kε Pσ Qβ; in quem Qθ; inferior eum Xα; quem Xβ   eum]
        om. Cγ; quem Bε Cι Dδ Dη Eβ Eη Fα Fβ Fζ Kα Kδ Lβ Lγ Lδ Lε Lη Lκ Mδ Mυ Mφ Nδ Nε
        Oγ Oζ Oι Oξ Oτ Oυ Pα Pβ Pδ Pθ Pι Pμ Pν Pϱ Pω Qγ Qι Qλ Sκ Tδ Vι Vψ Wα Wμ; eorum
        Mν Qμ Po; etiam Oχ; A quod Xδ; quod Cε; *add.* etiam Mα Mι Nγ Pζ Qε   scribunter]
        om. Kγ; signantur Kα; conscribuntur Cγ Wγ; scribantur Bθ   nomina] etiam Wθ
               Postea₁] Deinde Lζ Mτ Oχ Rε; seu quadratum id est Kδ; *add.* cum Fζ; *add.* est Bβ Bγ
        Bδ Bε Cγ Cε Cι Dη Eβ Eγ Eη Fα Fβ Kδ Kε Lδ Lε Lη Lκ Lμ Mδ Mη Mτ Mυ Mφ Nε Oγ Oζ
        Oι Oξ Oτ Oυ Pα Pβ Pδ Pθ Pμ Pν Pϱ Pω Qγ Qδ Qθ Qλ Rδ Sη Tδ Vι Wμ Xβ Xδ; *add.* qui
        Vτ; *add.* scribuntur sub eo Eα; *add.* sequitur Lβ   Postea₁ ... altitudinis] *om.* Nα Pτ Vψ
               quarta] 4ᵃ *some*; iiiiᵃ Qε; carta Sα; quadra Bθ Vτ; *add.* id est 4 Lκ; *add. in marg.* id est
        ad capiendum altitudinem solis t stellarum Lβ   quarta ... altitudinis] accipienda est
        [*blank*] Wγ   capiende] accipienda Cγ Mι Nγ; accipiende Cδ Eγ Kγ Lλ Mα Pζ Qε Sβ
        Sκ Sγ; accipiente Wθ; capienda Bβ Oβ; *add. interlin.* accipiende Vβ   altitudinis]
        altitudines Cζ   Postea₂] Deinde Bη Bκ Cγ Cδ Cζ Eγ Lλ Mα Mι Mλ Mτ Nγ Oη Oν Oϱ
        Oσ Pζ Qε Sα Sβ Sθ Sι Sλ Vα Vβ Vγ Vν Vτ Vυ Wγ Wθ; *add.* est Nδ Vψ

24-27   Postea ...nocte] *replaced by 16 lines of text* Mκ

25   quadrans] cadrans Pτ; quadrans Vψ; quadrantis Cγ; *add.* scilicet Vπ   cuius]
        cuiuslibet Pε; cum Gα; scilicet cui Bβ Bθ   latera] altᵒa Eδ; *add.* cuius Lκ   in] *om.*
        Bθ Nε   12] xii / duodecim *some*; ii Oϱ; tix Kα; av Sθ; 20 Bζ; *add. in marg.* partes dividi
        punc. quodli et latus parte et boca partes illius divisiones puncto vel digiti umbre recte
        vel umbre verse Lβ   puncta] *om.* Cδ Cζ Lζ Mι Mλ Nγ Oη Oϱ Pσ Sλ Vν; partes Mτ Pι
        Sι(*marg.*)   puncta ... sunt] dividuntur partes Wγ   divisa sunt] *illeg.* Eκ; dividi
        possunt Bζ Bη Bθ Bι Bκ Cζ Dγ Eδ Eζ Eμ Eϱ Eυ Gα Lζ Mλ Mν Mo Oβ Oη Oν Oϱ Oσ Pι Po
        Pσ Pτ Pυ Qδ Rα Rε Sη Sθ Sι Sλ Vα Vν Vπ Vϱ Vτ Vφ Xα; dividi possunt postremo Cδ;
        dividitur Cγ; dividuntur Eγ Kγ Lλ Mα Mι Nγ Oχ Pζ Qε Sβ Vγ Wθ; *add.* cuncta Mι Nγ;
        add. quodlibet larus per se et vora partes illud divisionem partam vel diniti umbra recta
        vel versa Pι   sunt] *om.* Pγ; possunt Qμ   *before* Sequitur] *add.* Postea Bε
               Sequitur] Similiter Sι; *add.* de Rε; *add.* tunc allidada id est Dη   Sequitur regula]
        Similiter tabulla Mτ   Sequitur ... circujvoluitur] *om.* Xβ   regula] allidada sive
        regula; *add. in marg.* al' alidada Oυ Po(allidada)   que] *om.* Oϱ   circumvoluitur]
        circumrolunter volunter Pθ; voluitur Cδ Sλ; voluntur Mτ   in₂] a Mα

25-26   puncta ... astrolabii] *om.* Sα

25-27   Sequitur ... nocte] *om.* Kδ

within it are written the names of the signs.[32] Then [there is] a quarter for measuring an altitude.[33] Then a square, whose sides are divided into 12 points.[34] The rule is next, which rotates on

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[32] *Comp.*, Cap. 2.

[33] *Comp.*, Cap. 2.

[34] *Comp.*, Cap. 3.

dorso astrolabii, in qua sunt tabule perforate, ad capiendum altitudinem solis in die, stellarum in nocte.

26 astrolabii] *add.* scilicet dicitur alidada Oγ qua] quo Bδ Nδ sunt] *add. interlin.* alhidada Lβ; *add.* alhidada id est due Pι; *add.* due Wγ; *ms Pω jumps to Cap. 9 (missing folios)* tabula] regula Mδ; regule Nδ; tabele Sβ; tabelle Bε₁ Eϱ Kγ Oβ Oϱ Oχ Pζ Pυ Qε Rα Sα Sη Sθ Vα Vβ Vφ Xα; tabulle Cγ; *add.* ad capiendum Oγ; *add.* septentrional' que autem Mι Nγ; *add. in marg.* al' pinule Oυ perforate] *om.* Eγ Sλ; *marg.* Vφ; *inserted after* "solis" Eα; forate Wγ; per foraminem Cγ capiendum] accapiendam Vγ; capiendam Lλ; sumendam Bη Cζ Oη altitudinem] latitudinem Wθ; *add.* perforate scilicet Sλ; *add.* scilicet Cδ solis] *om.* Mυ Mφ Nα Nε Vι in₂] de Kγ in die] *om.* Kθ die] *add.* et Bβ Bδ Cδ Dγ Mδ Mη; *add.* etin Pγ; *add.* uᶜtīō(*?*) et altitudinem Cζ

27 stellarum] *add.* fixarum Bε in]de Kγ nocte] *add.* etc. Rδ Xβ; *add.* et hoc per foramina Eκ; *add.* Explicit Bζ³⁵ Gα; *add. in marg.* Verte tria folia et habebis residium videlicit "Cum vis scire gradum solis" Lκ[*text skips from fol. 133ʳ to fol. 136ʳ*]; *add.* huc usque diximus de compositione astrolabii modo de eius utilitatibus est dicendum Vα; *add.* eum/cum dicendum Vα; *add.* Ideo(*?*) et c. Nε; *add.* Incipiamus igitur de operatione Wγ; *add.* Nota que pars astrolabii que est versus recte horatur facies rpms/[*illeg.*] astrolabii alia partis opposita parti superscriptem vocata [*illeg.*] sive dorsum Cγ; *add.* Sequitur capitulo primus Kγ *ms* Bε₁ *ends*

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³⁵ In ms Bζ the Prologue is found at the end of the other material, hence the "Explicit" at this point.

the back of the astrolabe on which are perforated vanes for taking the altitude of the sun in daytime and of the stars at night.[36]

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[36] *Comp.*, Cap. 5.

[APPENDIX PROEMIUM: VERSION B]

mss Mμ Nζ Pκ Pχ Tβ Vη Vμ Vo Wζ

INCIPIUNT CANONES ASTROLABII

Scribitur primo posteriorum [...].[37] In omni scientia presupponitur quid nominis ut igitur melior habeatur operatio astrolabii. Sequentium terminorum est cognitio premittenda unde nomina instrumentorum sunt plura. Primum est armilla suspensoria
5 capiendo altitudinem solis de die et stellarum de nocte, et dicitur arabice "alhantica." Secundum est alhabor, id est, ansa vel clavus que ei coniungitur et secundum alios dicitur illud ferrum concavum ipsi astrolabio inferiori in quo armilla movetur. Postea sequitur mater, scilicet rotula, in se continens omnes tabulas cum aranea cui coniungitur margolabrum sive limbus in 360 gradus divisus. Tabule autem ab hac matre
10 contente signantur tribus circulis quorum minor est circulus Cancri, et medius circulus

1   Incipiunt ... astrolabii] Pκ Pχ; *om.* Mμ Vo Wζ; De astrolabii utilitatibus Tβ; Exposicio nominum Vη; Opus astrolabii Vμ; Sequentur canones ipsius astrolabii Nζ

2-3   Scribitur ... astrolabii] *om.* Nζ

3   Sequentium] Noticia Pκ Pχ   terminorum ... cognitio] noticia sive cognitio terminorum est Mμ Nζ Wζ   cognitio] *om.* Pχ Pχ

4   premittenda] prenotanda Pκ Pχ   ad] *om.* Mμ Nζ   Primum] *add.* enim Vυ

5   capiendo] ad capiendam Tβ Vη   altitudinem] altitudines Vμ   et₁] aut Pκ; cum Pχ; vel Nζ Wζ   dicitur] vocatur Vμ   alhantica] alhanathia Tβ; alhanatya Vo; alhancigra Vμ; alhantica et secundum alios alhancia Nζ; alhanatya et secundum alios alhantica(alchantita Mμ) nuncipatur Mμ Pκ Pχ Wζ; alnahathia Vη

6   est₁] *om.* Mμ Pκ Vχ; alios Nζ   alhabor] *cut off* Pχ; alhabos Nζ Pκ; alhalos Wζ; *add.* vel alhantabor Vμ; althabor Vo   id est] *om* Nζ   ansa] ansera Pκ Pχ   et] sed Mμ Nζ Wζ   secundum] *rep.* Pκ

7   ipsi] *om.* Tβ   armilla] astrolabium Tβ Vη Vo

8   mater] *om.* Nζ   scilicet] *om.* Mμ Nζ   tabulas] *add.* climatum Nζ   aranea] *add.* id est rethe Vμ   cui] cuique matri Tβ Vη Vμ; *add.* matri Vo

9   margolabrum] almalgolabrum Nζ   sive] et Mμ; id est Nζ Pκ   divisus] *add.* est Vo

10   signantur] figurantur Vμ Vo   minor] primus Pκ Pχ   medius] *add.* est Pκ Pχ   circulus₂] *om.* Tβ Vη Vμ Vo

[37] Some noun is missing here, as the antecedent of the genitive *posteriorum*.

equinoctialis, et maximus circulus Capricorni. Postea sequuntur almucantharat, qui sunt circuli in medietate superiori descripti quorum quidam sunt integri, quidam imperfecti; quorum primus est orizon, qui dividit duo emisperia. Centrum autem inferioris almucantharat cenith capitum nominatur. Deinde sequuntur azimuth, qui 15 sunt partes circulorum almucantharat intersecantes. Post quos sunt hore, in medietate inferiori descripte. Inter quas quidem horas due sunt crepusculorum linee. Postea sequitur linea medii celi que est linea descendens ab armilla per centrum in oppositam partem astrolabii, cuius medietas a centro in armillam dicitur "linea meridiei"; et alia dicitur "angulus terre" sive linea "medie noctis." Postea sequitur alhantabuz, id est 20 aranea in qua sunt signa cum zodiaco constituta et etiam stelle fixe, in quo dicitur esse via solis. Et quicquid fuerit infra motum capitis Arietis et Libre, in hoc zodiaco dicitur

11   circulus] *om.* Tβ Vη Vμ Vo   almucantharat] almicanthrat Mμ; almicantrach Wζ; almicantrath Nζ Vμ Vo; almi^th Vη; almū Tβ; almucantrach Pκ; almucatarah Pχ

11-12   qui sunt circuli] *om.* Nζ

12   sunt₂] *om.* Mζ   quidam₂] *add.* autem Mμ Nζ Pκ Wζ

14   inferioris] interioris Vη Vμ   almucantharat] almi~ Nζ; almicanthrat Mμ; almicantrath Pχ Vμ Vo; almi^th Vη; almū Tβ; almucantrath Pκ   cenith] cenit Mμ; zenith Pκ Pχ   nominatur] appellatur Mμ; ymaginatur Tβ Vη Vμ(*add.* sive appellatur) Vo   Deinde] Inde Vη   azimuth] azimut Pκ; azi^th Vη; azymuth Tβ

15   circulorum] minoris Vμ; terminorum Vo   almucantharat] almi~ Nζ; almicantr' Vo; almicantrach Wζ; almicantrath Mμ Pχ Vμ; almi^th Vη; almū Tβ; almucantrath Pκ   Post quos] Postea Mμ Nζ Pκ Pχ Wζ   sunt₂] *om.* Pχ   hore] *add.* pnt Pκ(*corr. interlin. to* id est solent); *add.* solent Pχ

16   inferiori] *corr. from* superiori Mμ   descripte] *om.* Pχ   quas quidem] *om.* Mμ Nζ Pκ Pχ Wζ

17   sequitur] *om.* Nζ Pκ Pχ Wζ   celi] *add.* vel meridianus Vo   descendens] descentionis Pκ Pχ   per centrum] *om.* Nζ

18   medietas] medietatis Vo   in] usque Mμ Nζ(*add.* ad); versus Pκ Pχ Wζ

19   linea] *om.* Pκ Pχ Wζ   alhantabuz] alencabuth Wζ; alenhbuth Pχ; alentabuth Nζ Vo; alenthabuth Mμ; alentibuth Pκ; alhentabuch Tβ; alhentabuth Vη; elentebuth Vμ   id est] et Vo; sive Tβ Vη

20   vel] sive *some*   aranea] *add.* sive rethe Vμ Vo; *add.* vel rethe Tβ Vη   qua] quo Tβ Vη Vμ   zodiaco] fodyatho Vη   etiam] *om.* Mμ Pχ Pχ Wζ   fixe] *om.* Tβ

21   fuerit] *om.* Pχ   infra] inter Tβ Vη   motum] *add.* circulum Vη   Arietis] *om.* Vη   hoc] *om.* Nζ   zodiaco] zodyatho Vη

septentrionale; quod autem extra meridionale dicitur. Et tunc sequitur almuri, quod latine dicitur "ostensor", scilicet denticulus extra linea Capricorni, in alhantabuz derelictus. Deinde est almehaur, id est, foramen quod est in medio rethis, in quo est axis retinens tabulas climatum, in quo est alferaz, id est, "equus" restringens araneam cum rotulis. Sed in alia parte astrolabii sunt duo circuli equationis solis quorum unus continet numerum dierum anni, scilicet 365, et scribuntur sub eo nomina mensium. Et alius est circulus signorum in quo scribuntur gradus et infra eum scribuntur nomina signorum. Postea sequitur quadrans, cuius latera in 12 partes dividuntur. Tunc sequitur regula, sive allidada sive mendiclinium[38] que circumvoluitur in dorso astrolabii, in qua sunt tabule perforate ad capiendum altitudinem solis in die et stellarum in nocte. Deinde iterum habemus lineas horarias in dorso astrolabii.

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22   extra] *add.* fuerit Vμ   tunc] postea Nζ

23   scilicet] sive Mμ Nζ Pκ Pχ   denticulus] tenticlus Pκ Pχ; *add.* et est Mμ Nζ Pκ Pχ Wζ
       extra] ex Wζ   alhantabuz] alantabuth Mμ; alcantebuth Nζ; alehbuth Pχ;
       alentabuth Vo; alentibuch Pκ Wζ; alhentabuch Tβ; alhentabuth Vη; elentebuch Vμ

24   almehaur] alhebor Tβ Vη; almean vel almehair Vμ; almeham Wζ; almenar Mμ; almiham
       Nζ; almiuri(?) Vo

25   retinens] coniungens Vo   alferaz] alforach Wζ; alforarh Vη; alforat Nζ; alforath Pκ
       Pχ Tβ; alpharath Mμ; alpherat Vμ; alphorat Vo

26   rotulis] *add.* quidam cuneus Mμ   Sed] et Pχ   astrolabii] *om.* Mμ Pκ Pχ Wζ; dorsi
       Nζ   sunt] *add.* etiam Mμ

28   circulus] circulorum Nζ   in ... gradus] *om.* Mμ Nζ Pκ Pχ Wζ

28-29 in ... signorum] *om.* Vη

29   sequitur₁] *om.* Nζ Pκ Pχ Wζ

30   sive₁ ... mendiclinium] *om.* Mμ Nζ Pκ Pχ Wζ   allidada] alidoda Vη; *corr. in marg.
       from* allidoda Tβ   mendiclinium] mendiclineum; *add* sive linea fiducie Vμ

31   tabule] tabula sive tabule Nζ; *add.* vel tabelle Mμ Pκ Pχ   in₁] de Mμ   et] vel Nζ
       Wζ   stellarum] *add.* fixarum Vμ

32   horarias] horareas Nζ   in ... astrolabii] *om.* Nζ   astrolabii] *add.* Et sic
       habemus(habes Mμ) omnia instrumenta scire denominata Mμ Nζ Wζ; *add.* etc. Vo; *add.*
       etc. est sicut Vη

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[38] *Comp.*, Cap. 4 and Figura 4.

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[CAPITULUM 1]. DE GRADU SOLIS INVENIENDO CAPITULUM

1   *mss* Cα Eλ Eo Eσ Fγ Lι Mγ Mπ Oφ Pξ Pφ Qζ Qη Vξ Zα *begin*

De ... capitulum] *om.* Bδ Bζ Bκ Cα Cγ Cδ Cε Cη Dδ Eα Eγ Eκ Eλ Eϱ Eυ Kε Lζ Lκ Mα Mκ
Mμ Nα Oβ Oσ Oχ Pγ Pι Pκ Pμ Pσ Qε Qη Qι Sα Sβ Sθ Sι Sλ Tβ Vα Vν Vo Vτ Vυ Wγ Wζ
Wθ Wλ Xγ; *faded* Eδ(*four lines*) Fγ; Accepte gradu solis inveniendo per die suum et
econverso Cζ; Ad inveniendum gradum solis Lμ Qε; Ad inveniendum gradum solis in
dorso astrolabii Bι(*add. in marg.* 1ᵐ c); Ad inveniendum gradum solis per diem mensis Pτ;
Canones astrolabii Pξ; Capitulum ad inveniendum gradum solis per diem mensis vel
diem per gradum Vξ; Capitulum primum Pχ; Capitulum primum. De inveniendo loco
solis Mλ; Capitulum 2ᵐ Vσ; Canones astrolabii Vη; Cum volueris scire gradum solis per
diem mensis et econverso Eσ Oϱ(*add. in marg.* c. 2); De divisione gradus per diem et
econverso Sδ(*add.* C. 2); De gradu solis habendo per diem Rε; De gradu solis inveniendo
per diem mensis (suum Bη Eμ) et econverso Bη Eμ(*marg. and add.* 1ᵘˢ) Qδ; De gradu solis
inveniendo per regulam super diem mensis etc. Mδ Nδ; De gradu solis per diem mensis
et e converso inveniende Vφ(*add. in marg.* 1ᵐ); De inventione gradus solis Dγ Mι Nγ; De
invencione gradus solis et diei mensis Po Qμ; De inventione gradus solis in die et
stellarum in nocte Lγ; De inventione gradus solis per diem Dη; De inventione gradus
solis per(et Eζ) diem mensis Eζ Lε Nε Tδ; De(Sequitur de Vψ) inventione gradus(*interlin.*
Mη) solis per diem mensis et econverso Bε Bθ Cι Eβ Eη Fα Fζ Kγ(*later hand*) Kδ Lβ Lδ Lη
Mη Mφ Oγ Oζ Oι Oξ Oτ Pα Pδ Pθ Pν Pυ Qγ Qλ Rδ Sκ Vβ Vπ Vψ Wα Wμ Xδ; De
inventione vero motus solis similiter et diei mensis Zα; Hic secuntur canones ad
operandum cum astrolabio; capitulum primum de gradu solis inveniendo per suum et
econverso Oη; In quo gradu cuiuslib et signi sit sol Fβ(*different hand*); Incipit liber de
operatione astrolabii et primo ad [*cut off*] gradum sol[is] Pζ; Incipit opus astrolabii ad
inveniendum gradum solis per diem mensis et per gradus Mγ; Incipit opus astrolabii ad
inveniendum gradum solis per diem mensis vel diei per(*interlin.*) gradum Eo; Incipit
practica astrolabii Mτ; Incipit practica astrolabii et primo ad inveniendum gradum solis
per diem mensis vel diem per gradum Bγ(*later hand*); Incipit practica astrolabii per
lineam superscriptam Qζ; Incipit secunda pars de modo operandi per astrol'. Capitulum
primum, De gradu solis habendo per diem et diem mensis econverso per dorsum Oφ;
Incipiunt canones astrolabii Kγ(*add. later hand* De inventione gradus solis per diem
mensis et econverso; *add. in marg.* primum); Incipiunt operactiones astrolabii Gα;
Inventio gradus solis Lλ(*add.* 2.) Ov Vγ; Inventio gradus solis in dorso astrolabii per diem
mensis Mν Mυ(*add.* et econverso) Vι(*add.* et econverso) Wβ; Inventio gradus solis per
diem et mensis et e converso Xβ; Invencio gradus solis per diem mensis datam(*om.* Pβ Qβ
Rα Xα) et econverso Ov(*add.* sic habetur) Pβ Pε Qβ Rα Sη Wι Xα; Inveniendo gradus solis
per diem mensis datum et econverso Bβ Kθ; Modus inventionis gradus solis in dorso
astrolabii Vϱ; Practica astrolabii Lι; Prima practica. De inventione gradus solis per diem
mensis et econverso Kα; Primum capitulum. Inventio gradus solis mensis astrolabii Eτ;
Primus canonum Vμ(*add. in marg.* 1) Qualiter inveniantur gradus solis per diem mensis et
econverso Pϱ; Sequitur de utilitatiubus astrolabii Nζ; Sequitur usus astrolabii utilis valde
Pφ   *add. in marg.* Pᵘˢ Wζ; *add. in marg.* Pᵐ cᵐ Pκ; *add. in marg.* Capitulum secundum
Mκ; *add. in marg.* Nota de usu astrolabii Qμ

[CHAPTER 1]. CHAPTER ON FINDING THE DEGREE OF THE SUN

[*apparatus criticus for line 1 continued*]

1-19   De ... ostendet] *om.* Sα

Cum volueris scire gradum solis, pone regulam super diem mensis presentis, et gradus a summitate eius tactus erit gradus solis – qui cuius signi sit videbis – et eum

2   Cum] Cumque Vι; Et cum Pφ Sι; Quandu Lμ; Quia Bδ; Si Cα; *add*. igitur Bκ Kδ Mμ Nζ Pκ Vμ Vo Wζ; *add. illeg*. Pχ   volueris] vis *some*   scire] *om*. Eβ; *interlin*. Oγ; invenire Fγ   scire ... solis] equare solem, id est gradum in quo sit scire Mκ   gradum] gradus Kδ Vμ; graduum Sκ; equationem Vσ   gradum solis] in quo signo sit sol et quot gradus perambulaverit ex eo scito quod dies transierunt de mense latino et Eσ Kγ Oϱ   solis] *interlin*. Wβ; *add*. id est gradus in quo sit Vσ; *add*. ignotum Vν; *add*. in zodiaco Xα Xβ   regulam] allidadam Mκ; allidatam Vσ; rigulam Nγ; *add*. in dorso astrolabii Lβ(*marg*.) Oι(*interlin*.; scilicet in) Pι Pϱ Vμ Vo; *add. interlin*. scilict allidadam Qμ   super] in Nζ; sub Vτ; supra Fγ; *corr. to* supra Dδ   diem] *add*. presentem Lβ(*interlin*.) Sβ   mensis] *interlin*. Bι; *om*. Cα Dγ Gα Pυ   presentis] *om*. Eo Mo; *repeat* Cα; de quo queris Dη; in quo gradu solis vis invenire Wγ; *add*. in dorso Lι; *add*. in quo fueris Mκ Vσ; *add. 4-line gloss* Oη

2-6   Cum ... ostendet] Cum volueris scire in quo signo sit sol, scito diem mensis et pone regulam super illud, et invenies gradum sol in illa. Sic et per illud positis(?) sunt(?) horam capiendo altitudinem et ponendo inter almuth' sicut [*illeg*.] Sα

3   gradus$_1$] *om*. Vμ; signus Vτ; *add*. cuiuscumque signi Mκ; *add*. cuiusque signi Vσ   a] *om*. Oϱ; in Cα Dη Eσ Kγ Lι Mτ; super Oγ   eius] *om*. Cα Ov; cuius Mv; ei Pκ; eiusdem Pι; re Eσ; regule Kγ; regule supra locum mensis Mκ Vσ; vel Mι Nα   tactus] *om*. Cζ; *illeg*. Bη; *interlin*. Mτ; contactus Cα Nκ Pι Pκ Pχ Qζ; factus(?) Mμ; regule Sι; tantus Vτ; *corr. from* tactrar Kε; *add*. et equale Vπ; *add*. in circulo signorum Pι; *add*. regule Bθ Bκ Ov; *add. interlin*. id est gradus signorum Lβ   erit] erunt Vo   gradus$_2$] *om*. Cε Vτ; tactus Xδ   gradus solis] *om*. Bδ; *add. interlin*. gradus Mτ   solis] *om*. Mμ Pγ Pκ Pχ Wζ   qui] *om*. Vo Vτ; *interlin*. Mμ; id est gradus Oη; quem Lλ Mα Oχ Pζ Wγ Wθ; quere Mι Nγ; quod Sλ; *add*. gradus Dδ Qμ   qui ... sit] in eius signo sicut Cγ   cuius] *add*. autem Vo   sit] *om*. Eτ Pτ Sκ Xγ Xδ; erit Lι; fuerit Bε Oφ; *add*. per literam sterptam(?) Eσ Kγ; *add*. statim Dη   videbis] videbimus Vo; videbitur Bβ; videntes seu videbis Xβ; *add*. per lineam subscriptam Dη Mμ Nζ Pκ Pχ Vμ Vo Wζ; *add*. super graduum et signorum superius positorum Vη   et eum] *om*. Xδ; aliquam Mφ; cumque Mv; etiam eum Mγ Vv; eunque Nζ   eum] *om*. Dη Fζ Mμ Pχ Vμ Vo Wζ; *twice* Zα; alium Pτ Xγ; enim Mλ Qζ; gradus Pι; tunc Qη; *corr. to* gradus Lβ; *add*. gradum Cα Oϱ Vφ; *add*. scilicet gradum Eσ Kγ Vβ(*interlin*.)

3-5   eum ... signi] gradus septimi signi ab eo sibi consimiliter in numero erit nadir id est oppositus eius Wγ

When you wish to know the degree of the sun [along the ecliptic], set the rule [or alidade] on the day of the current month, and the degree touched by its tip will be the degree of the sun – you will see which sign this is – and

ex alia parte nota in zodiaco in rethi. Notabis etiam nadir eius, quod est similis gradus

4   ex alia parte nota] a parte nota aliqua(alia Sλ; autem Vα) Pφ Sι Sλ Vα; a parte(*add.*
        interlin. ex alia Eμ) nota aliqua(*add.* parte Bκ) notabis Bη Bκ Eμ Vυ; a parte(*add. interlin* vel
        ex altera quia in matre) nota aliquam(*expunged*) Oφ; a parte nota quam altera parte
        notabis Lζ; a parte reliqua nota Lι; ex alia nota aᶜᵃ notabis Sβ; ex alia nota notabis Mη; ex
        alia parte Fγ; ex alia parte a parte nota alia notabis Dγ; ex alia parte aliqua nota alia(*om.*
        Rδ; *add. interlin.* [*illeg.*] Bι) notabis Bι Qε Sθ Vϱ Wθ; ex(*om.* Eλ; a Cδ Oη; in Mι Nγ) alia
        parte(*om.* Eκ; perte Oη; *add.* astrolabii Eσ Kγ; *add.* rethis Mμ) nota(notam Vτ; *add.* aliqua
        Eσ Kγ Oϱ; *add.* eundem gradum Mμ; *erasure and add. interlin.* astrolabii Lβ; *add. erasure* Eζ)
        Bβ Bγ Bθ Cδ Cη Eζ Eη Eκ Eλ Eσ Eτ Eυ Kγ Kθ Lγ Lμ Mι Mμ Mπ Nα Nγ Oγ Oζ Oη Oν
        Oϱ Pγ Sη Vπ Vτ Wβ Wι; ex alia parte [*illeg.*] nota Xβ; ex alia parte nota alia(aᵃ Vξ) Eδ Mν
        Po Vξ; ex alia parte nota(notam Qδ) alia(aᵃ Wθ; aᶜᵃ Sβ) notabis Pτ Qδ Sβ Xγ; ex alia
        parte(*add.* in rethis eum Eϱ) nota aliqua(*del.* Eo) Eα Eγ Eo Eϱ Mα Vφ Wθ Xα; ex(a Cζ Oσ;
        add. aliqua(*expunged*) Pθ) alia parte(*add. interlin.* scilicet in rethi Vβ) nota(notam Lε)
        aliqua(aᵃ Wθ) notabis(*add.* in zodiaco in rethis Eα) Cζ Cι Eα Kδ Lε Lγ Lλ Mo Oσ Oχ Pδ
        Pζ Pθ Rα Sκ Vβ Vψ Wθ; ex alia parte nota altera Bζ; ex alia(aliqua Cε Nε) parte(*om.* Cε
        Nε) nota(notam Fζ Pμ Qβ Sδ Tδ Xδ; *corr. from* nomina Lκ; *add.* et Pμ) notabis Bδ Cε Dη Fζ
        Lκ Nε Oι Oξ Pμ Pξ Qβ Sδ Tδ Xδ; ex alia parte notabis Nζ Tβ Vη Wλ Zα; ex alia parte
        notam aliam notabis Qδ; ex alia parte notam nota Qη; ex alia parte rethis(in rethi Vμ Vo)
        nota eundem Pκ Pχ Vμ Vo Wζ; ex alia parte [*erasure*] notabis Pυ; ex altera parte Pι; ex
        altera parte nota(*add. and expunged* nota) Oυ; *add. in marg.* alia Wα; *add. and del.* notabis
        Wα) Bε Dδ Eβ Fα Kα Lδ Lη Mδ Oβ Oξ Oτ Pϱ Pσ Qγ Qθ Wα Wμ; ex altera parte(*twice*
        Mτ) notabis(noctis? Qι); Cα Mτ Qζ Qι Vι; ex altera parte notam(nota nota Mυ; nota Cγ
        Mφ) aliqua Cγ Gα Mυ Mφ; ex altera parte notam(*interlin.* Kε) notabis Fβ Kε Pα Pβ Pν Qλ;
        ex illa parte nota Pε; ex illa parte nota aliqua notabis Vγ; nota aliqua Mγ Mλ; notabis nota
        aliqua Vν; si aliud volueris operari notabis cum puncto in causti vel aliqua alia nota Mκ
        Vσ   in₁] *om.* Sβ   in zodiaco] *om.* Pι Sη Wλ; eum in zodiaco Qζ; in zodiacho Mτ;
        add. interlin in rethi Bι Oφ; *add. interlin.* et rethis Kε; *add. interlin.* scilicet in rethi Vβ; *add.*
        interlin. scilicet retis Sβ   in₂] *om.* Gα Lκ Oβ Qη Vφ; scilicet Bζ Eo(*add. interlin.* in) Rα
        Sβ Xα; vel Kγ; vel in Eσ   in rethi] *om.* Bη Bθ Bκ Cα Cγ Cδ Cε Cζ Dγ Eα Eγ Eδ Eζ Eκ
        Eλ Eμ Eυ Lζ Lι Lλ Mα Mγ Mη Mι Mλ Mμ Mν Mo Nγ Nε Oη Oσ Oχ Pζ Pκ Po Pτ Pυ Pφ
        Pχ Qδ Qε Qμ Rε Sδ Sι Sθ Sλ Tδ Vα Vβ Vγ Vμ Vν Vo Vξ Vπ Vϱ Vτ Vυ Wζ Wθ Xγ;
        notabis Oϱ; rethis Mκ Nζ Vσ; rethis notabis Fγ   rethi] rechi Wα; rete Vψ; rethis Bζ
        Oβ Qζ Qη Xα; reti Kδ Oι; retis Rα Vφ; rthethi Kα; *add.* notabis Eσ Kγ   Notabis] *om.*
        Bκ Lζ; Nota Eκ; Notaberis Bβ; super Dη; *corr. to* Noᵘ² Lβ   etiam] *om.* Bκ Dη Lγ; *erased*
        Lβ; et Lζ Mυ Vι Vτ; et forabis Oυ; *add. in* Nγ   nadir] *illeg.* Xγ; gaudair Sκ; gnadair Cι
        Mη Pδ Pθ; gnadayr Vψ; gnadir Cε Dδ; gnadyr Nε; nadair Dη Eβ Eδ Eμ Eυ Eζ Eτ Fα Fβ Lβ
        Lγ Lη Mν Mφ Oζ Oι Oν Oξ Oϱ Oτ Oυ Pα Pμ Oν Pξ Po Pσ Pυ Qβ Qγ Qι Qλ Sδ Sη Tδ Vβ
        Vι Vν Vπ Vϱ Vυ ; nadar Oν; nadare Mυ; nadayr Bγ Bκ Eσ Fζ Lε Lζ Pε Oσ Pγ Pτ Qδ Qη
        Wι; nadayz Cη; nadhir Cδ; nadir Bε Cζ Eα Eγ Eη Eλ Eo Eϱ Gα Kδ Kε Kθ Lκ Lλ Lμ Mα
        Mγ Mλ Mo Nα Oβ Oη Oφ Oχ Pβ Pζ Pϱ Pφ Qε Qζ Qθ Rα Rδ Sβ Sθ Sι Sλ Vγ Vτ Vφ Wβ
        Wμ Xα Zα; nadire Vα; nadyr Cα Kγ Lδ Mδ Mκ Mμ Pι Vξ Vσ Wλ; nadyrth Xδ; nardir Bδ

note it on the zodiac [i.e., the ecliptic] on the rete on the other side [of the astrolabe]. And you will note its nadir, which is a similar degree of the 7th sign.[1]

[*apparatus criticus for line 4 continued*]

Dγ; nardix Mι Nγ; natair Bθ; navcidit Bβ; vadair *corr. to* nadair Wα(*add. in marg.* gnadair); *add.* solis Kα; *add. and del.* solis Pκ; Wθ; *add. in marg.* id est opositio Sι   eius] cuius Vα; *om.* Cε Pι; *add.* etiam Xα; *add.* id est oppositum eius Cγ; *add.* in oppositum est Eγ
        quod] qui Bζ Cγ Dδ Lζ Lκ Mγ Mι Nα Nγ Nζ Pκ Qμ Rε Vμ Vν Vo Vπ Wζ Xα Xγ
        quod ... similis] similiter Mμ   est] erit Cγ Eγ Mι Nγ Oχ Pζ Vγ   est similis]
om. Wα   similis] *om.* Cζ Fγ Lι Mλ Mφ Oη Pφ Vι; *illeg.* Eη; *interlin* Oφ; simul Cη Kα;
solis Dη Xβ   gradus] *om* Cγ; gradibus alterius Mμ; gradu Oβ; gradui Mγ Pδ Pυ Qδ
Rε Vγ Vξ; *add.* alterius Vμ Vo; *add.* eius Oγ; *add. and del.* medii celi Vγ

4-5   Notabis ... signi] *om.* Mτ

4-6   eius ... ostendet] *illeg.* Eη

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[1] This is not the normal meaning of "nadir", i.e., the point in the celestial sphere vertically opposite the overhead zenith. Here the "nadir" of a point or position means the opposite point 180° across the sphere. In this capitulum it means the same degree as the sun but in the opposite sign. Beginning with (and including) the sign in which the sun was found and counting around the zodiac/ecliptic, the opposite sign will be the seventh sign.

5   septimi signi. Diem quoque mensis per gradum solis invenies; posita enim regula
super gradum solis diem quesitum ostendet.

5   septimi] 7/ 7^i / 7^{mi}/vii *many*; à Bβ; alii Fβ; alius opposita Lκ; alterius Pκ Pχ Qη; oppositi Pζ;
add. notabis diem Cγ   septimi signi] altitudinis signi scilicet septimi Nζ   signi]
opponitur/oppositur signus alii Gα; *add*. ab eo Dη; *add*. ab illo cuius gradum queris Fγ;
add. computando illud signum in quo est Cα; *add*. id est signi oppositi Mφ Vι; *add*. in
signi oppositi Mυ; *add*. notabis Eγ; *add*. oppositi anni Pκ Pχ; *add*. qui est gradus ortus Lι;
add. interlin. opposti Oφ; *add. in marg*. id est signi opposti Wα; *add. illeg*. Zα; *add. and del*.
anni Wζ   Diem] Dicit Vυ   Diem ... invenies] *om*. Wγ   quoque] *om*. Tβ; *corr.
from* quousque Sκ et Pι; quam Kα; quo Mι Nγ; *add*. gradus Wθ; *add*. solis Mυ
    mensis] *om*. Oγ; *rep*. Cα; *add. interlin*. econverso Wβ   per] *om*. Rδ; *marg*. Kδ
    gradum] gradus Oφ Pθ Rα Vμ   solis] *om*. Pγ; *interlin*. Eμ; *add*. si gradum
ipsum noveris Mκ   invenies] *om*. Cα Vη Wα; poteris scire Mγ; signandum ipsum
[*illeg*.] poteris scire Vσ; *add*. econverson Pι   posita] nondo (= ponendo?) Lκ; ponenda
Mμ Nζ Pκ Vμ Vo; positum Xα   posita enim] *corr. to* econverso u3 ponitur Lβ
    enim] *om*. Cδ Oφ Pφ Sι Xα Xβ Vμ Vo; *illeg*. Eγ; *interlin*. Qμ; es *corr. in marg. to* enim
Sκ; igitur Cγ; in Oχ   regula] *om*. Xα; *illeg*. Eσ; 12(*deleted*) Pβ; regulam Vμ

5-6   per ... ostendet] om. Oϱ   enim ... ostendet] *om*. Oη

6   super] supra Dδ Pϱ Vν   gradum] gradus Bζ Eo Kδ   solis] *om*. Dη; add. indicabit
tibi per contactum regule sub ipso gradu in circulo mensium Mγ   diem] *rep*. Qλ;
dies Eμ Eo Mγ Mλ Oφ Pφ Vν; *add*. presentem vel Fγ; *add*. tibi Cγ Eγ Lλ Mα Mι Oχ Sβ Vγ
    diem ... ostendet] *om*. Cδ; indicabitur tibi contactum regule ipse gradu in circulo
[*illeg*.] quot dies mensis presentis iam transierunt Vσ; quot dies mensis presentis iam
tamen fuerunt Mγ   quesitum] *marg*. Qζ   quesitum ostendet] ostendit Mτ; que
sit Kα Wμ; que sit quod notus erit Vτ; que sint ostendet Pμ; quesitus erit Cζ Eμ Lι Pφ Sι;
quesitus notus erit Bζ Mγ Mλ Oφ(notus *interlin*.); quesitus noctis erit Eo; quis sit ostendet
Dη; *add. 2.5 line gloss* Cζ   ostendet] ostendit Vα; noctis o[ste]n[de]t Eo; notus erit Vν;
add. De gradu solis Qη; *add*. econverso Kδ; *add*. etc. Rδ Vη

And you also find the day of the month from the degree of the sun, for the rule, when placed against the degree of the sun, will show the day you have sought.

[Comment:

      The calendar and zodiac circles around the rim on the back of the astrolabe enable the true motion of the sun along the ecliptic to be linked to the day of the year, and vice versa. This can then be used to set the rete on the front.]

CAPITULUM 2]. DE ALTITUDINE SOLIMS ET STELLARUM INVENIENDA

Cap. 2] *om.* Sα

1   De ... invenienda] *om.* Bδ Bε Bζ Bκ Cα Cγ Cδ Cε Dδ Eα Eγ Eκ Eλ Eυ Gα Kε Lζ Lι Lκ Mα
      Mκ Mμ Mπ Mτ Nα Nζ Oβ Oσ Oυ Oχ Pγ Pι Pκ Pξ Pσ Pφ Pχ Qε Qζ Qι Sβ Sι Sλ Tβ Vα Vμ
      Vν Vo Vτ Vυ Wγ Wζ Wθ Wλ Xα Xγ; *marg.* Eμ; *faded* Eδ Fγ; *illeg.* Vϱ; Ad inveniendum
      altitudinem solis Eϱ Mλ Vξ(*add.* in gradibus); Ad inveniendum altitudinem solis in
      qualibet Eo Mγ Pτ(*add.* hora); Ad inveniendum altitudinem solis et stellarum Lμ Oφ Qθ;
      Capitulum 2ᵐ. De altitudinis solis vel alterius rei habenda in dorso per regulam Qδ;
      Capitulum secundum de altitudine solis et stellarum accipienda Oη; Capitulum 3ᵐ Vσ;
      De(Sequitur de Sη) acceptione altitudinis solis et cuiuslibet alterius per astrolabium Bβ
      Kθ Pε Sη Wι; De altitudine solis Kγ(*later hand; add. in marg.* 2ᵐ) Lλ(*add.* 3.) Mι Nγ Pζ Rε;
      De altitudine solis accipienda Bθ Cι Kδ Mη(accipiendi) Pδ Pθ Pυ Rδ Sθ(*marg.; add.* et
      stellarum) Sκ Vβ Vπ(*add.* Rubrica) Vψ; De altitudine solis comprehenda Nε; De altitudine
      solis vel stelle accipienda per astrolabium Mν Mυ Vι; De altitudine solis vel stelle per
      astrolabium Eτ Wβ; De invenienda altitudine solis per astrolabium Rα Xα; De invenienda
      altitudine solis Qμ; De inventione altitudinis solis Dγ Eζ; De inventione hore et
      ascendentis Kα; Doctrina de modo accipiendi altitudinem solis vel alterius rei Bι(*add. in
      marg.* 2ᵐ cᵐ); Inventio altitudinis solis et stellarum Lδ Oγ Oτ; Invencio altitudinis solis et
      stellarum per astrolabio Qβ; Inventio altitudinis solis in qualibet hora Bγ(*later hand*);
      Sequentur canon 2ᵘˢ Vη; *add.* C. 3 Sδ; *add. in marg.* 2/2ᵐ/2ᵘˢ Eβ Pκ Qζ Vμ Vφ Wζ; *add. in
      marg.* Capitulum 3ᵐ Mκ; *add. in marg.* c. 3 Oϱ   De] *om.* Wα   et stellarum] *om.* Vγ
      et ... invenienda] *illeg.* Vφ   stellarum] *add.* fixarum Pβ   invenienda] *om.* Oν
      Zα; accipienda Bη Eμ; ad inveniendum Eσ; habenda Dη Xβ; venienda Oυ; *add.* Capitulum
      Cη Mo

1-6   De ... fixas] *illeg.* Eη

[CHAPTER 2]. ON FINDING THE ELEVATION OF THE SUN AND THE STARS.

Cum vis altitudinem solis scire, suspende astrolabium de manu tua dextra per eius armillam, et sinistro tuo latere soli opposito, subleva vel depone regulam, donec

2 Cum] Sum Oυ vis] volueris *many*; *interlin/ma*rg. Wα; *add*. inventionem Mτ vis scire] quesieris Bη Bκ Cα Cγ Cδ Cζ Eγ Eκ Eμ Lζ Lι Lλ Mα Mγ Mι Mλ Nγ Oη Oν Oϱ Oσ Oφ Oχ Pζ Pφ Qε Sβ Sθ Sι Sλ Vα Vβ Vγ Vν Vξ Vτ Vυ Wγ Wθ; vis habere Fγ solis] *add*. et stellarum Bδ Bε Bη Cζ Cι Dη Eβ Eμ Eσ Fα Fζ Kα Kγ Kδ Kε Lβ Lγ Lδ Lε Lη Lι Mδ Mη Mπ Mτ Mυ Mφ Nδ Nε Oγ Oζ Oη Oι Oξ Oτ Oυ Oφ(*interlin*.) Pα Pβ Pδ Pθ Pμ Pν Pξ Pϱ Pσ Qβ Qγ Qζ Qη Qθ Qι Qλ Sδ Sκ Tβ Tδ Vη Vι Vψ Wα Wμ Xβ Xδ Zα; *add*. et stellarum fixarum Dδ; *add*. id est per gradus elevatur centrum solis ab orizonte tuo Eυ; *add*. vel stellarum Wβ scire] *interlin*. Bγ; *om*. Eδ Eζ Eτ Kθ Mν Pγ Po Qμ Vϱ; habere Bθ Nα Pτ Pυ Qδ Rε Sη Vπ Wι Xγ; hore Wλ; invenire Bδ Bε Cδ Dδ Eβ Eσ Fβ Fζ Kα Kγ Kδ Kε Lβ Lγ Lδ Lε Lη Lκ Lμ Mδ Mπ Mυ Mφ Nδ Oγ Oζ Oι Oξ Oτ Oυ Pα Pβ Pμ Pν Pξ Pϱ Pσ Qβ Qγ Qζ Qθ Qι Qλ Sδ Tβ Tδ Vη Vι Wα Wμ Xβ Xδ Zα; invenire et stellarum Rδ astrolabium] strolabium Pβ; *corr. from*. astolabium Sκ de] in Cα Kε Lι Mτ Oγ Pγ Sκ Vo; *add*. de Nα manu] *add. interlin*. id est per manum Eδ tua] *om*. Bε Dη Fα Fζ Lγ Lδ Lε Lη Lι Lκ Mδ Mμ Mπ Mυ Mφ Nζ Oξ Oτ Oυ Pα Pβ Pι Pμ Pν Pξ Pϱ Pσ Pχ Qβ Qη Qι Qλ Sδ Tβ Tδ Vη Vι Vμ Vo Wα Wζ Wμ Xβ Xδ Zα; *interlin*. Eo tua dextra] *om*. Mκ dextra] *om*. Nα Xγ; *add*. in sinistram Kα

2-3 per eius] penes per ... armillam] *interlin*. Pτ

2-6 Cum ... fixas] *rewritten in 9 lines* Vσ

3 eius] *om*. Eκ Kγ Mκ Pκ Pχ armillam] armilam Cγ et] *add*. in Bδ Bε Bθ Dδ Dη Eβ Eσ Fα Fβ Fζ Kα Lγ Lδ Lε Lη Mδ Mπ Mτ Nδ Oζ Oι Oξ Oτ Oυ Pα Pβ Pμ Pν Pξ Pϱ Qβ Qζ Qη Qθ Qι Sκ Tδ Vη Vυ Xδ Zα sinistro ... opposito] et non sustineatur et oppositione supremum caput allidande soli Mκ tuo] *om*. Bη Nδ Pι; ductus Kα; suo Pχ latere] lateri Wγ soli] *om*. Kδ Rδ; *twice* Xα; eius Bκ; sibi Vτ; sole Eσ Vξ opposito] apposito Cα; opposita. Deinde Vη; oppositum. Deinde Tβ subleva] elevando Mκ; snaileva/suaileva(?) Sθ vel] et Wμ depone] deponiendo Mκ; deprime Bβ Bγ Bε Bι Cη Dδ Dη Eλ Eτ Fα Fγ Kα Eε Kθ Mμ Mτ Nζ Pγ Pε Pκ Qζ Rγ Tβ Vη Vμ Vo Wβ Wζ; pone *corr. to* depone Oι; *add*. depone Fα; *add*. vel deprime Cζ Oη; *add. interlin*. al' deprime Oφ regulam] allidadam Fγ; eam Mκ; rigulam Nγ; *add. interlin*. scilicet in dorso astrolabii Oι

When you wish to know the elevation of the sun, suspend the astrolabe from your right hand using its ring, and with your left side away from[1] the sun, raise or lower the rule [alidade] until

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[1] For "*oppositus*" Gunther writes "towards the sun." However, it makes no difference if the observer's left or right side is toward the sun or away from the sun. One angles the alidade so that the sun's rays pass through both pin holes, and one can then read the altitude of the sun along the edge, whether the alidade is angled from the upper left to the lower right (the observer's left side toward the sun), or from the upper right to the lower left (the observer's right side toward the sun). This is because the rim of the astrolabe is graduated from 0º to 90º on both sides up from the horizontal diameter to the top of the astrolabe, or down from the horizontal diameter to the bottom. See *Comp.*, Cap. 2. lines 9-11, and Figura 2.

radius solis per utriusque tabule foramen transeat; quo facto, vide quot gradus a linea

4   radius] radii Mκ   solis] *om.* Bδ Pξ Rδ; solie Vτ   per] *om.* Vτ   per ... transeat]
         ingrediantur directe per foramina utriusque pinule Mκ   utriusque] utumque Pχ
             utiusque tabule foramen] ambo foramina Eσ Kγ Mτ; ambo foramina tabule Bδ
         Bε(tabularum) Dδ Dη Eβ Fα Fβ Fζ Kε Lγ Lδ Lε Lη Lμ Mδ Mπ Mυ Mφ Nδ Oγ Oζ Oι Oτ
         Oυ Pα Pβ Pμ Pν Pξ Pϱ Pσ Qβ Qγ Qζ Qθ Qι Qλ Sδ Tβ Tδ Vη Vι Vυ Wα Wμ Xβ Xδ(tabule
         corr. to tabelle) Zα   tabule] *om.* Dγ Pε Pυ Qδ Rγ; *interlin.* Bι; regule Lι; tabelle Bη Cγ
         Eγ Eκ Eμ Nζ Oη Oϱ Qε Sβ Sθ Vα Vβ Vγ Wγ Wθ; *add.* vel tabelle Mι   foramen]
         foramina Cα Rα Vϱ Vυ Xα Xγ; foraminem Eυ   transeat] *om.* Dγ Qδ; transierat Kα;
         indictat(?) Lι; intra Mι Nγ; intrant Bη; intret Bζ Bθ Bι Bκ Cα Cγ Cδ Cζ Eα Eδ Eζ Eλ Eκ Eμ
         Eo Eϱ Eυ Fγ Gα Lζ Lκ Lλ Mα Mγ Mλ Mμ Mν Nζ Oη Oν Oϱ Oσ Oφ Oχ Pζ Pι Pκ Po Pτ
         Pφ Pχ Qε Qη Qμ Rα(*interlin.*) Sβ Sθ Sι Vα Vγ Vμ Vν Vo Vξ Vπ Vϱ Vτ Vυ Vφ Wγ Wζ Wθ
         Wλ Xα Xγ; *add.* vel [*illeg.*] Zα; *add. interlin.* intret Lβ; *add. inerlin.* al' intret Vβ   quo]
         hoc Kε   quo facto] cumque hoc feceris Mκ; tunc Vγ   quo ... vide] *om.* Mμ Pχ
         Wζ; et per Nζ Qη Vμ Vo   quo ... quot] Et tunc per quod Lκ   vide] *om.* Pκ; fide
         Mν; vede Mπ; videas Qι Vπ; *add.* per Dη Zα   quot] *om.* Gα; per quod Eσ Kγ Vη;
         quod Mν Mπ Sκ Wλ   quot gradus] quem gradum Vo   gradus] gradibus Bζ Bη
         Bκ Cα Cγ Eγ Eλ Eμ Eo Eυ Fγ Lζ Lι Lλ Mγ Mι Mκ(*add.* erigatur regula) Mλ Mo Nγ Oν Oϱ
         Oσ Pζ Pτ Pφ Rε Sβ Sθ Sλ Vα Vν Vξ Vπ Vϱ Vυ Wλ; *corr. to* gradibus Lβ; *add. interlin.* al'
         gradibus Vβ   a] *om.* Bδ   a linea] alenina Mπ; alia Bβ Mν

4-5   a ... orientali] *om.* Mν; super lineam orientalem *and add. 3 lines* Mκ

a ray of the sun passes through the pin-holes of both the vanes; having done this, see how many degrees

5   orientali elevatur regula, et illa est solis altitudo. Similiter facies in nocte, per stellas
         fixas.

    5   orientali] occidentali Kθ; orgencali Mπ; *add.* id est a linea illa qua transit a puncio Arietis
             per centram astrolabii cuspido Eυ   elevatur] allevatur Bβ   regula] rigula Nγ
                  et] quia Dη   illa] *om.* Bδ Bε Cη Cι Dδ Eβ Eσ Eτ Fα Fβ Fζ Kα Kγ Kδ Kε Lβ Lγ Lε
             Lη Lμ Mδ Mτ Mυ Mφ Nδ Oζ Oι Oτ Oυ Pα Pβ Pθ Pμ Pν Pξ Pϱ Pσ Qβ Qγ Qζ Qθ Qι Qλ
             Rδ Sδ Sκ Tβ Tδ Vη Vι Vψ Wα Wβ Wμ Xβ Xδ Zα; *illeg.* Eη Oξ Vτ; hoc Dη; idem numerus
             Lδ; ille numerus Oγ; ista Mπ Nα Pκ Vμ Vo Wζ; *add.* [*illeg.*] Lδ   illa est] *om.* Pγ
                  illa ... altitudo] illi ostenderit altitudinem solis Pδ   et est] *repeat* Bδ   est]
             erit Cγ Kθ Lκ Lι Lλ Mα Oϱ Oχ Qε Vγ   altitudo] *add.* solis Wζ   similiter] *om.* Lκ;
             eodem modo Vμ Vo; sic Nζ Oϱ Pκ Pχ Wζ; solis Xα   facies] *om.* Oϱ Pσ Qθ Rδ; fac
             many; interlin. Qζ; facias Bη Eσ Kδ Nζ Pχ Vη Vμ Vo Wζ Xβ; *add. illeg.* Zα   in] de Kδ
             Mo Vμ Vo Vτ; *om.* Cα Eκ Rα Xα   per] de Mμ Nζ Pχ Vμ Vo Wζ; sic de Lκ

    5-6   Similiter ... fixas] *om.* Oυ; Si autem volueris scire altitudinem stellarum in nocte supsenso
             astrolabio et opposita regula stelle ut predictum est de sole *and add. 3 lines* Mκ   per
             ... fixas] de altitudine stellarum fixarum deprimendo vel sublevando regulam quousque
             videris stellam cuius altitudinem vis scire per utriumque foraminem et habebis
             altitudinem eius Rγ; de stellis fixis Dη Qη; per stellam id est fixam Cζ; per stellam fixam
             Mλ Oφ(*add. interlin.* vel stellas fixas) Sι Vν; *re-written in 10 lines* Wγ   stellas fixas]
             stellam fixam quamcumque Lι

    6   fixas] *om.* Eδ Mo Mτ Oϱ Pξ Sθ; *add. illeg.* Bκ; *add.* cum oportunum fuerit Kδ Rδ; *add.* et
             cetera Pι; *add.* et per planetas si possu3 sed non tabulum quia locus ipsarum variatur Bζ;
             add. facies per stellas fixas Mπ; *add.* Nota quod hoc facilius(melius Oγ) fiat. Si retro
             tendantur candele ut melius videantur tabulo Lδ Oγ; *add.* per spiendo foramina et cetera
             Oβ; *add.* quacumque Oη; *add.* visas per foramina[2] Zα; *add. 3-line gloss* Cζ

    [2] These words were added by Gunther to his Latin text, based on the version published as an
addendum to Georg Reisch, *Margarita Philosophica Nova*, printed by Johann Grüninger (Strasburg, 1515).
See John Ferguson, "The *Margarita Philosophica* of Gregorius Reisch. A Bibliography," *The Library.
Transactions of the Bibliographical Society*, ser. 4, 10 (1929) 194-216.

the rule is raised above the eastern line, and that is the altitude of the sun. You will do the same thing at night using the fixed stars.

[Comment:
    Suspend the astrolabe from its ring so that it is vertical, then adjust the rule with its sighting vanes toward the sun or star so that the sun's rays pass through the two (smaller) holes in the vanes or so that the star can be seen when looking through the two (larger) holes in the vanes. The degree of elevation can then be noted, as the point at which the rule intersects with the graduated rim of the astrolabe.]

[CAPITULUM 3.] DE INVENTIONE HORE INEQUALIS ET SIGNI ASCENDENTIS.

Cap. 3] *om.* Sα

1　　　De ... ascendentis] *ms* Qα *begin; om.* Bδ Bε Bζ Bκ Cα Cγ Cδ Cε Cζ Cη Dδ Eα Eγ Eκ Eυ Gα
Lζ Lι Lκ Mα Mκ Mμ Mτ Nα Nζ Oβ Oσ Oχ Pγ Pι Pξ Pσ Pφ Pχ Qα Qε Qζ Qη Qι Rγ Sβ Sι
Tβ Vα Vη Vμ Vν Vo Vτ Vυ Wγ Wζ Wθ Xγ; *faded* Eδ Fγ; *illeg.* Eη Kα Kε; Ad habendam
altitudinem solis et ascensionem Mγ; Ad havendum certitudinem hore et ascendentis Vξ;
Ad habendum horam et ascendens Pτ; Ad inveniendum altitudinem solis et ascendentis
Eo Eϱ; Ad inveniendum horam diei et noctis et ascendentis Qθ; Ad inveniendam
horarum diei vel nocte vel ascendentis Lμ; Ad sciendum certitudinem hore et
ascendentis Dγ; Ad sciendum hore et ascendentis per gradum solis Bθ Cι(gradus) Eβ;
Capitulum 4ᵐ Vσ; De altitudine solis Kγ(*later hand; add. in marg.* 3ᵐ); De certitudine
horarum Mπ; De certitudine hore et ascendentis invenienda(*om.* Oφ) Lδ Oγ Oτ Oφ Rε;
De habenda hora et ascent~ Mλ; De hora diei et gradu ascendentis per astrolabii Eτ; De
hora diei et noctis et gradu ascendentis inveniendo per astrolabium Oν; De horis diei et
noctis capiendum. Cap. 3ᵐ Oη; De hora diei vel noctis cum gradu ascendentis Mν; De
hora diei vel noctis et gradu ascendentis eius Mυ; De hora diei vel noctis et gradu
ascendentis inveniendo Vι Wβ; De horis assōītur(?) in die Mι Nγ; De horis diei et noctis
accipiendis Eμ(*marg.; add. in marg.* 3ᵘˢ) Sθ(*marg.*); De horis diei et noctis accipiendo et
gradu ascendentis Bη; De(4. De Lλ) horis et ascendente in diei Lλ Pζ Vγ; De invenienda
certitudinem hore et ascendentis Bι(*add. in marg.* 3 cᵐ); De inventione hore(*om.* Sκ)
ascendentis per gradum solis Eσ Sκ; De inventione certe hore et ascendentis Eζ Po Qμ;
De inventione certe hore et gradus ascendentis Rα; De inventione horarum et ascendentis
Tδ; De inventione hore et ascendentis Dη; De inventione(*add.* solis Pυ) hore(horarum Lε
Oϱ) et ascendentis(abscen~ Rδ) per gradum solis(*add.* etc. Rδ) Eβ Fα Kδ Lβ Lγ Lε Lη Mδ
Mη Mo Mφ Nδ(*add.* capitulum) Nε Oζ Oι Oξ OϱOυ Pα Pβ Pδ Pθ(*add.* Rubrica et cetera)
Pμ Pν Pυ Qγ Qλ Sδ(*add.* C. 4) Vβ Vπ(*add.* Rubrica) Vφ(*marg.*) Vψ Wα(*om.* De) Wμ Xβ Xδ;
De inventione hore inequalis et signi ascendentis Zα; De inventione hore naturalis et
gradus ascendentis per altitudinem solis et stelle Sη; De inventione hore vel et gradu
ascendentis per altitudinem solis vel stelle Bβ Wι; De invencione hore inequalis et gradu
ascendentis per altitudinem solis vel stelle Pε; De inventione stelle fixe hore et gradus
ascendentis Xα; Inveniencio certitudinis hore et ascendentis Fζ Qβ(*add.* Capitulum);
Inventio certa horae et ascendentis de die vel de nocte Bγ(*later hand*); Qualiter inveniatur
hora et ascendens per gradum solis Pϱ; *add. in marg.* 3/3ᵐ/3ᵘˢ Pκ Qζ Vμ Wζ; *add. in marg.*
Capitulum 4ᵒʳ Mκ　　　　inequalis ... ascendentis] *illeg.* Cη

[CHAPTER 3.] ON FINDING AN UNEQUAL HOUR AND THE SIGN WHICH IS RISING[1]

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[1] The use of *ascensio* and *ascendere* in the *Practica* refers to the point on the horizon where the sun, or a star or planet, or the beginning (or end) of a sign (or another point on the ecliptic) crosses or rises above the horizon in the east. Similarly *occasus* and *occidere* refer to the setting of such objects or points on the horizon in the west. I have avoided the use of "ascendent" and "descendent" in English, preferring "rising" and "setting".

Si autem vis scire certitudinem hore et ascendentis, pone gradum solis super

2   Si autem] Cum Bζ Eλ Lι Pκ Pχ   autem] *om.* Eκ Kγ Mμ Nζ Oϱ Oφ Pι Pξ Pφ Qα Rε Sι
         Vγ Vμ Vν Vo Vτ Vψ Wζ   vis] volueris *many*   scire] *om.* Bη Cγ Eγ Eμ Mι Nγ Oχ
         Qε Wγ; habere Mκ Vσ; *add.* altitudinem solis Vo; *add.* per altitudinem solis Nζ Vμ; *add.*
         and del. altitudinem Sη   certitudinem] *om.* Pι; altitudinem Eυ(*add. interlin.* inequalis)
         Pγ; certitudinaliter Lκ; per altitudinem Qη; *corr. in marg. from* altitudinem Vη; *add.* solis
         Vo   hore] horam diei Pι; per horam altitudinem Lκ; *add.* descendentis Sβ; *add.*
         naturalis Rγ; *add.* inequalis Kδ Nα Rδ Wζ(*interlin.*); *add.* per astrolabium Vι; *add.* scilicet
         equalis Cζ Lι(?) Oη Sη;   et] signi Bβ Zα; vel equalis Pθ; *add.* etiam Cη Cι Mν; *add.*
         gradum Fγ Nζ Rγ; *add.* gradus *illeg.* Sι; *add. and del.* facies Sθ   hore et ascendentis]
         horas transactas de die Qη   ascendentis] ascendens Lκ; ascendendes Cζ; assendentis
         Mι N; asuncio Pε; *add.* hore Bη; *add.* in die equato sole et notato in gradu quam nadyr eius
         in rethi(*marg.* Mκ) ut dictum est in 2° capitulo[2] et accepta eius altitudine ut habitum est in
         3° capitulo,[3] move rethe donec Mκ Vσ; *add. interlin.* altitudinis Lβ   pone] ponas Mκ
         Vσ; ponere Mλ   gradum] gradus Mτ   solis] *add.* id est pone gradum signi in
         quo gradus est sol Cα; *add.* illius diei Eυ; *add. illeg.* Zα   super] id est per gradum
         solis computa numerum Pτ Xγ; in Pι; *add.* altitudinem Vμ

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[2] *2° capitulo*: as numbered in mss Mκ Vσ; actually Capitulum 1 in this edition.

[3] *3° capitulo*: as numbered in mss Mκ Vσ; actually Capitulum 2 in this edition.

However, if you wish to ascertain with certain knowledge the hour and the [sign] which is rising [at that time], set the degree of the sun [i.e., its position along the ecliptic on the rete]

almucantharat altitudinis ex parte orientis, si fuerit ante medium diem, aut ex parte

3 almucantharat] albimutantarach(?) Sι; almacantra Lκ; almᵃᵗ Kε; almiacatharath Eζ;
almicant~ Vο; almicantarach Kγ Oβ; almicantarat Oϱ; almicantarath Fγ Pσ Rδ;
almicantaraz Cδ Oη; almicanth101;rat Oι; almicanthararth Pο Tβ; almicanthrat Qζ;
almicantrat Kα; almicantrath Pχ; almichancarach Mγ; almirarat Vτ; almiᵗ Mμ Wζ; almiʈ'
Nζ; almiᵗʰ Qη Vη; almitantⁿch Vμ; almkatarach Sη; almuc[*illeg.*] Gα; almucacharath Pα;
almucancharat Wλ; almucanharatz Dη; almucant' Fα Lμ Qθ; almucantar' Oσ;
almucantarach Bδ Vϱ; almucantarat Eγ Eκ Lλ Oχ Pζ Qα Qε Vγ Wθ; almucantarath Bη Eα
Eη Eλ Fβ Kδ Lδ Lι Mπ Nε Oγ Pξ Pϱ Pυ Pφ Qγ Qμ Rα Sβ Tδ Vα Vβ Vπ Wγ Xβ;
almucantaraz Cζ Lζ Sλ; almucantᵃʳz Sθ; almucantera' Cα; almucanteraht Oν;
almucanterat Mι; almucanterath Nα Oφ Qι; almucanth' Pγ Pθ; almucantharach Cι Kθ Pτ
Rε Wβ; almucantharak Rγ; almucantharat Eδ Fζ Mα Oτ Oυ Sκ Zα; almucantharath Bβ Bγ
Bζ Bθ Bι Cη Dγ Eβ Eo Eϱ Eτ Eυ Lγ Lη Mη Mλ Mo Mυ Mφ Nδ Oζ Oξ Pδ Pν Qβ Qδ Qλ Sδ
Vι Vν Wμ Wι Xα Xγ; almucantrath Mτ Pκ; almucatar' Eσ; almucatarath Mδ;
almucatharath Pμ Wα; almuchanchath Cε; almuchantarach Vξ; almuchantarath Mκ Vσ
Vψ Xδ; almuchantharath Lε Pε; almuʳᵃᵗʰ Pι; almuschantarach Pβ; almutant Dδ;
almutantarach Mν; almutantaraz Vυ; almutanterat Nγ; almutantrat Cγ; almutarat Lβ;
almuᵗʰ Bε; almuthantaraz Eμ; almuthantharat Vφ; *add.* accepte Mκ Vσ; *add.* ħ Sη; *add.* sue
Cα   altitudinis] *om.* Vγ; altitudinem Mγ; per altitudinem Lι; super similem
altitudinem similiter sol fuerit levatus in illa hora Pι; *corr. in marg. from* seu Xβ; *add.*
lune(!) Qβ; *add.* solis Eκ; *add.* sue Bδ Bε Dδ Dη Eη Eλ Fα Fβ Fγ Kδ Kε Lδ Nδ Oβ Oγ Oζ
Oξ Oϱ Oυ(*marg.*) Pα Pβ Pξ Pϱ P Mκσ Vι Wα Qζ Qθ Tβ Tδ Vη Wζ(*interlin.*) Zα; *add.* sue
iam invente per(secundum Kγ) canonem precedentem Eσ Kγ; *corr. to* (*later hand*) scilicet
ante meridiem accepisti solis altitudinem Lβ   ex parte₁] *om.* Vσ; *marg.* Lκ
        orientis] horientis Mι Nγ; oriente Tδ; *add.* sumptam Lι; *add. illeg.* Lμ; *add. 2.5-line
gloss* Cα   si] *add.* alatitudo Vμ Vo   fuerit] *om.* Cα Oσ Pι; altitudo sit Bβ Bγ Cη Eτ
Kθ Pε Pγ Rγ Wα Wι; *add.* altitudo accepta Bι(*interlin.*) Vϱ   ante] an Vϱ; *ms Pε ends*
        medium diem] horam recessionis id est meridiem Mκ Vσ; meridiem Bβ Bγ Bε Bθ
Bκ Cη Dη Eσ Eτ Eυ Fγ Gα Kθ Lβ Lζ Lι Lκ Mπ Mτ Nζ Oβ Oν Pγ Pχ Qη Vα Vη Vμ Vo Vπ
Vτ Wζ Wι Wλ Xβ Zα; *add.* accepisti altitudinem solis(*om.* Oσ Pι Vυ) Cα(*add.* solis) Oσ Pι
Vυ; *add.* et cetera Pτ Xγ   aut] vel *some*; *add.* super almucanterā sue altitud[inis] Cα;
add. super almucantar' altitudinis Oσ; *add.* super almuʳᵃᵗʰ Pι; *add.* super almutantaraz
altitudinis Vυ   ex parte₂] *om.* Eσ Kγ Qα

3-4 medium ... post] *om.* Bδ Mν Nα   ante ... post] *om.* Mγ   ante ... diem] in die ante
meridiem Vγ   aut ... diem] *om.* Bδ Nδ; *marg.* Qι   aut ... altitudinem] *om.*
Mυ Mφ Vι

on the almucantar of the altitude on the side of the east, if the altitude be before noon, or on

occidentis, si post medium diem accepisti altitudinem; et super quam horam ceciderit

4   occidentis] occidente Tδ; *om.* Gα; *corr. from* orientis Qε; *add. and del.* sue Oϱ   si]
        interlin. Qα; *add.* altitudo sit accepta Bβ Bγ Cη Eτ Kθ Pγ Rγ Wβ Wι; *add.* etiam Vγ; *add.*
        fuerit Bκ Eσ Fγ Gα Kγ Lζ Lι Mκ Mλ Mπ Mτ Nζ Oη Oν Oφ Pφ Qα Qη Tβ Vη Vν Vξ Vσ
        Vτ Vφ Xα Xδ Zα; *add. and del.* fuerit Cδ Kε Wθ   post] *corr. from* operis Vσ
                medium diem] meridiem Bβ Bε Eα Eγ Eλ Eσ Fγ(*add.* quando) Lβ Lι Lκ Mκ Mτ
        Nζ(*add.* quando) Oβ Oφ Pι Pκ Pχ Qη Rε Vγ(*add. illeg.*) Vη(*add.* ubi) Vμ Vo Vσ Vτ Wζ Wλ
        Zα(*add.* celi)   diem] *om.* Mλ; *marg.* Sι; *add.* quod Oη; *add.* ubi Qη Tβ   accepisti
        altitudinem] *om.* Bβ Bγ Cη Eσ Eτ Kγ Mκ Mπ Oφ Pγ Pφ Rγ Qα Vσ Wβ; altitudo accepta
        Bε Bζ Eo Lζ Mγ Mλ Vν Vτ; *add.* solis Cα Kδ(*marg.*); *add. interlin.* va...cat Sι   et super]
        rep. Qδ   super] supra Bβ   quam] *marg.* Kδ; *add.* partem ex parte Lκ   horam]
        illeg. Wθ; gradu Bζ; horarum Bγ Bδ Bε Bθ Bκ Cα Cγ Cδ Cι Eγ Eδ Eη Eκ Eϱ Kα Kδ Lγ Lε
        Lζ Lλ Mα Mδ Mη Mι Mλ Mν Mo Mπ Mυ Mφ Nγ Oβ Oζ Oι Oν Oξ Oϱ Oσ Oτ Oυ Pα Pβ
        Pδ Pτ Pζ Pθ Pι Pμ Pν Pξ Po Pϱ Pσ Qα Qβ Qγ Qδ Qε Qθ Qλ Rα Sβ Sδ Sθ Sι Sλ Tδ Vα Vγ
        Vι Vπ Vυ Vψ Wα Wβ Wι Wλ Wμ Xα Xγ Xδ; horarum *corr. from* horam Eτ; horum Pυ; *add.*
        interlin. inequalem Eυ; *add. interlin.* vel horarum Eμ   ceciderit] *om.* Qλ; *marg.* Qι;
        incidit Pκ Pχ

the side of the west, if you have taken the altitude after midday; and upon whichever hour

5   nadir gradus solis illa est hora presens; et signum quod fuerit ex parte orizontis

5   nadir] nadar Oγ; gnadair Cε Cι Mη Pδ Pθ; gnadayr Nε Vψ; gnadir *corr. to*
nadir Mπ; guadair Sκ; nadair Bι Dη Eβ Eδ Eζ Eμ Eτ Eυ Fα Fβ Lγ Lε Lζ Lη Mφ Oζ Oι Oξ
Oϱ Oτ Oυ Pα Pμ Pν Pξ Po Pσ Pυ Qγ Qδ Qλ Qμ Sδ Sη Tδ Vβ Vι Vν Vπ Vϱ Wα; nadar Xγ;
nadayr Bγ Fζ Mγ Oσ Pγ Pτ Qβ Wι; nadᵃyr Vσ; nadayz Cη; nadire Mυ Vα; nadyr Cα Cδ
Kγ Mκ Mμ Pι Qη Qθ Vξ Xδ; nardir Bδ Mι Nγ; vadair Mν; *add.* a punctus oppositus Bκ;
add. id est oppositum Cγ Fβ Pα(*interlin.*) Sβ Vβ(*interlin.*); *add. illeg.* Lι; *add. interlin.* id est
in quartus oppositus Lζ   gradus] *om.* Lκ Oγ Pφ; *del.* Wζ; id est oppositus Wγ; *corr. in*
marg. to id est opositum gradum Sι   solis] *add.* iᵃ Cα Cι; *add.* in lineis horarum
inequalium inferius constitutis Mκ Vσ; *add. and del.* et signum Qε; *add. interlin.* illa Bγ;
add. vel regula ponitur directe super signum solis Oγ   illa] *om.* Bβ Bε Eτ Kθ Lβ Mπ
Pδ Rγ Wι; *suprascr.* Bγ; *illeg.* Eη; illarum Nδ; ipsa Qα; ista Kγ Kε Mτ Nζ Qζ Vo; talis Lκ
    illa ... presens] *marg.* Pζ; *om.* Eδ Eζ Mν   est] *illeg.* Eη Eλ; erit Bβ Bγ Cγ Eγ Eτ
Kθ Lβ Lδ Lλ Mι Nγ Pγ Rγ Sβ Wι   hora] *om.* Bβ; *add.* illa Lκ; *add.* inequalis Cα(*add. 19*
lines concerning planets) Tβ   praesens] *large erasure follows* Pυ; *add.* horas(hora Eυ)
noctis indicabit gradus Eκ; *add.* Horas(Hora Eυ Qα) vero(*om.* Eκ; autem Nα Pκ Pχ Sβ Sη
Vσ) noctis indicabit tibi(*om.* Eκ Oβ; tria Vo) gradus solis Bη Bθ Bι(solis *interlin.*) Bκ
Cγ(*add. 2.5-line gloss*) Cδ Cζ Dγ Eκ Eλ Eμ Eo Eϱ Eυ Gα Kγ Lζ Lλ Mα Mγ Mι Mκ Mλ Mμ
Mo Nα Nγ Nζ Oβ(*add. 5-line gloss*) Oη Oι(*marg.*) Oσ Oχ Pζ(*marg.*) Pι Pκ Pχ Qα Qδ Qε Qη
Rα Rε Sη Sθ Sι(*add.* va...cat) Vα Vβ Vγ Vμ Vν Vξ Vo Vπ Vϱ Vσ Vυ Vφ Wγ(*add. 3.5 lines*)
Wζ Wθ Xα; *add.* quod queris Qμ; *add. and del.* Et signi quod fuerit ex parte occidentis si
post(*l. 4*) ... hora(*l. 5*) presens. Horas vero noctis indicabit tibi gradus solis Oϱ; *add. in*
marg. sicut pre[?]bit in canone 4° Wζ   et] ex *corr. in marg. to* et Oϱ   signum] *add.*
sive gradus signi Lδ Oγ; *add.* per illud(istud Cζ) quod dicit hic scies certitudinem
ascendentis Cζ Oη   fuerit] *om.* Wβ; erit Eκ; est Lκ Rγ   ex] in Cγ Eγ Lλ Wθ
    ex parte] *om.* Pφ; *marg.* Sι; in Bζ Kγ Mγ Mλ Oφ(*interlin.*) Rε; *add.* orientali Vo
    orizontis] *om.* Cγ Cδ Eγ Sλ Wγ Wλ; oriçonte Rε; orisontis Bβ Dδ Eκ

5-6   est ... orientali] estia Kα   et ... occidens] Et gradus cuiuscumque(cuiusque Vσ) signi
qui ceciderit super orizontem sive super primum almuchantarath in parte orientali, est
ascendens in eadem hora proprie, licet etiam totum signum cuius est ille gradus possit
dici, ascendens qui vero ceciderit super primum almucharath(almuʳᵃᵗʰ Mκ) in parte
occidentali erit occidens Mκ Vσ   orizontis orientali] *illeg.* Eτ; orizonte orientali Eo
Mγ Mλ Oφ Vν; orizonte origentali Eδ; orizontis(*expunged*) orientali Pτ; orizontis in linea
orientali Mo; orientali in linea orizontis Wμ; orientali linea orizontis Oι; orientalis
orientis Kδ Sη; orientalis orizonte Tδ; oriente orientali Bζ Wτ; orientis(*add. and expunged*
linea orizontis) Lβ; orientis orientali Vυ Wθ; orientis orientalis *corr. to* orizontis orientalis
Lζ

the nadir of the degree of the sun falls that is the present hour; and the sign which would be on the east side of the horizon [i.e., toward the eastern horizon]

orientali est oriens, id est, ascendens; quod vero in occidentali occidens. Quod vero

6   orientali] *illeg.* Nα; *om.* Qδ; orientalis Bβ Bθ Bι Cδ Eζ Eκ Eλ Eϱ Fγ Lγ Lκ Lμ Mτ Oν Oυ Pα
           Pθ Qβ Qζ Sι Vι Vξ Vo Vπ Wβ Wζ; orient Oβ; orientis Rδ; *add.* accipi[*illeg.*] almucant' ex
           parti orientali Qα   est₁] erit Cγ Eγ Mι Nγ Oφ Oχ Pζ Qε Tβ Vζ Vη Wγ Zα; *add.*
           signum Pι   oriens] orientis Lλ   id est] *interlin.* Cγ; et Bκ Pι; vel Lκ Mμ Nζ Tβ Vμ
           Vo Wζ   id ... ascendens] *om.* Rγ; et precedens Pγ; vel descendens Pχ   quod₁ ...
           occidens] *om.* Cγ Pξ; *om., add. in marg.* Quod vero in occidentali est occidens sive cadens
           Tβ   vero₁] autem Wγ; *add.* ceciderit Vξ; *add.* ex parte Lβ; *add. and delete* fuerit Cδ
                in] ex in Pγ   in ... vero] *om.* Rδ   occidentali] *rep.* Cα;; *add.* erit Dη Eλ Mι
           Nγ Qε; *add.* est Kγ Mμ Pκ Pχ Vη Vo Wζ; *add.* fuerit Sι; *add.* linea Dδ Eη Fα Fβ Fζ Kε Lδ Lε
           Lη Lμ Mδ Nδ Oγ Oι Oξ Oτ Oυ Pα Pβ Pμ Pν Pϱ Qβ Qγ Qζ Qι Sδ Sι(*marg.*) Tδ Vμ Wμ; *add.*
           linea est Eσ Kα Mτ Qθ Vξ; *add.* locum Bε; *add.* occidentis Pφ; *add.* occidentis est sive Fγ;
           add. interlin. scilicet linea Oφ; *add. interlin.* scilicet orizontis Oι   occidens] *om.* Vτ;
           accidentis est occidens Oφ; *add.* est Bβ Bι Bκ Eκ Eo Gα Kε Lβ Lζ Mγ Mλ Mυ Mφ Oβ Oν
           Pφ Qζ Rγ Rε Sθ Vβ Vι Vν Vξ Vτ Wα Xα Zα; *add.* est sive cadens Bθ Eυ Vπ Zα; *add.* sive
           cadens Eλ Vη   occidens ... vero₂] *illeg.* Nα   vero₂] *om.* Mυ Wθ; autem Cγ Eγ Eκ
           Mι Nγ Pζ Qε; non Pγ; *add.* in occidentali Xα; *add. interlin.* autuem Vβ

6-7   Quod₂ ... celi₁] *om.* Vϱ   Quod₂ ... terre] Qui autem in linea medie diei erit gradus
           medii celi in illa hora, et eius nadyr erit angulus terre seu gradus anguli terre Mκ

is rising, that is, ascending; moreover, that one toward the west is setting. And what indeed

ceciderit in linea medii celi est in medio celi, et eius nadir angulus terre.

7   ceciderit] *om.* Vψ Wγ; acciderit Kθ; erit Eκ; est Pι   ceciderit ... celi₂] in medio(medii
         Eγ) celi linea erit in medie celi Cγ Eγ   in₁] super Fγ   in₁ ... celi₂] super primum
         almucharath in parte occidentali erit occidnes quia in linea medie diei erit gradus medii
         celi in illa hora Vσ   linea] *add.* meridionali Eσ; *add.* meridionali id est Nδ Nε Rδ
              medii celi] *twice* Eα; id est in medio celi Eσ; media Lι; medii Eκ; medii circuli Lκ;
         medii diei Lλ Mι Nγ Pζ Qε Vβ(*corr. to* celi) Sβ(*add. interlin.* scilicet celi) Wθ; medio celi
         Cγ; meridiei celi Wλ; meridionali Dη Tβ; meridionalis id est in medio celi Mτ Pσ Qζ Qθ;
         meridionalis id est(cum Mυ; *add.* in Lμ) medii celi Bδ Bε Cε Cι Dδ Eβ Eη Fα Fβ Fζ Kα Kδ
         Kε Lβ Lγ Lδ Lε Lη Lμ Mδ Mη Mπ Mυ Mφ Oγ Oζ Oι Oξ Oτ Oυ Oχ Pα Pβ Pδ Pθ Pμ Pν
         Pξ Pϱ Qβ Qγ Qι Qλ Sδ Sκ Tδ Vι Vψ Wα Wμ Xβ Xδ; meridionali illud Zα; *add.* id est in
         linea meridiei Cα   est] *om.* Fζ Qι Vι Zα; erit Cγ Dη Lι Lλ Mα Mι Nγ Qε Sθ(*add.* u)
         Vγ Wγ   est ... celi₂] *om.* Eδ Eζ Mν Mo Po Pυ Qδ Rα Vτ Xα   in₂] *om.* Lμ Oν Pγ Tβ
         Vμ Vo Xδ   medio celi] *illeg.* Mα; gradus medii celi Oν Vμ; medii celi Xδ; medio Oβ;
         medio celo Bβ Bδ Bη Bθ Bι Cε Cη Dγ Eλ Eμ Eυ Kθ Mδ Mγ(cello) Mλ Oσ Oφ Pγ Pτ Pφ
         Qα Rγ Sη Vβ Sβ Sι Sλ Vα Vν Vξ Vπ Vϱ Vυ Vφ Wι Wλ Xγ; medium celi Kδ(*marg.*) Kε Mτ
         Qζ Qθ Tβ Zα; *add.* est Lβ Lδ Lε Mη Nε   et ... terre] *marg.* Vυ   nadir] *illeg.* Mα;
         nadir *corr. to* nadair Eo; guadair Sκ; gnadair Cε Cι Mη Nε Pδ Pθ; gn[a]dayr Vψ; gnadir
         Dδ Mπ Rδ; nadair Bι Dη Eβ Eδ Eζ Eμ Eτ Eυ Fα Fβ Lγ Lε Lζ Lη Oζ Oι Oξ Oϱ Oτ Oυ Oχ
         Pμ Pν Pξ Po Pσ Pυ Qβ Qγ Qμ Sδ Vβ Vι Vν Vπ Vϱ; nadar Oγ Xγ; nadayr Bγ Cδ Dγ Fζ Oσ
         Pγ Pτ Qδ Tδ Wι; nadays Cη; nadire Vα; nadyr Cα Eσ Mδ Qη Vσ Vφ Xδ; nardir Bδ Mι Nγ;
         nazare Mυ; vadir Mγ Mν; vadir *corr. in marg. to* gnadair Wα; *add.* erit Dη Lλ; *add.* est Bζ
         Bθ Cγ Cε Dγ Dδ Eβ Eη Eκ Eσ Eυ Kγ Lμ Lι Mη Mλ Mμ Mo Mπ Mτ Mυ Nδ Nε Nζ Oβ Oζ
         Oν Oφ Pα Pβ Pδ Pθ Pι Pκ Pμ Pν Pξ Pϱ Pσ Pτ Pφ Pχ Qα Qβ Qγ Qζ Qη Qθ Qι Qλ Rε Sδ Sι
         Sκ Tβ Tδ Vι Vμ Vν Vξ Vo Vπ Vψ Wα Wβ Wζ Wμ Xβ Xγ Xδ Zα; *add.* est in Bγ(*interlin.*)
         Eλ Fγ Vτ; *add.* id est oppositum est Fβ; *add. interlin.* id est opposito Pα   angulus] in
         angulo] Rγ   terre] *add.* altera est supple altitudo solis sive gradus Fβ; *add.* seu gradus
         anguli terre Vσ; *add.* suple(supple Mπ Qβ; suppe Xδ) altitudo solis sive gradus Fζ Lβ Lγ
         Lε(*and del.*) Mπ Oι Oξ Oυ Pβ Pμ Pν Pσ Qβ Sδ Xδ; *add. illeg.* Mα; *add. Cap. 21 and 22* Lκ

7-8   medii ... ceciderit] meridionali Vη

falls on the line of the middle of the sky is in the middle of the sky and its nadir, the "angle of the earth."[4]

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[4] See Prologue, line 14, and note.

Et si ceciderit inter duo almucantharat, vide differentiam numeri inter

8   *before* Et] *add*. AD CORRIGENDUM GRADUS ALMICHANCARACH(ALMU^RATH Vξ) IMPERFECTI Mγ
         Vξ; *add*. AD CORRIGENDUM GRADUS [*illeg*.] Eρ; *add*. AD SUPULENDI(*?*) ALMICANTARATH
         GRADUS Kγ(*later hand; add. in marg*. 4^m) ; *add*. DE INVENIENDA HORA VEL ASCENDENTE CUM
         GRADUS SOLIS CAD^T INTER 2 Mλ; *add. in marg*. DE PROPORTIONE ALTITUDINIS Dγ   Et si]
         interlin. Bγ; Quod si altitudo solis Mκ Vσ; Si vero Vυ; *add*. altitudo Cγ Eγ Lδ Lλ Mι Nγ
         Oγ Oι(*interlin*.) Oρ Oχ Pζ Qε Sβ Sθ Vβ Vγ Wθ; *add*. altitudio solis Oβ Pα(*interlin*.); *add*.
         gradus solis Gα Nζ Vφ Wλ; *add*. vero altitudo solis sive gradus Sη; *add. interlin*. scilicet
         gradus solis Pθ Zα; *add. marg*. scilicet altitudino solis Oυ; *add. marg*. altitudo sive gradus
         solis Sι   Et ... inter] *marg*. Sκ   Et ... duo] Suppleo Kα   si] *add*. gradus solis
         Rδ Rε; *add*. altitudo Wγ   ceciderit] *add*. gradus solis Eκ Eλ Kδ   inter] infra Nζ
         Pκ Wζ; super Pφ Vφ   inter duo] *rep*. Pθ   inter₁ ... inter₂] super Dδ   duo] 2 /
         2° *some*; ii Oβ; *om*. Nα; duas Cζ Dγ Eo(*interlin*.) Lλ Mγ Oη Oσ Oφ Oχ Pφ Qα Qι Sβ Sθ Sι
         Vβ Vγ Vν Vρ Vτ Wγ Wθ Xβ Xγ; duos Mo Oρ Pζ Qε; tres *corr. in marg. to* 2 Po; 3 et Pγ Vα
                 almucantharat] abumitantarach Sι; almican~ Kγ0 almicanct^am Qζ; almicant' Oβ Vo;
         almicantarath Fγ Pσ Rδ; almicantaraz Bκ Cδ Oη; almicanth Cε; almicantharath Po Tβ;
         almicanthrat Wλ; almicathrath Eζ; almichancharach Mγ; almichanth Lκ; almikauthrat
         Qη; almi^at Wζ; almit' Nζ; almitantrath Vμ; almi^ut Mμ; almi^th Vη; alm^trat Kε; almu~ Pκ;
         almuc' Mπ; almucancarach Sη; almucancarath Vρ; almucancharath Pα; almucanr' Eσ;
         almucanrath Vτ; almucant' Lμ Qα Qθ; almucant^ar3 Sθ; almucantarach Bδ; almucantarah
         Qι; almucantarak Rγ; almucantarat Bη Eκ Lλ Oχ Pζ Qε Vγ Wθ Zα; almucantarath Bι Eα
         Eη EλFβ Kδ Lδ Lι Mδ Nε Oγ Pρ Pφ Qμ Sβ Tδ Vβ Wγ Xβ; almucantarathorum Vα;
         almucantaraz Cζ Eμ Lζ Oσ Sλ; almucantera~ Cα; almucanterath Oν; almucanth' Eβ Pγ
         Pδ; almucantharac Qγ; almucantharach Bθ Cι Kθ Pτ Rε Wβ; almucantharat Eδ Fα Mα Oζ
         Oι Oτ Oυ Pθ Sκ; almucantharath Bβ Bγ Bζ Cη Dγ Eo Eρ Eτ Fζ Lβ Lγ Lε Lη Mη Mλ Mo
         Mυ Mφ Nδ Oξ Pμ Pν Pσ Qβ Qδ Qλ Rα Sδ Vι Vν Vξ Vπ Wι Wμ Xα Xγ; almucantherath
         Oφ; almucantorath Pξ; almucantrath Gα Mτ; almuchantarath Vφ Xδ; almuchantaratz Dη;
         almuchantharat Wα; almuctr Pχ; almu^rath Mκ Pι Vσ; almuscan^arat Eγ; almuscantarach Pβ;
         almutantarach Mν; almutantarat Oρ; almutantaraz Vυ; almutanterach Mι Nγ; almutantrat
         Cγ; almuthantharat Vφ; almu^th Bε; al'tarat Kα   vide] *add*. quid Qη
                 differentiam] *illeg*. Nα; *add*. utriusque Mτ Qζ   differentiam ... numeri] quid
         denotatur per numerum(unius Qη) Nζ Qη Pχ Vμ Vo   numeri] *om*. Fγ Wζ; *marg*. Mτ
         Sβ; *interlin*. Kε; *om* Bδ(*blank*) Bη Bι Dγ Eδ Eλ Eτ Mλ Oγ Vν   inter₂] *om*. Eo Oι Qη; in
         Cι

8-9   vide ... almucantarath] *om*. Pκ Bζ Dε Oχ Pγ Vτ   differentiam ... solis] quod denomina
         per numerum intra almi^ut precedens et sequens Mμ   inter₂ ... solis] que ipsa altitudo
         srāt(*?*) primum almu^rath Mκ Vσ

8-16   Et ... superius] *rewritten in 68 lines* Cα (ff. 50^v-51)

And if it has fallen between two almucantars, observe the difference of the number between

almucantharat precedentem et altitudinem solis, et denomina ipsam differentiam de

9   almucantharat] abumitantarach Sι; almi~ Oβ; almic′ Kγ; almicactᵃᵐ Qζ; almicant~ Vo; almicantar′t Wζ; almicantarath Fγ Pσ Rδ; almicantaraz Bκ Cδ Eμ Oη; almicantharath Eζ Tβ; almicanthrat Wλ; almicantrat Kα Kδ; almicatharat Po; almichancarach Mγ; almichanth Lκ; almihanth Bε; almikrouth~ Qη; almit′ Nζ; almicant˜th Vμ; almiᵗʰ Vη; almncʳᵃᶻ Lζ; almᵗʳᵃᵗ Kε; almu~ Pκ; almuc′ Mπ; almucan Pφ; almucancarach Sη; almucancarath Pα Vϱ; almucanʳᵃᵗʰ Eτ; almucant′ Eβ Lη Lμ Qα Qθ; almucantar′ Oϱ; almucantarach Bδ; almucantarah Qι; almucantarak Rγ; almucantarat Bη Eκ Lλ Pζ Qε Vγ Wθ Zα; almucantarath Bι Eα Eλ Eη Fβ Fζ Kδ Lδ Lι Mδ Oγ Pξ Pϱ Pσ Pυ Qγ Sβ Sλ Vα Vβ Vψ Wγ Xβ; almucantaraz Cζ; almucantᵃz Sθ; almucanterahz Ov; almucanterath Nα Oφ; almucanth Kθ Lβ; almucanth′ Cι Fα Oζ Pδ; almucantharach Bθ Pτ Vξ Rε Wβ; almucantharat Eδ Mα Oι Oτ Pθ Sκ; almucantharath Bβ Bγ Cη Dγ Eo Eϱ Eυ Lγ Lε Mη Mλ Mo Mυ Mφ Nδ Oξ Pμ Pv Qβ Qδ Qλ Qμ Rα Sδ Tδ Vι Vπ Wι Wμ Xα Xγ; almucantrath Gα Mτ; almuchantar′ Dη; almuchantarath Xδ; almuchanth Nε; almuchanthorath Wα; almuchatarath Ov; almuʳᵃᵗʰ Pι Vv; almuscantarach Pβ; almut Dδ Eγ; almut′ Eσ; almutantarach Mv; almutantarat Oϱ; almutantaraz Vυ; almutantrat Cγ; almutantherach Mι Nγ; almuthantharat Vφ; almutr Pχ   precedentem] *om.* Gα; precedens Wζ; presentem Oγ   precedentem … solis] precedens et sequens Nζ Vμ; precedens et sequens almicant~ Vo   et₁ … solis] *om.* Mv Vv; in sequentem Qη   altitudinem] eo altitudinem Rα; *add.* gradus Eκ   altitudinem solis] sequentem Kα Pκ Pχ   solis] *om.* Bζ Bη Bθ Bι Bκ Cγ Cδ Cζ Dγ Eγ Eδ Eζ Eμ Eo Eϱ Eυ Lζ Lλ Lι Mα Mγ Mι Mλ Oβ Oη Ov Oσ Oφ Oχ Pζ Pμ Qα Qε Qμ Rα Sβ Sθ Sλ Vα Vβ Vγ Vξ Vϱ Vυ Wγ Wθ Xα; *interlin.* Sι; *add. one-line gloss* Cζ   denomina] denominabis Eo Lι Mλ Vτ; nomina Pυ; nota Mι Nγ; *add.* per Vμ   ipsam] *om.* Bβ Cη Pγ Rγ; *interlin.* Wι; illam Bγ(*interlin.*) Lι; *add. and del.* illam Eζ   differentiam] *om.* Eζ Mδ Mv; *add.* inter Bε Eη Xγ; *add. interlin.* graduum Wι   de] *om.* Wθ; et Cγ Pv

9-10   altitudinem … longitudinem] *om.* Mπ   de … longitudinis] *om.* Dδ; graduum Cζ; ipsum Dδ; vel usque numerum(?) Differentiam de numero altitudinis Qη

9-20   precedentem … superius] *rewritten in 9 lines* Fγ

the preceding almucantar and the altitude of the sun, and compare this difference with

10   numero longitudinis almucantharat, quod est 6 si almucantharat continet 6

10   numero] *add.* graduum Bη; *add.* unius Oϱ   longitudinis] *illeg.* Lμ Mα Nα; altitudinis
          Cι Mλ Mμ Mτ Nζ Pκ Pχ Qβ Rε Sδ Vμ Vξ Vτ Wζ; altitudinis *corr. in marg. to* longitudinis
          Vυ; graduum Eμ Lι Oη; illius Eγ; magnitudinis Xγ; unius Cγ Lλ Mι Nγ Oχ Pζ Qε Sβ(*add.*
          in marg. longitudinis) Sθ Vγ Wγ Wθ; *add.* ab Pϱ; *add.* et Sκ   longitudinis
          almucantharat] graduum contentorum inter duo almu^{rath} Mκ Vσ   almucantharat₁]
          alimutantarach Sι; almi^{at} Wζ; almic' Kγ; almicanct^{am} Qζ; almicant~ Oβ Vo; almicantar' Eσ;
          almicantarath Eζ Rδ; almicantaraz Cδ Oη; almicantharath Po Tβ; almicanthrat Wλ;
          almicantrat Kα; almicantrath Vμ; almichancarach Mγ; almichanth Lκ; almi^{rath} Pσ; almi^{raz}
          Bκ; almit' Nζ; almi^{th} Qη Vη; almi^{ut} Mμ; alm^{trat} Kε; almu Pφ; almu~ Pκalmu^{ant} Eγ; almuc'
          Mπ; almucancarach Sη Vϱ; almucancharath Pα; almucanrath Vτ; almucant Eκ(*cut off*);
          almucant' Eβ Lη Lμ Oζ Qα Qθ Rγ; almucantarach Bδ Bθ; almucantarah Qι Qμ;
          almucantarat Bη Lλ Oχ Pζ Sλ Vγ Qε; almucantarath Bι Eα Eλ Fβ Kδ Lδ Lι Mδ Oγ Qγ Qδ
          Sβ Vα Vβ Vν Wγ Xβ; almucantaraz Cζ Eμ Oσ; almucant^{a}z Sθ; alm ucanterath Nα Oν Oφ;
          almucanth' Cι Fα Lβ Mλ Nε Pγ Pδ; almucanthar' Dη; almucantharach Pτ Rε Wβ;
          almucantharat Eδ Fζ Mα Sκ; almucantharath Bβ Bγ Bζ Cη Dγ Eϱ Lγ Lε Mo Mυ Mφ Oι
          Oξ Oτ Pμ Pν Pϱ Pυ Qβ Qλ Rα Sδ Tδ Vξ Vπ Wι Wμ Xα Xγ; almucantrath Gα Mτ Pξ;
          almucath Eη; almuch Kθ; almuch' Pθ; almuch'a~ Eo; almuchantarath Oυ Vψ; almuchanth
          Cε; almuchantharat Xδ; almuchantharath Vι Wα; almuc^{raz} Kζ; almu^{rath} Eτ Pι;
          almuscantarach Pβ; almut Dδ; almutantarach Mν; almutantarat Oϱ; almutantaraz Vυ;
          almutantherach Mι Nγ; almutantrat Cγ; almutarath Nδ; almu^{th} Bε; almuthanth' Mη;
          almuthantharat Vφ; almutharath Eo; almutr Pχ   quod] qui Bη Cγ Eμ Mι Nγ Oη Pζ
          Vπ   quod ... almucantharat₂] *marg.* Po   quod ... continet] *om.* Xα   6₁] sex / vi
          some; sextum Wβ; *illeg.* Vψ; 16 Wθ; 60 Eυ; idem Sλ; *add.* gradus Bγ(*interlin.*) Bη Bθ Eλ Eυ
          Kα Lζ Oν Oϱ Qδ Sη Vϱ Vπ; *add. and del.* gradus Pι; *add.* quod Sη; *add.* scilicet Cδ Cζ Bη Bθ
          Bκ Eμ Eυ Nα Oη Oι(*interlin.*) Oν Oσ Pζ(*marg.*) Vυ   6₁ ... continet] *om.* Mo Pυ   si]
          om. Bδ Wβ; id est si Eυ; *add.* grad~ Rδ   almucantharat₂] alimutantarach Sι; almi^{at} Wζ;
          almic' Kγ; almicanct^{am} Qζ; almicant~ Vo; almicantarath Po(*marg.*) Pσ Rδ; almicantaraz Cδ
          Oη; almicantharath Tβ; almicanthrat Wλ: almicantrat Kα; almicantrath Vμ;
          almichancarach Mγ; almichanth Lκ; almi^{raz} Bκ; almit' Nζ; almi^{th} Qη Vη; almi^{ut} Mμ; alm^{tat}
          Kε; almu Pφ Xδ; almu~ Pκ; almuatharath Eζ; almuc' Fα Mπ; almucan^{ath} Qμ; almucanc'
          Sη; almucancarach Vϱ; almucancharath Pα; almucanrath Vτ; almucant' Eβ Lη Lμ Oζ Qα
          Qθ Rγ; almucantarach Bδ Bθ; almucantarah Qι; almucantarat Bη Eκ Pζ Zα;
          almucantarath Bι Bζ Eα Eλ Fβ Kδ Lδ Lι Mδ Oγ Oι Pξ Qδ Sβ Vα Vβ Vν Xβ; almucantaraz
          Cζ Eμ Oσ; almucanterath Oν Oφ; almucanth Eη Lβ Nε; almucanth' Cι Mλ Pγ Pδ Pθ;
          almucanthar' Dη; almucantharach Rε Wβ; almucantharat Eδ Fζ Sκ; almucantharath Bβ Bγ
          Cη Eϱ Lγ Lε Mυ Mφ Nδ Oξ Oτ Pν Pϱ Qβ Qλ Rα Sδ Tδ Vι Vξ Vπ Wι Wμ; almucantrath
          Gα Mτ; almuch Kθ; almuch'a~ Eo; almuchantarath Oυ Vψ; almuchanth Cε;
          almuchantherath Wα; almuc^{raz} Lζ; almu^{rath} Eτ Pι Qγ; almuscantarach Pβ; almut Dδ; almut'
          Eσ; almutantarach Mν; almutantarat Oϱ; almutantaraz Vυ; almu^{th} Bε Dγ; almuthantharat
          Vφ; almuthath' Mη; almutr Pχ; *add.* quod est sex Pγ   continet] *om.* Eδ Eζ Gα Mν Pζ
          Po Rα Sβ; contineant Oη Sι Vα Vυ; contineat Oφ Qμ; sit Qη   6₂] sex *some*; unum Vτ;
          add. graduum Rε

the longitudinal number[5] of the almucantar, which is six if the almucantar comprises 6

[*apparatus criticus for line 10 continued*]

10-11　quod ... gradus₂] *illeg.* Oβ　　　si ... 6] *om.* Xγ　　　si ... 3₁] *om.* Pτ　　　si ... gradus₂] *om.*
　　　　Nα　　　6₂ ... continet] *marg.* Pι

10-12　si ... 3] *marg.* Sβ　　　si ... aliis] *om.* Cγ Eγ Lλ Mα Mι Mγ Nγ Oχ Qε Sλ Vγ Wγ Wθ; *marg.*
　　　　Pζ

10-16　quod ... superius] *completely rewritten* Mκ(*6.5 lines*) Vσ(*5 lines*)

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[5] I.e., the number of longitudinal degrees between each pair of almucantars.

gradus et 6 gradus; quod si almucantarath contineat 3 gradus et 3, denomina partem

11   gradus₁] *om.* Mυ Mφ Qα Vι Wα; graduum Gα; signa Fζ Qι   et 6 gradus] *om.* Bβ Bε Bζ
          Bη Bθ Bι Cζ Dγ Dη Eη Eλ Eμ Eo Eϱ Eυ Kα Kγ Kδ Kε Kθ Lδ Lι Lμ Mγ Mλ Mμ Mτ Nα Oγ
          Oζ Oη Oφ Pζ Pκ Pμ Pϱ Pφ Pχ Qγ Qζ Qη Qθ Rγ Rδ Rε Sη Sι Vβ Vη Vμ Vν Vξ Vπ Vϱ Vτ
          Wβ Wζ Wλ Xδ Zα; *del.* Sκ Vφ   et₁ ... 3₂] *om.* Vo   gradus₂] *om.* Bγ Cη Eτ Pγ Pι Wι
              quod] et Dγ Eσ Rγ Xβ; ne Vϱ; vel tres/3 Nζ Pχ Qη   quod si] *om.* Lε Mπ Tδ; vel
          3/tres Vμ Wζ; *add. in marg.* "Quod si almucantarath" usque ad litteram exclusuram
          "Postea scito motum almuri" est addita tamen utilis et bona Vβ   quod ... 3₁] *marg.*
          Eζ(*later hand*)   quod ... 3₂] *om.* Qζ Vξ; 3 gradus Kα; et si contineat 3 Mλ; et si tres Tβ;
          et si 3 gradus Bδ Bε(*add.* et cetera) Cε Cι Eα Eβ Eδ(*om.* si) Eη Fα Fζ Kδ Kε Lβ Lδ Lε Lη Lκ
          Lμ Mδ Mη Mo Mυ Mφ Nδ Nε Oγ Oζ Oι Oξ Oτ Oυ Pα(*add. interlin.* almucancharat
          contineat) Pβ Pδ Pθ Pν Pϱ Qγ Qδ Qθ Qι Qλ Rδ Sη Sκ(*add. in marg.* continet) Vη Vι Vφ Vψ
          Wα Wμ Xδ Zα; et si 3/tres Mτ Pξ; et 3 Mν; et 3 gradus Eζ Eλ Po Pυ Rα Sβ Xα Xγ; et 3
          gradus et 3 gradus Qμ; si vero 3' gradus Eϱ; vel 3 gradus Vτ; vel 3ᵘᵐ si almu~(almiᵘᵗMμ)
          continet(sint Mμ) 3ᵉˢ gradus Mμ Pκ   si] *om.* Oβ   almucantarath] *om.* Lι Xβ; *illeg.*
          Nα; abimutantarach Sι; almi*at* Wζ; almic' Kγ; almichancarach Mγ; almicantarat Cδ;
          almicantaraz Oη; almicantrath Vμ; almit' Nζ; almiᵗʰ Qη; almiʳᵃᶻ Bκ; almʳᵃᶻ Lζ; almuᵃᵗᵃᵗʰ Eτ;
          almuᶜᵖ Eζ(*later hand*); almucan Pφ; almucancarath Vϱ; almucant' Qα Rγ; almucantarat Bη
          Eκ Pζ; almucantarath Bζ Bθ Bι Fβ Vα Vβ; almucantaraz Cζ Oσ; almucanterath Oφ;
          almucanteraz Oυ; almucanth'Pγ; almucanthar' Dη; almucantharach Rε Wβ;
          almucantharath Bγ Cη Eυ Lγ Qβ Tδ Vπ Wι; almucantharaz Eμ; almuch Kθ; almuchaʳ Eo;
          almuʳᵃᵗʰ Lε Pι Sδ Vν; almut Dδ; almut' Eσ; almutantarat Oϱ; almutantaraz Vυ; almuᵗʰ Bβ
          Bε Dγ; almutr Pχ   almucantarath ... 3₁] *om.* Kα   contineat] contineant Cζ Pζ Pι
          Vα; continet Vν; sit Qη; *add.* et si Tδ   3₁] *interlin.* Bγ; sex Pχ Vα   et 3₂] *om.* Bη Bι
          Bκ Dη Eσ Fβ Kα Kγ Kθ Lγ Lδ Lι Mπ Nζ Oβ Pζ Pι Pχ Qβ Qη Rγ Rε Sδ Vα Vμ Vϱ Wζ Xβ;
          et si 3 Nα; *add.* gradus Cδ Cζ Dγ Bζ Bθ Eζ Eκ Eμ Eo Eυ Lζ Mγ Mλ Nα Oη Oν Oσ Oφ Pτ
          Pφ Vβ Vν Vπ Vυ; *add.* numerus quibus possunt almicantaraz cressere Oη   3₂] tres
          some; *add.* gradus Oϱ   denomina] denominabis Rε; denominabit Eo Mλ Oφ Pφ Vν;
          denominabut Dγ; nomina Kα; *add. half-line gloss* Cζ

degrees and 6 degrees; but if the almucantars comprise 3 degrees and 3, compare the part

illorum de 3; et sic de aliis. Postea scito motum almuri ab initio primi almucantharat

12　　　　illorum] illam Eα; illarum Cδ; ipsorum Bθ Kε Qζ Vπ; istorum Vμ Vξ Vo　　　de 3] *om.*
Eλ; a 3 Pμ; a 3^{bus}/tribus Mμ Pχ Vμ Vo; *add. interlin.* vel a sex Wζ　　　de 3 ... aliis] *om.* Nε;
a tribus etc. Nζ　　　3] tribus/3^{bus} *some; add.* gradibus Dη Kε　　　et ... aliis] *om.* Sβ; *illeg.*
Kγ; et cetera Vη Vμ　　　sic de aliis] *illeg.* Bη Lμ Rγ Tβ Vφ; aliis Vι; *marg.* [*cut off*] de aliis
Mτ; cetera Bε Kα Zα; de aliis Eυ Pι; et tribus Bβ; *add.* numerus quibus possunt
almicantaraz crescere Cζ; *add. half-line gloss* Cζ　　　Postea] *om.* Nε; Deinde Eκ
　　　scito] cito Eϱ; scias Qη Vμ Vo; *add.* introytum id est Cγ; *add.* in tᵃuiia Eγ　　　scito
... almucantharath] *om.* Kα　　　motum] *om.* Kδ; gradum Kε Lμ Mτ Qζ; motu Rγ; *add.*
quod in limbo describit movendo ipsum gradum solis ab initio precedentis
almucantharat ad eius finem et Bζ　　　almuri] (*blank*) Bδ; *om.* Rδ; albimuri Sι; almmuri
Oβ; almurei Mυ; almury Lδ; *add.* movendo gradus solis Mμ Nζ Pκ Pχ Vμ Vo Wζ; *add.*
interlin. id est denticuli Oι　　　initio] fine Dγ Mλ Rε Vτ; *add.* id est que est tota in
denominacione illorum graduum quos pertransunt almuri in motu suo ab inicio Oη
　　　primi] *om.* Eλ Nα Vη; 1ⁱ Lμ; precedentis Dγ Mλ Vτ　　　almucantharat] *om.* Vη;
alm^{at} Bη Kε; almi^{at} Wζ; almicanct^{am} Qζ; almicant~ Vo; almicantarat Oϱ; almicantarath Pσ
Rδ; almicantaraz Cδ Oη; almicantharath Eζ Po Tβ; almicanthrat Wλ; almicantrath Vμ;
almicant^t Kγ; almichancarach Mγ; almichanth Lκ; almi^{raz} Bκ; almit~ Nζ Oβ; almitantarach
Sι; almith Qη; almi^{ut} Mμ; almu~ Pκ; almuc' Mπ Oζ; almucan^{ath} Qμ; almucancarach Sη;
almucancarath Vϱ; almucancharath Pα; almucanrath Vτ; almucan^{raz} Ov; almucant' Fα Lη
Lμ Qα Qθ; almucantar~ Sβ; almucantarach Bδ Bθ Pτ; almucantarah Qι; almucantarak Rγ;
almucantaras Nα; almucantarat Lλ Oχ Pζ Qε Sλ Vγ Wθ; almucantarath Bζ Bι Eα Eλ Fβ
Gα Kδ Lδ Lι Mδ Oγ Ou Pξ Pφ Qγ Vα Vβ Wγ Xβ; almucantaraz Cζ Eμ Lζ Oσ Sθ;
almucanth' Cι Dγ Eβ Eη Lβ Mλ Nε Pγ; almucanthar' Dη; almucantharach Rε Wβ;
almucantharat Eδ Fζ Mα Oτ Pυ Sκ Zα; almucantharath Bβ Bγ Cη Eϱ Eυ Lγ Lε Mo Mυ
Mφ Nδ Oι Oξ Pδ Pμ Pυ Pϱ Qβ Qδ Qλ Rα Sδ Tδ Vι Vv Vξ Vπ Wι Wμ Xγ; almucantrath
Mτ; almuc'ath Xα; almuch Kθ; almuchan Xδ; almuchantarath Vψ Wα; almuchanth Cε;
almuchantharat Pθ; almucha^r Eo; almu^{rat}(?) Eγ; almu^{rath} Eτ Pι; almuscantarach Pβ; almut
Dδ Eσ; almu^{ta} Oφ; almutantarach Mv; almutantaraz Vυ; almutanterach Mι;
almutantherach Nγ; almutantrat Cγ; almuth Bε; almuthanth' Mη; almuthanthärat Vφ;
almutr Pχ; *illeg.* Eκ; *add.* in quo est altitudo Oβ Pμ Xβ; *add. interlin.* in quo est altidudo
[*illeg.*] Pα; *add.* in quo est altitudo usque ad finem eius inter gradum et pone almure super
partem illorum Oϱ

of them with three, and so for the others. Then observe the movement of the indicator-muri from the beginning of the first almucantar

usque ad initium secundi de gradibus marginis; et pone super illorum partem
denominatam ab eis, secundum proportionem differentie dicte, ex 6 vel de 3

13   ad] *om.* Eζ; *add.* finem eius inter gradus marginis et pone almuri super partem illorum et
          cetera usque ad Pμ   initium] finem Xβ; numerum Cγ   secundi] 2^i Lμ; *illeg.* Nα;
          eius Xβ; id est secundus Bι(*interlin.*); secundum Rδ; sequenti Eλ Vτ; *add.* almucantharat
          Zα; *add.* almuri his(?) contrat Kα; *add.* gradus Qη; *add.* quota sint ipsa differencia numeri
          primi almicantaraz usque ad initium secundi Oη   de] *om.* Eα Mν Po; in *corr. to* de Eζ;
          in t^i(?) Xβ   gradibus] gradus Mν Oφ; gradus *corr. in marg.* Mτ; gradus altitudinis Eα;
          graduum Xβ; *add.* in Mι   marginis] magnis Pφ Vι; margindis Xβ; marginibus Wβ;
          add. id est limbi Kθ Lδ Oγ; *add.* sive limbi Rε; *add.* one-line gloss Cζ   et ...partem] et
          super rem illorum pone *illeg.* Eη   pone] *twice* Qι; *add.* almuri Cζ Eμ(*interlin.*) Eλ Kδ
          Oβ Oη Pθ Rγ Rδ Vo Vτ Xβ; *add.* id est almuri Qζ; *add.* scilicet almuri Bθ Eυ Vπ; *add.*
          notam Bδ Bε Dη Eβ Fα Fζ Kα Kγ Kε Lβ Lγ Lδ Lε Lη Lκ Lμ Mδ Mo Mπ Mτ Mυ Mφ Nα
          Oγ Oζ Oι Oξ Oτ Oυ Pα Pβ Pμ Pν Pξ Pϱ Pσ Qβ Qγ Qζ Qθ Qι Qλ Sδ Sη Sι(*marg.*) Tβ Tδ Vη
          Vι Wα Wμ Xδ Zα   super] si per Bδ; *add.* eos Dγ Mλ Oφ(*interlin.*)   illorum] *illeg.*
          Nα; eorum Eυ; illam Mδ Nδ Vo; ipsorum Mτ; istorum Qζ Vξ; *add.* graduum Lδ Oγ; *add.*
          in marg. notam Wζ   partem] *om.* Pχ; notam Dδ; *add.* illorum Eϱ; *add.* notam Eσ Lι Nδ;
          add. pone notam Xβ; *add.* pone numerum Fβ; *add. interlin.* id est almuri Kε; *add. interlin.*
          notam Qη; *add. two-line gloss* Cζ

14   ab eis] ad eis Lι; et aleis Vτ   eis] eius Pγ; *add.* gradibus Mυ Vι   secundum] *add.*
          differentiam Xα   proportionem] *add.* diem Oβ   differentie] *interlin* Wζ; *rep.* Eλ
               dicte] *om.* Mα Pι; denotate Qα; predicte Cγ Lγ Mι Nγ Oχ Pζ Qε Sβ Sθ Vα Wγ Wθ
               ex] de Bζ Bη Cζ Eκ Eλ Eμ Eo Kγ Kε Lι Mγ Mμ Nζ Pφ Pκ Pχ Qζ Qη Rε Vμ Vν Vξ
          Vo Vτ; in Oχ; *corr. to* de Wι   6] sex / vi *some*; *add.* gradibus Vμ   vel] idem Oφ Pφ
          Sι   de] *om.* Bι Cι Kδ Lι Oβ Oγ Pθ Pκ Pχ Qα Qη Qμ Rδ Vα Vo Vυ Xδ; ex Bθ Dδ Pι Vπ
          Vϱ   3] tribus / 3^{bus} *some*

14-15   vel ... gradibus] *om.* Cγ Eγ Lλ Mα Mι Nγ Oχ Pζ Qε Sθ Sλ Vγ Wγ Wθ; *interlin.* Sβ; *illeg.*
          Rγ (*damaged*)

as far as the beginning of the second [almucantar] along the degrees on the margin, and place on the part of them compared with them,[6] according to the proportion of the said difference, from 6 or from 3

[6] If the sun's altitude falls between two almucantars, place the sun's position for that day on each of those two almucantars and note the positions of the indicator-muri along the rim. Divide that arc along the rim according the the proportion of the sun's altitude to (or between) the two almucantars, place the muri on that point of division, and then the sun will be in the correct position for reading off the time.

15　　gradibus; et tunc habebis certum gradum inter duo almucantharat; et tunc considera

　　15　　gradibus] *om.* Bδ Bε Bη Bκ Cδ Dδ Dη Eβ Eη Eκ Eμ Eσ Fα Fβ Fζ Kα Kε Lβ Lγ Lδ Lε Lζ Lη Lκ Mδ Mπ Nδ Oγ Oη Oι Oυ Oξ Oϱ Oσ Oτ Oυ Oφ Pα Pβ Pμ Pν Pξ Pσ Pφ Qβ Qζ Qθ Qι Qλ Sδ Sι Tβ Tδ Vα Vη Vμ Vξ Vυ Wμ Xβ Xδ; *marg.* Wα; gᵃ Pτ; gra Pι; tolle Dγ Mγ Vτ Vν; vel duobus Zα; *add.* tolle Bζ Eλ Rε; *add. in marg.* "vel de tribus gradibus" est littera addita Vβ　　　　gradibus ... duo] *om.* Pϱ　　　　et₁] ex Dη　　　　et₁ ... almucantharat] *om.* Qη　　　　tunc₁] secundum hoc Qβ　　　　habebis] habebitis Cζ; *add.* locum Oχ　　　　certum] *illeg.* Oχ; 3/trium Pτ Pυ Xγ; certitudinem Mλ Rε; *add.* diem Vτ; *add.* locum Bγ(*interlin.*) Bζ Bη Bθ Bκ Cγ Cδ Cζ Dδ Dγ Eγ Eκ Eλ Eμ Eo Eυ Lζ Lλ Lι Mα Mγ Mι Oβ Oη Oν Oφ Oχ Pζ Pφ Qα Qε Sβ Sθ Sι Vα Vβ Vν Vπ Vυ Wγ Wθ; *add.* numerum Wβ; *add. and del.* partem Qδ; *add. in marg.* scilicet locum Oι　　　　gradum] *om.* Pσ; *interlin.* Qθ; gradus Bζ Bκ Cγ Cδ Cζ Eκ Eλ Eo Lζ Lι Oν Pζ Rε Vπ Wγ; locum gradus Oϱ; *add.* dictum Mπ; *add.* solis Eμ(*interlin.*) Eλ　　　　inter] *om.* Eo; intra Mι Nγ　　　　inter duo] *illeg.* Nα　　　　duo] *om.* Cε Mτ Pκ Pσ Qζ; 2 *some*; duas Bζ Cζ Dγ Eo Eσ Kγ Lζ Lι Mα Mγ Mλ Oη Oν Qι Rε Vγ Vν Vτ; duos Cδ Mo Mυ Mφ Oσ Oυ(*add. interlin.* vel duas vel duo) Oχ Pβ Pζ Pφ Qα Qε Sβ Sθ Sι Sλ Vα Vβ Vι Vυ Wα Wγ Wθ; 3 Xα　　　　almucantharat] al Xδ; alimutantarach Sι; almᵃᵗ Kε; almiᵃᵗ Wζ; almicant Kγ; almicant~ Vo; almicanctᵃᵐ Qζ; almicantarat Cδ; almicantarath Pσ Rδ; almicantaraz Bκ Oη; almicanteraz Oν; almicantharath Eζ Po Tβ; almicantrat Kα; almicantrath Vμ; almichancarach Mγ; almichanth Lκ; almit~ Nζ Oβ; almiᵗʰ Vη; almiᵘᵗ Mμ; almu~ Pκ; almuᵃᵗ Bη; almuc' Fα; almucan' Mπ; almucanᵃᵗʰ Qμ; almucancarach Sη; almucancarath Vϱ; almucanrath Vτ; almucant'Lη Lμ Oζ Qα Qθ; almucantar~ Rγ Sβ; almucantarach Bδ Bθ; almucantarat Eκ Oχ Pζ Qε Sλ Vγ Wθ Zα; almucantarath Bι Eα Eη Eλ Fβ Kδ Lδ Lι Lλ Mδ Oγ Oυ Pα Pξ Pφ Vα Vβ Wγ Wμ Xβ; almucantaraz Cζ Eμ Sθ; almucanterath Nα; almucanᵗʰ Oφ; almucanth' Cι Eβ Lβ Mλ Nε Pγ Pδ Pθ; almucantha' Xα; almucanthar' Dη; almucantharach Rε Wβ; almucantharat Eδ Lγ Mα Oτ Sκ; almucantharath Bβ Bγ Bζ Cη Fζ Lε Mo Mυ Mφ Nδ Oι Oξ Pμ Pν Pϱ Pυ Qβ Qδ Qι Qλ Rα Sδ Tδ Vι Vπ Wι Xγ; almucanthrat Wλ; almucantrat Cγ; almucantrath Gα Mτ; almucatharach Pτ; almuchantarath Vψ; almuchanth Cε; almuchantharath Wα; almucharat Eo; almuchʳᵃᵗʰ Vξ; almucʳᵃᶻ Lζ; almulch Kθ; almuʳᵃᵗ Eγ Vν; almuʳᵃᵗʰ Eτ Pι Qγ; almuscantarach Pβ; almut Dδ; almut'Eσ; almutantarat Mν Oϱ; almutantaraz Vυ; almutanterach Mι Nγ; almuᵗʰ Bε Dγ; almuthanth' Mη; almuthantharat Vφ; almutr Pχ; *add.* et hoc si posueris almuri super medium predictorum graduum si almith videlicet ad gradus vel super 3ᵐ partem si almiᵗʰ videlicet tres gradus et velit quere primum almiᵗʰ inter illos tres etc. Vη; *add.* et tunc numera exentem inter duo almucantharath subtrahe a gradibus almuri in limbo descriptis Bζ; *add. illeg.* Zα　　　　tunc₂] *om.* Vξ; tunch Pβ　　　　considera] *om.* Pξ; *add. and del.* illos gradus Vo

15 - Cap. 6:1　　et tunc₂ ... inequalium] *missing* Rγ (*the bottom half of fol. 74 has been torn out, although a few of the missing lines can be found on a wedge, now fol. 73bis, as restored in 1974*)

degrees; and then you will have the exact degree between the two almucantars; and then consider

eas horas et cetera, sicut dictum est superius.

Si[7] illud idem in nocte scire desideras, accipe altitudinem alicuius stelle in

16   eas] *om.* Cγ Dγ Eγ Eλ Kα Kθ Lλ Mα Mγ Mι Mλ Nγ Oν Oχ Pζ Pι Qε Sβ Sθ Vγ Vν Vυ Wγ
        Wθ; has Mτ; illas Cε Pκ Pχ Vμ Vo Wζ; istas Nζ   eas horas] eam horam Cζ Eμ Oη;
        add. supra quam cecederit gradus solis vel nadir gradus solis(eius Lι) et illa est presens
        hora diei vel noctis Lι Oη   et cetera] *om.* Bβ Bη Dγ Dη Kδ Mμ Mυ Oβ Pι Pκ Pχ Qη Rδ
        Vμ Vν Vξ Vυ Vψ Xγ; astedece (?) Eλl; et est Eα   cetera] *om.* Gα Mγ Mλ Oξ Qθ; alius
        Vτ; ascendentem Rε; *add. in marg.* et [*illeg.*] Wζ; *add. 32 line gloss* Cζ   sicut] *illeg.* Bη;
        secundum Mμ; ut Eκ   sicut ... superius] omnia alia sicut prius dictum est Tβ
              est] *om.* Vϱ; *add.* tibi Dγ Mγ Mλ Rε Vν   superius] *om.* Bκ Gα Mι Nγ Vγ Vo;
        prius Eϱ Nζ Oσ Pκ Pχ Qα Vη Vμ Vυ Wζ Zα; prius superius Vπ Vτ

17   *before* Si] *add.* AD HABENDUM HORAM ET ASCENSIONEM SIVE ASCENDENTEM PER STELLAS IN
        NOCTE Vξ; *add.* AD HABENDUM HORAM VEL ASC[END]ENS IN NOCTE PER STELLAS Mλ; *add.* AD
        HABENDUM HORAS ET ASCENDENS IN NOCTE PER STELLAS Eϱ; *add.* AD INVENIENDUM HORAS ET
        ASCENDENS IN NOCTE PER STELLAS Eo Gα; *add.* AD INVENIENDUM HORAS ET ASCENSIONES IN
        NOCTE PER STELLAM Mγ; *add.* DE EODEM IN NOCTE Mι Nγ Pζ Vβ; *add.* DE PREDICTIS IN NOCTE
        Vγ; *add.* 5. DE PREDICTIS INVENTIONE Lλ; *add.* DE SCIENDE PROPORTIONE IN ALTITUDINIS IN
        NOCTE Dγ; *add.* ILLUD IDEM FACIES IN NOCTE Wγ; *add.* ITEM DE EODEM IN NOCTE Oχ; *add.*
        ITEM DE INVENTIONE ASCENDENTIS PER STELLAS FIXAS IN RETHI POSITAS DE NOCTE
        CERTITUDINALITER. Oφ; *add. in marg.* 4/4ᵐ Pκ Vμ Wζ   Si] *om.* Cγ Oχ; Et Oβ; Sed Oη
        Xα; Sed si Oσ; *add.* autem Mκ; *add.* etiam Eλ; *add.* vero Cδ Xβ   Si ... desideras] Si
        volueris horas noctis [*illeg.*] ascedens in nocte scire per stellas Lι   illud] *om.* Oν Pι;
        istud Cα Vυ Wζ   illud idem] iᵈ Wλ; predictam Mκ Vσ   idem] *om.* Gα Lδ Oγ;
        interlin. Sβ; *add.* etiam Bζ Bη Bκ Cζ Eμ Eo Lζ Lλ Mα Mγ Oη Oϱ Sι Vα Vυ; *add.* facies Cγ
              in₁] *om.* Wι; de Dδ Eκ Nδ Vη Vo   in nocte] *om.* Wγ; *marg.* Qθ; *add.* etiam Wθ;
        add. si Cγ; *add.* sue de nocte Pκ Pχ   scire] videre Wθ   scire desideras]
        consideras Pτ; queras Eκ   desideras] consideras Kα Mo Oϱ; volueris Cδ Lβ Mκ Nζ
        Pβ Vσ   accipe] tunc Pι; *add.* id(?) Bε   altitudinem] *add.* gradus Rε   alicuius]
        om. Sλ; ipsius(*expunged*) Pν; *add.* gradus Vτ   stelle] *marg.* Sκ; *add.* fixe Bζ Bη Bθ Bι Bκ
        Cα Cγ Cδ Cζ Dγ Eγ Eκ Eλ Eμ Eo Eϱ Eτ Eυ Gα Lβ(*marg.*) Lζ Lι Lλ Mα Mγ Mι Mκ Mλ Mμ
        Mo Nα Nγ Nζ Oβ Oη Oι(*marg.*) Oν Oϱ Oσ Oφ Oχ Pγ Pζ Pι Pκ Pτ Pυ Pφ Pχ Qα Qδ Qε
        Qη Rα Rε Sβ Sη Sθ Sι Sλ Vα Vβ Vγ Vμ Vν Vo Vπ Vσ Vϱ Vτ Vυ Vφ Wγ Wζ Wθ Wλ Xα
        Xγ   in₂] *om.* Cε

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[7] A minority of mss treat this as the beginning of a new chapter; hence the added titles in some.

these hours, etc., as was said above.

If you were to wish to know the same thing at night, take the altitude of any star marked on

alhantabuz descripte, que transit ex parte orientis vel occidentis, et pone cacumen

18   alhantabuz] *illeg*. Xγ; abmimatantarach(?) Sι; ailancabut/allancabut Vγ; alaantibuz Pζ; alᵃazabut Wγ; alacantabuz Sλ; alahancabuth Mκ; alahantabuth Oβ Vσ; alancabud Eκ; alancabut Eγ Mα Mγ Mλ Qα; alancabuth Oη Vβ; alancabuut Wθ; alanca•cabut Sη; alanchabuch Dγ; alanchabuth Eμ; alanctabuz Cδ; alangabut Oϙ; alangabut / alanganbut Vα; alantabur Bκ Cα; alantabut Bζ Eo Mι Nγ Vν Vυ; alantabuth Bθ Cζ Eα Vπ; alantabuz Bδ Dδ Lζ Lη Oι; alanthabut Bη; alanthabuth Qη; alanthabuz Cγ Oσ; alcantabum Rδ; alcantabuth Qδ; alcatabuth Bι; alcuthabuth *corr. in marg. to* alahancabut Vφ; alemtibuch Pκ; alencabuth Mo Pτ Pυ Rα Vϙ Xα; alentabuch Eϙ; alentebuth Nζ; alenthabuth Mμ; aletabuch Vτ; aletibuth Pχ; alhabuth Tβ; alhanbuth Pγ; alhancabuch Oν; alhancabutz Qι; alhancabuz Cε; alhanchabuch Kθ; alhankabuth Mτ Pι; alhantabᵗ Fα; alhantabm Pϙ Vψ; alhantabu' Xβ; alhantabuch Wβ; alhantabur Pν; alhantabus Wλ; alhantabut Eσ Kγ Oχ; alhantabuth Bγ Dη Eδ Eζ Eλ Eυ Kδ Kε Lβ Lι Mν Po Qζ Qμ Vξ Vo Wι Zα; alhantabut/z Pα; alhantabuz Bε Eβ Eη Fβ Fζ Lγ Lδ Lε Lμ Mδ Mυ Mφ Nδ Nε Oγ Oζ Oξ Oτ Oυ Pβ Pθ Pμ Pξ Pσ Qβ Qγ Qθ Qλ Tδ Vι Wα Wμ; alhantbuz Mπ; alhanthabuch Rε; alhanthabuth Bβ Cη Eτ; alhanthabuz Cι Mη Pδ Sκ; alhentabuth Vη; allaancabut Qε; allancabunt Sθ; allancabut Lλ Sβ; allancabuz Sδ; allentabuch Wζ(*add. interlin*. id est rethe); almicabuth Gα; alphantabuz Kα; elentebuth Vμ; halantabut Oφ; halhantabut Xδ; almichanth Lκ; almucantarath Pφ; aranea Nα; *add. interlin. illeg*. Sη; *add*. et rethi Oβ; *add*. id est aranea Oι; *add*. id est rethi Bβ Bη(*interlin*.) Fβ(*interlin*.) Kθ(*interlin*) Mπ(*interlin*; rete) Qι Vβ(*interlin*.); *add*. sive rethi Nζ   descripte] *om*. Cζ Eμ Oη Vo; describe Mυ Mφ Vι; *add*. ex(in Dη) parte illa Bδ Dζ Dη Eβ Eη Eσ Fα Fβ Fζ Kα Kε Lβ(*and del*.) Lγ Lδ Lε Lη Lκ Lμ Mδ Mπ Mτ Mυ Mφ Nδ Oγ Oι Oξ Oτ Oυ Pα Pβ Pμ Pν Pξ Pϙ Pσ Qβ Qγ Qζ Qη Qθ Qι Qλ Sδ Tβ Tδ Vη Vι Wα Wμ Xα Xβ   que] qua *some*; quo *some*; qui Sκ   que transit] *om*. Dγ Eλ Mλ Rε Vν Vτ; *add. interlin*. scilicet Oι   que ... occidentis] ut predictum est in 3° capitulo[8] Mκ Vσ(*add. in marg*. que ... occidentis)   ex] in Pϙ Wγ   orientis] *add*. si est ante medium noctem Kα   vel] et Cγ Eδ Wγ; *add*. ex parte Bδ Bε Bζ Dδ Dη Eβ Eη Eμ Eσ Fα Fβ Fζ Kα Kε Lγ Lδ Lε Lη Lι Lκ Lμ Mπ Mτ Mυ Mφ Nδ Oγ Oζ Oη Oι Oξ Oτ Oυ Pα Pβ Pμ Pν Pξ Pϙ Pσ Qβ Qγ Qζ Qθ Qι Qλ Sδ Tβ Tδ Vη Vι Wα Wμ Xδ Zα; *add*. illia que ex parte Xβ   occidentis] *add*. si post Kα   cacumen] accumen Nα Vτ; acumen Cδ Dγ Mλ Wα; alumen Eλ; cacmum Eo(*and add. in marg*. al' cacumen); cacumine Oϙ; *add*. id est acumen Nζ

the hantabuz [i.e., rete] which crosses from the east or the west, and place the cacumen [i.e., tip of the star-pointer]

ipsius stelle in almucantharat sue altitudinis, et gradus solis indicabit tibi horas noctis,

19   ipsius] *illeg*. Mγ; *om*. Cγ Dη Eγ Wγ; illius Bβ Bγ Bθ Cα Cδ Cη Dδ Eτ Eυ Kε Kθ Lδ Lι Mι
         Mκ Mπ Mτ Nζ Oγ Oν Oφ Pγ Pκ Pμ Pφ Pχ Qδ Rα Sη Sλ Vμ Vξ Vo Vπ Vσ Wβ Wζ Xβ;
         istius Oβ; ius [= illius *or* ipsius] Vι   ipsius stelle] *om*. Bη Cζ Eμ Oη   stelle] *om*.
         Kα; *marg*. Mτ; *add*. ex parte orientis vel occidentis ubi inventa fuerit Mκ Vσ; *add*. fixe Qμ;
         add. in altitudinem Kθ   in] super Mκ Nζ Pκ Pχ Vσ Wζ   almucantharath] *illeg*.
         Nα; alm^at Kε; almi^at Wζ; almicah Kγ; almicant' Oβ Vo; almicantarath Pσ Rδ; almicantaraz
         Bκ Cδ Oη; almicanterth Oν; almicantharath Po Tβ; almicanthrat Wλ; almicantrat Kα;
         almicantrath Mτ Vμ; almicatharath Eζ; almichancarach Mγ; almichanth Lκ; almi^ctam Qζ;
         almit' Nζ; almitantarach Sι; almi^th Qη Vη; almi^ut Mμ; almu Bη; almu~ Pκ; almuc' Mπ Pθ
         Sκ; almucancarach Sη; almucancarath Vϱ; almucanrath Vτ; almucant' Eβ Eσ Fα Lβ Lη Lμ
         Qα; almucantar~ Sβ; almucantarach Bθ Xβ; almucantarat Eκ Lλ Oχ Pζ Qε Qθ Sλ Vα Vγ
         Wθ; almucantarath Bδ Bζ Bι Eα Eη Eλ Eϱ Eυ Fβ Fζ Kδ Lγ Lδ Lι Mδ Oγ Oι Oυ Pξ Pφ Qμ
         Vβ Vπ Wγ; almucantaraz Oσ Sθ; almucanteras Cα; almucanth' Cι Dγ Mλ Oζ Pγ Pδ Vι;
         almucantharach Pτ Rε Wβ; almucantharalz Dη; almucantharat Mα Pυ Zα;
         almucantharath Cη Mo Mυ Mφ Nδ Oξ Oτ Pα Pμ Pν Pϱ Qβ Qδ Qι Qλ Tδ Vν Vξ Wι Wμ
         Xα Xγ; almucantharit Eδ; almucantrath Gα; almuchantarath Vψ Xδ; almuchantaraz Eμ;
         almuchant'at Lε; almuchanth Kθ; almuchantharath Wα; almuchara^t Eo; almuc^rath Pι;
         almuc^t Cε; almu^rat Eγ; almu^rath Eτ Qγ Rα Sδ; almu^raz Lζ; almuscantarach Pβ; almut Dδ;
         almu^rath Mκ; almut^'ach Nε; almutantarach Mν; almutantarat Oϱ; almutantaraz Vυ;
         almutanterach Mι Nγ; almu^th Bε Oφ; almuthantarath Bβ Bγ; almuthanth' Mη;
         almuthantharat Vφ; almutharath Vσ; almutr Pχ; almutrantar Cγ; *add*. ca't Lμ   sue]
         om. Tβ; illius Mπ; ipsius Vη; *illeg*. Zα   sue altitudinis] poni fac sicut dictam est de
         altitudine solis Vσ; *add*. accepte Mo; *add*. accepte per regulam in dorso matris Bδ Bε Dδ
         Dη(*om*. matris) Eβ Eη Eσ Fα Fβ Kα Kγ Kε Lβ Lγ Lδ Lε Lη Lμ Mδ Mπ Mφ Nδ Oγ Oζ Oι
         Oτ Oυ Pα Pβ Pμ Pϱ Pσ Qβ Qγ Qδ Qζ Qθ Qλ Sκ(*marg*.) Tβ Vη Wα Wμ Xβ Xδ; *add*. accipe
         in dorso matris Mτ; *add*. accipe per regulam in dorso matris Mυ Pυ; *add*. vel si deberint
         inter duo almu^rath poni fac sicut dictam est de altitudine solis Mκ; *add. interlin*. accepte per
         regulam Wζ; *add. in marg*. si vero fuerit in medio celi stella illa dimittes eam Oσ   et]
         add. tunc Mκ Vσ   gradus] gradibus Oχ   solis] *om* Eϱ Oυ Pι Vφ; *add*. et ipse Mτ
              indicabit] ostendit Pι   tibi] *om*. Eκ Vν Vo Vϱ; *add*. gradus solis Cα   horas]
         rep. Vσ; hora seu horas Kα; *add*. inequales Cα

19-20   noctis ... horas] *om*. Wθ

of this star on the almucantar of its altitude, and the degree of the sun will indicate to you the hours [or hour] of the night,

20   sicut nadir eius horas diei; de aliis fac omnibus, ut dictum est superius.

20   sicut] *om.* Pγ; *twice* Sκ   nadir] gaudair Sκ; gnadair Cι Mη Pδ Pθ; gnadayr Nε Vψ; gnadir Dδ Mπ Rδ; nadair Bι Dη Eα Eβ Eδ Eμ Eτ Eυ Fα Fβ Lβ Lγ Lε Lζ Lη Mν Mφ Oζ Oι Oν Oξ Oϱ Pα Pμ Pν Pξ Po Pσ Pυ Qα Qγ Qλ Qμ Sδ Sη Vβ Vι Vν Vπ Vϱ Xγ; nadayr Bγ Cδ Fζ Oσ Pγ Pτ Qβ Qδ Tδ Wι Xδ; nadayz Cη; nadire Vα; nadyr Cα Eσ Mδ Mκ Oφ Pι Qη Qθ Vξ Vσ Vφ Wλ; nardir Bδ Mι Nγ; nazare Mυ; vadair Mγ; vadir *corr. in marg.* to gnadair Wα; *add. in marg.* id est oppositum Oυ   eius] *om.* Oν Wλ Tβ; *interlin.* Cδ; eiusdem Dη; *add.* indicat Wγ   horas] *om.* Bβ Bδ Bε Cι Cε Cη Dδ Eα Eβ Eδ Eζ Eη Eσ Eτ Fα Fβ Fζ Kα Lβ Lγ Lδ Lε Lη Lμ Mδ Mη Mλ Mν Mo Mπ Mυ Mφ Nα Nδ Nε Oγ Oζ Oξ Oτ Oυ Pα Pβ Pγ Pδ Pθ Pμ Pν Pξ Po Pϱ Pσ Pτ Pυ Qβ Qγ Qδ Qθ Qι Qλ Rδ Sδ Sη Sκ Tδ Vη Vι Vψ Wα Wι Wμ Xβ Xγ Xδ Zα; *interlin.* Bγ Oι Wβ; hora Vϱ; *add.* inequales Cα   horas diei] *illeg.* Kθ   diei] *om.* Bβ Eκ Eo; dies Eμ; in Qμ; *add.* id est si ceciderit cacumen stelle inter duos(duas Oη) almucantaraz(almicantaraz Oη) equabis sicut prius Cζ Eμ(*interlin.*) Oη; *add.* et non tuum indicabit tibi gradus solis horas inequales noctis sed etiam equales Cα   de ... superius] *om.* Lι; alia etiam tunc(*marg.* Mκ) invenies scilicet ascendentem et cetera sicut et in diei Mκ Vσ; et nota quod stella seu eius cacumen est cuspis illa que exit abalarzabut Wγ   aliis] *om.* Pκ Pχ; illis Wθ; *add.* autem Cα; *add.* etiam Bη Bθ Bκ Cζ Eμ Eτ Eυ Lγ Mα Mγ Mι Oϱ Oχ Pζ Qα Qε Sβ Sλ Vα Vβ Vγ Vν Vπ Vυ Wθ; *add.* etiam diebus Eγ; *add.* etiam horis Dγ Mλ; *add.* horis Rε; *add.* quoque Vo   aliis ... omnibus] de partibus horarum fac Pι   fac] *om.* Bε Eη Eκ Eϱ Vη Vι; *illeg.* Sι; facies Bκ; sit Bι   fac ... superius] *om.* Vϱ   omnibus] *om.* Dγ Eκ Fβ Gα Mλ Rε; etiam diebus Cγ; etiam horis Oφ Pφ Vo Vτ; horis Mγ Sι Vμ Vν; otum(?) Bδ   ut] *om.* Mπ; sicut Nε Oϱ Rδ Rε Vμ Vo   ut ... superius] *illeg.* Vι; isto modo Bκ; sicut de in superius est Bθ Kθ; sicut dictum est Mι Nγ Wβ; sicut dictum est superius Bζ Bι Cα Cδ Cε Cι Eλ Eo Eϱ Lλ Mα Mγ Mη Mλ Mo Oσ Oφ Oχ Pδ Pθ Pι Pτ Pυ Pφ Qα Qδ Qε Sβ Sθ Sκ Vα Vβ Vγ Vν Vπ Vτ Vυ Vφ; sicut dictum est in superioribus Bβ Bγ Cη Dγ Oν Pγ Wι; sicut dictum est prius Kγ Wθ; sicut dictum superius Bι Kδ Pζ; sicut distinctum est superius Mν Po Qμ; sicut supradictum est Lζ; sicut supra dictum est Vψ; ut dictum est Eκ Mτ(*add.* sq) Xα; ut dictum est prius Bη Cζ Eμ Oη Qη; ut dictum superius Xδ; ut predictum est superius Lδ; ut supradictum est Cγ Eγ Oγ   superius] *illeg.* Vo; prius Wζ(*add. and del.* capta altitudine alcuius stelle et posito cacumen eius super consimilem consimili altitudini inter almi^ath); prius capta altitudine alicuius stelle et posito cacumen eius super(in Mμ) consimilem(*om.* Nζ) gradum(*om.* Mμ Nζ) consimili altitudini inter almucantrath Nζ(almit′) Mμ(almi^ut) Pκ Pχ; prius superius Tβ; *add.* etc. Rδ; *add.* ita fac Vη; *add.* x a Po; *ms* Qα *ends*[9]

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[9] Ms Qα jumps to Cap. 37.

just as its nadir [showed] the hours [or hour] of the day; for all others do as was said above.

[Comment:

Having observed the altitude of the sun (Cap. 2) move that day's position of the sun (along the ecliptic on the rete) (Cap. 1) to the almucantar for that altitude, on the east if in the morning and on the west if in the afternoon. Lay the ruler on this point and examine the point on the ecliptic opposite to it, that is, the nadir of the sun. The time will be where the nadir lies between the unequal hour lines in the bottom segment of the astrolabe.

If the altitude lies between two almucantars, work proportionately.

The same can be done at night using the altitude of a star (if it is engraved on the rete). In this case, the position of the sun along the ecliptic (and not its nadir) will indicate the unequal hour of the night.

Note: obviously, if the sun's altitude is measured in the morning, the sign (in which the sun is that day) will be rising or ascending; and if measured in the afternoon, the sign will be setting.]

[CAPITULUM 4.] DE CREPUSCULO VESPERTINO ET MATUTINO

Cum volueris scire finem crepusculi vespertini et initium matutini, vide cum

1   De ... matutino] *om.* Bδ Bε Bζ Bκ Cα Cγ Cδ Cε Dδ Eα Eγ Eκ Eλ Eν Eσ Eυ Κε Lζ Lι Lκ Mα Mκ Mμ Mτ Nα Nζ Oβ Oσ Oυ Oχ Pγ Pι Pξ Pσ Pφ Pχ Qε Qζ Qι Sα Sβ Sθ Sι Sλ Tβ Vα Vη Vμ Vν Vο Vτ Vυ Wγ Wζ Wθ Wλ Xγ; *faded* Eδ Fγ; *rep.* Xβ; Ad habendum finem et initium crepusculi Mλ; Ad inveniendum crepusculum Dη; Ad inveniendum crepusculum vespertini et initium(*om.* Vξ) matutini Lμ Qθ Vξ; Ad inveniendum horam crepusculi Eo Eϱ Gα Mγ; Ad inveniendum horam crepusculi matutini et vespertini Bγ [*Later hand*]; Capitulum 5^m Vσ; De crepusculis Mι; De crepusculo Nγ; De crepusculo in altitudine et vespertino Cι; De crepusculo vespertino et matiotu(*!*) matutinio Wα; De crepusculo vespertino et matutino (*or* matutino et vespertino) Mη Mφ Nε Oξ Pβ Pδ Pθ Pν Pϱ Pυ Sδ Sη Sκ Vψ Wμ; De fine crepuscili et cetera Mπ; De fine crepusculi sequitur Qη(*later hand*); Capitulum 4^m. De fine crepusculi vespertini et finis Qδ; De fine crepusculi vespertini et initio matutini(ma Wι) Bη(*add. in marg.* Canon 4us) Bι(*add. in marg.* 4^m c) Cζ Eη Eμ(*add. in marg.* 4us) Kθ Lδ Oγ Oη Oτ Pζ(*marg.*) Vβ Wι; De fine crepusculi vespertini et matutini et initio Lλ; De fine et initio crepusculi vespertini et matutini Vγ; De inventione crepusculi vespertini et matutino Rε; Invencio cepusculi finis matutini et inicium matutini Po Qμ; De hora crepusculi utriusque Kγ(*later hand*); Inventio finis crepusculi et initium matutini Mυ(*later hand*) Qβ; Inventio finis crepusculi matutini initii vespertini Dγ; Inventio finis crepusculi vespertini cum mat~ Wβ; Inventio finis crepusculi vespertini et initium matutini Eζ Eτ Oν Oφ(*add. in marg.* De finem crepusculi vespertini sciendo) Rα Vι; Inventio finis crepusculi vespertini et initium matutini per lineam crepusculi per 18 almutanter Mν; Inventio finis per lineam crepuscili vespertini et matutini initii Xα; Inventio finis vespertini crepusculi et initium maturini Pτ; Modus accipiendi finem crepusculi vespertini et initium matutini Vϱ; Si volueris scire finem crespusculi et matutini Bβ; *add. in marg.* 4 Qζ; *add. in marg.* 4^m Vψ; *add. in marg.* 5 Pκ Vμ Wζ; *add. in marg.* C^m 5 Mκ   matutino] meridiano Kα; *add.* Rubrica Vπ

2   Cum] Dum Bδ; Si Pι; *add.* autem Bκ   volueris] *add.* etiam Eυ Vπ   finem] *om.* Vτ; *add.* gressi Eα   crepusculi] screpusculi Lι   vespertini] *om.* Dγ Pξ; *interlin.* Bε; vertini Nγ   et] vel Pι Pκ Vτ Wζ   initium] *om.* Lη; *marg.* Pι; *add.* crepusculi Tβ Vη Zα; *add.* vespertini Eδ   matutini] *add.* aurore Eλ; *add.* et aurore Vτ; *add.* si linee crepusculorum de quibus dictum est in 1° capitulo[1] sint(*interlin.* Vσ) descripte in astrolabii Mκ Vσ

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[1] *in 1° capitulo*: in the Prologue, numbered as Capitulum 1 in mss Mκ Vσ.

[CHAPTER 4.] ON THE EVENING AND MORNING TWILIGHT

When you wish to know the end of evening twilight and the beginning of early morning [twilight], observe when

venerit gradus solis ad lineam crepusculi occidentalis; tunc est finis eius; et cum ad orientalem, est initium crepusculi.

3   venerit] eveneris Kδ; fuerit Lι Oγ Xδ; pervenerit Cα Nζ Oσ Vυ; *add. and del.* dies Gα
           solis] *om.* Cι Mη Mλ Nε Wθ   ad$_1$] et Eo Pϱ; *add.* horam Bζ   lineam] finem
        Eγ Wγ; horam Mγ; *add.* horam Eo   crepusculi] *add.* circuli Eκ; *add.* vespertini sive
        Eλ; *add.* vespertini vel Rε Vτ   occidentalis] occidentalem Bβ; vespertini Pι; *corr. from*
        occidentalem Bγ; *add.* quam Bη Cζ Eμ; *add.* quare Lι Vπ; *add.* quare esse Vτ; *add.* quia Bθ
        Eλ; *add.* quoniam Oη; *add.* scilicet vespertini Nζ   occidentalis tunc] *om.* Cα
           tunc] *illeg.* Xγ; *om.* Bι Bκ Cα Cγ Eδ Eo Eϱ Lζ Mγ Mι Mλ Mμ Mν Mo Nζ Pγ Pζ Pκ Po
        Pτ Pυ Pφ Pχ Rα Sβ Sι Vα Vβ Vϱ Vι Vμ Vν Vξ Vo Vυ Wθ Wλ Xα; *interlin.* Bγ Vψ; ibi Cδ
        Sλ; quam tunc Cζ; quare tunc Eυ; qui tunc Wι(*marg.*); quia tunc Rε   tunc est] *om.* Bζ
        Eζ Gα; *illeg.* Pι; erit Lλ Mα Nγ Oχ Pξ Qε Sθ Vγ; et Dγ; et erit Eγ Wγ; interem Eκ; tunc
        erit Oφ(*add. in marg.*)   est] *om.* Pδ   cum] *om.* Kα Vo; o Pτ; venerit Pξ; *add.* venerit
        Bζ Cγ Dγ Eγ Eλ Eo Fγ Kγ Lι Mγ Mλ Pδ Rε Vξ Vτ Wγ   cum ad] tunc Wλ   ad$_2$]
        om. Fζ Xδ; *add.* lineam Eμ(*interlin*) Oη; *add.* lineam crepusculi Lι

3-4   occidentalis ... crepusculi] orientalis quare tunc est initium eius et cum venerit ad lineam
        crespuculi occidentalis tunc est finis eius Mκ Vσ   finis ... est] *om.* Sα

4   orientalem] horientalem Mι; lineam orientalem crepusculi Cζ; orientalis Oη; *add.* lineam
        pervenerit Qμ; *add.* tunc Cε Dη Eβ Eη Fα Fβ Fζ Kδ Kε Lβ Lγ Lδ Lκ Lμ Mδ Mη Mτ Mυ
        Mφ Nδ Oγ Oζ Oξ Oτ Pα Pδ Pθ Pμ Pν Pξ Pϱ Pσ Qβ Qγ Qζ Qθ Qι Qλ Qμ Rδ Sδ Sκ Tβ Tδ
        Vη Vι Vψ Wα Wμ Xβ Xδ Zα; *add. interlin.* crepusculi Eμ   est] *om.* Oβ; erit Cγ Lι Lλ
        Mα Mι Nγ Oχ Qε Sθ Vγ Wγ; *add. interlin.* erit Vβ; *add. in marg.* al' erit Oφ   est ...
        crepusculi] linea est inicium Kα   initium] *om.* Eα Pχ; *interlin.* Wζ; *add.* eius scilicet
        orientalis Fγ   crepusculi] *om.* Bδ Bε Cε Cι Eβ Eζ Eη Fα Fβ Fζ Kδ Lγ Lδ Lη Lε Lμ Mδ
        Mη Mν Mo Mφ Mπ Mτ Nδ Nε Oγ Oζ Oξ Oτ Pα Pδ Pθ Pμ Po Pσ Pυ Qβ Qγ Qδ Qθ Qλ Rδ
        Sδ Sκ Tβ Tδ Vη Vι Vτ Vψ Wα Wμ Xβ Xδ Zα; *marg.* Oι; *interlin.* Kε; *illeg.* Pξ; eius Eσ; et c.
        Eδ; *add.* matutini Bβ Dη Eτ Kθ Lκ Pι Wβ Pγ; *add.* matutine sive orientalis Sλ; *add.*
        occidentalis Bη; *add.* orientalis Bζ Bθ Bι Bκ Cα Cγ Cζ Dγ Eγ Eκ Eλ Eμ Eo Eϱ Eυ Gα Kγ
        Kε Lζ Lλ Mα Mγ Mι Mλ Mμ Nγ Oβ Oη Oι(*marg.*) Oν Oσ Oφ Oχ Pζ Pκ Pτ Pχ Qε Qη Pφ
        Qμ Rα Sα Sβ Sθ Sι Vα Vβ Vγ Vμ Vξ Vπ Vϱ Vν Vo Vυ Vψ Wγ Wθ Wλ Xα; *add.* orientalis
        id est aurore Vτ; *add.* orientalis id est matutini Lι; *add.* orientalis sive aurore Eλ; *add.*
        orientalis scilicet matutini Nζ; *add.* orientalis sive matutini Cδ; *add.* vel aurore orientalis
        Rε; *add. illeg.* Xγ

the degree of the sun comes to the line of the western twilight; then this is its end; and when [it comes] to [the line] of the eastern [twilight], it is the beginning of [morning] twilight.

5   Vel[2] sic: vide quando nadir solis venerit ad 18 gradum almucantharat in oriente,

5   *before* Vel] *add.* ALITER IDEM Cη; *add.* ALIUS MODUS Bβ; *add.* DE EODEM Sη Wι; *add.* DE
EODEM ALITER ATQUE MELIUS Mλ; *add.* DE EODEM ALITER ET MELIUS. CAPITULUM Wβ; *add.* DE
EODEM ET MELIUS ET CETERA Kθ; DE EODEM SCILICET MELIUS Pυ; *add.* DE EODEM SED MELIUS
Bθ Pδ Vπ(*add.* RUBRICA); *add.* ITEM DE EODEM ALIO MODO ET MELIUS Vβ; *add.* ITEM DE EODEM
ALITER Eτ; *add. in marg.* quod idem modus est melior Lδ   Vel] Deinde Pγ   Vel
sic] Aliter de eodem Oυ; Et Kδ; *add. in marg.* Istud capitulum "Vel sic" et cetera est
additum Vβ   Vel ... solis] Cum Pσ; Et cum Dδ Mδ Oξ Pδ Pν Qθ Qι Vξ   sic] *om.*
Bζ Kα Kθ Mη; aliter et melius Mκ Vσ; *add.* de eodem melius Wι; *add.* et melius Eλ Rε Vτ
     vide quando] *om.* Cι; *illeg.* Xγ; cum Bδ Bε Cε Dδ Dη Eβ Eσ Fα Fβ Fζ Kα Kγ Kδ Kε
Lβ Lγ Lδ Lε Lη Lκ Lμ Mη Mι Mπ Mτ Mυ Mφ Nγ Nε Oγ Oζ Oι Oτ Oφ Oυ Pα Pβ Pθ Pι
Pμ Pξ Pϙ Pφ Qβ Qγ(*interlin.*) Qζ Qλ Sα Sδ Sκ Tδ Vη Vι Vψ Wα Wμ Xβ Xδ Zα; [*illeg.*] cum
Eη; quando Nζ; vide cum Nδ Rδ Tβ   quando] *interlin.* Po   nadir] gaudayr Sκ;
gnadair Cε Cι Mη Pδ Pθ; gnadayr Nε Vψ; gnadir Dδ Rδ; nadair Bδ Bθ Dη Eβ Eδ Eζ Eυ Fα
Fβ Lβ Lγ Lε Lη Mυ Mφ Oζ Oι Oξ Oτ Pα Pμ Pξ Pν Po Pϙ Pσ Pυ Qβ Qγ Sδ Sη Vβ Vι Vπ
Xγ; nadar Eτ Oγ; nadayr Bγ Eα Fζ Mλ Pγ Pτ Qδ Tδ Wι Xδ; nadayz Cη; nadir *corr. to*
nadair Wα; nadyr Eσ Kγ Mδ Mκ Pι Vξ Vσ Vφ; naidar Bδ; narctir Nγ; nardir Mι; gradus
Mν; *add.* gradus Eλ Rε   solis] *om.* Cε; gradus solis Mκ Vσ   venerit] venit Tβ
     ad] *om.* Qι   18] 18ᵐ *some*; decimoctam Kθ; 8 Pμ; 10 Nε; XVIII Vσ; XVIIIᵘˢ Mκ
     gradum] *om.* Kε Oγ; gradus Kδ Lμ Mκ Vσ; *add.* super lineam emisperii orientalis
sive super primum Mκ Vσ   almucantharat] almat'Eσ; almicancrath Mτ; almicanrath
Vτ; almicantaraht Bζ; almicantarath Fγ Kδ Lδ Pξ Pσ Rδ; almicantaraz Oυ; almicanth Kγ;
almicantharath Tβ; almich Kθ; almichantaratz Dη; almichanth Lκ; almiᵗʰ Vη; almiᵗʳᵃ Kε;
almuc' Mπ; almucanᵃᵗ Vφ; almucanʳᵃᶜ Qγ; almucanʳᵃᵗʰ Mλ; almucant' Eβ Fα Lη Lμ Qθ;
almucantarach Bδ Bθ Xβ; almucantarat Zα; almucantarath Eα Eλ Eυ Fβ Mδ Oγ Pφ Qι Vβ;
almucantᵃt Qζ; almucanterath Nα; almucanth Eη; almucanth' Lβ Oζ Pγ Pδ Pθ;
almucanth'th Vι; almucanᵗʰ Oφ Tδ; almucanth Nε; almucanthar' Cι; almucantharach Rε
Wβ; almucantharat Fζ Nδ Oτ Sκ; almucantharath Bγ Cη Eτ Lε Mυ Mφ Oι Oξ Oυ Pα Pμ
Pϙ Pτ Pυ Qβ Qδ Qλ Sδ Vξ Vπ Wι Wμ Xγ; almucanthaᵗ Pν; almucantrat Kα; almucath Eζ;
almuchan' Sα; almuchanch Cε; almuchantarath Vψ Xδ; almuchantharath Wα; almuᵣ ᵃᵗ Eδ;
almuʳᵃᵗʰ Mκ Pι Po Vσ; almuscantarach Pβ; almut Dδ; almutantarach Mν; almutanterach
Mι Nγ; almuth Bβ; almuthanth' Mη; almuᵗʰ Bε; lalmucancarach Sη   in] versus(?) Pξ
     oriente] *corr. in marg.* Pι; adunte(!) Vτ; occidente Sα Vι

5-6   in ... almucantarath] *om.* Qζ; quia sol 15 gradus lucet ante se 2 partes Mι

5-7   Vel ... levius] *om.* Bη Bι Bκ Cγ Cδ Cζ Dγ Eγ Eκ Eμ Eo Eϙ Gα Lζ Lι Lλ Mα Mγ Oβ Oη Oσ
Oχ Pζ Qε Qη Rα Sβ Sθ Sι Sλ Vα Vγ Vν Vϙ Vυ Wγ Wθ Wλ Xα; *marg.* Mλ Vφ; *see*
Addendum 4 Mμ Nζ Pκ Pχ Qμ Vμ Vo; ; *rewritten in 4 lines* Cα

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[2]   A minority of mss treat this as the beginning of a new chapter; hence the added titles in some.

Or thus: see when the nadir of the sun shall have come to the 18-degree almucantar in the east,

erit finis crepusculi vespertini; et cum venerit ad 18 gradum almucantharat in occidente, erit initium crepusculi matutini, quod est levius.

6   erit] *om.* Bδ Vπ; est Oφ Vβ(*add. interlin.* erit) Vφ; quia tunc erit Rε; tunc enim erit Mκ Vσ; tunc erit Kε(*interlin.*) Tβ Vφ; *add.* sicut Sκ   finis] *corr. in marg. from* sicut Mη; initium Sα   crepusculi] *om.* Vη   vespertini] *om.* Eυ Oγ; *om./space* Bδ; matutini Sα   et ... almucantharat] *om.* Qδ   et ... occidente] *precedes 5-6* (vel ... crepusculi) Eυ   18] 18ᵐ *some*; decimocto Pσ; 10 Nε; 16 Pϱ; 19 Qθ   cum ... almucantharat] *om.* Mo Vφ   gradum] *om.* Oγ; gradus Kδ Lμ; *add.* ad Sη; *add.* in Bζ   almucantharat] *om.* Lδ Oυ; almiᵃᵗ Kε; almicancrath Mτ; almicantar' Dη; almicantarath Fγ Kδ Pσ Rδ; almicanth Kγ; almicantharath Tβ; almicarath Vτ; almich Kθ; almichanth Lκ; almiᵗʰ Vη; almu Oξ; almuc' Mπ Oζ; almucᵃ Cε; almucancarach Sη; almucanʳᵃᵗʰ Lε; almucant' Eβ Fα Lη Qθ; almucantarach Bδ Xβ; almucantaraht Bζ; almucantarat Lγ Zα; almucantarath Eα Eλ Fβ Mδ Oγ Qι Tδ Vβ Vφ; almucanterath Nα; almucanth' Cι Lβ Lμ Nε Pγ Pδ Pθ Vι; almucantharach Rε Wβ; almucantharat Fζ Nδ Oτ Qλ Sκ; almucantharath Bγ Cη Mo Mυ Mφ Oι Pα Pμ Pν Pϱ Pτ Pυ Qβ Sδ Vξ Vπ Wι Wμ Xγ; almucantrath Eη; almucath Eζ; almucha Xδ; almuchantarath Vψ; almuchantharat Wα; almuchantrath Sα; almucʳᵃᵗʰ Mλ; almuʳᵃᵗ Eδ; almuʳᵃᵗʰ Eτ Pι Qγ; almuscantarach Pβ; almut Dδ; almut' Eσ Mη; almutantarath Mν; almutanterach Nγ; almutantrat Kα; almuth Bβ; almuᵗʰ Oφ; alᵗʰ Bε; *add.* quare sol 15 gradus lucet ante se et post Nγ   almucantharat in] [*illeg.*] liniam emisperii Vσ   occidente] oriente Sα

6-7   finis ... erit] *om.* Pζ   vespertini ... crepusculi] *om.* Eυ

7   erit] *om.* Mo; est Bβ Bγ Bζ Cη Dη Eτ Kθ Mλ Mν Nα Oν Po Pϱ Pτ Sη Vξ Vπ Wι Xγ; et Bδ; hoc Kα; iste modus Dη   initium] finis Oφ Sα; *add.* vespertini Eα   initium ... matutini] crepusculum matutinum Vτ; matutini vespertini Sα   crepusculi] *twice* Vη   quod] et hec Bβ Bγ Cη Eα Eδ Eζ Kγ Mλ Mν Nα Pγ Pτ Vβ(hoc) Vξ(hoc) Wα Wι   quod ... levius] *om.* Bζ Fγ Mμ Pι Rε Tβ Vτ Zα Vσ; de omnibus [*illeg.*] sicut dictum est superius fac Xγ; et hoc est melius dicitur Mo; et hoc melius Bθ Eυ Qδ Vπ Vφ   est] *om.* Pγ Vξ; erit Cι Dδ Eβ   levius] levis Cη Pγ; levus Bβ; melius Dη Nα Pυ Sη; melius quare levius precedente Bγ; *add.* et cetera Bβ; *add.* et melius precedente Eδ Eζ Mλ Mν Oν Po; *add.* Linea crepusculi est sub orizonte 18 gradibus Kγ; *add. interlin.* al' melius Vβ; *add. marginal gloss* Mκ; *add. 3-line gloss* Vσ

this will be the end of the evening dusk; and when it shall have come to the 18-degree almucantar in the west, it will be the beginning of the dawn twilight, which is easier [to perform].

[Comment:

When the place of the sun on the ecliptic for that day reaches the twilight line (or the twilight almucantar) in the west, the evening twilight is over and full night begins; when it arrives at the twilight line in the east, night ends and dawn begins.

Since working with the sun's position below the horizon might be difficult, the second method is to work with the opposite position (its nadir) above the horizon. Thus twilight ends at night when the nadir of the sun's position crosses the 18° almucantar in the east; and dawn begins when the nadir of the sun's position crosses the 18° almucantar in the west.]

[ADDENDUM 4]

lines 5-7: mss Mμ Nζ Pκ Pχ Vμ Vo; *ms* Qμ *(marg., later hand) has a similar but expanded version*

Vel scias illo modo que aliquam stellam ponas super altitudinem suam. Vel quando nadir solis est ex parte orientale elevatus ad 18 gradus inter almucantharat in
10   oriente et tunc est finis crepuscili vespertini. Sed si fuerit elevatus invenerit nadir eius ad 18 gradus ex parte occidentali tunc est initium crepusculi matutini.

8   illo] alio Pκ Pχ   que] *om.* Vμ; quod Pκ Pχ   ponas] pones Mμ   suam] *om.*
         Mμ   Vel₂] Et Mμ Pκ Pχ

8-9   Vel₁ ... elevatus] Vel vide sit quando nadir solis venerit Vo

9   est ... elevatus] Vel vide sit quando nadir solis venerit Vμ   elevatus] elevatum Mμ
                18 gradus inter] 18 gradus Mμ; 18 gradum Vo; 18ᵐ gradum Vμ
                almucantharat] almicant~ Vo; almicantrath Vμ; almit~ Nζ; almut' Pκ Pχ

9-10   almicantharat ... et] *om.* Mμ   in oriente et tunc] *om.* Nζ Pκ Pχ

10   finis] *add.* est Pκ Pχ   Sed ... eius] Vel Nζ Pκ Pχ   elevatus] elevatum Mμ
                invenerit] *om.* Vμ   invenerit nadir eius] *om.* Mμ   eius] *om.* Vμ

11   18 gradus] 18 gradum in almicant~ Vo; 18ᵐ gradum almitantrath Vμ   tunc] *om.* Nζ;
         et Pκ Pχ

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[CAPITULA 5.] DE INVENTIONE ARCUS DIURNI ET NOCTURNI

Si vis scire arcum diei et noctis, pone locum solis, id est, gradum in quo est,

1   De ... nocturni] *om.* Bδ Bε Bζ Bκ Cα Cγ Cε Cδ Dδ Eα Eγ Eκ Eλ Eυ Kε Lζ Lι Lκ Mα Mκ Mμ
     Mτ Nα Nζ Oβ Oσ Oχ Pγ Pι Pκ Pξ Pσ Pφ Pχ Qε Qζ Qη Qι Sβ Sθ Sι Sλ Tβ Vα Vη Vμ Vν
     Vo Vσ Vτ Vυ Wγ Wζ Wθ Wλ Xγ; *illeg.* Eζ; *faded* Eδ Fγ; *later hand* Kγ; Ad extrahendum
     arcum diei vel noctis per gradum solis Eo Mγ Vξ; Ad habendam arcum diei vel noctis
     solis alterius Pτ; Ad inveniendum arcum diei et(vel Mυ Qθ Vι) noctis Eτ Mυ(*later hand*)
     Qθ Vι Wβ(*add.* Capitulum); Ad inveniendum arcum diei sive noctis per astrolabium
     niimoiuur Mν; Ad inveniencium arcum diei vel noctis per gradum solis Eϱ Gα; Ad
     inveniendum arcum diurnum vel nocturnum Mλ; Ad(7. Ad Lλ) sciendum arcum diei
     et(idem Lμ) noctis Lλ Lμ Vγ; Capitulum 5ᵐ. De arcu diurno vel nocturno habendo Qδ;
     De arcu diei Mπ; De arcu diei et(sive Vβ) noctis Pζ Vβ Vψ; De arcu diei et(vel Eη) noctis
     inveniendo Eη Lδ Oγ Oτ; De invencione arcum diei vel noctis gradum solis vel alterius
     Sη Wι; De invencione arcus diei et noctis Dη Rε; De invencione arcus diei et noctis per
     locum solis Po Qμ; De invencione arcus diurni habe~ in astrolabio Sα; De inventienda
     quantitatem arcus diurni sive nocturni per rᵐˢ Bι(*add. in marg.* 5 cᵐ); De quantitate arcus
     diei et noctis et mora stellarum super terram Bη(*add. in marg.* 5ᵘˢ) Cζ Eμ(*add. in marg.* 5ᵘˢ)
     Oη; Inventio (Inventione Dγ) arcus diei vel noctis per gradum solis Bγ(*later hand*) Dγ
     Oφ(*add. in marg.* De sciendo arcum diei et noctis); Invencio arcus diurni et nocturni Mo
     Xβ; Inventio arcus(archus Xα) diurni sive nocturni solis vel stellarum Rα Xα; Modus
     inveniendi quantitatem arcus diurni et nocturni Vϱ; Scientia arcum diei et noctis.
     Capitulum Q; Sciencia inveniendi arcum diei et noctis Oν; Si volueris scire arcum
     diurnum vel nocturnum Bβ; *add. in marg.* 6 Pκ Qζ Wζ; *add. in marg.* 5ᵐ Vψ; *add. in marg.* C.
     6 Mκ Oϱ   arcus] (*and elsewhere*) archus Oϱ Xβ Xδ   diurni] diei Pα Zα; dierum
     Mδ   et] sive Bθ Pυ Vπ   et nocturni] *om.* Nε Sκ; atque noctis Zα   *add.* etc.
     Rδ; *add.* Rubrica/Rx Cη Nδ Vπ

2   Si] Cum Eλ Lι Mι Nγ Qη Wθ   vis] volueris *many*   scire] invenire Rε
               arcum] ortum Pκ Pχ   diei] diurnum Kδ Rδ   et] vel Bβ Dγ Gα Mτ Nζ Pι
               noctis] nocturnum Kδ Rδ; *add. and del.* per locum solis Qμ   locum] *om.* Mα;
     gradum Cγ Eγ Kε Mκ Mμ Mτ Nζ Oβ Pκ Pξ Pσ Pτ Pχ Qζ Qη Vϱ; *add. interlin.* id est
     gradus Vβ   locum ... est²] gradum in quo sol fuerit in ista die Eλ   solis] *om.* Nα
     Pγ   id est] et Vγ Vμ Wλ; idem Rδ; in Nγ Vτ; primi Eυ   id est gradum] *om.* Cγ
     Kε Mτ Pσ; *interlin.* Qζ; in primo gradu Pϱ   id est ... est₂] *om.* Nζ Pξ; in quo sol fuerit
     Wγ; super lineam emisperii orientalis sive Mκ Vσ   gradum] *add.* solis Nα Sη Vξ;
     add. interlin. diem Oι   quo] *add.* sol Cγ Eγ Oβ Qζ(*interlin.*)   est] *interlin.* Mτ; erit
     Lδ; fuerit Bη Bι Bκ Cα Cγ Cδ Cζ Dγ Eγ Eμ Eo Kγ Lζ Lλ Mα Mγ Mι Mλ Nγ Oη Oν Oϱ Oσ
     Oφ Oχ Pζ Pφ Qε Sβ Sθ Sι Sλ Vα Vβ Vγ Vϱ Vν Vτ Vυ Wθ; fuerit sol Lι; fuerit sol in illo
     die Rε; *add.* isto dic Vτ; *add.* sol Bη Cζ Eκ Eμ Gα Mι Mμ Nγ Oγ Oι(*interlin.*) Oφ(*interlin.*)
     Pι Pκ Pτ Pχ Qη Qμ Tβ Vη Vμ Vo Wζ Wλ Zα; *add. interlin.* in zodiaco Bγ

2-3   id est ... super] fuerit Bζ

2-7   Si ... terram] *om.* Sα

[CHAPTER 5.] ON FINDING THE ARC OF THE DAY AND OF THE NIGHT.

If you want to know the arc of the day and of the night, set the place of the sun, that is, the degree in which it is,

super primum almucantharat in oriente; et nota locum almuri inter gradus limbi. Post

3 super] *om.* Cζ Eυ Pγ; *interlin.* Mπ; *marg.* Oϱ primum] *om.* Dη Eo Mλ Oφ; *interlin.* Pτ;
add. id est orizontem Vψ primum ... locum] *marg.* Pτ almucantharat]
orizontem Dη; almi^{at} Kε Wζ; almicancaraz Oυ; almicancrath Mτ; almicanrath Vτ;
almicant~ Vo; almicantarat Eζ; almicantarath Fγ Kδ Lδ Rδ; almicantaraz Cδ Oη;
almicanth Kγ; almicantharath Tβ; almicantrath Vμ; almicath Pσ; almich Kθ; almichanth
Lκ; almic^{raz} Lζ; almi^{raz} Bκ; almit' Nζ; almit~ Pχ; almith Vη; almi^{ut} Mμ; almuc' Cε Mπ;
almucancarach Sη; almucancarath Vϱ; almucan^{at} Bη; almucancharath Mo Pα; almucan^{rath}
Rα; almucant' Eβ Fα Lη Lμ Qθ; almucantar~ Sβ; almucantarach Bδ Bθ Xβ; almucantarat
Cα Eκ Pζ Qε Sθ Sλ Vγ Wθ Zα; almucantarath Bζ Bι Eα Eη Eλ Gα Lι Lλ Mδ Oγ Pξ Po Pφ
Qι Qμ Vα Vβ Wγ; almucantaraz Cζ Oσ; almucant^at Qζ; almucanterath Nα; almucanth' Cι
Lβ Mλ Nε Oζ Pγ Pθ Qβ; almucantharach Rε Vπ Wβ; almucantharat Eδ Mα Oτ Sκ;
almucantharath Bβ Bγ Cη Eϱ Eυ Fβ Fζ Lγ Mυ Mφ Nδ Oι Pμ Pν Pϱ Pυ Qδ Qλ Sδ Tδ Vν Vξ
Wι Wμ Xα Xγ; almucantharaz Eμ; almucantha^t Oξ; almucanth't Vι; almucantrat Kα;
almuca^{rath} Lε; almucatharat Oχ; almuch' Eo; almuchan Xδ; almuchancarath Mγ;
almuchantarath Oυ Vψ; almuchanth' Pδ; almuchantharath Wα; almucth Oφ; almu^{rat} Eγ;
almu^{rath} Eτ Mκ Pι Qγ Vσ; almuscantarach Pβ; almut Dδ; almut' Eσ Mη Oβ Pκ;
almutantarat Oϱ; almutantarath Mν Sι; almutantaraz Vυ; almutanterach Mι Nγ; almuth
Dγ Qη; almuthatharat Vψ; almutrantat Cγ; alth Bε in oriente] *om.* Cη Eτ Pγ Pξ Qη;
interlin. Bγ; in occidente Vι; in oientem Fζ; in orizonte Lβ; *add.* quod idem est Mκ Vσ
et] *add.* loca Kα nota] *om.* Bε; notate Cζ; notato Eμ Oη locum] *add.* in Pφ
almuri] alamuri Oβ; almurium Rδ; almury Lδ; *add.* ex ei Mυ; *add. and del.* eundem in
ipsis gradibus Mδ almuri inter] almucantrat Kα inter] et Eδ; in Pι Vo; infra Xβ;
intra Lκ Mυ Pμ inter gradus] in gradibus Bζ Bι Bκ Cγ Cδ Cζ Dγ Eγ Eκ Eλ Eμ Gα Lλ
Mα Mγ Mλ Nα Nγ Oη Oι Oν Oσ Oφ Oχ Pζ Pχ Qε Sβ Sη Sθ Sλ Vα Vβ Vγ Vμ Vν Vϱ Vτ
Vυ Wθ; in gradu Fγ Pφ Rα; in gradum Sι; in ipsis gradibus Cα gradus] gradibus Lι
Mμ Nζ Oϱ Pκ Rε Vo; gradibus margolabri seu Wγ; gradum Cι Eσ Fβ Kδ Lκ Mη Oβ Oυ
Pν Pϱ Vπ limbi] *om.* Lι; labri Bκ Cα Lζ Mι Mo Nγ Oϱ Oσ Po Qε Rα Sβ Sθ Sλ Wθ;
labri sive limbi Cγ; labtii Vυ; lymbi *some*; solis Vμ; sriori(?) Sι; *add. interlin.* al' labri Vβ;
add. interlin. id est limbum [*illeg.* = astrolabii?] Bγ

3-4 almuri ... locum] *om.* Qη inter ... locum] *om.* Tβ post hec] pone Sι post Qλ post
hoc *some*; postea *some*

3-5 post ... gradibus] *om.* Oχ

on the first almucantar in the east; and mark the place of the indicator-muri among the degrees of the rim. After

hec move gradum solis usque ad occidentem; et nota etiam locum eiusdem in ipsis
gradibus; et motus eius ab una nota in aliam est arcus diei. Reliqua vero pars circuli est

4   move] morie Sθ; *pone corr. to* move Qη; *add.* almuri vel Oϱ; *add.* rethe et Qβ   gradum]
         locum Qε   gradum solis] almuri Lλ Mι Nγ Sβ Wθ; *add. interlin.* in al' almuri Vβ
              solis] *om.* Wλ; *interlin.* Bε   usque ad] ad Bε Bη Cε Eλ; super Eϱ; *add. in marg.*
         almucantharath Oι   occidentem] lineam emisperii occidentalis sive usque ad
         primum almu^rath occidentalis quod similiter idem est Mκ Vσ; *add.* donec gradus solis
         cadat super ultimum almacantaraz ex parte occidentalis Cζ Oη; *add.* per lineam medii celi
              Kγ   et ... eiusdem] et positione eum sub primam almuri in occidente et tunc quod
         nota gradum almuri Cα   nota] notato Cζ Eμ; numero Rδ   nota etiam] notent Qι
              etiam] *om.* Eκ Fβ Fγ Mμ Mτ Nζ Pι Pκ Pχ; *interlin.* Wζ; in *corr. in marg.* to etiam Sκ;
         add. in Eσ; *add.* tunc Vσ   locum eiusdem] eiusdem Qη; gradum eius Nζ; locum
         [*illeg.*] (*add. interlin.* almuri) Xγ; locum almuri Bζ Dγ Eλ Eo Eσ Kε Mγ Mλ Oχ Qε Rε Vν
         Vξ Vτ Wγ Wμ; locum almuri eiusdem (*or* eiusdem almuri) Bδ Cγ Dδ Dη Eβ Eγ Eη Eκ Fα
         Gα Kγ Kθ Lβ Mα Mυ Mφ Nα Nδ Oβ Oι Oυ Pι Qβ Qμ Sη Vη Vι Vμ Vo Wλ Xβ; locum
         almuri eundem Bγ Fβ Fζ Kα Lγ Lδ Lε Lη Lκ Mδ Mπ Oγ Oζ Oξ Oτ Pα Pβ Pμ Pν Pξ Pϱ
         Qγ Qλ Sδ Tδ Wα Xδ Zα; locum almuri [*illeg.*] eundem Pσ; locum almuri et eundem Qι;
         locum almuri in lymbo Lμ Mτ Qζ Qθ; locum eius Fγ Pγ Pκ Pχ Wθ; locum eiusdem ^almuri
         Wζ; locum eundem Cδ Cε Cη Cι Eτ Kδ Mη Pδ Pθ Rδ Sκ Vψ; locum huius almuri Bβ;
         locum ipsius Mκ; locum ipsius almuri Vσ; *add. interlin.* almuri Bη; *add. interlin.* scilicet
         almuri Vβ   in ipsis] almuri in dictis Mκ   ipsis] *om.* Bζ Bη Cζ Dγ Eκ Eλ Eμ Eo Fγ
         Kγ Lι Mγ Mλ Nζ Oη Oφ Pφ Rε Sι Vμ Vν; dictis Vσ; eiusdem Sβ; hiis Mι Nγ; primis Pϱ;
         temperis Bδ

4-5   et ... gradibus] et illud considera locum almuri in gradum limbi Bε

5   gradibus] gradu Pφ; *add.* limbi Cα Cζ Eκ Eμ(*interlin.*) Lι Nζ Oβ Oη Pι Vo   et] *add.*
         subtrahe Pτ Xγ   motus] motum Sθ   eius] *om.* Bη; huius Oϱ; ipsius Tβ Vη; ispius
         almuri Mκ Vσ; *corr. interlin. to* gradus eius Vψ; *add.* scilicet almuri Fγ; *add. interlin.* scilicet
         almuri Lζ   una] *om.* Mλ   nota] *om.* Pι; hora Oγ; natura *corr. in marg. to* nota Sκ;
         corr. from nonan Mη; *add.* usque Oσ Pτ Xγ   in] ad Dη Mγ Mη(*interlin.*) Mλ Mπ Nζ
         Qη Pκ Pχ; usque ad Cα; *add. interlin* ad Vβ   aliam] *add.* notam Bδ Eβ Eη Fα Fβ Fζ Kγ
         Kε Lβ Lγ Lη Lκ Lμ Mδ Mπ Mυ Mφ Nδ Oγ Oζ Oι Oξ Oτ Oυ Pα Pμ Pν Pξ Pϱ Pσ Qα Qβ
         Qζ Qθ Qι Qλ Sδ Tβ Tδ Vη Wα Xβ Xδ Zα; *add.* notam secundo signatum versus dextro a
         parte Cα   est₁] *om.* Fζ Pμ; erit Cγ Lλ Mα Mδ Mι Nγ Oχ Pζ Qε Sθ Vγ Wγ; indicabit
         Mκ Vσ   arcus (*and elsewhere*)] archus Mκ Xα   diei] *add.* horarum equalium Cα;
         add. scilicet que nota est super orizontem Mφ; *add.* similiter que nota est super orizontem
         Mυ Vι   vero] *om.* Mμ Nζ Pκ Pχ   pars] *add.* est Lβ   circuli] alii Cα; eius Dη;
         graduum limbi Mκ Vσ; totius Lζ(*interlin.*)   est₂] *om.* Pτ; *illeg.* Mα; erit Cγ Lλ Mι Nγ
         Oχ Pζ Pτ Sθ

5-6   reliqua ... diei] *om.* Vβ

this move the degree of the sun until it comes to [first almucantar in] the west, and also note its place among these degrees; and its motion from one mark to another is the arc of the day. On the other hand, the remaining part of the circle is

arcus noctis, quia illa duo continebunt 360 gradus, que est quantitas diei et noctis. Et similiter facies de stellis fixis, si volueris scire earum moram super terram.

6   noctis₁] *add.* et archus qui habuerit plures gradus erit maioris temporis Mκ Vσ   quia] et Eλ Oβ Pκ; quare Fγ Lι Vμ; qui Cγ Lλ Mι Nγ Oχ Pζ Vγ; quod Sθ   quia ... duo] Et ambo archus scilicet diei et noctis Mκ Vσ   quia ... 360] *rep. and del.* Bδ   quia ... noctis] *om.* Gα Mν Vψ   illa] *om.* Eγ Lλ Pζ Oχ Qε Sβ Sθ Vγ Wθ; *illeg.* Oβ; arcus Wγ; illi Kε; ista Nα Pι Qη; *add.* secundo Qη   duo] *om.* Bκ Lζ; 2 / 2° *some*; secundo Sι; zodiaco Kα; *add.* arcus Eλ Rε Vτ; *add* coniuncta Bθ Eυ Fγ Vπ   continebunt] *illeg.* Sι; continent Dγ Eλ Pφ; continere debent Wγ; *add.* insimul(?) Mκ Vσ   360] ccclx Lκ Oχ Qε Sβ; 36 Cα; 38 Oβ; cccc lx Sθ   gradus] *om.* Eζ Eσ Lδ; *ms* Wθ *ends*   que] qui Cγ Pα; quod Oγ   que est] *illeg.* Cε   est] sunt Cγ   quantitas] *ms* Kι *begins*

7   similiter] *om.* Bθ Vπ; idem Tβ; illud Vη   facies] fac Kι Qζ; facias Lκ Nζ Vη Vμ Wζ   de] cum Eλ   fixis] *add.* constitutis in astrolabio Mκ Vσ; *add.* in nocte Zα   si v[oluer]is *interlin.* Mτ   volueris] *om.* Eκ; vis *many*   scire] *om.* Bζ Cζ Dγ Eo Kα Mλ   earum] *om.* Xβ; horarum Bβ; *add.* ea Vπ   earum moram] *om.* Oβ   moram] *om.* Oη; horam Mμ; nomina Kδ Rδ; *add.* arcum Qι; *add.* sub terra et Qη   terram] *add.* etc. Rδ; *add.* et sub terra Bη Bθ Bι Bκ Cγ Cδ Cζ Dγ Eγ Eκ Eλ Eμ Eo Eϱ Eυ Bζ Gα Kγ Lζ Mα Mγ Mι Mκ Mλ Mμ Nγ Nζ Oβ Oη Oι(*marg.*) Oν Oϱ Oσ Oφ Oχ Pζ Pι Pκ Pφ Pχ Qε Qμ Rα Rε Sβ Sθ Sι Sλ Vα Vβ Vμ Vν Vξ Vπ Vσ Vτ Vυ Vψ Wγ Wζ Xα; *add.* eodem modo describendo arcus ut dictum est Vμ; *add.* et etiam sub ipsa terra Vo; *add.* ponendo cacumen stelle super orizontem sicut gradibus solis Mτ; *add.* ponendo cacumen stelle super orizontem et operare similiter cum gradum solis Kε Kι Lμ Qζ; *add.* scilicet ponendo caput stelle super primum almu^rath orientis et movendo ipsam usque ad primum almu^rath occidentalis et notando locum almuri hic et ibi ut predictum est Mκ Vσ; *add.* scire Fζ; *add.* vel sub terra Fγ Vϱ; *add.* 19 lines Cα; *add. later hand* 4 lines in marg. Qμ

the arc of the night, since these two will contain 360 degrees, which is the quantity of the day and the night. And you will do similarly for the fixed stars, if you wish to know their duration above the earth.

[Comment:

Place the sun's position on the ecliptic on the first almucantar (i.e., the horizon) to the east, and then to the west. Use the indicator-muri to find the two corresponding degrees along the rim and the number of degrees between them is the "arc of the day". The remainder of the circle will be the "arc of the night."]

[CAPITULUM 6.] DE QUANTITATE HORARUM DIEI INEQUALIUM

Si volueris scire quantitatem horarum inequalium diei, divide arcum diei per

1   De ... inequalium] *om.* Bδ Bε Bζ Bκ Cα Cγ Cδ Cε Dδ Eα Eγ Eκ Eλ Eυ Gα Kε Kι Lζ Lι Lκ Mα Mκ Mμ Mτ Nα Nζ Oβ Oσ Oχ Pγ Pι Pκ Pξ Pσ Pφ Pχ Qε Qζ Qη Qι Rγ Sα Sβ Sθ Sι Sλ Tβ Vα Vη Vμ Vν Vo Vσ Vυ Wγ Wζ Xγ; *faded* Eδ Fγ; *illeg.* Eζ; Ad faciendum quantitatem horarum per arcum diei vel noctis Mγ; Ad inveniendum quantitatem horarum inequalium per arcum Kγ(*later hand*); Ad inveniendum quanto pars hore inequalis habeat Lμ Qθ; Ad sciendum quantitatem horarum diei inequalium et equalium per arcum diurnum Dη; Ad sciendum quantitatem horarum inequalium diei et noctis Pτ; Ad sciendum quantitates horarum per arcum diei et noctis(*add.* inequalium Eo) Eo Eϱ Vξ; Capitulum 6ᵐ. De quantitate horarum diei vel noctis inequalium Qδ; De quantitate horarum equalium diei et noctis et quot horas habeant dies. Capitulum 4ᵐ Oη; De invenienda quantitate horarum inequalium diei et noctis Mλ; De inventione horarum inequalium per arcum solis Vψ; De quantitate horarum diei inequalium habenda Fβ Oγ Oτ; De quantitate horarum inequalium et numero equalium(inequalium Pζ) Mι Pζ(*marg.*); De quantitate horarum inequalium diei et noctis Bη(*add. in marg.* 7) Cζ Eμ(*add. in marg.* 7ᵘˢ) Eτ; De quantitate horarum inequalium diei(*om.* Vγ) et(*add.* de Vγ) numero equalium Lλ(*add.* 8.) Nγ Vγ; De quantitate horarum inequalium diei vel noctis habenda(*om.* Kθ; Rubrica Vπ) Bθ Kθ Pυ Vπ; De quantitate hore inequalis Oν; Inventio horarum inequalium Eζ; Inventio quantitatis horarum inequalium Dγ Po Qμ; Inventio quantitatis horarum inequalium per arcum diei Oφ(*add. in marg.* De sciendo quantitatem horarum inequalium diei); Inventio quantitatis horarum inequalium per arcum diei vel nocte Bγ(*later hand*); Modus inveniendi quantitatem horarum inequalium Vϱ; Scientia quantitatem horarum inequalium Qβ; Si vis invenire quantitatem horarum inequalium Bβ; *add. in marg.* 6 cᵐ Bι; *add. in marg.* 6/6ᵐ Vμ Vψ; *add. in marg.* 7 Mκ Pκ Qζ Wζ; *add. in marg.* C. 7. Oϱ   diei] *om.* Eη Kα Lη Mπ Vι Wι Zα; *add.* vel noctis Mυ Rα Rε Xα   inequalium] *interlin.* Vβ; inequale Fζ; *add.* Capitulum Mo Nδ; *add.* habenda Lδ Vβ; *add.* Rubrica Xβ; *add.* sive noctis. Capitulum Wβ; *add.* sive noctis in [*illeg.*] Mν; *add.* vel noctis Vι; *add.* vel noctis hora Pδ

2   *before* Si] *add.* 50 lines Oη   Si] Cum Bη Bθ Bκ Cγ Cδ Eγ Eλ Eo Fγ Lζ Lλ Mα Mγ Mι Mλ Nγ Oν Oϱ Pζ Pκ Pφ Pχ Oσ Oφ Oχ Qε Qη Rε Sα Sι Sλ Vα Vβ Vγ Vμ Vπ Vσ Vτ Vυ Wγ; Cum autem Cζ Eμ Oη   volueris] vis *many*   scire] *om.* Eδ Eϱ Po Qδ Qμ Rα Vα Xα; *interlin.* Vψ   quantitatem] *interlin.* Eζ   horarum] *om.* Sλ   diei₁] *om.* Eλ Pv Pϱ Pχ; dierum Cγ Eγ Eμ   arcum] *and elsewhere* archum Xβ; *add.* circuli Pβ   diei₂] *om.* Vτ; diurnum Cζ Eμ Oη   per] in Eσ Lκ Vυ

2-5   *rewritten as 17 lines* Cα

[CHAPTER 6.] ON THE QUANTITY [I. E., LENGTH] OF THE UNEQUAL HOURS OF THE DAY

If you wish to know the quantity/length of the unequal hours of the day, divide the arc of the day by

12, et habebis numerum graduum hore diurne; quem si subtraxeris de 30, remanebit
numerus graduum hore nocturne, quare hora inequalis nocturna cum hora inequali
5   diurna facit 30 gradus in omni die, qui sunt due hore equales.

3   12] *illeg.* Eζ; *marg.* Mη; XII Lκ Oχ Qε Sβ Sθ; duodecim Eσ Mα Pζ Pφ; 22 Bβ; [*blank*] Sλ; *add.*
         qui est numerus horarum inequalium tam diei quam noctis et Qμ   habebis] habemus
         Pτ Xγ   graduum] *add.* cui [*illeg.*] Eυ; *add.* quenende Fγ; *add.* qui respondent Bθ Bκ Lζ
         Mκ Oν Vπ Vσ   hore] *om.* Bβ Rδ   hore diurne] horarum vel hore diurne Xβ; hore
         vel horarum diei Bε; hore vel horarum diurnarum Bδ Dδ Eβ Eη Eσ Fα Fβ Fζ Kα Kε Kι Lβ
         Lγ Lδ Lε Lη Lκ Lμ Mδ Mπ Mτ Mυ Mφ Nδ Oγ Oζ Oι Oξ Pα Pβ Pμ Pν Oτ Oυ Pξ Pϙ Pσ
         Qβ Qγ Qζ Qθ Qι Qλ Sδ Vι Wα Wμ Xδ; horarum diurnarum Dη Tβ Vη Zα; *add. interlin.*
         scilicet inequali Lζ   diurne] *om.* Sθ; diuturne(?) Bβ; *add.* inequali Bκ   quem si] et
         Pι; quam si Dη Kδ Mγ; que Qδ; quod Qι; quod si Lι; quos Bκ Eγ Lλ Mι Nγ Oϙ Oχ Pζ Qε
         Sα Sβ Sθ Vγ Vσ Wγ; quos si Bθ Eυ Mκ Vπ   subtraxeris] *illeg.* Eγ Mα Wβ; delebis Bκ;
         demas Cδ; minues Lλ Mι Nγ Oϙ Oχ Pζ Qε Sα Sβ Sθ Vγ Wγ; subtraas Sι; subtrahas Bε Bθ
         Eκ Eϙ Fγ Gα Mκ Mo Oν Pγ Pι Pκ Pυ Qδ Rα Rε Sη Vβ Vπ Vϙ Vψ Wλ Xα Xγ; subtraheris
         Fβ Sκ; subtrahas Bι; subtrahens Wα; subtraheris Qμ; subtrahes Eυ Nα Oφ Pφ; subtrahis
         Bβ Bγ Cη Mν Po Wι; subtraxis Dδ Eη Eτ Oβ; *add.* scilicet minues(?) Kγ; *add. interlin.* al'
         minues Vβ   de] *illeg.* Eγ; a *many*   30] XXX Lκ Oχ Qε Sθ; triginta Bβ; *corr. in marg.*
         from 9030 Mη

3-4   quem … nocturne] *om.* Bη Cγ Cζ Eζ Eμ Oη Oσ Sλ Vα Vυ; aliud quod remanet erit
         quantitas hore nocturne Oν; quos delebis ex 30, et quod remanet erit quantitas(*add.*
         interlin. gradibus) hore nocturne Lζ; *add. in marg.* Cδ; *illeg. in marg.* Pτ   remanebit
         numerus] et que remanet erit quantitas Bκ; habebis numerum Bζ Dδ Eλ Eo Mγ Mλ Rε
         Vν; habebis [*illeg.*] numerum Kγ   remanebit … nocturne] habebis gradum nocturnum
         Vτ

4   numerus] *om.* Xβ   graduum] *om.* Fα; *add.* unius Cδ   hore] *add.* sua Bκ
         Lζ(*interlin.*)   nocturne] media Qδ; noctis Cδ   quare] et Bθ; quia *some*   quare
         … nocturna] *om* . Vγ   quare … cum] et Vπ   hora₁] *om.* Vϙ   inequales] et
         inequales Pϙ; *add. illeg.* Wμ   nocturnal] *om.* Eγ; diurna Cγ Sλ Wγ   nocturna …
         inequali] *marg.* Bθ; *om.* Lι Lλ   cum] et Cδ   hora₂] *om.* Vψ

5   diurna] noctis Wγ; nocturna Cγ Sλ; *add.* unius diei naturlis sit vincte(?) Qμ   facit]
         om. Mυ Mφ Vι; constituntur Bε; fac Qη Zα; facint Nζ; faciunt Fγ Mι; facuerit Wγ   30]
         XXX Lκ Oχ Qε Sθ; 20 Nε; 300 Vυ   gradus] *om.* Pκ Pχ; [*blank*] Sλ   in] *om.* Lκ Pκ Pχ
         Wζ   in omni] cum Nζ   omni die] ordine Mι Nγ   die] *om.* Qθ; hora diei Nε
             qui] que Mτ Oγ Pφ; quo Kα   qui … equales] que etiam valent duas horas
         equales Dη   due] *om.* Pδ Vα; *interlin.* Oφ; 2 *many*; *illeg.* Pι; [*blank*] Sλ; secunde Bβ; 12
         Eσ Qι; 3 Pν; 24 Xβ   equales] equalibus Eτ; inequales Mo Zα; inequales in die Pι; *add.*
         "cum hora inequali nocturna" et cetera ad lineam priam nō(?) Vπ; *add.* et cetera Kθ; *add.*
         et noctis Eτ; *add.* 1-line gloss Zα; *add. later hand 11 lines in marg.* Qμ

12, and you will have the number of the degrees of a daytime hour; if you subtract this [number] from thirty, the number of degrees of the nighttime hour will remain, since an unequal nighttime hour with an unequal daytime hour amounts to 30 degrees in the whole /every day, which are two equal hours.

Si[1] horas diei volueris querere equales, divide arcum diei per 15, et habebis

6   *before* Si] *add. illeg.* Eζ; *add.* AD HABENDUM HORAS DIEI EQUALES ET NOCTIS Mλ; *add.* AD INVENIENDAS HORAS DIEI EQUALIS Lμ Po Qθ Qμ; *add.* DE HORIS DIEI EQUALIBUS SIVE NOCTIS Mν Wβ; *add.* (CAPITULUM 7ᴹ Qδ) DE HORIS DIEI VEL NOCTIS EQUALIBUS Rα Qδ; *add.* DE HORIS EQUALIBUS Mπ Oν; *add.* DE HORIS EQUALIBUS DIEI Lκ; *add.* DE HORIS EQUALIBUS DIEI SIVE(ET Rε) NOCTIS Mυ Vι; *add.* DE HORIS EQUALIBUS HABENDIS PER ARCUM DIEI VEL NOCTIS Oφ; *add.* DE INVENIENDO HORAS DIEI EQUALES Dγ; *add.* DE INVENTIONE HORARUM DIEI EQUALIUM Bι(*add. in marg.* 7 cᵐ) Pβ; *add.* DE INVENTIONE HORARUM EQUALIUM Vψ Zα; *add.* DE MUTATIONE HORARUM EQUALIUM Kγ(*later hand*); *add.* DE NUMERO HORARUM EQUALIUM DIEI VEL(AL' Pυ) NOCTIS Bθ Pυ Vβ Vπ; *add.* DE QUANTITATE CONSTITUET(*om.* Cζ) HORARUM EQUALIUM DIEI ET NOCTIS ET QUOT HORAS HABET(HABIAT Cζ) QUALIBET(QUILIBET Cζ) DIERUM. Cζ Eμ(*marg.; add. in marg.* 6ᵘˢ); *add.* DE QUANTITATE HORARUM DIEI(*om.* Mη Mo Xδ) EQUALIUM(INEQUALIUM Fζ; *add.* CAPITULUM Nδ) Cι Eβ Fα Fβ Fζ Kα Kδ Lβ Lγ Lε Lη Mδ Mη Mo Mφ Nδ Nε Oζ Oι Oξ Oϱ(*add. in marg.* C. 8) Oυ Pα Pδ Pθ Pμ Pν Pϱ Qγ Qλ Rδ Sδ Sκ Tδ Xδ Vψ Wα Wι Wμ Xβ; *add.* DE QUANTITATE HORARUM EQUALIUM DIEI ET NOCTIS ET QUOT HORAS QUILIBET HABEAT Bη(*add. in marg.* 6); *add.* INVENTIO HORARUM EQUALIUM Eo Eϱ Lδ Kθ(*add.* dierum equalium [*illeg.*]) Oγ Vξ; *add.* MODUS INVENIENDI HORAS EQUALES Vϱ; *add.* SI VIS HORAS DIEI EQUALES IN ASTROLABII Bβ; *add. in marg.* De horis diei equalibus Oφ; *add. in marg.* 8 Wζ; *add. in marg.* 9 Mκ   Si] *add.* autem Bη Bκ Cα Cγ Cδ Cζ Eγ Eμ Lζ Lλ Mα Mι Nγ Oη Oϱ Oσ Oχ Pζ Qε Sα Sβ Sθ Sλ Vα Vβ(*interlin.*) Vγ Vυ Wγ; *add. in marg.* 7/7ᵐ Vμ Vψ; *add. in marg.* 8ᵐ Qζ   Si ... equales] Si vis inequales numerum horarum equalium diei Lι   horas] numerum horarum Bη Cζ Eμ Oη   diei₁] *om.* Eκ Mκ; *add.* equales Vμ   volueris] velis Lκ   querere] habere Eκ; inquerere Cζ Eμ Oη Wψ; scire Bε Bη Mμ Rϱ Oβ Pι Pκ Pξ Pχ Qη Vγ Vμ Vo Vξ Xβ Xδ; scire et querere Cα; scire querere Xα; investi' [*illeg.*] Eλ; *corr. to* scires Qζ   equales] *om.* Xβ; equalium Cζ Eμ Oη   divide] *om.* Mλ Vτ; quem divide Xβ   diei₂] diurnum Bε   15] *illeg.* Dδ; XV Lκ Oχ Qε Sθ; 24 Vτ

6-7   *These lines precede line 1* Bκ Cζ Cι Eμ Oη; *these lines follow Cap. 7* Mκ Vσ   Si ... nocte] *om.* Dη

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[1] As indicated by the added titles (or sometimes by an enlarged initial capital) many mss treat this as a separate capitulum.

If you wish to find out /know about the equal hours of the day, divide the arc of the day by 15 and you will have

numerum horarum equalium; similiter in nocte.

7   numerum] *twice* Pι; *add*. graduum Vτ   numerum ... equalium] *om.* Vξ   horarum]
           om. Lλ Sλ Vγ; horam horarum Cε; *add.* diei Oφ(*interlin*.) Vo   equalium] *om.* Eκ Xβ;
           diei Oη Tβ; inequalium Cε; *add*. diei Bβ Bε Cι Dδ Eα Eβ Eη Eσ Fα Fβ Fζ Kα Kδ Kε Kι Lβ
           Lγ Lη Lκ Lμ Mδ Mη Mτ Mυ Mφ Nα Nδ Nε Oι Oτ Oυ Pβ Pδ Pζ Pθ Pϱ Qζ Qθ Qι Qλ Rδ
           Sδ Sκ Tδ Vι Vψ Wα; add. diei vel subtrahe numerum horarum diei a 24 horis equalibus et
           numerus remanenes ostendit tibi horas noctis equales Vη   similiter] per hoc erit Pξ;
           scilicet Sλ; *add*. fac Bε Eκ; *add*. facies Cα Cδ Cγ Eγ Pσ Vψ; *add*. etiam Dγ Mλ Rγ
                    similiter in nocte] *om.* Zα; similiter facies de arcu noctis Pι   in nocte] divide
           arcum noctis per 15 et habebis numerum horarum equalium noctos Vμ   nocte] octe
           Vα; *add*. de arcu nocturno Kα; *add*. divide arcum nocturum(noctis Pκ Pχ Wζ) per
           15(quindecim Vo) et habebis numerum horarum equalium noctis Mμ Nζ Pκ Pχ Wζ; *add*.
           dividendo arcum nocte Oβ; *add*. dividendo arcum nocte per 15 gradus Vξ; *add*. divides
           arcum noctis Qη; *add*. et cetera Rδ Xα; *add*. fac per arcum noctis Fγ; *add*. Nota per gradum
           solis in [*illeg*.] hore noctis sed per nadir eius hore diei super et hoc in astrolabio Qζ; *add*.
           per arcum noctis Bζ Bθ Dγ Eλ Eo Eυ Kγ Lι Mγ Mλ Pτ Rε Vν Vπ Vτ Vψ Wλ Xγ; add. per
           arcum noctis et cum sciveris horas equales(*om.* Vσ) unius scilicet diei vel noctis, minue
           illas de 14or et residuum erit numberus horarum equalium alterius Mκ(et ... alterius
           marg.) Vσ; *add*. per arcum nocturnum Gα; *add*. queras per arcum noctis earum numerum
           Bγ(*later hand*); *add*. 4-line gloss Mτ Zα; *add*. 6.5-line gloss Vσ; *add*. later hand 4 lines in marg.
           Qμ

the number of equal hours; similarly in the night.

[Comment:

       If you know the arc of the day, it can be divided by 12 to give the length of an unequal daylight hour.

       Subtracting the length of a daylight unequal hour from 30 will give the length of a night-time unequal hour.

       Dividing the arc of the day by 15 will give the number of equal hours in the day and similarly for the number of equal hours in the night.]

[CAPITULUM 7.] DE PARTE HORE PRETERITA INVENIENDA PER ALMURI

Cum transierit pars hore et volueris scire quota pars hore sit, scito numerum

1   De ... almuri] *om.* Bδ Bε Bζ Bκ Cα Cγ Cδ Cε Dδ Dη Eα Eκ Eλ Eυ Gα Kε Kι Lζ Lι Lκ Mα
Mκ Mμ Mτ Nα Nζ Oβ Oν Oσ Oχ Pγ Pι Pκ Pξ Pσ Pφ Pχ Qε Qζ Qη Qι Rγ Sα Sβ Sθ Sι Sλ
Tβ Vα Vη Vμ Vν Vo Vξ Vσ Vυ Xα Xγ Wγ Wζ Wλ; *illeg.* Eγ Eζ Lλ; *faded* Eδ Fγ; Ad
habendum partem hore diei vel noctis transactam Mλ; Ad inveniendum partem hore
preteritam vel futuram Bι(*add. in marg.* 8 cᵐ); Ad inveniendum quota pars hore fuerit Lμ
Qθ; Ad inveniendum quota pars hore transacta sit Po Qμ; Ad sciendum quota pars hore
sit transacta Qβ; Ad sciendum quota pars hore transierit Dγ; Ad sciendum quota pars
hore transierit vel futura sit ad huc Bγ(*later hand*); Capitulum 8ᵐ. Ad habendum quota
pars hore naturli(?) sit transacta Qδ; De hora invenienda preterita per almuri Mυ; De
inventione parte hore die vel noctis transacta Rα; De parte Mπ; De parte hore transacte
quota sit Rε; De partibus horarum Zα; De proportione cuius vis partis hore ad suam
horam Mι Nγ Pζ(*marg.*) Vβ(*add.* id est de parte preterita hore invenienda per almuri) Vγ;
Inventio quota pars hore alicuius sit preterita Kθ Sη(*later hand*) Wι; Modus inveniendi
partem horarum preteritarum Vϱ; Quota pars diei sit transacta de horis transactis Eη;
Quota pars diei vel noctis transierit ultra horis perfectis omne tempore Oη; Quota pars
hore diei vel(et Bη) noctis transierit vel et horas perfectas omne tempore Bη(*add. in marg.*
8) Cζ Eμ(*add. in marg.* 8ᵘˢ); Quota pars hore sit transacta de horis transactis Lδ Oγ Oτ;
Quota pars hore transierit Kγ(*later hand*); Quota pars hore transerit vel [*illeg.* = futura?] sit
Pτ; Quota pars ipsius hore sit transacta Oφ(*add. in marg.* De sciendo partem horaram
perteritarum hore pertransacta hore transacte); Quota pars transacta erit vel futura Eϱ; Si
vis scire quota pars hore est elapsa Bβ; Scias quota pars hore transierit vel futura sit Eo;
Ut scias quota pars hore transierit vel futura est Mγ; *add. in marg.* 8 Mκ Vμ; *add. in marg.*
9/9ᵐ Qζ Wζ; *add. in marg.* C. 9 Oϱ   parte] *om.* Qλ Mφ   invenienda] inveniendo
Fζ   invenienda ... almuri] *om.* Eτ Mν Wβ(*add.* Capitulum)   per almuri] *om.* Eσ
Lγ Mδ; Capitulum Nδ   almuri] al. Xδ; almuhantaruz Vψ; *add.* crespusculum Cη; *add.*
etc. Rδ

2   Cum] Si Eκ; *add.* autem Bθ Bκ Cα Dη Eυ Fγ Lζ Mκ Oσ Vπ Vσ Vυ   Cum ... hore₁] *om.*
Mτ   Cum ... sit] Cum vis scire quota pars hore transierit Vγ   transierit]
pertransierit Cα Cδ Cε Cζ Fγ Lι Oη Vμ Vo Vψ; transient Bβ; transiverit Pφ; *add.* autem Lι
          pars₁] ipsa Oϱ; ipse Sλ; partes Bβ; *add.* ipse Vα   hore₁] *add.* inequalis Kδ
Kε(*interlin.*) Nζ Pθ Qζ Qη Rδ Vμ Vo   scire] *om.* Wλ   quota] que Dγ Mλ; *add.*
interlin. vel que Oφ   quota ... sit] *om.* Lλ Mι Nγ Qε Sθ; *marg.* Pζ; quanta sit Cγ Wγ;
quantitatem Mα; quota restat Oχ(*interlin.*)   pars₂] *om.* Eγ; *add.* ipsa Bζ Bκ Cα Cζ Dγ
Eλ Eo Lζ Mμ Mγ Mλ Oη Oν Oσ Pφ Rε Vβ Vν Vτ   pars₂ ... sit] fuerit Lι   hore₂]
om. Eγ Gα; *corr. from* hora Sκ; *add.* inequales Kε(*interlin.*) Mτ Qζ   sit] *om.* Bθ Eα Eμ
Vπ Vσ; transierit Kι; *add.* pertransita Kε Mτ Qζ   scito] scias Dη Vμ; signa Wβ; sue
Vτ; sume Bζ Eλ Eo Mγ Mλ Vν   numerum] numero Kε Qγ; numerus Nδ

[CHAPTER 7.] ON FINDING THE PART OF AN HOUR WHICH HAS PASSED USING THE MURI

When a part of an hour has passed and you want to know what part of an hour it is, ascertain the number

graduum in limbo ab initio hore usque in almuri; et quomodo ille numerus se habebit
ad numerum totius hore, sic pars hore transacta se habebit ad totam horam.

3   graduum] *add.* et altitudinis Zα   graduum in labro] *om.* Bδ   in₁ ... hore] *om.* Xα
         in limbo] *om.* Dη Pξ; *marg.* Qδ   limbo] *illeg.* Eα Eδ; astrolabio Rγ; [margo]labro
         Bβ Bγ Cα Cδ Cε Cη Cι Eγ Gα Lλ Mα Mη Mι Mo Nγ Nε Oν Oϱ Oσ Oχ Pα Pδ Pζ Po Pυ Pφ
         Qε Rα Sα Sβ Sλ Vα Vυ Vφ Vψ Wι; labro *corr. to* limbo Lζ; labro id est in limbi Cγ; lambro
         Mν; libro Sθ; lymbo *some; corr. from* labro Sκ; *add. interlin.* vel in margolabro Oφ; *add.*
         interlin. al' labro Vβ   ab ... almuri] *om.* Mμ   initio] *add.* illius Pκ Pχ Vμ Vo Wζ;
         add. istius Nζ Qη; *add. later hand 4-line marginal note* Qμ   hore] *om.* Mδ Rα Sα; *interlin.*
         Oχ Vφ   usque] *add.* ad locum nadir presentem et sic fac Fγ   usque in] illius
         usque Cα; in Mδ; iste usque ad Wλ; usque Eα; usque ad Bβ Bδ Cγ Dδ Eγ Eϱ Gα Kε Kι Mν
         Mτ Oβ Oχ Pι Pφ Qε Qζ Qη Qι Sθ Tβ Vτ Vυ Wγ Wζ Zα; *add. interlin.* finem eius per Bκ Lζ
         in₂] *om.* Rδ; ad Pκ Pχ Vσ; ad locum Nζ Vμ Vo   almuri] alanzabut Wγ;
         altitudini Xβ; amuri Sθ; finem in almuri Eϱ; lineam(?) Vτ; locum almuri in limbi Wζ;
         lymbo(*expunged*) almuri Qδ; *add.* Deinde gradum nadir revolve usque ad primum hore et
         vide quot gr~ correspondeant toti hore in almuri Fγ; *add.* et quomodo in almuri Eυ; *add.*
         finis eiusdem tot prima pars graduum pertransita ab almuri vero numerum graduum
         [*illeg.*] partem hore Gα; *add.* in limbo Nζ Pκ Pχ Vμ; *add.* lymbi Vo   almuri ...
         numerus] finem eiusdem hore sunt sicut prima pars graduum pertransita ab almuri Pι
         et] *add.* vide Sα Oι(*marg.*)   quomodo] *interlin.* Wμ; quo Xβ; quod Cζ Lι; quoto
         Oη; vide quam Oβ; vide quo Oϱ; *add.* inveniens Cγ   ille] iste Kε Kι Nα Nζ Pκ Pχ Qι
         Qη Vo Vτ Wζ Xγ Xδ   numerus] *om.* Cγ Eλ Eo Nζ Pκ Pχ Sα Sθ Wζ; *add.* graduum Vμ
         Vo; *add.* ille Sι; *add.* iste Cδ   habebit] habet Kδ Lκ

3-4   usque ... hore₁] *om.* Dη

4   numerum] *om.* Lδ; *add. interlin.* graduum Bγ   totius] *om.* Pξ; *add.* umbre (*?*) Nδ
         hore₁] *om.* Pγ; *interlin.* Lζ; *add.* si etiam ponentur nadir super finem Fγ; *add. interlin.*
         transacte Qμ   sic] similiter Tδ; sit Vη   sic pars hore] *om.* Eζ Pι; *marg.* Vσ
         sic ... transacta] transacte ita Bη   sic ... horam] *om.* Pζ   pars] *om.* Cζ Eμ;
         partes Kα; *add. interlin.* vel post equales Oφ   pars hore] *om.* Lι Oη   hore₂] *om.* Bβ
         Bγ Cζ Cη Eκ Eμ Eτ Eυ Kθ Oγ Oζ Pβ Pγ Pξ Pϱ Rγ Vξ Wβ Wι   transacta] *om.* Fγ Mμ
         Nζ Pκ Pχ Qη Wζ; pertransacta Kε Qζ; pertransita Kι Mι; transacte Kα Mη Vμ Vo;
         transactum Cζ Eμ Lι   se] *om.* Bδ Kθ; si Wλ; *add.* Xα   se habebit] *om.* Lκ Qζ Qη
         habebit] habebunt Kα   totam] *om.* Bδ Eγ; noctam(*!*) Cγ; *add.* illam Pξ; *add.*
         ipsam Wγ   horam] *add.* etc. Rδ; *add. 3-line gloss* Eσ Kγ Zα

of degrees on the rim from the beginning of this hour to the indicator-muri, and in the way that number has to the number [of degrees] of the whole hour, so the part of the hour which has passed will have to the whole hour.

[Comment:

Compare the current position of the indicator-muri along the edge of the astrolabe to the whole distance the indicator-muri would move in an hour, and that proportion will be equivalent to the portion of the hour which has elapsed.]

1 [CAPITULUM 8.] DE NUMERO HORARUM DIEI EQUALIUM PRETERITARUM

Si volueris scire quot hore equales transierunt de die, accipe gradum solis et

1 De … preteritarum] *om.* Bδ Bε Bζ Bκ Cα Cδ Cγ Cε Dδ Eα Eκ Eλ Eυ Gα Kε Kι Lζ Lι Lκ Mα Mκ Mμ Mτ Nζ Oβ Oν Oσ Oχ Pγ Pι Pκ Pξ Pφ Pχ Qε Qη Qι Rγ Sα Sβ Sη Sθ Sι Sλ Tβ Vα Vη Vμ Vν Vo Vσ Vτ Vυ Wγ Wι Wζ Wλ Xα Xγ; *illeg.* Eγ Eζ Lλ; *faded* Eδ Fγ; *later hand* Kγ Mυ; Ad inveniendum quot horae equales de die transierunt Lμ Qθ; Ad sciendum quot hore diei vel noctis sint transacte Mλ; Ad sciendum quot hore equales diei transacta sint Dγ; Ad sciendum quot hore equales diei transierunt Po Qβ(*add.* de die. Capitulum) Qμ(die); Ad sciendum quot horas equales habeat dies Bγ(*later hand*); Capitulum 9ᵐ. De horis diei equalibus diei vel noctis equalibus preteritis Qδ; De horis diei equalibus transactis Oφ(*add. in marg.* De sciendo quot hore inequales transierint de die); De horis equalibus diei vel noctis preteritis Rα; De horis equalibus in die Vγ; De(Die Pζ) horis equalibus in diebus preteritis Mι Nγ Pζ; De numero horarum equalium transactarum Rε; Inveniendo horarum equalium diei sive noctis preteritarum Eτ; Inventio horarum diei sive noctis preteritarum Mν; Inventio quot hore diei inequales (*corr. to* equales) sint iam transacte Bι(*add. in marg.* 9 cᵐ); Quot hore equales de die transierunt Lδ Oγ; Quot hore equales de die vel nocte Oη; Quot hore equales die(*om.* Pτ) sint transacte Kθ Pτ; Quot hore equales in die aliqua transierint Vξ; Quot hore equales transierint de die Eη Oτ; Quot hore equales transierint de die vel de nocte Bη(*add. in marg.* 9) Cζ Eμ(*marg.; add. in marg.* 9ᵘˢ); Quot hore transierunt Mπ; Quot hore equales de die ipse transierint Eo Eϱ; Sciencia in inventione horarum diei sive noctis preteritarum Wβ; Si vis numerum horarum equalium Bβ; Ut scias quot hore equales de die ipsa transierint Mγ; *add. in marg.* De horis equalibus in die preteritis Vβ; *add. in marg.* 9 Vμ; *add. in marg.* 10 Mκ Pκ Qζ(10ᵐ) Wζ; *add. in marg.* C. 10 Oϱ   numero] inventione Vψ   diei] *om.* Sκ; *marg.* Lβ   equalium] *add.* inveniendo Cη   preteritarum] *add.* Capitulum Cη Nδ; *add.* etc. etc. etc. etc. Rδ; *add.* Rubrica Vπ

2 Si] Cum Bζ Bη Bι Bκ Cγ Cζ Dγ Eγ Eλ Eμ Eo Lλ Mα Mγ Mι Nγ Oη Oϱ Oσ Oφ Oχ Pζ Pφ Qε Sα Sβ Sι Sλ Vα Vβ Vγ Vξ Vϱ Vτ Vυ Wγ; Cum autem Cα; *add.* vero Bθ Eυ Mκ Vπ Vσ   volueris] *add.* etiam Wλ   scire] *om.* Eδ Qε   quot] que Wλ; quo Pμ; quod Bδ Eσ Kα Kγ Kε Lβ Lκ Vη Vξ   hore equales] *om.* Vγ   equales] *om.* Pκ Pχ   equales transierunt] *illeg.* Nα   transierunt] fuerunt transacte(*interlin.* Lζ) Bκ Lζ; transeunt Mν Qμ(*add. interlin.* vel [tran]sierint); transeunt *corr. to* transierunt Sδ; transierint Mγ Sβ Vυ   de] *om.* Xβ; in Cγ Eγ Pϱ Wγ   de die] *om.* Vγ   die] *add. interlin.* scilicet ab ortu solis Lβ   accipe] accepta Cε; pone Cγ Eγ Wγ; *add.* altitudinem Pι   gradum] gradus Qδ Pι Tδ; *add. interlin.* altitudinis Lβ   solis] *add.* in signo Cα; *add. interlin.* in zodiacho Bγ   et] *add.* eius altitudinem et gradum solis Rε

[CHAPTER 8.] ON THE NUMBER OF EQUAL HOURS OF A DAY WHICH HAVE PASSED

If you wish to know how many equal hours have passed in a day, take the degree of the sun and

pone super almucantharat altitudinis et signa locum almuri in gradibus. Postea volve

3   pone] *om.* Cγ Eγ Oχ Wγ; *illeg.* Nα; *add.* eum Mι Mμ Oι Oϱ Oφ Qε Sα Vβ(*interlin.*) Vγ Vμ
           super] *interlin.* Cδ; usue ad primum Vτ; *add.* eum Eυ Lλ   almucantharat] alm^{chʹ}
Bζ; almi^{at} Wζ; almicancaraz Oν; almicancrath Mτ; almicantʹ Lμ Vo; almicantar^a Cα;
almicantarath Fγ Lδ Rδ; almicantaraz Cδ Oη; almicantharath Eζ Tβ; almicantharatz Dη;
almicantrarch Gα; almi^{ch} Pσ; almich Kθ; almichancarath Mγ; almichantʹ Lκ; almicth Bε;
almi^{raz} Bκ; almitʹ Nζ Oβ Pχ; almitantrath Vμ; almitarth Kγ; almith Qη Vη; almi^{thrat} Wλ;
almi^{trat} Kε; almi^{tt} Qζ; almi^{ут} Mμ; almucʹ Mπ Sβ; almu^c Cε; almucan^{ach} Qμ; almucan^{at} Bη;
almucancarach Sη; almucancarath Vϱ; almucanchʹ Dγ; almucan^{rath} Eτ; almucantʹ Fα Qθ;
almucantarʹ Rγ; almucantarach Bθ; almucantarat Cζ Eκ Oϱ Oχ Pζ Qε Sθ Sλ Vγ;
almucantarath Bδ Bι Eα Eη Eλ Eϱ Kδ Lγ Lι Lλ Mδ Mκ Oγ Pξ Pφ Qι Vα Vβ Vπ Wγ Xβ;
almucantaraz Eμ Vυ; almucantaraz *corr. to* almucantarath Oσ; almucanterath Nα Oφ;
almucanthʹ Cι Eβ Lβ Mλ Oζ Pδ Pθ; almucantha Pγ; almucanthanth Cη; almucantharach
Bβ Rε Wβ; almucantharat Eδ Lη Mα Qλ Sκ Zα; almucantharath Bγ Eυ Fβ Fζ Lε Mυ Mφ
Nδ Oι Oξ Oτ Oυ Pα Pμ Pν Po Pϱ Pυ Qβ Rα Sδ Vξ Wι Wμ Xα Xγ; almucanthath Tδ;
almucanthrth Vι; almucantrat Kα; almucarath Vτ; almucatharath Pτ; almuchʹ Eo;
almuchan Xδ; almuchancharat Mo almuchantʹ Sα; almuchantarath Qδ Vψ;
almuchantharath Wα; almuc^{raz} Lζ; almuctantaraʹh Sι; almu^{rat} Eγ; almu^{rath} Pι Qγ Vν Vσ;
almuscantarach Pβ; almutʹ Dδ Eσ Mη Nε Pκ; almutantarath Mν; almutanterach Mι Nγ;
almutrantar Cγ; *add.* sue Cα Eγ Vμ Vν Vo   altitudinis] *add.* solis Bε Eη; *add.* sue
Bγ(*interlin.*) Cγ Rε Vτ   signa] nota Mι Nγ; pone Eα; singna Eμ   locum] *om.* Kε
Kι Mτ; *interlin.* Qζ; *add.* solis Bε   almuri] per almurum Bε; *add.* supra Wζ   in] ex
Qδ   in gradibus] *twice* Pθ   gradibus] gradu Fγ Pφ; *add.* limbi Bβ Bε Dη Gα Kθ
Mυ Mφ Nζ Oι(*marg.*) Pι Pκ Pχ Sι Vι Vμ Vo(lymbi) Wζ Wλ; *add.* marginis Cα; *add.* Postea
volve inter gradus Vη   Postea] *rep.* Rδ   volve] move Cγ Eγ Wγ; revolve Dη Sβ;
volvis Fβ; *add.* regulam Tβ

set it on the almucantar of the altitude and mark the place of the indicator- muri on the degrees. Then turn

retro gradum solis usque ad primum gradum almucantharat in oriente;[1] et secundo

4   retro] *om.* Dη Vη; retrorsum Fγ; *corr. from* rethe Mμ; *add.* id est contra motum diurnum
         Kι(*interlin.*) Qζ   gradum₁] *twice* Vξ; gradus Mμ Mτ Pκ Pχ   ad] *om.* Kε Kι
             ad ... gradum] *om.* Cε   primum] *illeg.* Nα   gradum₂] *om.* Bη Bθ Bκ Cζ Dγ
         Eδ Eζ Eλ Eμ Eϱ Eυ Fγ Gα Kθ Kι Lζ Lι Lλ Mα Mγ Mκ Mλ Mμ Mν Mo Mτ Nζ Oβ Oη Oφ
         Oχ Po Pφ Pχ Qδ Qμ Rα Rγ Sα Sλ Vβ Vγ Vμ Vo Vξ Vϱ Vσ Vτ Wγ Wζ Wλ Wμ Xβ Xγ;
         interlin. Cδ; *del.* Lη Oι; sive gradum Kα   almucantharat] *om.* Nε; almi^at Wζ;
         almicancaraz Oν; almicancrath Mτ; almicant' Lμ Vo; almicantarath Fγ Lδ Rδ;
         almicantaraz Bκ Oη; almica^th Pσ; almicantharath Eζ Tβ; almicantharatz Dη; almicantrat
         Kα; almicantrath Gα; almicant'th Vμ; almich Kθ; almichantrum Lκ; almi^at Kε Kι; almit'
         Nζ; almi^t Oβ; almitarth Kγ; almi^th Bε Qη Vη; almi^thart Wλ; almi^ut Mμ; almiutantarath Sι;
         almu^ath Qγ; almuc' Cε Cι Fα Mπ Sβ; almucan Vν; almucancarach Sη; almucancarath Vϱ;
         almucan^rath Eτ Rα; almucanrath Vτ; almucant' Lη Pθ Qθ; almucant^ar Eκ; almucantar' Rγ;
         almucantarach Bβ Bθ Qμ Xβ; almucantarat Cζ Mα Oχ Pζ Qε Sλ Vγ; almucantarath Bδ Bι
         Eα Eλ Kδ Lγ Lι Lλ Mδ Mκ Oγ Oι Pφ Qδ Qι Tδ Vα Vβ Vπ Wγ Wμ; almucantaraz Cδ Eμ
         Oσ Vυ; almucanterath Nα Oφ; almucan^th Xα; almucanth' Dγ Eβ Lβ Mλ Pδ; almucanth'a
         Pγ; almucantharach Rε Wβ; almucantharat Fζ Oζ Sκ Zα; almucantharath Bγ Cη Eϱ Eυ Fβ
         Lε Mo Mυ Mφ Nδ Oξ Oτ Oυ Pα Pμ Pν Pξ Po Pϱ Pτ Pυ Qβ Qλ Vξ Wι; almucantrath Eη;
         almuch' Eo Mγ; almuchan Sα Xδ; almuchantarath Vψ; almuchanth Vι; almuchantharath
         Wα; almu^rat Eγ Eδ; almu^rath Pι Vσ; almu^raz Lζ; almuscantarach Pβ; almut' Dδ Eσ Mη Pκ Pχ;
         almutantarat Oϱ; almutantarath Mν; almutanterach Nγ; almuth' Bζ; almutrantat Cγ;
         almu^trat Qζ; calmucan^at Bη   in oriente] Bβ Bγ(*add. interlin.* vel orizonte) Bδ Cη Dη Eκ
         Eλ Eτ Fβ Kδ Kε Kθ Kι Lβ Lδ Lκ Lμ Mπ Mτ Oβ(*add.* et in [*illeg.*] orizontem) Oγ Oξ Pβ Pγ
         Qγ Vξ Wβ Wι Wλ; ex parte orientale id est orizontem Cα; graduum in orizonte Nδ; id est
         ad orientem Eμ Oη; id est ad orizontem Cζ Lι Pι; id est ad orizontem Oσ(*add. in marg.*
         orientalem); id est in oriente Cγ; id est orientem Cε Oϱ Xβ; id est orizonte Xα; id est
         orizontem Bκ Cδ Cι Gα Eα Eδ Eζ Lζ Lλ Mα Mη Mν Mo Oχ Pδ Pζ(id est *interlin.*) Pθ Po
         Pυ Qε Rα Sβ Sθ Sλ Vα Vβ Vϱ Vυ; id est orizontem orientalem Oν; id est orizontis Mι Nγ;
         id est usque ad orizontem Bη Vγ; in orientem Mλ Vτ; in orizonte/-em Bζ Bθ Bι Dγ Dδ Eβ
         Eγ Eη(*add. in marg.* orientali) Eo Eϱ Eυ Fα Fζ Kα Lγ Lε Lη Mγ Mδ Mυ Mφ Nα Nε Oζ Oι
         Oτ Oυ Oφ(*add. in marg.* al' id est orizontem) Pα Pμ Pν Pξ Pϱ Pσ Pτ Pφ Qβ Qδ Qθ Qι Qλ
         Qμ Sδ Sη Sι Sκ Tδ Wα Wμ Vι Vν Vπ Vφ Xγ Xδ; in orizonte/-em orientali Bε Vη Zα;
         orizonem Vψ; sive ad orizontem Mμ Qη; sive ad orizontem orientalem Vμ; super
         orizontem Nζ Pκ Pχ; supra orizontem orientalem in [*illeg.*] Qζ; [*illeg.*] orientem orientali
         Vo; *corr. in marg. from* super orizontem Wζ; *add. interlin* sive ad orizontem orientem Kε
             et] *add.* tunc Lι   secundo] *om.* Qη Sλ; *illleg.* Bδ; et etiam Sη; etiam Nα Pξ; sb Mν;
         similiter Rε Wλ; sunt pr[imo?] Vψ; sub Pυ; tunc Cα Kα Lμ Qζ Vo Wζ; tunc etiam Bε Cε

                                                                              [*continued opposite*]

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[1] It is not possible to choose definitively between "in oriente" and "in orizonte/m" in this
instance. The scripts for both words are very close to each other, and scribes obviously also had trouble
choosing between them. In any case, it makes no real difference to the meaning of the instructions.

the degree of the sun back as far as the first degree almucantar [i.e., the horizon] in the east; and then

[*apparatus criticus for line 4 continued*]

Cι Dδ Dη Eβ Eη Eσ Fα Fβ Fζ Kδ Lβ Lγ Lδ Lε Lη Lκ Mδ Mη Mπ Mυ Mφ Nδ Nε Oγ Oζ Oξ Oτ Oυ Pα Pβ Pδ Pθ Pμ Pν Pϱ Pσ Qβ Qγ Qδ Qθ Qι Qλ Rδ Sδ Sκ(*del.* etiam; *add. in marg.* interim) Tβ Tδ Vη Vι Wα Wμ Xβ Xδ Zα

4-5   secundo nota] subnota Po

5   nota locum eiusdem almuri. Post hec divide gradus qui sunt inter duas notas per 15, et habebis horas equales.

     5   nota] numero Rδ; **add**. iterum Wζ   locum] gradus Eσ   locum eiusdem almuri] eius locum Pγ Wβ; eiusdem locum Bγ(*add. interlin*. almuri) Cη Dδ Eκ Eτ; locum almuri Bε Eλ Nζ Pκ Pχ Qη Vβ(*add. interlin*. eiusdem) Vτ Wζ; locum cuiuslibet almuri Mτ; locum eius almuri Cι Kδ Mη Mμ Nε Pδ Sκ Vψ; locum eius de almuri Vπ; locum ipsius almuri Vμ Vo; *add. interlin*. in limbo Oι   eiusdem ... gradus] gr~ divid~ Xβ   Post hec] Postea *some*; Post hoc *some*; Post Bη   divide] *om*. Mτ; *interlin*. Wζ; divides *some*; *corr. from* adde Vμ   gradus] *om*. Wα; *add*. per 12 gradus Mγ; *add*. solis Mυ   qui sunt] *om*. Mυ   sunt] fuerint Cα   inter] *add*. illas Bε   duas] 2 / 2ᵃˢ *some*; duas 2 Pξ; et Mτ; secundas Kα   duas notas] et nota Pϱ; primam notamet 2ᵃᵐ Fγ; tanosß (?) Bβ   per 15] *illeg*. Nα; *om*. Mγ Sλ Vα; 15 Mκ; xv Oχ Qε Sβ Sθ Sι; et 15 Eδ Mν   15] quindecim Lκ; 17 15 Vσ; *add*. gradus Sη

     6   horas] *add*. pertransitas Mυ Mφ Vι; *add*. transactas Rε; *add*. transitas Vτ   equales] *add*. 1-line gloss Cα; *add*. per stellam super suam altitudinem positam retrahendo(detrahendo Vπ) gradum solis ad occidens(*add*. et Vπ) dividendo ut prius Vπ Xγ; *add*. Si vero fuerint gradus que non possent dividi per 15, pars quolibet gradum computa minuta et hore Kδ Pθ Rδ

mark the place of the same muri. After this divide the degrees which are between the two marks by 15 and you will have the equal hours.

Similiter facies in nocte; postquam enim inveneris horam equalem[2] per

7   Similiter] Scilicet Oϱ; Sic Lζ Oη Oν Oσ Oφ(*add. interlin.* similiter) Pφ Vα   Similiter ...
         nocte] *marg.* Pτ   Similiter ... equalem] *om.* Dη   facies] fac Mτ Pξ Vμ; facias Vη
         Wζ   in] *interlin.* Pζ; de Bγ Bζ Cη Kε Mτ Qζ Vμ   nocte] *add.* per stellam Bκ; *add.*
         per(*om.* Vσ) stellam super(*rep.* Vη) suam(*om.* Mκ Vσ) altitudinem(latitudinem Eυ)
         positam(*om.* Dγ Fγ) retrahendo(detrahendo Bθ Dδ Eυ Mκ Vσ; retrogᵃdo Gα; trahendo Dγ
         Mλ) gradum solis ad occidens(occidentem Rε) dividendo(et divide Pι; et divide per 15
         Vτ; *add.* per 15 Rε) ut prius Bζ Bθ Dγ Dδ Eλ Eo Eυ Fγ Gα Mγ Mκ Mλ Pι Pτ Rε Tβ Vη Vν
         Vσ Wι Wλ; *add.* per stellam super suam altitudinem positam retrahendo gradum solis
         usque ad occidens vel orizontem occidentalem quod [*illeg.*] et dividendo ut prius.
         Similiter facies in nocte Zα; *add. interlin.* scilicet per stellas Lς   postquam] post Oη
         Xδ   enim] *om.* Bβ Bδ Bε Cγ Cι Dδ Eβ Eγ Eζ Eη Eσ Fα Fβ Fζ Kα Kγ Kδ Kε Kθ Kι Lβ
         Lγ Lδ Lε Lη Lι Lκ Lμ Mδ Mη Mμ Mπ Mτ Mυ Mφ Nζ Nδ Nε Oβ Oγ Oζ Oν Oξ Oτ Oυ Pα
         Pθ Pι Pκ Pμ Pν Pξ Po Pϱ Pσ Pχ Qβ Qγ Qζ Qη Qι Rδ Tβ Vη Vι Vμ Vo Vτ Vψ Wα Wγ Wζ
         Xβ; etiam Fγ; vero Cε Eα Eδ Gα Mν Mo Nα Pβ Pζ Pτ Pυ Qδ Qθ Qλ Qμ Rε Sβ Sδ Sη Sκ Tδ
         Wλ Xγ Xδ Zα   inveneris] veneris Bβ; *add.* vel scieris Vξ   horam] *om.* Oϱ(*blank*)
         Sα; *illeg.* Vo; horas Fγ; locum Wγ   horam ... per] *om.* Lδ   equalem] *corr. from*
         inequalem Oι Sκ; *corr. to* inequalem Eη Wα; equales Fγ; inequalem Bβ Bγ Bζ Bη Bθ Bι Bκ
         Cα Cγ Cδ Cε Cζ Cη Cι Dγ Dδ Eα Eγ Eδ Eζ Eκ Eλ Eμ Eo Eϱ Eτ Kγ Kδ Kε Kθ Kι Lζ Lλ Lμ
         Mα Mγ Mη Mι Mκ Mλ Mμ Mν Mo Mτ Mυ Mφ Nγ Nε Nζ Oβ Oη Oν Oσ Oφ Pγ Pδ Pζ Pθ
         Pι Pκ Po Pτ Pυ Pχ Qδ Qε Qζ Qη Qθ Qμ Rα Rγ Rδ Rε Sβ Sθ Sι Sλ Tβ Vα Vβ Vγ Vι Vξ Vν
         Vπ Vϱ Vσ Vτ Vυ Vφ Wβ Wζ Wι Wλ Wμ Xα Xβ Xγ Zα; *add.* in nocte Cα   per] *om.* Lδ;
         et Sλ

7-11   per ... instans] si vis scire inequales fac eodem modo et divide per 12 et eodem modo
         scies de oriente in die ad qquamlibet partem die et de occidente ad quamlibet partem
         noctis Fγ

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[2] As noted in the apparatus, the majority of the mss have "unequal hour" ("horam inequalem")
when it should be "equal hour."

You will proceed similarly at night, for after you have found the equal hour using

gradum solis et altitudinem alicuius stelle, signato loco almuri, reduces gradum solis ad
orizontem occidentalem, et notabis iterum locum almuri. Et spacium inter hec duo loca

8   gradum₁] gradus Vπ; *add.* altitudinis Kε Kι Mτ Qζ; *add.* horam equalem Lδ   solis]
            om. Bγ Cη Dγ Eκ Fβ Kα Pγ   et] aut per Tβ; invenies Pϱ; vel Oι; *add.* ad Bβ; *add.* per
            Cγ Vη   alicuius] *om.* Oχ; illius Sι   stelle] *add.* cum Pϱ; *add.* fixe Cα; *add.* quia Dη;
            add. (que Gα) inventam(*add.* et Oβ) in dorso(*add.* astrolabii Kι) et positam in rethi ut
            oportet Bζ Dγ Eλ Eo Gα Kγ Kι Mγ Mλ Oβ Oφ(*marg.*) Pι Qζ(*add. illeg.*) Rε Vν Vτ Wι Wλ
            Xγ; inventam in dorso astrolabii et positam in rethi ut oportet id est quantum hora
            excedit(excedat Kε) equalis(*om.* Kε) inequalem Kε Mτ   signato] signando Vo; signo
            Pκ Pχ   loco] *om.* Wγ; locum Nζ Pκ Pχ Vo; *add. in marg.* in quo tunc est Bγ
               almuri] *om.* Wμ; *add.* in qua motum diurnum Qζ; *add.* in limbo Oι; *add.* tunc Oσ
               reduces] *twice* Mφ Vι; induces Eo   gradum₂] arcum Eλ; gradus Pκ Pχ
               solis] *om.* Pξ; *illeg.* Vγ; *add.* ad orientem id est Qζ

8-9   reduces ... occidentalem] 24 gradus solis ad orientem id est ad orizontem orientalem
            interim Mτ   ad ... occidentem] corr. inmarg. from in occidentem Wreduces ... almuri]
            om. Bζ   ad orizontem] in Nζ Pκ Pχ

9   orizontem] cai[*illeg.*] Cι; oriente Cγ; orientem Fβ Lβ Nε Pϱ Wγ   orizontem
            occidentalem] orientem ad orizontem orientem [*illeg.*] Kε Kι   occidentalem] *add.* a
            quo incipit nox Dη; *add.* ibi incipit nox Lγ; *add.* quando ibi incipit Dδ Lι Oξ; *add.* quando
            incipit nox Eη Eσ Lβ Lκ Pμ Pν; *add.* quando ibi incipit nox Bδ Bε Eβ Fα Fβ Fζ Kα Lδ Lε
            Lη Lμ Mδ Mμ Mπ Mυ Mφ Nδ Nζ Oγ Oζ Pα Pβ Pκ Pϱ Pσ Pχ Qβ Qζ Qθ Qι Qλ Rγ Sδ Tβ
            Tδ Vη Vι Wα Wζ Zα; *add.* quare ibi incipit nox Vμ Vo; *add. illeg.* Qζ; *add. interlin. illeg.* Qζ
               notabis] nota Bε Eη Mμ Pκ Pχ Vμ Vo Wζ   interim] certum Mτ Qθ Xβ; istum
            Pκ Pχ Wζ; totum Lγ   interim locum] in locum interim Zα   locum] *om.* Kγ Pϱ;
            interlin. Eκ; in loco Qδ; *add.* in Pκ Pχ Wζ   almuri] *om.* Rγ; *add. interlin.* in limbo Oι
               Et₂] in Oϱ Sα; per Pτ   inter] in Bβ Pγ; ut Eυ   hec] *om.* Oη Vψ   hec
            duo] *om.* Cδ   hec ... loco] duas notas Xα   duo] *interlin.* Qλ; 2 / 2º *some*; ɪɪº Qε; 3
            Oσ; et Xβ; etiam Mυ   loca] *om.* Pι; *add.* signata Eλ

the degree of the sun and the altitude of some star, and the place of the indicator-muri has been noted, you will bring back the degree of the sun to the western horizon, and you will mark again the place of the muri. And you will divide the space [i.e., the degrees] between these two places

10   divides, sicut prius, per 15, et invenies. Eodem modo scies quot sint hore equales inter
          meridiem vel quemlibet punctum alium et quodlibet instans.

          10   divides] *interlin* Cδ; divide *some*   sicut prius] *om.* Bζ Bθ Dγ Eo Eυ Vν Vσ Vτ; sicut
                    primum Eα; ut prius Mτ Vμ; *add.* et scilicet Pγ; *add. interlin.* scilicet per 15 Vβ   per
                    15] *om.* Bε Cγ Cδ Eγ Mι Oϱ Oσ Oχ Pζ Sθ Sλ Vα Vβ Vγ Vυ Wγ; *interlin.* Lζ; *illeg.* Eη; per
                    quindecim Lκ; per 12 Vσ   et] *om.* Eγ Mι Nγ Qι; scilicet et] Bγ Bι Eδ Eϱ Eτ Mν Pγ Pυ
                    Po Qδ Sη Wβ Vϱ Xα Xγ; scilicet Bβ Cι; scilicet et Qμ   invenies] *add.* horam Kδ Rδ;
                    add. horas noctis Nα Pκ Pχ; *add.* horas(*add.* equales Eλ Rε Vτ) noctis preteritas Eλ Eϱ Mμ
                    Nζ Oβ Qη Pι Rε Vo Vτ Vφ Wζ Xα; *add.* optatum Vα; *add.* quod queres Cγ Eγ Wγ; *add.*
                    scilicet horas noctis preteritas Rα Sβ; *add. in marg.* (*later hand*) scilicet per altitudinem solis
                    in diei vel stelle in nocte Qμ   eodem] eo Bε Eη; Et habebis eodem Vβ; *add. in marg.*
                    Hec littera "Et habebis eodem modo" et cetera est addita Vβ   eodem ... sciens] et
                    similiter Cγ   modo] *om.* Lμ Qζ Qθ Xδ   scies] *om.*[3] Bδ Bε Dη Eβ Eη Eσ Fβ Gα Kα
                    Kε Kι Lβ Lγ Lδ Lε Lη Lι Lκ Lμ Mδ Mπ Mτ Mυ Mφ Nδ Oγ Oζ Oι Oξ Oτ Oυ Oφ Oχ Pα Pβ
                    Pμ Pν Pξ Pϱ Pσ Pφ Qβ Qγ Qζ Qθ Qι Qλ Sδ Tβ Tδ Vβ Vη Vι Wα Wλ Wμ Xβ Zα; scias Oβ;
                    scieris Pγ; *corr. from* sciens Bγ   quot] quod Bδ Eη Gα Kγ Lκ Wλ Pξ Sκ Vη; que *corr.*
                    in marg. to quot Mκ   sint] sunt Cγ Dη Eβ Lβ Lγ Lη Mδ Mυ Oζ Oι Oτ Pβ Pγ Pμ Pϱ Pφ
                    Qθ Sδ Sκ Tβ Vβ   equales] equinoctiales Eυ   inter] *marg.* Oξ

          10-11   per... instans] *om.* Sα   et ... instans] *om.* Eζ; et habebis horas nocte predictas Vμ;
                    unum et invenies scilicit horas noctis preteritas Bζ; et videas quo eius sint in 15 inter 2
                    notas et tot sunt hore transacte Cα   Eodem ... instans] *om.* Bη Bι Cδ Cε Cζ Dγ Eα Eγ
                    Eδ Eμ Eo Eϱ Lζ Lλ Mα Mγ Mη Mι Mλ Mμ Mν Nα Nγ Nε Oη Oϱ Oσ Oχ Pζ Pι Pκ Po Pτ
                    Pυ Pχ Qε Qη Rα Sβ Sη Sθ Sι Sλ Vα Vγ Vν Vo Vϱ Vυ Wγ Xα Xγ; *marg.* Qμ Vφ Wι; horas
                    equales noctis [*illeg.*] Bκ; *add. in marg.* vel sic eodem modo quot sint hore equales inter
                    meridiem [*illeg.*] Vo   equales ... meridiem] *illeg.* Zα

          11   meridiem] meridionale Qδ; *add. in marg.* scilicet cum eis in meridie vel in quoque alio
                    instanti Qμ   vel] et Bβ Bγ Cη Dη Eκ Eλ Gα Kγ Lδ Mδ Mκ Mπ Nδ Oβ Oγ Pξ Qγ Qμ
                    Tβ; vel inter Kε Qζ Rγ   vel ... instans] *om.* Mτ Zα; et qualibet Ø quod volueris Vφ
                         quemlibet] quemcumque Lι Qδ; quolibet Oβ; quodlibet Bβ Dη Eλ Rγ Rε; *add.*
                    horum Vψ   alium] aliud Bβ Bθ Gα Mκ Pξ Pϱ Pσ Rε Vσ Vτ; almuri Bε Eη Rγ   et]
                    om. Pγ; in Dη; vel Bθ Dδ Eλ Eυ Kα Mκ Rε Vπ Vσ Vτ   quodlibet] quolibet Dη;
                    quolibet ad Dδ   instans] *om.* Cγ Kα; *illeg.* Eσ Gα; in Ø Vτ; instanti Dη; Ø Qζ; *add.* etc.
                    Rδ; *add.* et inter primam et [*illeg.*: repperis (?) Lδ, vapperis (?) Oγ] Lδ Oγ; *add. in marg.* Et
                    hoc est verum si aliqua stella notabitur orietur in occasu solis Oι

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          [3] The mss which omit the verb "scies" from this last sentence generally treat "invenies" as part of
          this sentence and therefore its verb.

as before, [that is], by 15, and you will find [the answer]. In the same way you will know how many equal hours are between midday or any other point and any moment you please.

[Comment:

Find the current position of the sun and (using the indicator-muri to find the degrees) divide the degrees from there back to the sunrise by 15 and this will give the number of equal hours which have passed since dawn. At night divide (by 15) the difference in degrees of the current position of a star back to the time of sunset and this will give the number of equal hours which have passed at night.

And you can do this for elapsed time from any (starting) point to the current point in time.]

[CAPITULUM 9.] DE CONVERSIONE HORARUM INEQUALIUM IN HORAS EQUALES

Si volueris reducere horas inequales in horas equales, scito gradus horarum

1　　　　*before* De] *add*. 11 Lλ; *add*. Capitulum 10ᵐ Qδ　　　De ... equales] *om*. Bδ Bε Bζ Bκ Cα Cγ
Cδ Cε Dδ Eκ Eλ Eυ Gα Kε Kι Lζ Lι Mα Mκ Mμ Mτ Nα Nζ Oβ Oν Oσ Oχ Pι Pξ Pσ Pφ Qε
Qη Qι Rγ Sα Sβ Sθ Sι Sλ Tβ Vα Vη Vμ Vo Vσ Vτ Vυ Wγ Wζ Wλ Xγ Zα; *illeg*: Eγ Eζ
Kγ(*later hand*); *faded* Eδ Fγ; 9° horarum inequalium in equales et e converso Nγ; Ad
reducendum horas inequales ad horas(*om*. Qθ) equales Lμ Qθ; Conversio horarum
inequalium in horas(*om*. Mι) equales e converso Mι(*later hand*)Rα Vι Xα; Conversio
horarum inequalium in equales Mo; Conversio horarum inequalium in horas equales
[*illeg*.] Vι; De reductione horarum inequalium Wι; De reductione horarum inequalium
in(ad Po Qμ Rε Sη Vγ) horas(*om*. Rε Vγ) equales Bη(*add*. et e converso; *add. in marg*. 10)
Mλ Oη(*add*. et inequales) Po Qμ Rε Vγ(*add*. et e converso) Sη; De reductione horarum
inequalium in horas equales et inequales(*add*. e converso Eμ) Cζ Eμ(*marg; add. in marg*.
10ᵘˢ); De reductione horas inequales ad horas equales Mπ; Modum reducendi horas
inequales ad equales Bβ; Reductio horarum equalium in inequales Mγ Eo; Reductio
horarum inequalium Eϱ; Reductio horarum inequalium in(ad Bζ Mυ Oφ Vξ) horas(*om*.
Bζ Eτ Mν Pτ Vζ) equales Bι(*add. in marg*. 10 cᵐ) Bζ Dγ Eτ Mν Mυ(*later hand*) Oφ(*add. in
marg*. Ad reducendum horas inequales ad horas inequales) Pτ Vβ(*add. in marg*. Conversio
horarum inequalium in equales et e converso) Vζ Vϱ Wβ(*add*. Capitulum); Reductione
horas inequales ad equales Lκ; Scientia reductionis horarum inequalium in horas equales
Qβ; *add. in marg*. 10 Vμ; *add. in marg*. 11 Mκ Oϱ(C. 11) Pκ Qζ(11ᵐ) Wζ; *ms* Pω *resumes*
　　　　inequalium] equalium Qλ Wα　　　　in] *om*. Oξ Pθ Pμ; et Rδ　　　　in ... *equales*] *om*.
Kα　　　　horas] *om*. Oζ Pζ Pθ Pν Pψ　　　　equales] *add*. Capitulum Nδ; *add*. etc. Rδ; *add*.
et econverso Lλ Xβ; *add*. Rubrica/Rx Cη Vπ; *add*. ut pie(?) Fβ

2　　　　Si] Cum Bζ Bη Bθ Bκ Cα Cγ Cζ Dγ Eγ Eλ Eμ Eo Eυ Lζ Lλ Mα Mγ Mι Mκ Mλ Mυ Mφ Nγ
Oη Oϱ Oφ Oχ Pζ Pφ Qε Rε Sα Sθ Sι Sλ Vα Vβ Vι Vμ Vν Vπ Vσ Vτ Wγ Wι; *add*. autem
Zα　　　　Si ... equales] *om*. Vγ　　　　volueris] vis *many*; *add*. scire Oβ　　　　reducere]
ducere Kα Sλ; scire Eϱ　　　　inequales] equales Dη Kε Kι Mτ Qζ Vα; *corr. to* equales Vμ
　　　　inequales in horas] *om*. Eζ Vη　　　　in] *illeg*. Zα; ad *some*; et Qθ　　　　in horas] ad
Rγ; *corr. in marg. from* et horas Wα　　　　in ... equales] *om*. Cε Mα Mγ Oχ Pγ Qγ Qε Rα Sλ
Vτ Vψ Wβ Wλ　　　　horas₂] *om*. Bε Bζ Cδ Eη Eκ Kα Mι Mυ Mφ Nγ Pζ Pσ Qι Sθ Vι;
interlin. Sβ　　　　equales] inequales Dη Kε Mτ Qζ Vμ; *add*. et econtra Dη Kι　　　　scito]
om. Oβ; scias Cα Kα; scitis Pω; sic fit vide Oo; vide Vμ; vide per 8ᵐ canonem Mμ Pκ Pχ
Wζ(octavum); vide per Xᵐᵘᵐ Qη; *add*. per 8ᵐ canonem Bζ Eϱ Gα Nζ Pι Rα Sβ(*interlin*.);
add. tunc vide per 8ᵗᵘᵐ canonem Oβ　　　　scito gradus] scitis gradibus Bε Bζ Dγ Dδ Dη Fζ
Eβ Eη Eλ Eo Eσ Fα Fβ Kε Lβ Lγ Lδ Lη Lκ Lμ Mγ Mλ Mπ Mτ Mυ Mφ Nδ Oγ Oζ Oι Oξ
Oσ Pα Pμ Pν Pξ Pϱ Pσ Qβ Qγ Qζ Qθ Qι Qλ Sδ Tβ Tδ Vι Vν Vτ Wα Wι Xδ Zα; s [*blank*]
gradibus Mδ　　　　gradus] gradibus Pω Rε Xβ; gradum Bι Mν Sθ; graduum Oη; *add*.
inequalium Cε　　　　horarum] *interlin*. Sβ; *add*. diei vel noctis Zα

[CHAPTER 9.] ON THE CONVERSION OF UNEQUAL HOURS INTO EQUAL HOURS

If you wish to restore unequal hours into equal hours, ascertain the degrees of the unequal hours

inequalium, quot sint, et divide eos per 15 et habebis horas equales; similiter facies de horis equalibus.

3   inequalium] equalium Eα Eζ Po Qζ; *add.* scilicet(.6. Lδ) multi[plican]do numerum graduum in quantitatem horarum Lδ Oγ   quot] que Qζ; qui Sη; quod Bδ Bζ Kγ Kε Vξ Qη Qθ Qι Sκ Wλ   quot sint] *om.* Dη; id est in quot gradibus hora equalis excedat inequalem vel e converso Pι; quot gradus sunt Vo   sint] est Vγ; sunt Eμ Lλ Mν Oη Qμ Rα Sθ Vν Vϱ Xγ; *add.* gradus Bζ; *add.* gradus quos Eγ; *add.* qui gradus sic habuntur divide arcum diei per 12 qui pervenit in numero quotiens gradus unius hore inequalis Vμ; *add.* (*and del.* Wζ) qui(accipe qui Mμ) gradus habuntur sic divide arcum diei per 12(*corr. from* 15 Vo) ac pervenit in numero quotiens(contiens Mμ) gradus unius hore inequalis quos(*add.* cum/eum Vo) multiplicata per 6 si sex hore sunt pertransite et habebis ad querere(quod queres/queris Mμ Pκ Pχ Wζ) Mμ Nζ Pκ Vo(*om.* et habebis ad querere) Wζ   divide] divides *some*; Deinde divide Pκ; Quos si quid gradus divide Vμ; Quos si quidem gradum divide Vo; dividesque Bθ Eυ Mκ Vπ Vσ; divides quoque Fγ; *add.* eum Vτ   eos] *om.* Bζ Eγ Pι Vμ; *interlin.* Pκ; eas Cα Pξ Qγ; eos gradus Oβ; gradus earum Bη Cζ Eλ Eμ Oφ Pφ Rε Sι Vν Vτ; gradus eorum Dγ Eo Mγ Mλ Oη Wι; quos Cγ Wγ; *add.* quota sit Qε   15] XV Oχ Qε Sβ Sθ; quindecim Lκ Tδ; 1 Pγ   et habebis] *om.* Cε   horas] *om.* Cγ Eγ Mμ Qλ Wα Wγ Wι Wλ Zα   equales] *marg.* Pζ; inequales Dγ Xγ Vη; *add.* horas inequales dividendo per 12 Lε Tδ   similiter] *twice* Mι; consimiliter Mμ Vμ Vo Wζ; *add.* etiam(?) Kθ   facies] *om.* Lι Mα; fac Eγ Wγ; facias Nζ Vη Wζ

3-4   similiter ... equalibus] *om.* Oη Pκ Pχ   de ... equalibus] *om.* Bζ

4   horis] *om.* Bβ Bη Bθ Bκ Eα Eδ Eζ Eλ Eo Eϱ Cδ Cζ Dγ Eμ Eυ Fγ Gα Lλ Mα Mγ Mκ Mλ Mν Nα Nγ Oβ Oϱ Oσ Oφ Oχ Pζ Qδ Qη Rα Sα Sθ Sι Vγ Vμ Vo Vϱ Vσ Vυ Wγ Wλ Xα Xγ; cuiuslibet Eγ   equalibus] dequalibus(!) e converso Pι; inequales dividendo per 12 Eγ; inequalibus Lι Rγ Zα; inequalibus dividendo per 12 Vμ Vo; inequalibus si vis hore equales scilicet dividendo gr~ per 12 Fγ; *add.* ad horas inequales Bκ; *add.* divide eas per 12 Lι; *add.* divide per quantitatem hore inequalis Nζ; *add.* dividendo gradus per 12 Oβ; *add.* dividendo per 12 Mμ Qη; *add.* equales dividendo per 12 Oξ Wγ; *add.* et cetera Rγ; *add.* horas inequales Bε Eη Rε; *add.* horas(*om.* Cγ Kα Pξ; in horas Pβ; *add. interlin.* id est gradus Tβ) inequales(equales Lμ Qθ Zα) dividendo per 12(1 [*illeg.*] 2 Qζ; duodecim Mτ Oφ Pφ Qθ; 15 Nδ) Bδ Cγ Eβ Dη Fα Fβ Fζ Kα Kδ Kε Kι Lβ Lγ Lη Lκ Lμ Mδ Mπ Mτ Mυ Nδ Oζ Oι Oτ Oυ Oφ Pα Pβ Pθ Pμ Pν Pξ Pϱ Pω Pφ Qβ Qγ Qζ Qι Qλ Rδ(*add.* etc. etc. etc.) Sδ Tβ Vη Vι Wα Xβ Xδ Zα; *add.* horas inequales dividendo per 12. Et habebis partes horarum inequalium Vβ(*add. in marg.* "horas inequales" et cetera est littera addita); *add.* horas inequales dividendo(*add. and expunged* horas equales) gradibus horarum equalium per 12 Wμ; *add.* in horas inequales dividendo per illa Pϱ; *add.* in inequales dividendo numerum graduum equalium horarum per gradus [*illeg.*] hoc in equales Kθ; *add.* inequales Bθ Eλ Vπ Vσ; *add.* inequalibus Eυ Mκ; *add.* inequales et divide eas per 12 Eσ; *add. 2.5-line gloss* Cα; *add. 3-line gloss* Dδ; *add. 4-line gloss* Oγ; *add. 6-line gloss* Vσ; *add. interlin.* in inequales Qμ; *add. in marg.* scilicet dividendo gradus earum per numerum graduum equales tunc habunt gradus inequales Qμ; *add. in marg.* Scilicet numero graduum horarum equalium divide eos per numerum graduum hore inequalis qui tunc est et habebis Bγ; *add. interlin.* scilicet reducendo Kθ

how many there are, and divide them by 15, and you will have the equal hours. You will do the same with equal hours.

[Comment:
        Take the length in degrees of a day or some part thereof in the unequal hour period and divide this by 15, and this will give the number of equal hours in that period. Note: it is the number of degrees in the period and not the number of unequal hours which are divided by 15.]

[CAPITULUM 10.] DE ALTITUDINE SOLIS IN MERIDIE HABENDA

Si volueris scire altitudinem solis in media die, quod est initium recessionis,

1   De ... habenda] *om.* Bδ Bε Bζ Bκ Cα Cγ Cδ Cε Dδ Eα Eκ Eλ Eμ Gα Kε Kι Lζ Lι Mα Mκ Mμ Mτ Nα Nζ Oβ Oν Oσ Oχ Pγ Pι Pξ Pσ Pφ Qε Qη Qι Rγ Sα Sβ Sθ Sι Sλ Tβ Vα Vη Vμ Vν Vo Vσ Vτ Vυ Wγ Wζ Wλ Xγ; *illeg.* Eγ Eζ Lγ; *faded* Eδ Fγ; *cut off* Pζ; Ad habendum altitudinem solis in meridiei Vζ; Ad habendum altitudinem solis Eo Eϱ(*add. later hand* in meridiei) Mγ; Ad habendum solis altitudinem meridianam Pτ; Ad inveniendum altitudinem solis in meridie Lμ Qθ; Ad sciendum altitudinem solis in media(*om.* Wι) die Kθ Po Qμ Sη Wι; Capitulum undecimum. De altitudine solis meridiana vel stellis Qδ; De alatitudine solis meridiani Kγ(*later hand*); De altitudine solis meridiana et stellarum Bη; De accipenda altitudine in media die Vγ; De altitudine solis invenienda. Cap. Qβ; De altitudine solis meridiana(meridina Cζ) et stellarum Cζ Eμ(*marg.; add. in marg.* 11ᵘˢ) Oη; De altitudine solis in media die Lκ; De exalracione(*?*) solis Eσ; De invenienda altitudione solis in meridie Bι(*add. in marg.* 11 cᵐ) Vβ(*add. in marg.* De altitudine solis in media die); De invencione solis in meridie Wβ; Inventio altitudinis solis in meridie Bγ(*later hand*) Dγ Eτ Mν Oφ(*add. in marg.* De sciendo altitudinem solis in meridie) Vϱ; Inventio hore diei per allidadam Sκ[1]; Si altitudinem solis vis scire in astr[olabi]ea Bβ; *add. in marg.* 11 Vμ; *add. in marg.* 12 Mκ Oϱ(C. 12) Pκ Qζ(12ᵐ) Wζ   habenda] *om.* Dη Kα Mι Mλ Mπ Nγ Rε Zα; invenienda Bθ Pυ Vπ; *add.* Capitulum Cη; *add.* etc. etc. Rδ; *add.* Rubrica/Rx Nδ Vπ

2   Si] Cum Cα Cγ Cδ Cζ Dγ Eγ Eλ Eμ Eo Lζ Lλ Mα Mγ Mι Mλ Nγ Oη Oν Oϱ Oσ Oφ Oχ Pζ Pφ Qε Rε Sα Sβ Sθ Sι Sλ Vα Vβ Vν Vτ Vγ Vυ Wγ Wι; Consimiliter facias si Pκ Pχ; Et si Bκ   volueris] vis *many*; volu.vin volueris Bζ   scire] *om.* Eδ Lδ Lλ Mα Qε Sθ Vα Vγ Vτ; *interlin.* Oσ; *marg.* Pζ; *add.* manifeste Fβ   solis] *interlin.* Qι   in] *om.* Sβ; *interlin.* Pζ Qξ   in ... die] *interlin.* Vξ   media die] medio die Rε Vμ Vν; meridie Eλ Eσ Mι Mτ Nγ Nζ Pϱ Vo; meridie hoc est media die Dη; meridies Fγ   die] *interlin.* Oσ; nocte *corr. later hand to* die Eϱ   quod] qui Dγ Mγ Vν; quot Oβ   est] *om.* Bβ Fγ; *add.* in Sβ; *add.* spacium Eυ   initium] *marg.* Vμ; *add.* cp̄ris(*?*) Qμ; recessionis] *add.* a chenith Bγ; *add.* [*illeg.*] a meridie Qζ; *add.* dicatur Bβ; *add.* eius a loca meridiana Cα; *add.* a meridie Mτ; *add.* scilicet ipsius diei W; *add. in marg.* etiam si non luceat sol super terram Oι

1-4   *different text* (*12 lines*) Pι

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[1] This is actually the title of Cap. 11.

[CHAPTER 10.] ON HAVING KNOWLEDGE OF THE ALTITUDE OF THE SUN AT MIDDAY

If you wish to know the altitude of the sun at midday, which is the beginning of its decline [i.e., the beginning of its afternoon descent to the horizon],

pone gradum solis super lineam medii celi; et numerus graduum almucantharat a loco

3   pone] *om.* Pγ; ponendus est Vμ   gradum] gradus Nδ Vμ Vπ; *interlin.* Sθ
        gradum ... graduum] *om.* Xβ   solis] *om.* Pα; *illeg.* Vγ; illius Bε Eη   lineam]
add. mediam Bδ; *corr. in marg. from* medium Mλ   medii] *add.* vel Mα   medii celi]
meridiei Vγ Wγ   celi] diei Cγ Oχ Pζ Sβ Sθ Vβ(*add. interlin.* al' celi)   et] in Cγ Eγ
        graduum] gradus Pω; *add.* in Fγ   almucantharat] alenchabuth Qη; almi^{at} Kε
Wζ; almicancaraz Oυ; almicancharach Mγ; almicancrath Mτ; almicanrath Eζ; almicant~
Vο; almicantar' Lμ; almicantarath Fγ Lδ; almicantaraz Bκ Cδ Oη; almicanter' Cα;
almicanth Pσ; almicanthar' Dη; almicantharath Tβ; almicantrath Gα; almich Kγ;
almichanth Lκ; almic^{raz} Lζ; almirath Rδ; almit' Nζ Oβ; almitantrath Vμ; almith Vη; almi^{ut}
Mμ; almiutantarach Sι; almuc' Cε Mπ; almucan Sβ; almucancarach Sη; almucancarath Vϱ;
almucancrath Vτ; almucan^{rath} Rα; almucant' Qθ Rγ Sλ; almucanta^{ath} Qμ; almucantarach
Bθ Xβ; almucantarat Cζ Eκ Pζ Pω Qε Sθ Vγ Zα; almucantarath Bδ Bι Eα Eη Eλ Kδ Lγ Lλ
Mδ Mκ Oγ Oι Pξ Pυ Pφ Qγ Qδ Qι Tδ Vα Vβ Vπ; almucantaraz Vυ; almucant^at Qζ;
almucanterath Nα Oφ; almucanth Xα; almucanth' Cι Eβ Lβ Lη Mλ Pγ Pθ Wγ;
almucantharach Pϱ Rε Wβ; almucantharat Fζ Mα Oζ Sκ; almucantharath Bβ Bγ Cη Eϱ Eυ
Fβ Lε Mo Mυ Mφ Nδ Oξ Oτ Oυ Pα Pμ Pν Po Pτ Qβ Qλ Sδ Vν Vξ Wμ Xγ; almucanthath
Vι; almucantrat Kα; almuch Kθ; almuch' Bζ Eo Wι; almuchan Sα Xδ; almuchantarath Vψ;
almuchantaraz Eμ Oσ; almuchantharat Wα; almu^{rat} Eγ Eδ; almu^{rath} Eτ Lι Vσ;
almuscantarach Pβ; almut' Dδ Eσ Mη Nε; almutantarat Oϱ; almutantarath Mν;
almutanterach Mι Nγ; almutantrat Cγ; almuth Bε Dγ; almu^{that} Wλ; almutr Pκ Pχ; *add.*
orizonte orientali ad locum solis Cα   a] *om.* Kα; et Oβ; in Sη   loco] *add. interlin.*
orizonte Bι; *add. in marg.* in quo gradus solis tangebat tunc orizont[*cut off*] scilicet sole
oriente Bγ

3-4   a loco solis] *om.* Dη

set the degree of the sun on the line of the mid-sky, then the number of the almucantar
degrees from the place

solis in orizontem est altitudo eiusdem medie diei. Similiter facies cum stellis fixis.

4   solis] *om.* Bδ Bε Cι Cε Dδ Eβ Eδ Eη Eϱ Eσ Fβ Fζ Kδ Kε Kι Lγ Lδ Lε Lη Lκ Lμ Mδ Mν Mo
           Mπ Mυ Mφ Nδ Nε Oζ Oξ Pα Pβ Pθ Pν Po Pξ Pϱ Pω Qβ Qδ Rα Rδ Sη Tβ Vη Vι Vψ Wα
           Xα Xβ Zα; *interlin.* Oι; illa (*interlin.*) Lβ; iº Kγ   solis in] *interlin.* Wζ   solis in
           orizontem] orienti usque ad lineam medii celi Mμ Nζ Pκ Pχ Vμ; solis orizontis usque ad
           lineam medii celi Vo   in] *interlin.* Pϱ; ab Dη Kα; usque ad Cα Lι; usque in Cζ Oη;
           usque(*suprascr.*) in Eμ; *add. interlin.* al' usque in Oφ   orizontem] orizonte *some*;
           orizonte orientale Dη; occidente Bι; oriente Bδ Eo Fγ Kα Mπ Oϱ Qθ Tδ Vβ(*add. interlin.*
           al' orizonte) Vυ; orientem Oσ; orizonte Mδ Vα; *add.* quod idem Cα; *add.* id est usque ad
           lineam medii celi Qζ(*interlin.*) Wζ(*om.* id est)   est] cum Mγ; erit Cγ Lδ Lλ Mι Ov Pζ
           Qε Vγ; *add. interlin.* al' et Oφ   eiusdem] *om.* Cι Xδ; eius Bε Dη Qι; solis Sβ; solis eius
           Vμ; solis eiusdem Vo   medie diei] meridiei Cγ Eγ Eδ Kδ Mι Nγ Pβ Rδ; in meridie Fγ
                 Similiter] *blank* Sη   Similiter ... fixis] *om.* Rγ   facies] *om.* Cε Mη Nε Pγ;
           illeg. Cι; fac *some*; facias Nδ Vη Vμ Vo; operandum est Cα   cum] *om.* Eτ; de Pζ Pξ; in
           Sλ   fixis] *om.* Oη; scitis Fβ; *add.* de nocte Nζ Pκ Qη Vμ Wζ; *add.* in nocte Mμ Oβ
           Oι(*interlin.*); *add.* nocte Vo; *add.* scilicet ponendo cacumen(acumen Mτ) stelle supra
           lineam medii celi cum(ostendit tunc Mτ; tunc Kι) gradus qui sunt ab alimba(almicancrath
           Mτ; almik Qζ; almik^at Kι) primo in oriente(orizonte Mτ) usque ad locum solis in linea
           medii celi positum ostendit altitudinem stelle in medio diei(celi Mτ) Kι Mτ Qζ; *add.* Pone
           enim eas super linea medie diei et aspice altitudinem super quam ceciderit
           almucantarath et illa erit altitudo altior qui p't cᵃe(?) illa die in regione tua Wγ; *add.* si
           volueris habere altitudinem meridianam arcus stelle fixe Cα; *add.* si vis scire altitudinem
           earum in media nocte Fγ; *add.* ut s[imiliter(?)] Kδ; *add. later hand in marg.* si volueris
           earum altitudinem in linea medii celi scire Qμ

of the sun on the horizon is the altitude of the same at midday. You will perform the same action with the fixed stars.

[Comment:

       If you want to know the altitude of the sun at midday, place the point of the sun on the ecliptic (for that day) over the line through the middle of the sky (that is, the vertical diameter), and the number of the almucantar where it lies will be the altitude of the sun.]

[CAPITULUM 11.] INVENTIO HORE DIEI PER ALLIDADAM

Si per allidadam horariam vis scire horam diei naturalem, pone allidadam super

Cap. 11] *om.* Bζ Bη Bι Bκ Cα Cδ Cζ Dγ Eγ Eμ Lζ Lλ Mα Mγ Nζ Oσ Oχ Pζ Qε Rα Rγ Sβ Sθ Sι Sλ Vα Vγ Vϱ Vυ Wγ; after Cap. 15 with insertion mark: Mλ; *in bottom marg. with interlin. glosses* Qμ(*later hand*)

1   Inventio ... allidadam] *om.* Bδ Bε Cγ Cε Dδ Eα Eζ Eκ Eλ Eυ Gα Kι Lι Lκ Mκ Mμ Mτ Nα Oβ Pγ Pι Pκ Pξ Po Pσ Pφ Pχ Qζ Qη Qι Sα Sη Tβ Vη Vμ Vo Vσ Vτ Vφ Wζ Wλ Xα Xβ Xγ Zα; *faded* Eδ Fγ; *illeg.* Mυ; Ad habend' horam diei naturalem per allidadam inchorariam Qβ; Ad inveniendum horam naturalem diei Lμ Oφ(*marg.*) Qθ; Ad horam diei naturalem per allidadem horariara(*!*) Eϱ; Ad sciendum horam naturalem diei Vξ; Ad sciendum horam per allidadam Pτ; Capitulum 12ᵐ. De hora diei naturali per allidadam Kγ(*later hand*) Qδ; De accepa horarum per allidadam Kθ; De hora diei naturalis habenda per allidadam horariam Mλ; De horis naturalibus Mπ; De inventione horarum inequalium per alliladam horariam Oν; De inventione hore diei(*add.* naturalis Vβ) per allidadem Dη Kδ Mι(aldidam) Rδ(alidadam) Rε(alidadam) Vβ; Invencio eiusdem per lineas horarias in dorso Vι; Inventio horarum per allidadam que dicitur horaria Bγ(*later hand*); Inventio hore(horarum Vψ) diei per allidadam Cι Eβ Eτ Vψ; Inventio hore per allidadam horariam Mν; Si per allidadam vis scire horam diei Bβ; Verto 3 folia ca. Wι; [*illeg.*] gradus solis scilicet [*illeg.*] soli superiem pinnulam allidada Qμ   hore] horarum Lδ Oγ; *add.* naturalis Bθ Pυ Vπ   diei] naturalis Wβ   per allidadam] *om.* Eσ   allidadam] aldidam Nγ; alidadam Nε; *add.* Rubrica/Rx Sδ Vπ   *add. in marg.* 12/12ᵐ Vμ Vφ; *add. in marg.* 13 Mκ Oϱ(C. 13) Qζ(13ᵘˢ) Sδ(c. 13); *add. in marg.* 14 Pκ; *add. in marg.* Hoc capitulum "Si per allidadam" et capitulum subsequens "Item per alidadam" sunt ambo addita Vβ

2   Si] Cum Pκ Pχ Vμ; Et si Eυ; Ut si Eλ Vπ Vτ; *add.* autem Eα   per] *om.* Vη; quod Wλ   allidadam₁] aldidam Mι Nγ; alhidadem (*and elsewhere*) Pι Zα; alidadam Eα Eζ Rγ Rδ Rε; alidandam Mτ(*and elsewhere*); alilada Oν(*and elsewhere*); alyadam Qη; callidadam/tallidadam Vσ; hahidada Eσ   horariam] *om.* Cγ Eδ Fζ Lδ Nζ; linearum Oϱ; *add.* iam Lκ   scire] *om.* Cε Eα Eδ Eκ Eτ Kδ Mη Mλ Mν Nα Pγ Po Sη Wβ; *del.* Eζ Pθ; *interlin.* Sκ; habere Bδ Bε Dδ Eβ Eη Eσ Fα Fβ Kα Kε Kθ Kι Lβ Lγ Lδ Lε Lη Lι Lκ Lμ Mδ Mo Mπ Mυ Mφ Nγ Nδ Oγ Oζ Oι Oξ Oϱ Oτ Oυ Oφ Pα Pδ Pμ Pν Pϱ Pσ Pω Pφ Qγ Qδ Qζ Qθ Qι Qλ Rδ Sα Tδ Vβ Vη Vι Wα Wμ Xα Xβ Xδ Zα; invenire Bγ(*interlin.*) Bθ Dη Eλ Eυ Fγ Kγ Mκ Mτ Rε Vπ Vσ Vτ Vψ Wι   horam] hore Oγ; *add. in marg.* inequalem Mκ   diei] diey Xα; *add.* illius in dorso Xδ   naturalem] talem Bβ; equalem Lδ Oγ; *add.* horem Nδ; *add.* horam inequalem hore Vη; *add.* id est equalem Pι Zα; *add. interlin.* id est inequalem Kε; mᵃent Fβ   pone] *rep.* Lι   allidadam₂] *om.* Nγ Pθ; alhidadam Eσ; alidadam Rδ; alididam Oγ Qθ Rε; aliud Vψ; allid' Mη; alliladam Oν(*and elsewhere*); almuri Fγ; eam Nζ   super] *om.* Mυ; per Oγ

2-3   allidadam₂ ... altitudinem] altidadam(*!*) Mι   super altitudinem] *om.* Mφ Vι

2-5   pone ... quesita] *om.* Xα

[CHAPTER 11.] FINDING THE HOUR OF THE DAY BY THE ALIDADE

If you wish to know the natural [i.e., unequal] hour of the day using the hour-alidade [or "time-telling" alidade], place the alidade on

altitudinem medie diei illius in dorso astrolabii suspensi; et verte dorsum ad solem tam
diu donec umbra uniuscuiusque anguli superioris pinnule cadat in allidada, quelibet in

5   directo sui lateris; et ubi ceciderit in divisionibus erit hora quesita.

3   altitudinem] allidadam Mo; hora Xγ; lineam sive arcum Pι; *add*. in Pκ Pχ Wζ; *add*. solis
      Wλ   medie] *add. and del*. noctis Fγ   medie diei] medii diei *some*; meridiei Eδ Vτ;
      add. naturalis Rγ   illius] ipsius Lι; istius Nζ Qη Vτ; *add*. allidadam Pθ   suspensi]
      om. Eϱ Gα Nα; *interlin*. Vφ; et fac punctum in qua ubi ipsam suspensat arcum hore 6$^{\text{te}}$ Pι
          et] deinde Rε   et verte dorsum] vertando dorsum Vo; vertendo illius Bβ Eα Eδ
      Eζ Kθ(*add*. scilicet dorsum); vertendo illud Mν Nζ Pκ Po Pχ Vμ Wζ   dorsum] *om*.
      Eλ; idem Kγ; *add*. illud Mλ Mμ Ov; *add. and del*. astrolabii Pυ; *add*. astrolabii Qμ(*interlin*.)
      Rε Vβ(*interlin*.)   ad solem] *rep*. Kι   tam] *om*. Vξ

3-4   tam diu] *om*. Fγ Sκ

4   diu] *om*. Bδ   donec] quousque Vμ Voo   uniuscuiusque] cuiuscumque Pθ Rδ;
      cuiuslibet Kε Kι Mτ Nα Qθ; cuiusque Kδ Lμ Pσ; uniuscuius Eϱ; unius cuiuslibet Vφ;
      utriusque Pφ; *add*. pinnule Dδ; *add. interlin*. al' utriusque Vβ   anguli] *om*. Kα Oφ; diei
      Mυ Mφ Vι   superioris] *om*. Sδ   pinnule] *om*. Eϱ Gα Pι Vφ; *blank* Kδ Pβ; per nulle
      Rδ; perinule Fβ; pinnile Bθ; pinnulle Eα Mυ; pinule Eμ Mπ Qδ Sη Sκ Wλ; premule Pφ
          allidada] aldida Mι Nγ; alhidada Eσ; alidada Nε Rδ Xβ; alididam Oγ Qθ Rγ Rε;
      allidadam *some*; allilada Vψ; alyadam Qη; *add*. piah(?) in dorso Gα   quelibet] *om*. Bδ
      Bε Cγ Cι Dδ Dη Eβ Eη Eσ Fα Fβ Fζ Gα Kα Kδ Kε Kι Lβ Lδ Lε Lι Lκ Lμ Mδ Mη Mπ Mτ
      Mυ Mφ Nγ Nε Oγ Oζ Oι Oξ Oϱ Oτ Ου Oφ Pα Pβ Pδ Pθ Pμ Pν Pϱ Pξ Pσ Pω Pφ Qβ Qζ
      Qη Qθ Qι Qλ Rδ Sα Sδ Sκ Tβ Vη Vι Vψ Wμ Xβ Zα; quolibet Vβ   in$_2$] *om*. Pφ; *interlin*.
      Oφ

5   directo] puncto Vψ; recto Qλ; recto *corr. to* directo Wα   lateris] *blank* Fβ   ubi] il
      Vσ   ceciderit] cecideris(*!*) Mo; occiderit Cη; *add*. punctus Pι; *add*. talis umbra Bβ
      Eα(tallis) Eδ Eζ Kγ Kθ Mλ Mμ Mν Nζ Ον Pκ Po Pχ Vμ Vo Wζ   in] et Xγ   in
      divisionibus] *rep*. Lβ   divisionibus] diebus Pξ; *add*. horarum Bβ Bγ(*interlin*.) Bε Cγ
      Eα Kγ Kθ Lδ Mλ Mμ Mν Nζ Oγ Pι Pκ Po Pχ Qζ Vμ Vo Wζ; *add*. ibi Bθ Eλ Fγ Lδ Mκ Mo
      Oγ Pυ Tβ Vσ; *add*. regule Nα Pυ Vβ; *add*. si(?) Xγ   erit] est *corr. to* erit Oφ; in Nα;
      add. ibi Rε Sη Vβ   hora] ipsa Oζ; umbra Pκ Pχ; *add*. illa Vμ   quesita] acquisita
      Tβ; *add*. Ad horam diei naturalis per allidadam horariam cognoscenda Gα; *add*. etc. Rδ

the back of the suspended astrolabe on the altitude [of the sun] at the middle of that day; and turn the back to the sun until the shadow of each edge of the upper vane falls on the alidade, anywhere in line with its side. And where it falls in the divisions will be the desired hour.

[Comment:

This chapter depends on the marking of the unequal hour-lines as outlined in the *Constructio*, Cap. 5. (Because, as noted there in the comment, few western astrolabes had these markings, Capitula 11 and 12 of the *Practica* are often omitted.)

Placing the time-telling alidade or rule (specifically the end along which the time-telling hours have been marked) on the maximum altitude of the sun for that day (noon, solar time) sets the two variables which determine the length of the natural day and of the 12 unequal hours for that day – the latitude of the observer and the day of the year (or the position of the sun along its annual orbit). Then, suspending the astrolabe, turn it so that the edges of the upper vane toward the sun will cast a shadow down the alidade, the edges of the shadow lining up along the rule. The unequal hour can then be read where the end of the shadow falls, according to the lines engraved across the alidade.

Note: since the alidade will be pointing more or less upwards toward the place in the sky where the noon-day sun would be, the early morning hour shadow or the late day hour shadow will cross the alidade close to the vane; and the nearer the hour is to noon, the more "vertical" will be the shadow and hence cross the alidade further from the vane. This is why the hour lines on the alidade are numbered from the vane toward the centre (1 to 6) and then back from near the centre to the vane (7 to 12).

Note: in modern practice, one must adjust the calculation by using the "solar noon" when the sun is indeed vertically overhead in the sky for the observer, rather than "civil noon" based on modern time zones. Solar noon can easily be calculated by dividing the length of time between sunrise and sunset by two, and adding this to the time of sunrise.

Thus if the sun rises at 6:34 a.m. and sets at 8:04 p.m. (or 20:04), the difference is 13:30 hours, half of which is 6:45 hours. Noon would then be at 6:34 plus 6:45 or 13:19 (i.e., 1:19 p.m.) Which would be the end of the 6th unequal hour and the beginning of the 7th. (It does not matter whether this is standard time or daylight saving/summer time as long as the calculations and the final reading all use the same time system.)]

[CAPITULUM 12.]¹ DE EODEM INVENIENDO PER LINEAS

Item per allidadam etiam in dorso et lineas horarum inter latera gnomonis, si

Cap. 12] *om.* Bζ Bη Bι Bκ Cα Cδ Cζ Dγ Eγ Eμ Eo Eϱ Gα Lζ Lλ Mα Mγ Mμ Oβ Oη Oσ Oχ Pζ Pι Qε Qη Rα Sβ Sθ Sι Sλ Vα Vγ Vν Vo Vϱ Vυ Wγ Xα; *add. different version in bottom marg.* Eϱ(*later hand*); *in bottom marg.* Qμ(*later hand*) Vφ

1   De ... lineas] *om.* Bδ Bε Bι Cγ Cε Dδ Dη Eα Eδ Eζ Eκ Eλ Eυ Kγ Kε Lι Lκ Mκ Mν Mτ Nα Nζ Oν Pγ Po Pξ Pσ Pτ Pφ Qζ Qι Qμ Rγ Sα Tβ Vη Vμ Vσ Vτ Vφ Wα Wζ Wλ Xγ; *faded* Fγ; Ad sciendum horam naturalem in dorso astrolabii Vξ; Capitulum 13ᵐ. De eodem in dorso Qδ; De eodem Kθ Mι Mπ Nγ Sη; De eodem habenda per allidadam et lineas horarias Mλ; De eodem inveniendo etiam per allidadam Qβ; De eodem inveniendo per lineas Oι Tδ; De eodem per lineas horarias etc. etc. Rδ; De eodem per lineas horarias in dorso Rε Vβ; De eadem per lineas horarum Kδ Vπ(*add.* Rubica); De inventione horarum inequalium in dorso astrolabii Zα; Inventio de eodem per lineas Qγ; Inventio eiusdem per lineas horarias in dorso Eτ Wι; Item ad capitulum de eodem Lμ; Item alio modo fit supple Bγ(*later hand*); Item de eodem Oφ(*marg.*); Item de eodem ad ca^lum(calculum?) Qθ; Item per alia in horarias in dorso Wβ; Si horam vis scire per alidadam in dorso Bβ
               eodem] eadem Fζ Kα   inveniendo] *om.* Bθ Cι Mη Nε Pδ Pθ Pυ Sδ Vψ
               lineas] *add.* horarum Bθ Pδ; *add.* horias Mo; *add.* horias [*illeg.*] Xβ; *add.* Rubrica/Rx
         Bθ Nδ   *add. in marg.* 13 Pκ Vμ Wζ; *add. in marg.* 14 Mκ Oϱ(C. 14) Qζ(14ᵘˢ) Sδ(c. 14)

1-7   De ... quadrante] *marg.* Vφ

2   Item] Et est Lβ Lκ Wμ; Tunc Fβ   per] *om.* Wλ; qui Bθ Vπ   allidadam] alhidadam Zα(*and elsewhere*); alhidd^m Eσ; alidadam Qδ Rγ Rδ Rε; allididam Oγ(*and elsewhere*); allididera Mι; *add.* id est regulam Nζ; *add. interlin.* in astrolabio Zα   etiam] *om. some*   etiam ... dorso] *om.* Pω   dorso] *add.* astrolabii Bδ Cγ Eβ Kα Lγ Lλ Mδ Mι Mμ Nα Nδ Oι Oν Pξ Rε Sη Vβ Wβ   et] ad Lκ; per Eτ Xβ Xγ; et per Vσ; si Eκ(*deleted*); si vis horam diei naturalem invenire Rε; *add.* in Pβ; *add.* per Bθ Fγ Vφ
               horarum] foarum Oϱ   inter] in Eυ   latera] *add.* et cetera latera Eα
               gnomonis] *blank* Kδ; g[*illeg.*]monis Pβ; gno'is Cη Pγ Wι; gnomonibus Pφ; gomonis Eλ Mπ; *cut off* Eζ; *add.* descriptas vel super Eυ; *add.* vel super/supra Bθ Eλ Mκ Mo Nα Pτ Pυ Qδ Qμ Rε Sη Vβ Vτ; *add.* vel 8ᵃ Vσ   si] *om.* Cε; sic Cγ Eβ Eη Fα Fβ Lβ Lε Lη Mδ Mι Nγ Nδ Oζ Oξ Oτ Oυ Pα Pβ Pμ Pϱ Pσ Pφ Qβ Qγ Qθ Qι Qλ Sα Tδ Xδ; sic Oϱ; vel supra Vπ Xγ(*ms skips to Cap. 28*); *add.* ibi Fγ

2-3   inter ... sic] in dorso poteris illud idem invenire. Pone ergo Dη   inter ... super] *marg.* Eζ(*later hand*)   si sint] sicut Lκ; sit sicut Fζ Lγ Oι Wμ

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¹ In many mss this capitulum continues on without title from Cap. 11.

[CHAPTER 12.] ON FINDING THE SAME THROUGH THE [HOUR-]LINES

Also by the alidade on the back and the hour lines between the sides of the gnomon[2] as if

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[2] The use of *gnomon, -onis* here is not clear. Perhaps because gnomons cast shadows, it is an oblique reference to the shadow square on the back of the astrolabe, and hence to the unequal hour-lines which are usually drawn next to it – see variants "(*add*. vel super)".

See also Cap. 42, 43 and 44.

sint posite ut in quadrante, sic. Super altitudinem solis meridianam in illa die pone
allidadam; et nota ubi meridianus circulus, id est, linea finis 6^e hore, secuerit lineam

5   fiducie ipsius allidade; et pone ibi signum de incausto; et illud signum valet situationem

3   sint] *illeg.* Lι; inter Oϱ; sit Cε Pδ Wμ; sunt Oφ; *add.* ibi Nζ   posite] imposite Pκ Pχ;
        ponite Pβ; supponite Vφ; *add.* ibi Bβ Bδ Cι Dδ Eα Eβ Eη Eσ Fα Fζ Kδ Lγ Lδ Lε Lη Lι Lκ
        Mη Mι Mφ Nγ Nε Oγ Oζ Oι Oϱ Oτ Oυ Oφ Pα Pβ Pδ Pθ Pμ Pν Pξ Pϱ Pσ Pω Qβ Qγ Qζ
        Qθ Qλ Qι Rδ Sα Sδ Sκ Tβ Vη Vι Vμ Vo Vψ Wα Wβ Wζ Wι Wμ Xβ Xδ; *add.* linee ibi Mδ
        Nδ   ut] *om.* Bθ Sκ Vπ Vσ; sicut Fγ Nε   sic] *om.* Eσ Kγ Kθ Mλ Mμ Mν Nζ Oν Pκ
        Po Pχ Tβ Vβ Vη Vμ Vo Wζ Wλ Zα; *del.* Sκ; fac sic Rε; sicut Mτ Mυ; sint(?) Qθ; vel in
        quadris superioribus dorsi astrolabii Fγ   super] *om.* Pφ; per Vφ Wμ; si Oϱ; similiter
        Pγ; sit Lβ Lκ   altitudinem] *om.* Vσ   solis] *om.* Kα   meridianam ... die] in
        meridie Fγ   in illa] gnilla(*!*) Bβ   illa] *om.* Lβ Lκ; alia Fα Pφ; ista Kι Mτ Nζ Vo
        Wζ   illa diei] meridiei Lη   die] di|ca Lι   pone] *om.* Dη

4   allidadam] *marg.* Fα; a^d Eβ Fβ Oι Oξ Oτ(*add. in marg.* allidadam) Oυ Oφ Pξ Qλ Sδ Wμ; a^{dā}
        Lε; alhidd' Eσ; ali^d Fζ; alidadam Rγ Rδ Rε; aliud Cγ Kα Lκ Mδ Mι Nγ Nδ Pα Pμ Pν Pφ
        Qβ Qδ Qι Wα Xδ; allud' *corr. to* allid' Sκ; illud Lι; regulam Bδ; *add.* id est regulam Pκ Pχ
               nota] numero Rδ   ubi] ibi *corr. to* ubi Oτ   meridianus] meridionalis Eδ
               circulus] *om.* Vφ   id est] *om.* Pκ; est Cγ; in Mδ Nδ; *add.* que est Oγ   id est
        linea] *del. and add. interlin.* qui est Bγ   linea] *om.* Kε Kι Mτ Rγ Vo; lineas Pγ; *add.* qua
        est Lδ Tβ; *add. interlin.* quia Oφ   finis] *blank* Wζ; finalis Pγ Vμ   6^e] 6 *many*; sexte
        some; 64 Cγ   hore] horarum Mτ   secuerit] *blank* Cγ; cecuerit Eζ; fecint *corr. in*
        marg. to secuerit Sκ; seccurrit Nα; secuit Pφ   lineam] *rep.* Oν

5   fiducie] *add.* 6 hore Dδ; *add.* in Qδ   ipsius] *marg.* Oι; illius Lι Mν Oφ Pκ Pμ Pφ Pχ Qβ
        Sδ Wλ   allidade] *om.* Rδ; aldide Mι Nγ; alhidd'e Eσ; alidade Qδ Rγ Rε; aliodose Pκ
        Pχ; allid' Mη Nε Sκ   ibi] ibidem Kδ Rδ   de incausto] *om.* Dη; cum afcaūito(?)
        Tδ; cum incausto Vμ; de enclaustro Fγ Pφ; de incasto Mι; *add.* id est de atrameto Nγ; *add.*
        id est de atramento Mι; *add.* vel de quacumque vis Nζ   de ... signum₂] *om.* Pγ   et
        illud signum] et cetera Cγ Pφ; et cum Oϱ; et grad~ Pω   signum₂] *om.* Bβ Bε Cε Cι Dδ
        Dη Eβ Eη Eσ Eυ Fα Fβ Fζ Kα Kδ Kε Kι Lβ Lγ Lδ Lε Lη Lι Lκ Lμ Mδ Mη Mι Mκ Mμ Mπ
        Mυ Mφ Nα Nγ Nδ Nε Nζ Oγ Oζ Oι Oξ Oτ Oφ Oυ Pα Pβ Pδ Pθ Pκ Pμ Pν Pξ Pτ Pυ Pχ
        Qβ Qγ Qδ Qζ Qθ Qι Qλ Qμ Rδ Rε Sα Sδ Sκ Tβ Tδ Vβ Vη Vι Vμ Vo Vπ Vσ Vφ Vψ Wα
        Wζ Wλ Wμ Xβ Xδ Zα   valet] videlum Nγ; *add.* ad Bβ Bε Bθ Dδ Eη Eλ Eσ Eυ Kδ Kθ
        Lμ Mκ Mμ Mτ Nζ Oφ(*interlin.*) Pκ Pσ Pχ Qζ Qθ Qι Qμ Rε Vμ Vo Vπ Vσ Vφ Wλ Xβ; *add.*
        and del. ad, *add. interlin.* sicut situs Wζ   situationem] *om.* Eα Tβ; *illeg.* Kγ; situationi
        Nγ

5-7   et₂ ... quadrante] et tunc sume altitudinem solis in quacumque parte diei et ubi cadit iste
        signum ibi est hore in tali altitudine Fγ

they were placed on a quadrant, thus. Place the alidade on the midday altitude of the sun on that day and note where the midday [unequal hour] circle, that is, the line of the end of the 6th hour, cuts the trusted line[3] of this alidade, and place there a red mark;[4] and this mark takes the place of

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[3] *lineam fiducie*: the line down the "middle" edge of the alidade must be accurate and trustworthy since measurements depend on it. See *Comp*. Cap. 4 line 13.

[4] The term *incausto* usually denotes the use of red wax. *Encausto* would be ink or dye. Here one needs to make a temporary mark on the alidade, and a dot of wax would be one (temporary) way of doing this. Note that Mι suggests "blacking" (*atramentum*).

margarite in quadrante. Deinde accipe altitudinem solis in quacumque hora vis, et illud signum inter horas dabit horam naturalem, ut in quadrante.

6   margarite] *blank* Cγ; margharite Mτ; *add*. ut Eδ   in quadrante] direcgte Fζ
         quadrante] qua divide Pφ   Deinde] *twice* Pγ; De Xβ   accipe] *om*. Zα; *blank*
         Cγ   quacumque] qua Dη Qι; qualibet Oζ   hora] *illeg*. Qλ; *add*. tu Vφ   vis]
         om. Mμ Nζ Pκ Pχ Vμ Wζ   illud] istud Vo

6-7   et … horam] ad ᵉᵗ signum inter horas dabit horam *corr. in marg. to* et huius signum dabit
         horas inter ceteras horas naturales Sκ

7   signum] *add*. positum in allidada cum incausto Vη; *add. interlin*. ubi cadit Kι   inter]
         add. has Kα   inter horas] *om*. Lι   horas] has lineas Eλ Rε Vτ; *corr. in marg. from*
         lineas Wζ; *add*. quam [q3] Pγ   dabit] habet Vμ; habet vel dabit Vo; ostendet Eλ Rε
         Vτ; *add*. tibi Pδ   horam] *om*. Pω; *add*. diei Bβ Eα Eζ Kγ Kθ Mν Oν Qζ(*marg*.) Vμ Vo
         naturalem] *add*. diei Mμ Nζ Pχ Wζ; *add*. id est inequalem Vη; *add*. inequalem Zα;
         add. interlin. scilicet inequalem Wζ   ut] *om*. Dδ Mκ Nδ; *add*. est Vo; vel Nα   ut …
         quadrante] *om. Eκ Kε Kι Mτ Vφ*   quadrante] *om*. Qθ; *add*. etc. Pκ Pχ; *add*. Et nota si
         quevis ante meridiem debet numerando incipere de prima hora versus sextam. Si quevis
         post debet incipere a sexta versus primam Dδ; *add*. margarita Oφ; *add*. sit Kδ; *add*. sit/fit
         etc. Rδ

the bead[5] in a quadrant. Then take the altitude of the sun at whatever hour you want and that mark between the hours will give the natural hour, as in a quadrant.

[Comment:

     To find the unequal hour for any point of time in the day, first note the altitude of the sun at midday for the day in question by rotating the ecliptic circle on the rete so that the position of the sun in the ecliptic on that day is on the vertical midday line, and then by reading the altitude using the almucantars.

     On the back of the astrolabe set the alidade to that midday altitude, and mark (temporarily) on the alidade (along its "centre line" edge) the point where it cuts the sixth unequal hour-line arc (found above or below the shadow square). Next rotate the alidade to the altitude of the present time; the temporary mark will now sit on or between other unequal hour-line arcs, and from this you can read (or estimate) the present time in unequal hours.

     One would follow similar steps if one were ascertaining the present time using a quadrant.]

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[5] Although the actual meaning of *margarita* is an oyster's "pearl", it is also the name commonly given to the sliding bead on the plumbline of a *quadrans vetus*.

[CAPITULUM 13.] CAPITULUM PREAMBULUM AD QUEDAM SEQUENCIA

Amplius scito quod circulus signorum dividitur in duos semicirculos, quorum

Cap. 13] *in bottom marg.* Qμ(*later hand*)

1   Capitulum ... sequencia] *om.* Bδ Bζ Bκ Cα Cγ Cδ Cε Dδ Eα Eγ Eζ Eκ Eλ Eυ Gα Kε Kι Lζ Lκ Lλ Mα Mκ Mμ Mτ Nα Nζ Oβ Oγ Oν Oσ Oχ Pγ Pζ Pι Pκ Pσ Pξ Pφ Pχ Qε Qζ η Qθ Qι Qμ Sα Sβ Sθ Sι Sλ Tβ Vα Vγ Vη Vμ Vν Vo Vσ Vτ Vυ Vφ Wγ Wι Wζ Wλ Xα Zα; *faded* Eδ Eo Fγ; *illeg.* Lμ; Ad cognoscendum sequentia Vξ; Capitulum 14ᵐ. Preambulum ad capitula sequentia Qδ; Capitulum de gradibus equidistantibus a solstitiis Rε; Capitulum preambulum ad sequentia, et est de gradibus equedistantibus a solsticiis Vβ; Capitulum untile ad sequentia Rγ; Consideratio solsticiorum in ipso rethi Bγ(*later hand*); Cum gradus solis habeant altitudines meridianas et umbras equales Cζ; De divisione circuli signorum Mπ; Divisio circuli Bβ; Duos gradus sol habent altitudines meridianas et umbras equales Eμ(*marg.; add. in marg.* 12ᵘˢ); Equatio solis per halhancabuth Oφ; Nota preambulum ad quedam sequencia vel de gradibus equidistantibus ab equinoctio Vι; Notabilia capitulorum sequentibus utilia Sη; Notabilia de gradibus equidistantibus a solsticii Eτ Mν Wβ; Notabilia per capitulis sequentibus utilis Kθ Po; Nota preambulum ad quedam sequentia vel de gradibus equidistantibus Mυ; Notabilia precedentia ad sciendum gradum solis per alhantabut Dγ; Notabilia precedentia ad sciendum gradum solis per alhantabuth et quemdem alia Rα; Preambulum ad [*illeg.*] Kγ(*later hand*); Quedam distinctio partium zodiaci utilis ad sequentia Vϱ; Quedam divisio signorum utilis ad sequentia Bι(*add. in marg.* 12 cᵐ); Qui gradus solis habeant altitudines meridianas et umbras equales Bη(*add. in marg.* 12) Oη; Quid precognosci habet ad sequentia Mγ Pτ; Quod pre[*illeg.*] ad sequentia Eϱ   Capitulum] *om.* Mδ Oϱ Pβ Pμ Pϱ Vψ Xβ Xδ; Nota Oφ   preambulum] preambulatorum Kδ; preamolum(*!*) Mι Nγ   quedam] *om.* Bε Mλ; quod Pα   sequencia] sequenciarum Vπ; *add.* a dicenda Pα; *add.* et de zodiaci divisione Qβ; *add.* necessarium Mδ; *add.* necessarium Rubrica Nδ   *add. in marg.* 13ᵐ Vφ; *add. in marg.* 14 Vμ; *add. in marg.* 15 Mκ Oϱ(C. 15) Pκ Qζ(15ᵘˢ) Sδ(c. 15); *add. in marg.* Amplius capitulum Lζ

2   Amplius] *om.* Rγ; Et Bκ; Et tunc amplius Qη; Nota et amplius Zα; *add.* autem Mυ Mφ Vι Wα   scito] nota Kε Mτ; scias Cα; sciendum Vμ Vo   quod circulus] quanta Wγ   circulus] aliqua Cγ Eγ   signorum] *add.* id est zodiacus Nζ   in ... semicirculos] solsticia Cγ Eγ Wγ   duos] 2 / 2ᵒˢ *some*; duo Mα Sθ Vα; *add.* rizcalis Vπ; *add.* equales Qμ   semicirculos] circulos *corr. interlin. to* semicirculos Oγ; semicircula Sθ

2-4   Scito ... estivale] *om.* Dη

[CHAPTER 13.] PRELIMINARY CHAPTER TO CERTAIN THINGS WHICH FOLLOW

Further know that the circle of signs is divided into two semicircles, of which

unus est a capite Capricorni in caput Cancri, et alius a capite Cancri in caput Capricorni;
et caput Capricorni est solsticium hyemale, caput Cancri estivale. Scito etiam quod

5   omnes duo equidistantes gradus ab aliquo horum solsticiorum sunt unius declinationis

3   est] *om.* Nδ Vo Χα   capite₁] *om.* Mo   capite₁ ... Capricorni₂] *marg.* Εζ(*later hand*)
          Capricorni₁] Cancri Βζ Dγ Εο Μγ Μλ Rε Vν Vτ   in₁] *om.* Wγ; ad Lι; usque ad
          Ελ   in₁ ... Cancri₁] *om.* Pφ; usque ad caput Cancri Wβ(*marg.*)   in₁ ... alius] et Μι
          Νγ   in₁ ... Capricorni₂] *om.* Εν Ρο; *marg.* Μκ; usque ad caput Cancri Εδ(*marg.*)
          caput₁] *om.* Pδ   Cancri₁] *marg.* Cε; Capricorni Βζ Dγ Εο Μγ Μλ Rε Vν Vτ;
          Capricorni *corr. to* Cancri Qζ   et ... alius] et quorum unum est Εσ   et ...
          Capricorni₂] *om.* Εα Μν Οϱ Sα; *blank* Lβ   alius] aliud Wγ; alter Fγ; illius Qγ; *add.* est
          Pζ   a₂] in Κδ; in *corr. interlin. to* a Sκ   a capite₂] *om.* Wγ   Cancri₂] *om.* Qμ;
          Capricorni Βζ Dγ Εο Μγ Μλ Rε Vν Vτ   in₂] ad *some*; usque ad Ελ Qι   caput₂]
          capite Cι Pδ   Capricorni₂] Cancri Βζ Dγ Εο Μγ Μλ Rε Vν Vτ

3-4   et ... Capricorni] *marg.* Qδ   in caput₂ ... caput₁] *om.* Wγ

4   et ... Capricorni] *om.* Gα Lγ Mo Pϱ Pξ Pυ Pω Qδ; *marg.* Rα Sκ Wα; quod Pβ   caput₁]
          interlin. Εα   caput Capricorni] *om.* Ββ Εδ   caput₁ ... estivale] caput Cancri est
          solsticium estivale(stivale Sι), caput(*add.* vero Ελ Rγ) Capricorni(*add.* est Cα Μλ Οφ Pφ Sι
          Vν) solsticium(*om.* Rγ) hyemale Βζ Cα Ελ Εο Μγ Μλ(caput Cancri *marg.*) Οφ Pφ Rγ Rε
          Sι Vν; caput Cancri est solsticium hyemale Vτ; et solsticium estivale, et capud Capricorni
          est solsticium yemale Dγ   Capricorni] Cancri Lλ   est] *om.* Wγ; in Lκ
          solsticium] *om.* Dδ Μπ   hyemale] gemale Wγ; hièle Sδ; hiemale Εκ Fγ Qγ Sθ
          Sλ Χδ; hiemamale Qε; iemale Rδ; yemale *many*; ymale Χα   hyemale ... Cancri] *om.* Pζ
          caput₂] *om.* Μα Μι Μτ Νγ Οχ Qε Sβ Sθ Wγ; *add.* vero Βθ Cγ Μκ Qμ Vμ Vo Vπ Vσ
          Cancri] *add.* solsticium Εα Qμ Zα; *add.* est Qδ Vυ; *add.* est solsticium Ογ Οη Qι
          estivale] hestivale Μλ; stivale Pβ   Scito] Nota Dη; Scias Cα; Sciendum Μμ Vμ
          Vo Wζ   Scito etiam] Sciendum Νζ Pκ Pχ   Scito ... quod] *om.* Wγ   etiam]
          om. Bη Dη Wζ; *interlin.* Χδ; *rep.* Rδ; ea Sη; vero Pσ   quod] *om.* Κα

4 - Cap. 21 line 4: solsticium ... meridiem] *from 15% to 30% of each line of ms Gα is cut off or too
          tightly bound to be read*

5   omnes] *om.* Nα Sη   duo] *om.* Bη Cδ Εμ Εν Gα Κα Pθ Qμ Vσ; 2 / 2° *many*
          equidistantes] equales distantes Cα; eque distantes Dγ Κα Lκ Μν Οφ Qη Sλ Vϱ Χα
          gradus] duorum graduum Εν; duorum graduum id est quodlibet in gradus
          equidistantes it est Qμ; id est 2ᵒʳᵘᵐ graduum Vσ   aliquo] aliquorum Pξ; altero Cγ;
          altitudo Wγ; latero Εγ   aliquo ... solsticiorum] alterior duorum solsticiorum versus
          meridiem vel alicuius Vτ   horum] eorum Sθ; illorum Μμ] istorum Βζ Cα Dγ Ελ Εο
          FγvΜγ Μλ Pφ Sι Vν Wι; istorum duorum Νζ Pκ Pχ Rε Vμ Wζ; istorum duorum
          punctorum Vo; *add.* duorum Dη Fγ Οβ Qη   solsticiorum] *add.* scilicet Cancri et
          Capricorni Dη   sunt] *om.* Pα; sint Sθ; sint sint Οχ   unius] *add.* alius Βη
          declinationis] et equalis convitionis Μτ

one is from the beginning of Capricorn to the beginning of Cancer, and the other from the beginning of Cancer to the beginning of Capricorn; and the beginning of Capricorn is the winter solstice, the beginning of Cancer the summer [solstice]. Know as well that every two degrees equidistant from any of these solstices are of one declination [*or* have the same declination]

versus septentrionalem vel meridiem; et dies eorum vel noctes sunt equales, et umbre et altitudines sunt equales in media die semper.

6   versus] *om.* Pω; ad Kγ Sκ(*interlin.*); ut Cγ   versus ... meridiem] *om.* Vτ; versus
           meridiem et versus 7ᵉᵐ Fγ   septentrionalem] aquilonem(*!*) Mτ   vel₁] et *some*; per
           Pτ; *add.* versus Cα   et₁] *add.* omnes Cα Oφ Pφ   eorum] horum Cγ Eγ Pξ
                  eorum ... noctes] et hore Wγ   vel₂] *om.* Vϱ; et *some*   noctes] *add.* eorum Eα
                  sunt equales] *om.* Bθ Eυ Mκ Vσ; *add.* si gressa comparacione(*?*) Oβ; *add.* similiter et
           noctes Wγ   umbre] [*illeg.*] umbre Mκ; *add.* quoque Wγ; *add.* quoque eorum Eγ Lλ
           Mα Nγ Oχ Pζ Qε Sβ Sθ Vβ Vγ   et₃] *om.* Rγ; *add.* similiter Bθ Eo Eυ Fγ Mγ Mκ Qμ
           Vπ Vτ Wι

6-7   et₂ ... altitudines] *om.* Dη   et₂ ... equales] *om.* Eβ Eσ Gα Nδ Qι Qλ Sλ Vα Vμ Wα Xβ;
           illeg. Cε

7   altitudines] altitudo Qε; latitudines Pν Vϱ; *add.* solis Fγ   altitudines ... semper]
           altitudo solis media die semper est equalis Wγ   sunt] *om.* Bβ Bη Bθ Cδ Cι Eα Eδ Eμ
           Eo Eϱ Eυ Fζ Kγ Kδ Kθ Lζ Lλ Mα Mγ Mι Mκ Mλ Mo Mν Nα Nγ Nε Nζ Oβ Oσ Oχ Pζ Pι
           Pκ Po Pυ Pχ Qδ Qη Qμ Rα Rδ Rε Sα Sβ Sη Sθ Sι Sκ Vγ Vν Vξ Vπ Vϱ Vτ Vυ Vφ Vψ Wζ
           Xα; similiter Wι   sunt equales] *om.* Bζ Dη Lκ Mυ Mφ Oν Pδ Vι   media] *rep.* Oχ
                  media die] *illeg.* Kθ; medio dei Fγ; meridie Eδ   die] nocte Wλ; nocte die Wι
                  die semper] *interlin.* Pχ   semper] *om.* Bγ Cη Eλ Eκ Eo Eτ Fγ Kγ Lβ Rγ Wβ Wι;
           simpliciter Dγ; *add.* equales Mκ; *add.* etc. Rδ; *add.* et illud est quia archus quos facit sol
           experiens in talibus gradibus sunt equales adminetur Lδ Oγ

toward the north or the south; and their days and nights are equal, and the shadows and altitudes at midday are always equal.

[Comment:

      Astronomical information useful for the following chapters:

      The ecliptic can be divided into two semicircles at the solstices, with the winter solstice at the beginning of Capricorn and the summer solstice at the beginning of Cancer.

      And pairs of points on the ecliptic equidistant from the either solstice will have the same declination (north or south of the celestial equator), and equal days and nights; and at midday the sun will have the same altitude and cast equal shadows.]

[CAPITULUM 14.] DE GRADU SOLIS IGNOTO PER RETHE HABENDO

Cap. 14] *om.* Dη Qη Wγ

1   De ... habendo] *om.* Bδ Bζ Bκ Cα Cγ Cδ Cε Dδ Eα Eγ Eζ Eκ Eλ Eυ Gα Kι Lκ Lζ Lι Mα Mκ
           Mμ Mτ Nα Nζ Oβ Oν Oσ Oχ Pγ Pι Pκ Pξ Pσ Pφ Pχ Qε Qι Rγ Sα Sβ Sη Sθ Sι Sλ Tβ Vα
           Vμ Vν Vo Vσ Vτ Vυ Vφ Wζ Wλ; *faded* Eδ Eo Fγ Lλ; Ad cognoscendum gradum ignotum
           Bη(*add. in marg.* 13); Ad cognoscendum gradum solis etc. Xα; Ad habendum gradum
           solis ignotum Vξ; Ad [*illeg.*] gradum solis ignotum Lμ; Ad inveniendum gradum solis
           ignotum Bγ(*later hand; add.* qualibet die) Kθ Mλ Po Qθ Qμ Wι; Capitulum 15ᵐ. De gradu
           solis ignoto Qδ; Capitulum de gradu solis ignoto Bε; De arte cognitionis ignotum gradum
           solis Eϱ; De cognoscendo gradum solis(*om.* Oη Eμ) ignotum Cζ Eμ(*marg.; add. in marg.*
           13ᵘˢ) Oη Pτ; De gradu solis(*marg.*) per rethe inveniendo Rδ; De gradum solis ignotum
           inveniendo per alhantabuth Kγ(*later hand; add. in marg.* 14); De inventione
           gradum(gradus Rε) solis ignotum Eζ Rε; De investigatione gradus solis(*om.* Pζ) ignoti Nγ
           Pζ(*marg.*) Vβ Vγ; Ignotum gradum solis qua arte cognoscas Mγ; Inventio gradus solis
           ignoti Dγ Oφ Vϱ; Inventio gradus solis ignoti et cetera Bι(*add. in marg.* 13 cᵐ); Inventio
           gradus solis ignoti per alhatas[*i.e.,* alhantabuz] vel per rethe habendo Mυ; Inventio
           gradus solis ignoti per alhantaz Rα; Invencio solis gradus(*add. marg.* ignoti Wβ) per
           alhantabuth Mν Wβ; Sequitur 14 canon Vη; Si vis scire gradum solis ingnotum(*!*) Bβ
                      ignoto] *om.* Kα   ignoto ... habendo] *om.* Mπ   per ... habendo] *om.* Eσ Zα
                      rethe] re[*del.*] Pμ; recte Fβ; rete Mδ Oγ Vψ; rethi Sδ   habendo] habendum Lβ;
           inveniendo Kα; *add.* Rubrica/Rx Pμ Vπ; *add.* Capitulum Nδ Qβ   *add. in marg.* 14ᵐ
           Vφ; *add. in marg.* 15 Vμ; *add. in marg.* 16 Mκ Oϱ(C. 16) Pκ Qζ(16ᵘˢ) Sδ(c. 16)

[CHAPTER 14.] ON FINDING THE UNKNOWN DEGREE OF THE SUN BY THE RETE
[i.e., finding the position of the sun along the ecliptic using the rete]

Si volueris cognoscere gradum solis ignotum, pone notam super altitudinem

2   Si] Cum Bη Bθ Bκ Cα Cδ Cζ Dγ Eλ Eμ Mα Mγ Mι Mλ Nγ Oη Oν Oϱ Oσ Oφ Oχ Pζ Pφ
         Qγ Rε Sα Sβ Sθ Sι Sλ Vα Vγ Vν Vπ Vσ Vυ Wι   volueris] vis *many*   cognoscere]
         om. Sλ Vα; agnoscere Eλ; ignoscere(*!*) Vη; noscere Vμ Vo; scire Bκ Cγ Cδ Cζ Eα Eγ Eζ Eκ
         Eμ Eσ Gα Lζ Lλ Mα Nγ Nζ Oν Oϱ Oσ Oχ Pσ Pτ Qε Sα Sβ Sθ Sι Vγ Wι Zα; scire vel
         cognoscere Kα; *add. interlin*. al' scire Vβ   solis] *om.* Cγ Eγ   ignotum] in notum
         Mι Nγ   pone] ponam Mυ; *add.* gradum solis Xδ; *add.* regulam Pφ; *add. 7 lines* Cα;
         add. interlin. scilicet in almucantarath Qμ   notam] nota Mι Nγ; regulam Mγ Vν; *add*.
         cum incausto Vη; *add*. sciliciem Kθ; *add*. super almicantarat Zα   super] solis
         meridianam Pι; sive Vσ; supra Lκ   altitudinem] *illeg.* Pσ; lineam Bζ; solis Kθ; *add*. in
         linea Pι; *add*. in rethi et regula regionis Wλ; *add*. inter almicantarat Vη; inventum per
         dorsum Cζ; *add*. scilicet solis Bβ; *add*. solis Vμ Vo

2-3   Si … astrolabii] Cum volueris cognoscere gradum solis ignotum id est si no|veris in quo
         gradus signi in rete in quocumque die sit sol debes accipere per dorsum astrolabii
         maiorem altitudinem in meridie illius diei et scias quot gradus ascendit et numera tot
         gradus in almuchanterath et in fine illorum graduum in linea meridiana pone notam. Et
         post modum volve rethe donec aliquis gradus cadat super notam et ille gradus vel eius
         nadyr est gradus solis illius diei. Et pone regulam vel notam super altitudinem medie
         diei in mediate scilicet quam sumpsisti prius per regulam in dorso astrolabii. Oφ; Cum
         volueris cognoscere gradum solis ignotum id est si [*illeg.*] in quo gradus signi in rethe in
         quocumque diei sit sol debes accipere per dorsum astrolabii maiorem altitudinem in
         meridie illius diei et scias quot gradus ascendit [*illeg.*] numera tot gradus inter
         almucantarat et in fine illorum graduum in linea meridiana pone notam. Et post modum
         volve rethe donec alius gradus cadat super notam et ille gradus vel eius nadyr est gradus
         solis in signo per illo die. Et postea pone regulam et notam super altitudinem medie diei
         imediate quam sumpsisti prius in dorso astrolabii. Cα   notam … medie] [*illeg.*] g^{re} in
         soli super altitudinem in rethe et [*illeg.*] omnis Gα

If you wish to learn the unknown degree of the sun, place a mark on its midday altitude

medie diei, quam sumpsisti prius per regulam in dorso astrolabii. Deinde volve rethe,
cadentque duo gradus super ipsam notam; quarum unum scies esse gradum solis per
5   signum mensis cuius fuerit dies.

3   medie] *marg.* Lδ   medie diei] diei in medie Cγ Eγ; diei in medietate Sλ; meridiei Kε
Kι Mτ   diei] celi Pκ Pχ; die Nγ; *add.* illius in dorso astrolabii suspensi Bδ Pξ; *add.* in
linea meridiana Nζ; *add.* in medietate Fγ Oϱ Sα; *add.* in medietate scilicet Vσ; *add.* in
medietate solis Pτ; *add.* scilicet Bκ Gα Mλ Rε Vτ; *add.* scilicet in medietate Vα; *add.* sive
medietate scilicet Eo; *add.* solis diei super almicantarath Lδ; *add.* super almucantarath Oγ;
add. super lineam medii diei Tβ   quam] in medietate scilicet a qua Bη Eμ Oη; in
medietate a qua Cζ Eλ; in medietate(mediate Pφ Wι) scilicet quam Bθ Cδ Eυ Mγ Eo Lζ
Mκ Oν Pφ Vβ Vι Vπ Wι; quamquam Eδ Eξ; quas Oϱ; quia Lζ; si qua Dγ; *add. in marg.* "In
medietate" etc. usque "Deinde voluens" est littera addita Vβ   quam ... regulam] *om.*
Pι   quam ... astrolabii] *om.* Cγ Eγ Lλ Mα Mι Nγ Pζ Qε Sθ; *marg.* Sβ;   sumpsisti]
assumpsisti Fγ; invenisti Bδ Dδ Eβ Eη Eσ Fβ Fζ Kα Kδ Kε Kι Lβ Lγ Lδ Lε Lη Lι Lκ Lμ Mδ
Mη Mμ Mπ Mτ Mυ Mφ Nδ Nε Nζ Oγ Oζ Oι Oξ Oυ Pα Pβ Pδ Pθ Pκ Pμ Pν Pξ Pχ Qβ Qγ
Qζ Qθ Qι Qλ Rδ Sδ Sκ Tβ Tδ Vμ Vo Wα Wζ Xβ Xδ; scilicet Sλ   prius] *om.* Bε;
primum Eα; *add.* altitudinem Cζ Oη   per regulam] *om.* Cα Pφ Rε; per regulas Qγ;
per tabulam Mν; *add.* signando diligenter punctum ultima quam non ascendit tunc notam
illum Lδ Oγ   per ... astrolabii] *add. interlin.* va...cat Lε   astrolabii] abstrolabii Pα
      volve] move Kε MτQζ Qθ; volvens Mι Nγ Qε Sθ Sλ Vβ; volves *some*   rethe]
recte Cγ Oχ Qε Vυ; recte *corr. to* rete Wα; rete Bη Bκ Cδ Cζ Eγ Eμ Lλ Mα Nα Oν Oυ Pζ
Pφ Sθ Sλ Vα Vγ Vψ; rhete Oγ; rotam Mι Nγ; *add.* donec Eγ; *add.* donec aliqui gradus
tanget(cadent Vη Zα) super illam(alium Vη) notam in predictam lineam descriptam Tβ
Vη Zα

4   cadentque] candendem Oη; cadent *some*; cadent quoque Pι; caderit Eγ; cadet Mα; eodem
et Sθ; et cadent Oϱ; et caden quot Kα; *add.* duo gradus qui erant equidistantes ab aliquo
duorum solsticiorum Wλ   cadentque duo] [*blank*].d. Sλ   duo] *om.* Pγ Qι; 2 *some*;
duos Lκ Wβ; *corr. from* duos Mμ; et Mτ   gradus] gradibus Vϱ; *add.* duorum
signorum Rε; *add.* videlicet duo que equidistant ab aliquo solsticiorum non accipies
signum pro notam sed pro duodecima parte zodiaci Oη   super] secundum Vσ
      ipsam] *om.* Kε Kι Mτ Qζ; illam Vτ   notam] altitudinem Oβ; *add.* altitudinis Bζ
Bθ Dγ Eλ Eμ Eo Mγ Mκ Mλ Pτ Qμ(*interlin.*) Rε Vν Vπ Vσ Vτ Wλ; *add.* altitudinis solis
Cα; *add.* factam in lineam medii celi Vμ Vo; *add.* ipsam altitudinis Fγ Wι; *add.* videlicet
duo que equedistant ab aliquo solsticio Cζ   quarum] quorum *many*; *add.* gradum Cζ
Eμ(*interlin.*); *add. interlin.* altitudinem Oφ   unum] *om.* Mμ; unumque Vγ; utriumque
Lλ(*add. interlin.* ali' unum)   scies] scias Bκ Dδ Mτ Pζ Pι Pφ Wζ   esse] *om.* Bβ Cγ
Eλ Mυ Oγ Vτ   solis] *om.* Mδ Nδ

5   signum] *add.* non accipiatur signum per nota vel 12ª parte zodiaci Cζ; *add.* solis Vϱ; *add. in
marg.* per mensem non poteris scire utrum sol ascendat ad nos vel recedat a nobis Qμ
      cuius] cum Oχ; *add.* mensis(?) Vo   fuerit] *add.* ille(?) Vo; *add. illeg.* Qι
      dies] *om.* Vα Xβ; *add.* cognosces quas fit Fγ; *add.* etc. Rδ

which you have previously taken with the rule on the back of the astrolabe. Then turn the rete and two degrees will fall on the said mark, one of which you will know to be the degree of the sun by the sign of the month of which it will have been the day.

[Comment:

To ascertain the position of the sun along the ecliptic, measure the altitude of the sun at midday. Then rotate the rete until the ecliptic is over the intersection of the almucantar of that altitude and the midday line, i.e., the vertical diameter.

There will be two possibilities depending on how far you turn the rete, for instance, a degree in Gemini and a degree in Leo. Common sense will tell you which to choose, i.e., Gemini if it is springtime or Leo if it is autumn.]

[CAPITULUM 15.] QUIS DIES CUI DIEI SIT EQUALIS

Si volueris scire que dies cui diei sit equalis, scies hoc per gradus

Cap. 15] *om.* Wγ

1   Quis ... equalis] *om.* Bδ Bε Bζ Bκ Cα Cγ Cδ Cε Dδ Dη Eα Eγ Eκ Eλ Eυ Gα Kι Lζ Lι Lκ Lλ
       Mα Mι Mκ Mτ Mτ Nα Nγ Nζ Oβ Oν Oσ Oχ Pγ Pζ Pι Pκ Pξ Pσ Pφ Pχ Qε Qζ Qη Qι Qλ
       Rγ Sα Sβ Sθ Sι Sλ Tβ Vα Vγ Vη Vμ Vν Vo Vσ Vτ Vυ Vφ Wζ Wλ; *faded* Eδ Fγ; *illeg.* Eζ;
       Ad inveniendum gᵒsse(= grosse?) qui dies sint equales Bγ(*later hand*); Ad inveniendum
       que(qui Qθ) dies sint equales Lμ Qθ; Ad sciendum quis dies cui diei sit equalis Dγ Mλ
       Oφ; Capitulum 16ᵐ. Que dies cui sit equales Qδ; Cognitio quis dies cui diei anni sit
       equalis Vβ Wβ; Cognoscio qua dies cui dei sit equalis Mυ Vι; De dictus que dies cuilibet
       diei sit equalis Kα; De equalitate dierum Mπ Zα; De mgⁱtione/ingⁱtione diei cui sit equalis
       Rε; Invencio equalitatis dierum Kθ Po Qμ Sη Wι; Que dies circuli sit equalis Pτ; Qui dies
       anni cui diei sit equalis Eμ(*marg.; add. in marg.* 14ᵘˢ); Quis dies sit equalis Kγ(*later hand;*
       add. in marg. 15)   Quis] Que Bη Bι Cζ Fζ Mν Mφ Vξ Wμ   dies] *add.* anni Bι(*add.*
       in marg. 14 cᵐ) Cζ Oη Vϱ   equales] *add.* altitudo Rδ; *add.* Capitulum Qβ; *add.*
       habendus Kδ; *add.* Rubrica/Rx Bθ Vπ; *add.* sequitur capitulum Mo   *add. in marg.* 14
       Bη; *add. in marg.* 15ᵐ Vφ; *add. in marg.* 16 Vμ; *add. in marg.* 17 Mκ Oϱ(C. 17) Pκ Qζ(17ᵘˢ)
       Sδ(c. 17)

2   Si] Cum Cα Cγ Cδ Dγ Eλ Eo Mλ Oφ Oχ Pφ Rε Sα Sι Vβ Vν Wι; Cum enim Sβ; Cum
       etiam Bη Bκ Cζ Eμ Lζ Lλ Mι Nγ Oη Oν Oϱ Oσ Pζ Qε Sθ Sλ Vα Vγ Vυ; Cumque Eγ; *add.*
       etiam Bθ Eυ Fγ Mα Vβ(*interlin.*); *add.* vero Dη   volueris] *om.* Oχ; vis vel volueris Xα
            que] quis Bι Lι Pξ Vν Vϱ Vτ   que dies] *om.* Kα; Rδ   dies] *add.* presenti Pι
            cui] *om.* Oβ Vσ; cuius Qε Xβ; cuiuslebet Kα; que Bζ   diei] *om.* Cγ Eγ Qγ Vσ
            sit] *rep.* Eσ Pφ   scies] *om.* Oχ Sι Vτ Wβ; scias Bδ Dγ Eα Eβ Fζ Kα Mτ Mυ Mφ
       Oζ Qβ Qγ Sκ Tδ Vη Xβ   hoc] *om.* Cε Dη Qι; hec Wβ hic Oϱ; *add.* quod per Qη
            gradus] gradum Fζ Lλ Nγ; signa Eζ

2-3   gradus equidistantes] gradum equidistantem Bι Cη Eτ Mo Pγ Pτ Pυ Qδ Sι Sη Vξ Vϱ Vτ
       Wβ; *corr. from* gradum equidistantem Bγ

[CHAPTER 15.] WHAT DAY IS EQUAL TO WHICH DAY

If you wish to know which day is equal to which day, you will know this by the degrees

equidistantes a solsticiis, quia eorum dies sunt equales, sicut dictum est superius.

3   equidistantes] distantes Pξ; eque distantes Bβ Bδ Kα Lκ Mν Qη Xα; eque distantem Vϱ
         a] *om.* Nα; et Rδ; per a Xα   solsticiis] sosticō Cδ   quia] quare Fγ Oϱ
         dies] *om.* Eλ; declinationes Rε Vτ; add. semper cuius/eius Nζ   dies ... superius]
         om. Vϱ   sunt] erunt Dη; *add.* declinationes Eλ   equales] *om.* Vσ; *add.*
         delinquitur[6](de relinquitur Rε) quod nocte noctibus preter modicum Dγ Mλ Rε; *add.*
         reliquitur ergo quod nocts sunt equales et dies equidistantes Fγ; *add.* relinquiturque
         noctibus graduum quod noctes noctibus et dies diebus equidistantium ab altero preter
         modicum Mκ; *add.* relinquiturque quod nocte noctibus preter modicum sunt equale Oν;
         add. relinquiturque noctes noctibus et dies diebus equidistantes ab uno solsticio sunt
         equales preter modicum Eυ; *add.* relinquiturque quod noctes noctibus et dies diebus
         equidistantium graduum ab uno solsticio noctibus graduum equidistantium ab altero
         preter modicum Bζ Vν; *add.* relinquiturque quod noctes noctibus et dies diebus [*blank*]
         noctibus graduum equidistantium ab altero preter modicum Bθ; *add.* relinquiturque
         quod noctes noctibus et dies diebus alicui ab uno solsticio noctibus graduum
         equidistantium ab alterorum preter modicum Eo; *add.* relinquiturque quod noctes
         noctibus et dies diebus noctibus graduum equidistantium ab altero preter modicum Vπ;
         add. relinquiturque quod noctes noctibus et dies diebus equidistantium graduum ab uno
         solsticio noctibus graduum est ab uno solsticio noctibus graduum equidistantium ab
         altero preter modicum Mγ; *add.* relinquiturque quod noctes noctibus graduum eque
         distantium ab uno solsticio noctibus graduum equidistantium ab alterutro preter
         modicum Wι; *add.* relinquitur quod nocte noctibus preter modicum Vτ; *add.* ut dictum est
         superius. Relinquiturque quod noctes noctibus et dies diebus equidistantium graduum
         ab uno solsticio ab noctibus graduum equidistantium ab altero preter modicum Oβ
                  sicut] *om.* Zα; sic Lβ; ut Bζ Bθ Bκ Cγ Dγ Eα Eγ Eo Eυ Lι Mγ Mλ Mτ Nζ Oν Pκ Pχ
         Qη Rγ Rε Vπ Vσ Vτ Wζ Wι   sicut ... superius] *om.* Eλ Eτ Fγ   dictum] predictum
         Bκ Kι Lε Oν   est] *om.* Kι Oχ   superius] *om.* Bε Bκ Cγ Eγ Lδ Lζ Mι Mυ Nγ Oγ
         Oν Pκ Pσ Pχ Sι Sλ; iam Cδ; prius Bδ Cα Dη Eβ Eη Eσ Fβ Fζ Gα Kα Kγ Kε Kθ Lε Kι Lβ Lγ
         Lη Lι Lκ Mπ Mτ Mφ Nδ Oζ Oι Oξ Oτ Oυ Pα Pμ Pν Pξ Pϱ Pω Qβ Qγ Qθ Qλ Tβ Vη Vι Vo
         Wα Wμ Xβ Xδ Zα; supra Qη Vμ Wζ; *add.* etc. Rδ

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[6] In ms Mλ, Cap. 11 and 12 are inserted at this point.

equidistant from the solstices, since the days of those [degrees] are equal, as was said above.

[Comment:
        If you want to know to know which day is equal to which other day, look at the degree of the sun in the ecliptic for the day, and days which are equidistant from the solstices by the same amount are equal, as was said above (Cap. 13).]

[CAPITULUM 16.] DE INVENTIONE GRADUS STELLE CUM QUO CELUM MEDIAT

1   De ... mediat] *om.* Bδ Bε Bζ Bκ Cα Cγ Cδ Eα Eγ Eκ Eλ Eσ Eυ Gα Lκ Kε Kι Lζ Mα Mι Mκ
         Mμ Mτ Nα Nζ Oβ Oν Oσ Pγ Pι Pκ Pξ Pσ Pφ Pχ Qε Qη Qθ Qι Rγ Sα Sβ Sη Sθ Sι Sλ Tβ
         Vα Vη Vμ Vν Vo Vσ Vτ Vυ Vφ Wγ Wζ Wλ Xα; *faded* Eδ Eo Fγ Lλ; *illeg.* Eζ; *partly in marg.*
         Pθ; Ad habendum gradum celi cum quo stella de linea mediat vel oritur Mλ; Ad
         sciendum cum quo gradu veniat stella ad lineam meridianam vel oriatur Vγ; Capitulum.
         Ad inveniendum que stella cum gradu zodiaci oriatur Lμ; Capitulum 17ᵐ. De gradu
         stelle cum quo celum [*illeg.*] Qδ; Cum quo gradu quelibet stella celum mediat vel oritur
         Bι(*add. in marg.* 15 cᵐ) Vϱ; Cum quo gradu quelibet stella mediet(mediat Oη) celum vel
         cum quo oriatur Bη(*add. in marg.* 15) Cζ Eμ(*add. in marg.* 15ᵘˢ) Oη; Cum quo gradu sit
         stelle in ortu vel in medio celi(*om.* Mγ) Eϱ Mγ Vξ; Cum quo gradu stella celum mediat
         Pτ; Cum quo gradu stella veniat ad mediam lineam Pζ(*marg.*); Cum quo gradu stella
         veniat ad medium celi vel oritur vel occidat Kγ(*later hand*; *add. in marg.* 16); Cum quo
         gradu stella venit ad medium celi(celum Vι) Mυ Vι Wβ; Cum quo gradu stella venit ad
         meridiem Eτ Mπ; Cum quo gradu venit stella ad mod' celi Mν; De gradu stelle Zα; De
         inventione gradus cum quo stella aliqua celum mediat Rε Vβ(*add. in marg.* cum quo
         gradu veniat stella ad meridianam linineam); Ex quo gradu veniat stella ad meridianam
         lineam Mι Nγ; Invencio gradum cum quo stellam meridialis oritur Kθ; Invencio gradum
         cum quo stella(stellam Dγ Oφ) celum mediat Bγ(*later hand*) Dγ Oφ Wι; Invencio gradum
         cum quo stella(stellam Qμ) celum mediat vel oritur Po Qμ Rα(*add.* vel occidit); Si vis
         scire cum quo gradu zodiaci aliqua stela venit ad meridiem Bβ   De inventione]
         Inventio Mo Xβ   stelle] *om.* Oϱ; *add.* in nocte Bθ Pδ Vπ; *add.* note Pυ; *add.* Rubrica Vπ
              cum ... mediat] per filum Fβ; *om.* Pν; *add.* Capitulum Nδ Qβ   quo] *om.* Pβ
              celum] rep. Rδ   mediat] *om.* Xδ; medicat Tδ; medum Oϱ; *add.* etc. Rδ   *add.*
         in marg. 16ᵐ Vφ; *add. in marg.* 17 Vμ; *add. in marg.* 18 Mκ Oϱ(C. 18) Pκ Qζ(18ᵘˢ) Sδ(c. 18)

1-4   *Ms Kα inserts the following, then Cap. 16, line 5, then Cap. 17, then the standard Cap. 16, lines
         1-4*:
         DE GRADU SOLIS INVENIENDO IN RETHE
                  Si vis invenire gradum solis in rethe considera altitudinem solis in meridiei et
         move rethe et videt duo gradus zodiaci super cenith altitudinem super almītrarat in linea
         meridionali vel meridiona quorum unum scias esse gradum per signum cuius fuerit dies.

[CHAPTER 16.] ON FINDING THE DEGREE OF A STAR WITH WHICH IT DIVIDES [I.E., COMES TO THE MIDDLE OF] THE SKY

Si volueris scire cum quo gradu aliqua stella venit ad medium diem, vel oritur, pone stellam super lineam medie diei, quia gradus qui ceciderit super eandem lineam

2   Si] Cum Bζ Bη Bκ Cα Cγ Cζ Dγ Eγ Eo Eυ Lλ Mα Mγ Mι Mκ Mλ Nγ Oη Oϱ Oσ Oφ Oχ Pζ Pφ Qε Rε Sα Sβ Sθ Sι Vα Vβ Vν Vπ Vσ Vυ Wι; *add.* autem Bκ   Si ... medium] *om.* Xα   Si ... oritur] *om.* Vγ; Ad hoc sciendum Wγ   scire] invenire Kα   cum] *om.* Oχ Pμ Rγ; in Mι Qδ   quo] *interlin.* Vτ   gradu] per gradum Vη; *add.* accedit sive Cγ; *add.* zodiaci Bβ Nζ; *add. interlin.* signi Oι   aliqua] *om.* Dη Fγ Pξ Xβ; ā Cδ   stella] *om.* Oγ; *add.* celum mediat Fα; *add. interlin.* in reti non posita Qμ   venit] inieint Bγ; venent Vπ; venerit Oφ; veniet Fγ   ad] *om.* Mτ   medium] mediam *some; add. in marg.* [*illeg.*] medium celi Qζ   diem] *om.* Qε; celi Eμ Eυ Fγ Gα Mγ Mλ Nζ Oη Pκ Pχ Rε Vμ Vν Vo Vπ Vσ Vτ Wζ Wλ; celi diem Eη; celi vel ad medium diem Oν Qβ(*add. illeg.*); celum Bε Bζ Dη Eλ; celum vel diem Lδ; diei Pφ; *add. interlin.* vel celi Bγ; *add. interlin.* scilicet celi vel arcum Qμ   vel] *om.* Cα; aut *some;* quando Cγ   vel oritur] *om.* Eσ; partem Sθ   oritur] *cut off* Eκ; ad hortum Nα; ad ortum Bδ Bε Cα Cε Cι Dδ Dη Eβ Eη Fα Fβ Fζ Kδ Lγ Lδ Lε Lη Lι Lκ Lμ Mδ Mη Mτ Mμ Mφ Nδ Nε Oι Oζ Oξ Oϱ Oτ Oυ Pα Pβ Pθ Pμ Pν Pξ Pϱ Pσ Pω Qγ Qθ Qλ Rδ Sα Sδ Sη Sκ Tβ Tδ Vη Vι Vψ Wα Wμ Xβ Xδ Zα; orizon Oχ; ortum Dγ Eλ Kε Kι Mγ Mκ Mλ Oγ Oφ Pφ Qβ Qζ Qι Sι Vν Vo Vπ Vσ Vτ; ortum vel occasum Fγ; *add.* eius Vη; *add.* eius orizontem occidentem Zα; *add.* vel occasum Cα Oφ Pφ; *add. interlin.* sive occidit Cδ

3   stellam] *om.* Kδ; *add.* meridie Sι   super] *add.* eandem Bε   lineam₁] *add.* eandem est gradus quesitus Pμ   lineam₁ ... super] *om.* Oτ   medie diei] *om.* Bε(*add. interlin. illeg.*); diei superius Sι; medie celi Wγ; medii diei Nγ; medii dies Qε; meridiei Cγ Eγ Eδ Mμ Nζ Oβ Pκ Pν Pχ Vγ Vo Wζ; meridiei vel medie diei Bη Cζ Eμ   quia] *om.* Mκ; et Bβ Bε Cα Cγ Cδ Eγ Eλ Gα Lβ Mμ Oβ Oγ Oσ Qη Sλ Vη Wγ Wμ Zα; et nota punctum(?) Nζ; quare Oϱ; qui Vσ; ui Bθ; ut Pι; *add.* inehipticia(?) Dδ   quia ... qui] qui gradus qui gradus Vπ   gradus] *add.* i^e qui zo^co Cα; *add.* signi Lβ(*interlin.*); *add.* zodiaci Bε Zα; *add.* zodiaci scilicet Sι   qui] *om.* Vσ Xβ; *add.* semper Xδ; *add.* tunc Wμ; *ms* Fε *begins*   ceciderit] ascenderit Xβ; cecideris Vσ; cecidit Bκ Eα Mτ Pγ   eandem] *om.* Bδ Cε; eam Dγ Mγ Mλ Oφ PφWι   lineam₂] *om.* Cα Eγ Lδ Oγ Oν; *add.* vel punctum(?) Nζ; *add. interlin.* meridianam Tβ

3-4 qui ... quesitus] *om.* Mη; *rep.* Lλ

3-5 super₁ ... occidentalem] in ortu vel in medio celi vel in ocasu et vide quis gradus zodiaci sit in his locis cum illis veniunt ibi Fγ

If you wish to know with which degree any star comes to the meridian, or rises, set the star on the midday line, since the degree which falls on the same line

est gradus quesitus. Similiter fac ad lineam orientalem et occidentalem.

5   Gradum[1] vero longitudinis habebis per filum positum super polum zodiaci per

4   est] *om.* Eο; et Vη; erit Cγ Cδ Eγ Lλ Mι Oχ Sθ Sλ Vγ Wγ   est … lineam] *om.* Bδ Eη
           gradus] *om.* Bκ Lε   quesitus] *om.* Pκ Pχ; *add.* medie diei Pμ   Similiter …
           occidentalem] Similiter facies in ortu alicuius stelle et occasum id est pone caput stelle in
           prima almicantera ex parte oriente et vide quis gradus zodiaco incadit super illam
           almicanteram primam capite illius stelle stante super illam almi^raz et ille est gradus cum
           quo venit illa stella ad ortum et peritur de occasu alicuius stelle operandi est. Cα
           fac] *om.* Cγ Pζ; faciens Vτ; facies Bη Bθ Bκ Cα Cδ Cζ Dγ Eλ Eμ Eυ Lζ Mα Mι Mκ
           Nγ Oβ Oϱ Oσ Oφ Qε Rε Wβ Sα Sθ Sι Sλ Vα Vβ Vπ Vσ   lineam] *om.* Kθ; horam Rγ
           orientalem et] *om.* Eγ Wγ; orizontem Vυ; *add.* de gradu ascendente et occidentalem
           Kα   et] vel *some*   et occidentalem] *om.* Bβ Bζ Bκ Cδ Dγ Eα Eμ Eo Eϱ Eσ Kθ Lζ
           Lλ Mα Mγ Mι Mλ Mμ Mν Nγ Oσ Oχ Pζ Pκ Po Pτ Pχ Qε Rα Sβ Sθ Sι Sλ Vα Vγ Vν Vo Vϱ
           Vυ Vφ Xα; *cut off* Gα; etc. Nζ; et patet propositum Vμ; scilicet primum almicantaraz Oη;
           add. et ad lineam terre et orientis Wγ; *add.* scilicet primum almucantarat Cζ; *add.* [*cut off*]
           que stella orota cum gradu solis Gα; *add. in marg.* "et occidentalem" est litera addita Vβ;
           add. in marg. illeg. Nζ

4-6   et … inventum] *marg.* Eζ(*later hand*) Qμ(*later hand*)

5   *before* Gradum] *add.* DE GRADU LONGITUDINIS STELLE (STELLARUM Kδ Pθ Rδ) Cι Kδ Mη Nε
           Pθ Rδ Sκ Vψ Zα; *add.* DE GRADU LONGITUDINIS(LONGITUDINIBUS Sδ) STELLE(*om.* Kα;
           STELLARUM Oυ Pβ) PER FILUM Eβ Eη Eσ Fα Fβ Fζ Kα Lβ Lγ(*twice*) Lδ Lε Lη Mδ Mι Mυ Mφ
           Nγ Nδ Oγ(*add.* habendo) Oζ Oι Oϱ Oτ Oυ Pα Pβ Pμ Pν Pϱ Pω Qβ Qγ Qλ Sδ Tδ Vι Wα
           Wμ Xδ; *add.* DE GRADU LONGITUDINIS STELLE HABENDO Pδ; *add.* DE INVENTIONE GRADUS
           LONGITUDINIS EIUSDEM STELLE Vβ; *add. in marg.* 18 Vμ; *add. in marg.* 19 Oϱ(C. 19) Pκ
           Qζ(19us) Sδ(c. 19)   Gradum] Iradum Rδ; Gradus Pφ Xβ   vero] *om.* Xδ; quoque
           Fε Mι Nγ; *add.* stelle P   longitudinis] *illeg.* Pξ; latitudinis Bθ Vπ; *add.* stelle Bε Eη Kγ
           Lδ Nζ Oγ Oι(*interlin.*) Qι Vμ Vo Vψ Wζ(*interlin.*); *add.* stellarum Kδ; *add.* superp^e(?) a
           principio alicuius signi Tβ   habebis] *om.* Pβ; *marg.* Lη; habebit Pφ   filum] solem
           Sα   super] supra Mτ; *add.* stellam et Vξ; *add.* stellam et super Fγ   polum] filum
           in polo Wλ; polus Eμ   zodiaci] *om.* Pβ; zodyaci Bγ Fβ Lκ Vη Wι; *add.* qui est centrum
           zodiaci Zα   per] *add. illeg.* Qζ

5-6   Gradum … inventum] *om.* Bζ Bη Bι Bκ Cα Cγ Cζ Dγ Eγ Eα Eδ Eo Eϱ Gα Lζ Lι Lλ Mα Mγ
           Mλ Mν Oη Oσ Oχ Pζ Po Pτ Qε Rα Sβ Sθ Sι Sλ Vα Vυ Vφ Wγ Xα; *marg.* Eμ Oφ Wι; Quia
           gra Pι

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[1] Some mss treat this as a new capitulum, with or without an added title.

is the degree sought; do the same for the east line and the west [i.e., for the rising and setting of the star on the horizon].

Moreover you will have as a discovered fact the degree [or the discovery of the degree] of longitude through a string placed on the pole of the zodiac across

totam declinatione inventum.

6   inventum] *add.* azimuth sit sol Vη; *add.* et similiter a cume stelle Eλ Vτ; *add.* Iste modus
           non est omnino verus quia perietis proprie non est super polos zodiaci Lδ Oγ; *add.* per 23
           gradus qui est proxima declinatio Zα; *add.* per filum in(per Pκ Pχ) qua(quam Pκ Pχ Vμ
           Vo Wζ) transiens per cuspidem stelle quesite et per(*om.* Vo) gradus zodiaci et gradus
           cadens(contactus Vμ Vo) a(cum Vμ) filo est gradus(*add. interlin.* longitudinis Wζ) stelle
           Mμ Nζ Pκ Pχ Vμ Vo Wζ; *add.* super arcum stelle Rε; *add. alternative version of Cap. 18 in
           8.5 lines* Vσ

the whole declination.

[Comment:

To find the degree of the ecliptic which crosses the meridian at the same time as a particular star (i.e., mediation), turn the rete so that the star is on the meridian line and then observe what degree of the ecliptic is also on the meridian line.

This can also be found by running a string from the pole of the zodiac to the star and on to the ecliptic.]

[CAPITULUM 17.] DE ALTITUDINE CENITH SOLIS HABENDO

Si volueris cenith altitudinis solis scire, accipe altitudinem eius qua hora volueris

1   De ... habendo] *om.* Bδ Bε Bζ Bκ Cα Cγ Cδ Cε Dδ Eγ Eα Eκ Eλ Eσ Eυ Fε Gα Kε Kι Lζ Lι
Lκ Mα Mκ Mμ Mτ Nα Nζ Oβ Oν Oσ Oχ Pγ Pι Pκ Pξ Pσ Pφ Pχ Qε Qζ Qη Qι Rγ Sα Sβ Sθ
Sι Sλ Tβ Vα Vη Vμ Vν Vo Vσ Vυ Vφ Wγ Wζ Wλ; *faded* Eδ Eo Fγ Lλ; *illeg.* Eζ; Ad
habendum cenith ortus(*del.*) solis Mλ; Ad habendum altitudine(*interlin.*) cenith solis(*add.
in marg.* vel alicuius stelle) per azimuth Eϱ; Ad habendum cenith solis per azimuth Mγ
Vξ; Ad inveniendum cenith altitudinis solis vel alicuius(*om.* Mυ Vι) stelle Eτ Mν Mυ Vι
Wβ; Ad inveniendum cenith(cenit Lμ) in qualibet altitudinis solis Lμ Qθ; Ad sciendum
zenith solis Vγ; Capitum 18^m. De zenith altitudinis solis Qδ; De altitudine cenith ipsius
sive solis capitulum Qβ; De cenith(cenit Zα; chenith Mπ) altitudinis solis Mπ Pτ Zα; De
cenith(cenich Mι Nγ) solis Mι Nγ Pζ(*marg.*); De cenith(czenit(Bη) solis et stellarum in qua
parte orizontis(orientis Cζ) oriuntur vel occidunt Bη(*add. in marg.* 16) Cζ Eμ(*marg.; add. in
marg.* 16us) Oη; De eodem Sη; De inventione altitudinis cenith solis vel stelle Vβ(*add. in
marg.* Hoc capitulum "Gradum vero longitudinis" est additum); De inventione zenith
altitudinis stelle Kγ(*later hand; add. in marg.* 17); Doctrina ad inveniendum cenith vel
centrum(?) solis in qualibet hora Bι(*add. in marg.* 16 c^m); Inventio cenith Oφ; Inventio
cenith alti Wι; Inventio cenith altitudinis solis vel stelle Kθ Po Qμ; Inventio chenith ipsius
solis Bγ; Invencio cenit solis Dγ; Inventio cenith vel centh vel sunt in omni altitudine Rα;
Inventio cenith vel centri(?) solis in qualibet hora Vϱ; Si cenit solis scire desideras Bβ

     cenith] çenich Xα   habendo] *om.* Cι Dη Eβ Eη Fα Fβ Fζ Kα Kδ Lβ Lγ Lδ Lε Lη
Mη Mφ Nε Oγ Oζ Oϱ Oτ Pα Pβ Pθ Pμ Pν Pϱ Pω Qλ Rδ Sδ Sκ Tδ Vτ Vψ Wα Wμ Xα Xβ
Xδ; *illeg.* Oξ; habenda Mo; invenienda Bθ Pυ Vπ; inveniendo Pδ; vel stelle Rε   *add.
in marg.* 19 Vμ; *add. in marg.* 20 Mκ Oϱ(C. 20) Pκ Qζ(20us) Sδ(c. 20)

2   *before* Si] *add.* Cenit solis [*illeg.* = erit?] ille ponitus firmamenti qui directe ponitur in linea
qui [*illeg.* = venit?] a cenit capitis tui ad illum punctum illa linea notatur asimut. Fε

     Si] Cum Bδ Bζ Bη Cα Cγ Cδ Cζ Dγ Eγ Eλ Eμ Eo Lζ Lλ Mα Mγ Mι Mλ Mo Nγ Oη
Oν Oϱ Oσ Oφ Oχ Pζ Pφ Qε Rε Sα Sβ Sθ Sι Vα Vτ Vν Vυ Wι; Cum autem Bκ Vι; Cum hoc
Wγ; *add.* autem Fγ; *add.* ergo Fε; *add.* vero Bθ Mκ Vπ Vσ   Si ... scire] *om.* Vγ

     cenith] *and elsewhere* ceni Sθ; cenit Bζ Eϱ Fβ Kα Pμ Qε Wλ; cenich Eo Mι; cent Eγ;
centrum Eμ(*add. interlin.* Id est cenith); chenith Vτ; sinith Lι; tuch Cδ(*add. interlin.* vel
ascenth); zenit Bη Cγ Pκ Wζ; zenith Kδ Kι Lκ Pϱ Pσ Pχ Qδ Sα Vα Vυ Vφ   cenith ...
solis] *om.* Wγ; solem Sλ   altitudinis] *om.* Bβ Bγ Bζ Bη Bι Bκ Cζ Cη Eγ Eδ Eμ Eo Eϱ
Eυ Gα Kθ Lδ Lζ Lλ Mα Mγ Mι Mμ Mν Nγ Oγ Oη Oϱ Oσ Oχ Pζ Pι Pκ Po Pτ Pυ Pχ Qε
Qη Rα Rγ Sα Sβ Sθ Sι Vα Vν Vξ Vϱ Vυ Wζ Wι Xα; *interlin.* Cδ Eζ Qμ; altitudinem Eη Kδ
Vψ; corporis Dγ Mλ Nζ Rε Vτ; eius gradus Vσ; gradus Bθ Eλ Fγ Mκ Vπ Vφ(*interlin.*); id
est versus ortus ipsius Cγ(*interlin.*)   solis] *om.* Pγ Rα Wλ Xα; *interlin.* Kε; *add. interlin.*
vel stelle Wζ   scire] *om.* Vϱ; invenire Lδ Lι Nα Oγ Rγ Sη Vβ Vμ Vo; *add.* hoc est de
quo azimut solis sit Zα; *add.* idem in qua parte mundi sol oriatur Qμ   accipe] *interlin.*
Eζ; *illeg.* Oβ; eius *corr. to* solis Pχ   altitudinem] *om.* Eo; altitudinis altitudinem Fβ; in
latitudine Oχ; *add.* scilicet Eϱ; *add.* scilicet solis Rα Xα   eius] hore Eϱ; solis Gα Mμ
Nζ Pι Pκ Pχ Qυ Vμ Vo Wγ Wζ; *add.* in Bκ Dη   qua] quota Nε   qua hora] in hora
qua Sλ; qua Wγ; que hora Pβ

[CHAPTER 17.] ON FINDING THE CENITH [I.E. AZIMUTH][1] OF THE SUN BY THE ALTITUDE

If you wish to know the cenith of the altitude of the sun [i.e., its azimuth], take its altitude for which hour you wish

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[1] The word "zenith" here (for "azimuth") is not used in the usual modern sense of the word, but is well attested in medieval Latin. Both "zenith" and "azimuth" are derived from the same Arabic word meaning "direction". Our use of "zenith" as the point overhead is actually derived from the more restrictive medieval term *cenith capitis* which is found elsewhere in this text, especially in the *Compositio*. See J.D. North, *Chaucer's Universe* (Oxford: Clarendon Press, 1988), p. 60 note 18.

hoc scire, et pone gradum solis super almucantharat altitudinis in parte qua fuerit sicut facis ad inventionem horarum. Post hoc, accipe quid congruit gradui solis de azimuth,

3　　　hoc] *om.* Pκ Pχ Vη　　　　hoc scire] *om.* Xβ　　　　gradum] gradus Mτ; altitudinem Lι
　　　　　gradum solis] *om.* Dδ　　　et] est Wι　　　solis] *om.* Bζ Bη Cζ Eo Oη Oφ Pγ Pφ Sι;
　　　add. in signo Cα Vν　　　almucantharat] alim̄rat Oβ; almi^at Kε Kι Qζ Wζ; almicacrath Mτ;
　　　almicanch' Mγ; almicanlerā Cα; almicantarach Kδ; almicantarath Eζ Fγ Gα Lδ Pσ Rδ Sι;
　　　almicantaraz Cδ Oη; almicantart Fε; almicanteraz Oν; almicanth Kγ; almicantharath Bβ
　　　Po Tβ; almicantrat Kα; almicantrath Vμ; almich Kθ; almichant' Lκ; almi^chī Wλ;
　　　almikanthrat Qη; almi^rat Eδ; almi^rath Eτ; almi^raz Bκ; almit' Nζ; almi^th Bζ Vη; almi^ut Mμ;
　　　almuc' Cε Mη Mπ Nε Pθ; almuca^ath Qμ; almucan^at Bη; almucancarath Pξ; almucancharath
　　　Mo Pα; almucanrath Vτ; almucant' Lμ Qθ Sλ Vo; almucantarach Bδ Mκ Sβ Sη Xβ;
　　　almucantarak Rγ; almucantarat Cζ Oχ Pζ Qε Sθ Vγ Zα; almucantarath Bθ Bι Eα Eλ Lγ
　　　Mδ Mν Nα Oγ Oι Pφ Pω Qι Qλ Tδ Vα Vβ Wγ; almucantaratz Dη; almucantaraz Oσ;
　　　almucantatat Eκ; almucanterath Oφ; almucan^th Dγ; almucanth' Cι Eβ Oζ; almucanthanth
　　　Cη; almucantharach Pτ Rε; almucantharat Fζ Lβ Lη Mα Sκ; almucantharath Bγ Eϱ Eυ Fα
　　　Fβ Lγ Lε Mυ Mφ Nδ Oξ Oτ Oυ Pδ Pμ Pν Pϱ Pυ Qβ Vν Vξ Vπ Wβ Wμ Rα Sδ Xα;
　　　almucanthrath Vι; almu^cat (*?*) Eγ; almucatarach Eη; almucatharath Qδ; almuch' Eo;
　　　almuchan' Sα Xδ; almuchancaraz Eμ; almuchantarath Vψ; almuchantharath Wα; almuch't
　　　Wι; almuc^raz Lζ; almu^rath Lι Pι Qγ Vσ; almustantarath Pβ; almut' Dδ Eσ; almutantaraz Vυ;
　　　almutanterach Mι Nγ; almutarath Pγ; almutcantar Cγ; almuthantharat Vφ; almu^th Bε Pϱ
　　　Pχ; alucancarath Vϱ; aliud cenith *corr. in marg. to* almucanrat Mλ; *add.* eadem Pι; *add.* sue
　　　Cα Nζ Vμ Vν; *add.* sui Dη　　　altitudinis] *om.* Vη; [*illeg.*] latitudinis Pι; *add.* accepte Bθ
　　　Bκ Cδ Eλ Lζ Mκ Qμ Rε Vπ Vσ Vτ; *add.* et accipe nadir Fγ; *add.* sic Oβ; *add.* sue Kγ
　　　　　in parte] *om.* Pδ; in Pι; *add.* in Dδ Kγ Kδ Nγ Oν Pκ Pφ Pχ Sκ(*interlin.*) Vμ　　　　in ...
　　　fuerit] *om.* Cα　　　qua fuerit] sua [*illeg.*] fuerit in oriente vel occidente Zα　　　sicut]
　　　marg. Xα; sic Nγ Vυ Wα

4　　　facis] *interlin* Eζ; facies Cε Pθ Oχ; fa[*blank*] Mν; facit Oϱ; fecisti Mι Nγ; sit Vμ; *add.* ww Bκ
　　　　　ad] in Oβ Pκ Pχ; in ad Lζ; per Vμ Vo　　　ad inventionem] inveniendem Mμ; de
　　　inventione Nζ　　　inventionem] ventionem Eσ　　　horarum] *add.* mot(*?*) si de oriente
　　　pone super orientem [*illeg.*] Zα; *add.* si in oriente vel occidente. Si est ante meridiem pone
　　　super orientem, si post meridiem pone super occidentem Vη　　　Post hoc] Post hoc hoc
　　　Oβ; Post quo Zα; Postea *some*; Postea hoc Pτ　　　accipe] aspice Bζ Bη Bκ Cα Cδ Cζ Eγ
　　　Eυ Eμ Eϱ Gα Kε Kθ Lζ Lι Lλ Mλ Mμ Mτ Nζ Oβ Oη Oι Oσ Oφ(*add. interlin.* al' accipe) Oχ
　　　Pζ Pι Pκ Pφ Pχ Qζ Rα Rε Sβ Sθ Sι Sλ Vα Vβ(*add. interlin.* al' accipe) Vγ Vι Vμ Vo Vυ Wζ
　　　Xα; accipe *corr. to* aspice Bθ Qε; *add.* aspice Vπ; *add.* vel aspice Dδ　　　quid] qui Mη;
　　　quod Dδ Lκ Lλ Pξ Sβ; quot Vμ　　　quid congruit] [*cut off*] in parte orientali vel
　　　occidentali Gα　　　congruit] contigit Sι Xβ; convenit Lζ Oν Vγ　　　gradui]
　　　altitudinem Cε; gradibus Mτ Pκ Pτ Pχ Wζ　　　gradui solis] sibi Fγ　　　solis] *cut off* Pβ
　　　　　solis de azimuth] *add.* id est super quod gradum de azimuth cadet gradus solis in
　　　signo Cα　　　de] *om.* Oφ; et Cε　　　de azimuth] *interlin.* Eμ　　　azimuth] alzemut
　　　Cγ; ascimith Eγ; asimut Bη Fε Lλ Pζ Wζ; assumut Mι Nγ; azimuc Oη; azimut Vυ;
　　　azymuth Nζ; *add.* incipiendo a primo azimuth usque ad gradum solis Pδ

4-5　　Post hoc ... et₂] Super quot gradus ceciderit Sα

to know this, and set the degree of the sun on the almucantar of the altitude on the side [i.e., to the east or west, whether it is morning or afternoon] which it was just as you do for finding the hours. After this take what coincides with the degree of the sun in the azimuths

5 et super quem gradum sit cenith et de quarta que opponitur ei similiter; et necesse est

5 et₁] *add.* scies Tδ; *add. in marg.* scies Lε super ... cenith] super quem ceciderit Mτ;
super quem gradum ceciderit sic zenith Rγ; super quem gradum vel ceciderit cenith solis
Mo; super quod gradus Fα; super quot gradus sit Mι Nγ; super quot gradus ceciderit Bβ
Bε Bζ Bθ Bι Bκ Cδ Cζ Dδ Eζ Eκ Eλ Eμ Eo Eϱ Eτ Eυ Gα Kα Kθ Mγ Mκ Mλ Mμ Oβ Oη Oι
Oϱ Oσ Oφ Pι Kι Lζ Oν Pτ Pφ Qζ Qη Qμ Rα Sβ Sι Sλ Vα Vβ Vν Vπ Vϱ Vσ Vτ Vυ Vφ Wι
Wμ Xα Zα

quot] quantus Xα; quem Eκ Eτ Kα Oι Pτ Qζ Qμ; quod Bε Bζ Bκ Eζ Eo Eϱ Kθ Qη
Vτ gradus] gradum Pτ; quare in eodem azimuth est gradus solis qui erit in
parte opposita in eadem [altitud]ine et sic habebit solem idem cenith altitudinis
in quartis oppositus Sδ ceciderit] posueris(*expunged*) ceciderit Wι; *add.*
cenith Kθ

add. 6 lines Xβ; *add. in marg.* In aliis reperitur sic: "Et super quot gradus[*add. interlin.* quem
gradum] sit cenith de quarta que opponitur. Et necesse est" etc. Vβ; *add. in marg.* quia in
eodem azimut erit(est Sκ) gradus solis quando erit in quarta(parte Sκ) opposita in eadem
altitudine et habebit sol(solis Nε) idem zenit altitudinis in quartis oppositis Nε Sκ

super ... similiter] super quam sit zenit de 4ᵃ que opponitur ei similiter (sit ...
similiter *corr. in marg. to* ceciderit de quarta in qua ponitur ibi est cenit solis) Kε; super
quod gradus ceciderit de quarta que opponitur sibi est cenit solis Vη; super quos gradus
ceciderit de quarta in quam(qua Wζ) ponitur ibi est cenith solis Kγ Nζ Pκ(zenit)
Pχ(zenith) Vμ Vo Wζ(zenit) quem] *illeg.* Oζ; eadem(?) Oχ; illum Kδ Pθ Rδ; quam
Cγ Pβ Sη; quemque Lε; quod Cε Mπ Oγ Qδ; quot Dγ Lλ Mα Pζ Vγ quem ... cenith]
quod(quot Rε) gradus cecederit Rε Tβ gradum] *add.* quia in eodem azimuth est(erit
Fβ) gradus solis que(quando Fβ) erit in parte opposita in eadem altitudine et sic habebit
solis idem cenith altitudinis in quartis oppositis Fβ Qβ sit] *corr. in marg. to* ceciderit
Pω sit cenith] ceciderit Fγ Lι Wγ; *corr. in marg. to* cecderit Eη cenith] cent Sθ;
zenith Lκ Qδ et₂] *om. many* de] *om.* Fγ Lγ de ... similiter] de gradus
que(*add. interlin.* ei Pζ) opponitur Eα Pζ; de quarta in qua ponitur et illi erit cenit solis Oβ;
de quarta in qua ponitur ibi est cenith solis sic cenith. De quarta que ei opponitur Bβ; de
quarta in qua ponitur ibi est cenith solis(*add.* similiter Mτ Qζ) Mμ Mτ Qζ; de quarta in
quarta ponitur et ibi est cenith solis Vτ; de quarta que opponitur erit cenit altitudinis solis
Eκ; de quarta que opponitur ei, et ibi est cenrus sive cenith solis Kθ; de quarta que
opponitur et ibi(sibi Tβ) est cenith solis Bζ Bη Bθ Bι Bκ Cδ Cζ Dδ Eλ Eμ Eo Eϱ Eυ Kι Lζ
Mγ Mλ Mo Oη Oν Pτ Oσ Qη Qμ Rα Rε Sα Sβ(et ... solis *marg.*) Tβ Vα Vν Vπ Vϱ Vσ Vφ
Vυ Wι Wμ Xα Zα

que] in qua Kι Qη; qui Vπ; *add.* ei Cδ Lζ Mo; *add.* eius Oν opponitur]
apponitur Vσ; apponitur *corr. to* pponitur Oσ; opponit ei Vπ; ponitur Kι Qη;
supponitur Bκ; supponitur eum Dδ; *corr. to* supponitur Lζ et] ei Wμ Xα; ei
et Eυ; eius(?) Vφ; soli Oη et ibi] et in Bζ; sibi Zα est] *om.* Sα; erit Bκ;
add. gradus Vυ cenith] cent Oσ; zenit Vυ; zenith Sα Vφ solis] *om.* Pτ
Sα; *add.* sit cenith de quarta(gradu Xα) que opponitur Rα Xα

de quarta que supponitur sibi erit gradus cenith solis Pι; de quarta super quam(qui Oφ)

[*continued opposite*]

and on this degree is the cenith [i.e. azimuth of the sun at that hour] and likewise of the quarter which is opposite to it; and it is necessary

[*apparatus criticus for line 5 continued*]

ponitur et ibi(ubi Pφ) est cenith solis Pφ Oφ Sι Vβ; que opponitur et in 3[=est?] cenit solis Kα; que quarta que opponitur erit cenith altitudinis Eτ; quarta que op[*cut off*] cenith solis Gα; quarta que opponitur ibi cenit est sol Wλ   de] *om.* Xδ   quarta] iiiiᵃ Qε
       que] *add.* ibi Fε   opponitur] *add.* solis(?) Lι; *add. in marg. 6-line gloss* Bγ   ei]
add. est zenith Bε; *add.* id est cenit solis Fε; *add.* quia in eodem azimuth erit sol qui erit in parte opposita eadem altitudine et sic habebis idem cenith altitudinis in quartis oppositis Mπ   ei similiter] *om.* Bγ Cγ Cη Dγ Eγ Lλ Eδ Eζ Mα Mι Mν Nγ Nε Oχ Pγ Po Pυ Qδ Qε Rγ Sη Sθ Sλ Vγ Vξ; *marg.* Wβ(*add. illeg.*); erit Vψ; ibi est cenith solis Fγ Lι(senith) Oϱ; ibi est gradum solis Wγ; vel ponitur Nα; *corr. in marg. to* ibi est cenith solis Oι
       similiter] *om.* Cε Mη; *interlin.* Eη; et ibi est cenith solis Mκ; *add.* et ibi erit cenith solis quia in eodem azimuth erit gradus solis qui erit in opposita parte in eadem altitudine et sic habebis sol idem cenith altitudinis in quartas oppositas Dη   et₃] similiter et Bβ Kι
       est] *om.* Oϱ

5-6   que ... quarta] *om.* Fβ

5-7   quem ... occidentalis] *7½ -lines* Cα

ut hec quarta sit meridiana orientalis, vel septentrionalis orientalis; aut occidentalis
meridiana, vel septentrionalis occidentalis. Et similiter facies de stellis fixis per earum

6   ut] quod Bι Fγ Lι Pξ Qη Rγ Sβ Vμ Vo   hec] *om. Sα* Sη Xβ   quarta] iiiiᵃ Qε
          sit] *om.* Bθ Eζ; quo opposita sit quarta Sβ; scilicet per Pφ; *add.* aut / vel *many*
          vel] *om.* / aut *many*   orientalis₂] *om.* Bζ Fε; occidentalis Eσ Kθ   aut] *om.* / vel
          many   occidentalis] *om.* Qζ

6-7   meridiana ... occidentalis] meridiana [*blank*] occidentalis meridiana(*del.*) aut occidentalis
          meridiana vel septentrionalis occidentalis Mν; meridiana occidentalis vel septentrionalis
          Eo Wι; occidentalis vel septentrionalis orientalis vel septentrionalis occidentalis Sλ;
          meridiana orientalis aut/vel meridiana occidentalis Mo Pτ Qδ Qη; meridiana orientalis
          aut meridiana occidentalis aut occidentalis septentrionalis vel orientalis septentrionalis
          Kγ; (aut Fγ Mκ) meridiana orientalis, aut meridiana occidentalis, vel/aut septentrionalis
          orientalis vel/aut septentrionalis(*om.* Qμ Wλ) occidentalis Bι Cγ Cζ Eγ Eλ Eυ Fγ Mι Mκ
          Mμ Nγ Nζ Oβ Oν Oϱ Oσ Pζ Pι Pκ Pχ Qμ Rα Sα Sθ Vα Vμ Vo Vσ Vυ Vφ Wζ Wλ Wμ Xα;
          meridiana orientalis vel meridiana occidentalis vel septentrionalis Wγ; meridiana
          orientalis(occidentalis Eδ) aut occidentalis meridiana aut septentrionalis occidentalis Eα
          Eδ Eζ Pγ Po Pυ Vϱ; meridiana orientalis vel occidentalis aut septentrionalis orientalis vel
          occidentalis Lι; meridiana orientalis vel orientalis septentrionalis et cetera Vτ; meridiana
          orientalis vel septentrionalis Mγ Mλ Pφ Sι Vν; meridiana orientalis vel septentrionalis,
          meridiana vel septentrionalis occidentalis Lκ; meridiana orientalis aut/vel septentrionalis
          occidentalis Bη Eμ Mτ Oχ Qι Vγ; meridiana orientalis vel septentrionalis orientalis aut
          occidentalis Lγ Pω; meridiana orientalis vel septentrionalis orientalis, aut occidentalis
          meridiana vel septentrionalis occidentalis Vη; meridiana orientalis(*written over, illeg.*), vel
          septentrionalis orientalis vel septentrionalis occidentalis Eϱ; meridiana vel
          septentrionalis occidentalis Pξ; meridiana vel septentrionalis orientalis vel septentrionalis
          Bθ Vπ   aut occidentalis meridiana] *om.* Lλ

7   meridiana] *add.* et est occidentalis Mη   vel] *om.* / aut *many*   vel septentrionalis]
          rep. Lδ   occidentalis] *add.* et cetera Cε   similiter] sempter Wλ; sic Wγ
          facies] *om.* Pκ; *del.* Pχ; fac Fγ Nζ Wζ(*interlin.*); facias Lι Vη Vμ   de] *om.* Vμ
          de stellis fixis] *rep.* Eκ   fixis] *om.* Cζ Lι Nζ; *marg.* Eμ   per] super Lι
          earum] *add.* similitudinem vel Fγ

7-8   per ... altitudines] *om.* Xδ; idem etc. Nε

that this quarter be the north-eastern, or the south-eastern, or the north-western, or the south-western. And similarly you will do this for the fixed stars through their

altitudines.

8   altitudines] altitudinem Eo Pτ; *add*. et cetera/etc. Mτ Rδ; *add*. operari poteris Pκ Pχ; *add. 4*
           lines Zα; *add. 12 lines* Cα; *add*. Mτ Qζ(*add. in marg*. 21ᵘˢ):

           Cum volueris(*add*. etiam Qζ) habere maximam elevationem vel maximum
           appropinquationem solis ad cenith nr̄m̄(minimam?) pone principium Cancri ad medii
           celi lineam et gradus almicantrath(almitz Qζ) ut prius(*add*. dictum est Mτ) ostendit tibi
           maximam elevationem solis.

           Et si volueris scire quantum distat ad huc a cenith subtrahe elevationem
           maximam a 90 gradibus(*om*. Qζ) et residuum erit differentiam(*add*. inter cenith et
           maximam elevationem [*illeg*.] in quolibet elevatione poceris in [*illeg*.] distancia Qζ) inter
           cenith et elevationem solis.

           Et si volueris scire iuxta(*om*. Qζ) minimam(maximam Qζ) altitudinem et
           maximam depressionem pone caput Capricorni ad lineam medii ifm(celi in eorum Qζ)
           almicancrath(almitz Qζ) exteriora id est extra istum punctum extencia numerando qui
           gradus sunt altitudo solis yma(ima Qζ).

altitudes.

[Comment:

   To find the azimuth of the sun at any time, take its altitude at that time. Then rotate the rete so that the position of the sun on the ecliptic for that day sits on the appropriate almucantar of the altitude. This intersection will also indicate the azimuth on which the sun lies at that time. (It will be to the east if the hour is in the morning and to the west if it is in the afternoon.)]

[CAPITULUM 18.] DE CENITH ORTUS SOLIS HABENDO, ET ALIORUM PLANETARUM

Et si volueris scire cenith ortus solis, vel alicuius stelle fixe, pone gradum solis

Cap. 18]¹ *om.* Eλ; Cap. 18 *repeated* Mι₁ *and* Mι₂, Nγ₁ *and* Nγ₂

1   De ... planetarum] *om.* Bδ Bε Bζ Bη Bκ Cγ Cδ Cε Cζ Dδ Dη Eα Eγ Eκ Eμ Eυ Eσ Fε Gα Kε
         Kι Lζ Lι Lκ Lλ Mα Mι₁ Mκ Mμ Mπ Mτ Nα Nγ₁ Nζ Oβ Oη Oν Oξ Oσ Oχ Pγ Pζ Pι Pκ Pξ
         Pφ Pχ Qε Qζ Qη Qι Rγ Sα Sβ Sδ Sθ Sι Tβ Vα Vγ Vη μ Vν Vo Vϱ Vσ Vτ Vυ Vφ Wγ Wζ
         Wλ Xα Xβ; *faded* Eδ Eζ Fγ; Ad habendam cenith(cenich Eo) ortus solis Eo Eϱ Mγ Mλ; Ad
         habendum cenith solis ortus vel stelle Vξ; Ad inveniendum cenith(cenit Lμ) in ortu solis
         Lμ Qθ; Ad inveniendum cenith ortus solis Eτ; Ad sciendum cenith(cenit Dγ) ortus solis
         Dγ Oφ; Capitulum 19ᵐ. De zenith ortus solis vel occasus vel stellis Qδ; De cenit ortus
         solis vel alicuius stelle scire inveniendum Mυ; De cenith ortus vel occasus solis Rα; De
         inventione cenith ortus etc. Kγ(*later hand; add. in marg.* 18); De inventione cenith ortus
         solis vel alicuius stelle Vβ; Inventio cenith ortus Wι; Inventio cenith ortus solis Bι(*add. in
         marg.* 17 cᵐ); Inventio cenith ortus solis et stellarum Vϱ; Inventio chenith ortus solus per
         azimuth Bγ(*later hand*); Inventio cenich ortus solis vel alicuius aliarum stellarum Vβ;
         Inventio cenich ortus solis vel alterius stelle Mν; Inventio cenith ortus vel occasus solis
         vel alterius stelle Pτ; Invencio cenith ortus solis vel stelle Kθ Po Qμ Sη; Si cenit ortus solis
         vel alicuius stelle scire desideras Bβ   cenith] *and elsewhere* cenit Pμ; zenit Rδ
              solis] *om.* Pμ Qλ Vι Wα   habendo] *om.* Pω   habendo ... planetarum] *om.*
         Zα; vel stelle Rε   et aliorum planetarum] *om.* Sκ; et alicuius stelle fixe Bθ Vπ; et
         alterius stelle Pυ; *add.* Capitulum Nδ; *add.* et alius stelle fixe Pδ; *add.* etc. Rδ; *add.* vel stelle
         invencion~ Vι   *add. in marg.* 18ᵐ Vφ; *add. in marg.* 20 Mκ Vμ; *add. in marg.* 21 Oϱ(C.
         21) Pκ Sδ(c. 21)

2   Et] *om.* Fγ Tβ; Ut Eη   si] *om.* Lι; *illeg.* Wγ; cum Bζ Bη Bθ Bκ Cα Cδ Cγ Cζ Eγ Eμ Eo
         Eυ Fγ Kι Lζ Lλ Mα Mι₁ Mκ Mλ Nγ₁ Oη Oν Oϱ Oσ Oφ Oχ Pζ Pφ Qε Rε Sα Sβ Sθ Sι Sλ
         Vα Vβ(*added interlin.*) Vγ Vμ Vν Vπ Vσ Vτ Vυ Wι   scire] *om.* Eo Fε Wμ   cenith]
         om. Xβ; cenit Bζ Mμ Qε Sβ Sδ Vα Wλ; cent Oσ Sθ; centrum Sλ; zenit Cγ; senith Lι; zenith
         Bε Kδ Lκ Nα Pκ Pϱ Pχ Sα Vα Vφ Wγ; *add. interlin.* id est azimuth Eμ; *add. interlin.* id est
         versus ortus qua non semper habere eundem locum ymo dieti transiantur Cγ   ortus]
         rep. Rα; *add.* occasus Rγ   ortus ... fixe] *inerlin.* Lδ   vel] *om.* Xα; et Mγ
              alicuius] *om.* Eδ; alie Vα; altitudinis Lκ   fixe] *om.* Eσ Qη Sα; oriens Pξ; *add.* id
         est archum transitem per cenith capitum et archum solis in orizonte Lδ Oγ(*repeated in
         marg.*)   gradum] gradus Oη; *add.* cuiuslibet Vι   solis²] *om.* Lμ Pσ Qθ; *interlin.* Kε;
         marg. Wα

2-3   pone ... stellam] *om.* Eσ

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¹ In ms Vσ there is also a different version of Cap. 18, which is found between Cap. 16 and Cap.

[CHAPTER 18.] ON FINDING THE [POINT][2] OF THE RISING OF THE SUN, AND OF THE OTHER
PLANETS

And if you wish to know the [point, i.e., direction] of the rising of the sun, or of
any fixed star, take [i.e., observe or locate] the degree of the sun

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[2] Again "cenith/zenith" is being used in the general sense of "direction" (i.e., point).

vel stellam super orizontem orientalem, et aspice quid sibi accidat de azimuth, super quam sit ortus; et hoc est cenith ortus. Et super simile eius erit occasus in simili eius

5   quarta, sive septentrionalis sive meridionalis fuerit.

3   vel] sive *some*   vel stellam] *om.* Bζ Cγ; vel alicuius stelle fixe Wι; vel/sive stelle Kα Nζ Rγ Sι Tβ; *add.* fixam Cα Eυ Fγ Qμ(*interlin.*) Vπ Vϱ   super₁] *om.* Xα   orizontem] orientem Qγ; *add.* scilicet Oχ   orientalem] *om.* Bδ Eδ Vγ Vϱ Xβ; orizontalem Vσ; *add. illeg.* Vξ   aspice] a' Rγ; accipe Dγ Kγ Lη Mκ Nα Pτ Pυ Sη Vξ Vσ Wγ Wζ Wλ Xβ; respice Sλ; vide Mμ Nζ Pκ Pχ Qη Vμ Vo; *add. interlin.* vel accipe Qμ   quid] quem Dδ; qui Tβ; quod Pφ   sibi] *om.* Wλ; ea Oν; ei Bκ Lζ; scilicet Eα; si Sη; sit Oχ; tibi Dη   accidat] abscidat Vυ; accedat Oξ; accideat Cγ; accideat *corr. to* accidat Kε; accidit Mι₁ Mι₂; accipiat Nα; congruat Bδ; congruit Bζ Bθ Eo Eυ Fγ Mγ Mλ Vν Vπ Vσ Vτ Wι; contigerit Rε; *add.* vel congruat Cα; *add. interlin.* vel congruit Qμ   de] *om.* Cδ; *add.* gradibus Pι   de azimuth] decenit Qε Sθ; id est cent Mα   azimuth] alzemut Cγ; ascemuth Eγ; asimut Fε Sα Wζ; azemut Bκ Pβ; azim^t Lβ; azimut Bζ Wγ; azymuth Nζ; cenich Nγ₁; cenit Oχ; *add.* vel Cα   super₂] similiter Cη

3-4   azimuth ... est] *om.* Lλ Vγ

4   quam] *om.* Pθ; quem Bβ Cγ Dη Fγ Kδ Lβ Mν Mπ Pδ Rγ Rδ Vν Vφ Xα Xβ; quo Pι; quod Bε Cα Lε Mι₂ Oγ Pν Pχ Qθ Sδ Tβ Wζ Xδ   sit] est Bκ Oν; fit Lζ Oφ(*add. interlin.* al' sit) Pβ Pι   ortus₁] *om.* Mυ Xδ; *add. interlin* solis Wζ   et₁ ... ortus₂] *om.* Bε Bη Eα Eη Eυ Lδ Mι₂ Oγ Oτ Pϱ Vσ   hoc] hec/hic *some*   est] *om.* Bζ; *interlin.* Sκ; erit Cα Cγ Mα Mι₁ Nγ₁ Pζ Qε; *add. interlin.* vel erit Oφ   cenith] cenit Mμ Pφ Qε Rδ Sβ Sδ Vυ Wλ; çenith Qδ; cent Sθ; centrum Sλ; senith Lι; zenit Cγ Kε Pκ Pχ Wζ; zenith Sα Vα Vφ Wγ   ortus₂] *om.* Pξ; hortus Rδ; *add.* solis Nζ Pγ Tβ Vη Zα   super] in Mυ Mφ; si Bθ Pμ Vπ; secundum Bκ Cζ Eμ Lζ Mκ Pζ Oη Oι Oσ Sι Vα Vν; secundum ip Vτ; secundum hoc Mλ Rε; similiter Eσ Kε(*add. interlin.* id est super similiter cum qua eius occasus) Kι(*add. interlin.* id est super 9sais 9 qᵃ eius occasus) Lκ Qθ; *add. interlin.* in hoc Oφ; *add.* secundum Rα   super simile] secundum similiter Pφ; similiter similis Mτ   simile] similem Vγ; similem gradum Oβ Qη; similiter simile Qμ; solem Kα; *add.* oppo'i Wγ   simile eius₁] sine si nulle/simille Mι₁ Nγ₁   eius₁] *om.* Bζ Eo Mμ Nζ Oγ Oη Oϱ Pκ Pχ Sα Vo Wζ; *interlin.* Wι; idem Sλ; illius Tδ; *add.* gradum Bκ Oι(*marg.*) Oν; *add.* quarta Mφ Vι   erit] *om.* Wλ; est Bζ Cδ Cζ Eμ Eo Mγ Mλ Oη Oϱ Oφ(*add. interlin.* al' erit) Pφ Pκ Pχ Rε Sι Sλ Vβ Vμ Vν Vσ Vτ; gradum et Lζ   erit ... eius₂] *rep.* Wα   occasus] occasum Lζ; *add.* eius Vυ; *add. interlin.* solis Wζ   in simili] si similis Mτ   simili] simulrter(!) Oη   eius₂] *om.* Mμ Nζ Oβ Pκ Pχ Qη Vμ Wζ

4-5   Et₁ ... fuerit] *7 lines* Cα   in ... quarta] *om.* Mυ Mφ Vι   eius quarta] *interlin.* Eζ

5   quarta] *om.* Eδ; 4ᵃ / 4ᵗᵃ *some*; ē Po; parte quarte Oϱ Sα; *add. interlin.* scilicet opposita Oφ   quarta ... meridionalis] orōlis(?) Kα   sive₁] *om.* Mπ; *add.* sit Kδ   sive₁ ... fuerit] *om.* Fγ   septentrionalis] orientalis Cη   sive₂] *om.* Eo; aut *some*; vel *few*   meridionalis] meridiam Mα; meridiana Bη Dγ Cζ Eγ Lλ Mγ Mκ Oχ Pθ Vβ(*add. interlin.* meridionalis) Vγ Vν Vσ; *add.* occit Vτ   fuerit] *om.* Bκ; *add.* et similiter facias de stellis fixis per earum altitudinem Mι₁ Nγ₁; *add. 8 lines* EK

or the star on the eastern horizon, and observe which azimuth falls near it, on which it rose; and this is the [point] of the rising. And on its corresponding [degree] will be the setting in its corresponding quarter – it will be either north or south.

[Comment:

Relate the day of the year with the position of the sun in the zodiac, as before.

To find the degree of the eastern horizon where the sun (or a star) rises, rotate the rete until that point on the zodiac is on the eastern horizon. The degree of sunrise will be shown by the azimuth of that point.

The degree of sunset will be the same azimuth but along the western horizon.]

[CAPITULUM 19.] DE QUATUOR PLAGIS MUNDI

Ad habendas quatuor mundi plagas veraciter, accipe altitudinem solis ut supra,

Cap. 19] *om.* Bη Cα Cδ Cζ Eγ Lζ Lλ Mα Mμ Oη Oσ Oχ Pζ Qε Sθ Sι Sλ Vα Vγ Vυ; *bottom marg.* Eμ Lζ(fol. 38ᵛ) Sβ

1   De ... mundi] *om.* Bδ Bε Bζ Bκ Cγ Cε Dδ Eα Eλ Eκ Eμ Eσ Eυ Fε Gα Kε Kι Lζ Lι Lκ Mκ Mμ Mτ Nζ Oβ Oν Pγ Pι Pκ Pξ Pσ Pφ Pχ Qη Qι Rγ Sα Sβ Tβ Vη Vμ Vo Vσ Vτ Vφ Wζ Wλ; *faded* Fγ; Ad habendum mundi plagas in(*om.* Pτ) qualibet die Mγ Pτ; Ad habenda 4/4ᵒʳ mundi plagas Dη Kδ; Ad habenda 4/4ᵒʳ plagas mundi qualibet die Eo; Ad inveniendum 4ᵒʳ/quatuor plagas mundi Lμ Mλ Qθ; Ad inveniendum quatuor plagas mundi per equacione stellorum Kγ(*later hand*; *add. in marg.* 19); Ad sciendas certe quatuor plagas mundi principales Bγ(*later hand*); Capitulum 20ᵐ. De 4ᵒʳ plagis mundi habendis Qδ; De inveniendis 4/4ᵒʳ/quatuor mundi plagas Dγ Oφ Rα Rε; De inventione 4ᵒʳ plagarum mundi Vβ; De plagis mundi habendis Oϱ; de plagis mundi inveniendis Mδ Nδ; De quarta plaga mundi Xα; Inventio 4ᵒʳ plagarum Eτ; Inventio 4/4ᵒʳ plagarum mundi Eδ Kθ Mυ Po Qμ Sη Vι Vϱ Wβ; Inventio quatuor plagarum mundi per astrolabio Mν; Si 4ᵒʳ mundi plagas cupis habere Bβ   quatuor] *om.* Kα; 4/4ᵒʳ *many*   mundi] *om.* Lγ Zα; *add.* etc. Rδ; *add.* habendis Capitulum Mo; *add.* inveniendis Bθ Fβ Pυ Vπ Wμ; *add.* inveniendo Pδ; *add.* Rubrica Vπ   *add. in marg.* 19ᵐ Vφ; *add. in marg.* 21 Vμ; *add. in marg.* 22 Mκ Oϱ(C. 22) Pκ Qζ(22ᵘˢ) Sδ(c. 22); *add. in marg.* hoc deficit capitulum de 4 plagis mundi Lζ

2   Ad habendas] Cum autem volueris habere Bκ; Regionis Zα; *add. in marg. 25-line gloss* Bγ   quatuor] *om.* Cγ Oϱ Sα Vξ; 4 / 4ᵒʳ *some*; iiii Eμ   mundi] *om.* Oβ   veraciter] *om.* Dη Eμ Kα; qualibet die Vξ   accipe] recipe Oφ(*add. interlin.* alʼ accipe) Pφ; add. plagas Vσ   solis] *om.* Vσ   ut supra] *om.* Eκ   supra] gradus Eα Qθ; 8ª *corr. in marg. to* supra Sκ; *add.* et pone eam in almuʳᵃᵗʰ Pι

2-3   ut ... sit₁] *om* Eμ

2-18 Ad ... predictas] *marg.* Eμ

[CHAPTER 19.] ON THE FOUR DIRECTIONS [CARDINAL COMPASS POINTS][1] OF THE WORLD

To find the four [cardinal] compass points of the world with exactitude, take the altitude of the sun as before

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[1] Although *plaga* means an area as in an open expanse of land or sea, a territory or region, or a climatic region or zone, in this capitulum it must mean a direction or compass point.

et vide in qua quarta sit. Deinde vide in qua altitudine ipse gradus solis sit inter lineas
azimuth a principio quarte orientalis, que incipit a coluro septentrionali sive a medie
5   noctis linea, a qua incipies computare. Et quotus fuerit numerus, tantum sume in dorso

3   et vide₁] *om.* Nε   vide₁] in die Mτ; invendie(?) Oϱ; m Eδ   in₁] *om.* Xβ   qua
quarta] qua gradum Lμ Pμ; quo gradu Dη Fε Nζ Oϱ Pκ Pσ Pχ Sα Wζ   quarta ...
qua₂] *om.* Cε   sit₁] *om.* Bδ; *add.* altitudo Pγ Zα; *add.* Postea pone gradum solis in rethe
in sua altitudine[2] Bβ Bδ Bε Cγ Dδ Dη Eη Eσ Fα Fβ Fε Fζ Kδ Kθ(*deleted*) Lβ Lγ Lδ Lε Lη Lι
Lκ Lμ Mδ Mι Mυ Mφ Nγ Nδ Nζ Oγ Oζ Oι Oϱ Oτ Oυ Oφ Pα Pβ Pδ Pθ Pκ Pμ Pν Pϱ Pσ
Pφ Pχ Pω Qβ Qγ Qδ Qθ Qι Qλ(*faded*) Rδ Rε Sα Sκ Tβ Tδ Vβ Vη Vι Vo Vψ Wα Wζ Wμ Xβ
Xδ Zα
        Postea] Posita Cγ   gradus solis] *interlin.* Wζ   solis] *om.* Kε Nζ   in]
        om. Eσ   in rethe] *marg.* Sκ   rethe] reta Mι; rete Rε Vψ; rethi Fβ Fζ Kα Lε
        Lι Lμ Mυ Mφ Nδ Nζ Oι Oϱ Oτ Pϱ Pσ Qβ Qγ Qδ Qθ Qι Sα Sδ Tβ Vβ Vη Vo Xδ;
        rethy Lκ; reti Kδ Mδ Oυ Oφ Pφ Vι Wα; rhete Oγ; rota Nγ   altitudine] *add.*
        scilicet(?) altitudo si ante meridiem vel post Qδ
Deinde] *add.* pone Lγ   Deinde ... qua] *faded* Qλ   Deinde ... altitudine] *marg.* Oφ
        vide₂] *om.* Pγ   in qua₂] *om.* Kγ   ipse] *om.* Oγ Vν   ipse gradus] *om.* Rγ
Wλ   sit₂] *om.* Vξ; *interlin.* Kε   inter] super Bδ   lineas] *om.* Wλ; *rep.* Nγ

4   azimuth] alzemut Cγ; asimut Fε; azimut Bζ Pω; azumuth Nα Xα; azymuth Eϱ Lζ Nζ; *add.*
si Oφ(*add. marg.* al' sive)   azimuth a principio] ab inicio Pξ   a₁] in *some*; si in Pφ
        principio] *illeg.* Zα   quarte] 4te *some*; iiiiᵉ Eμ; 8ᵉ Vσ   orientalis] *add.*
        septentrionalis Pκ Pχ; *add./del.* vel Wζ   a₂] in Eo Vι   coluro] colluro Bκ Lζ Pξ
        Vη; *add. interlin.* id est a linea an^li{anguli?} noctis Kε   septentrionali] *om.* Bζ; *add.* et
        vide in quo gradu sit cuspis(?) ea pone gradu(*add.* solis Vo) in rethi in sua altitudine Mμ
        Vo(*add.* a coluro septentrionali)   a] *om.* Rγ   medie] meridie Cγ Pφ

4-5   que ... computare] *om.* Dη   a₂ ... incipies] *om.* Kα   sive ... linea] *om.* Pι; et vide in
qua gradu sit. Postea pone gradum solis in rethi in sua altitudine a coluro septentrionali
sive alia meditate noctus Vμ(*add. in marg.* 10-short-line gloss)   a₃ ... linea] altitudo
medie noctis Mτ

5   linea] *om.* Lι Nζ   a] in Mι Nγ   a qua] *om.* Bζ Eλ Kγ Qδ Wι; *interlin.* Eζ Vφ; *marg.*
Kε; et ibi Bκ Lζ   a ... incipies] incipiens Bι Bθ Cι Dγ Dδ Eo Eϱ Eυ Mγ Mκ Mλ Mν Mo
Pι Po Pυ Qη Qμ Rα Sβ Sη Vβ Vν Vπ Vϱ Vσ Vτ Vψ Xα   qua] quantus Mτ   qua
incipies] *rep.* Pχ   incipies] incipiens Nα Pθ Sκ   computare] *om.* Mγ; *add.* per ii[2]
Kα   Et] in Oφ(*add. interlin.* al' ut)   Et quotus] *rep.* Vπ   fuerit] sint Vπ Vσ;
sit Mτ   numerus] *interlin.* Eζ   tantum] *om.* Nδ   tantum sume] cium sve (!)
Vτ   sume] accipe Vμ; sumpme Kθ   in] *om.* Vη; de Vξ

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[2] I am undecided as to whether or not this line should be included in the main text. About half
the manuscripts include it and half do not. In itself it does not really add much to the meaning of the text,
although to some readers it might prove helpful in understanding the process involved here.

and see in which quarter it is. Then see in which altitude is this degree of the sun among the azimuth lines from the beginning of the eastern quarter, which starts from the northern colure or the midnight line, from which you begin to count. And whichever the number is, take as much on the back

astrolabii ab ipso coluro versus armillam, procedendo per orientem, si est ante
meridiem, vel per occidentem, si est post meridiem; et ubi numerus idem finitur, ibi
pone regulam. Deinde astrolabium utraque manu tenens, sursum versa eius posteriori
superficie, diligenter te oppone soli donec radius solis transeat per ambo foramina.

6   astrolabii] abstrolabii Pα; *add. interlin*. id est Oφ; *add. in marg*. in eadem quarta Sκ   ab
         ipso] a Vσ; ab illo Nζ Pκ Pχ Wζ; vel ab ipso Qι; *corr. interlin. from* abu Eζ   coluro]
         almero Pφ; colluro Bκ Cε Dη Lζ Mτ Nγ Pγ Pξ Vπ; corulo Rδ; *add*. a principio capricorni
         Zα; *add. interlin*. septentrionali Bγ   armillam] *add*. computando Mτ
              procedendo] *illeg*. Eo; procedendum Cη; procedendum *corr. to* procedendo Bγ;
         procedentem Wι; procedentionem Oξ   per] ad Eo Qμ; versus Tβ   per orientem]
         om. Eδ Mν Ro; per orizontem Eζ(*interlin*.); pr orizontem *corr. to* per orientem Bγ   si
         est] sive Eα Xβ   est] *om*. Mτ; fuerit Fγ Lδ Oγ   ante] *add*. orientem Eϱ

6-7   si ... occidentem] *om*. Nα

7   meridiem₁] medium diem Eκ Vξ   vel] *om*. Pϱ; et Kγ   vel ... meridiem₂] *om*. Eλ
         Fγ Rα Xα   vel ... idem] *om*. Pξ   per] *om*. Xβ; ab Pι; post Mμ Pθ Pφ   per
         occidentem] postcedentem Eα   si est] sive Xβ   est] *om*. Lι; fuerit Eυ Mκ Vπ Vσ;
         sit Bκ Lδ Oγ   meridiem₂] *om*. Lι Mτ   et] ut Bθ   ubi] *om*. Qθ; *interlin*. Rα; ibi
         Vϱ   ubi ... finitur] *om*. Mυ Mφ Vι Wα   idem] *om*. Qι Wβ; ille Bβ Eμ Lδ Nζ Pκ Pχ
         Vμ Vo; iste Qη Wζ   finitur] confinnitur Rγ; finietur Vσ; finis Mπ; fuerit Oφ(*add. in
         marg*. al' finietur) Pφ Qη   ibi] *om*. Nζ Pι Pκ Pχ Vμ Vo Wζ

7-8   ibi ... regulam] *om*. Mμ

8   pone] pones Bκ   regulam] rigulam Nγ   astrolabium] *om*. Kε Kι Mτ; *interlin*. Qζ;
         abstrolabium Pα; *add*. in Dη Oι(*interlin*.)   utraque] *om*. Pκ Pχ Wζ   tenens] *om*. Eλ
         Vτ; tene Fγ; tociens/totiens Mτ Pϱ   sursum] *deletion and add. in marg*. sursum Eζ(*later
         hand*); *add*. non suspend~ per armillam sed orpas idem alens sursum Zα   versa]
         versus Wζ; visa Tβ   eius] est eum Bθ Vπ; *add*. foramina Eμ(*add. interlin*. facie)
              posteriori] posteriora Lκ; posteriore Vπ; superiorem Nζ Qζ Pκ Pχ Vo(*corr. interlin.
         to* posteriorem); superiori Eα Fβ Fε Kι Lμ Mι Mμ Mτ Nγ Pσ Qθ Vμ Wζ; superiori scilicet
         Vξ; *add. interlin*. id est dorso Bγ

9   superficie] facie Bθ Eυ Mκ Rγ Vπ Vσ; superficiem Nζ Pκ Pχ Vo; *add*. regule [*illeg*.] in eat
         statu Eμ; *add. interlin*. scilicet facie Qμ   diligenter] *om*. Wβ   te] *om*. Dη Eσ Lλ
         Vμ; de Fβ(*add. interlin*. bep(*!*))   oppone] opponas Pκ Pχ Wζ; pone Oι Pξ   solis]
         om. Mμ Nζ Oφ Pκ Pχ Qη Vμ Wζ; *interlin*. Kθ; *illeg*. Xβ; solaris Bκ   per] *om*. Fγ
              ambo] *om*. Eσ Oϱ Sα   foramina] *add. illeg*. Zα; *add*. pinnularum Kε Kι Mτ Qζ

of the astrolabe from the same colure towards the ring, proceeding to the east, if it is before midday or towards the west if it be after midday; and where the same number ends, place the rule there. Then holding the astrolabe in both hands, with its back surface turned upwards, carefully turn yourself toward the sun until a ray of the sun passes through both pin-holes.

10   Tunc caute pone illud super terram, ut non moveatur ad aliquam partem; et habebis
     quatuor lineas in centro astrolabii concurrentes quatuor mundi plagas directe oppositas
     indicantes, scilicet orientalem, occidentalem, et cetera. Similiter operabis in nocte per
     stellam fixam.

10   Tunc] Etiam Mτ   caute] autem Vϱ   pone] ponas Qη Vϱ Wλ; ponens Pγ; pones
        Bζ Bι Eτ Fγ Mκ Oν Pι Rα Vβ Vσ Vτ Vφ Xα; *add.* si Qλ   illud] *om.* Bζ Dγ Pκ Pχ; illum
        Nα; istud Vo; *illeg.* Vσ; regulam Vζ   ut] donec Kθ   non] *om.* Pι Eβ; *interlin.* Bγ
        Xα   moveatur] *corr. from* moveantur Bγ; *add.* super Wλ   ad] super terram seu
        Mτ   aliquam] aliam Bκ; *add.* eius Mτ   partem] *add.* et si Nα

11   quatuor₁] *om.* Pν; 4ᵒʳ *many*; iiiiᵉ Eυ; *add.* mundi Kε Qζ   quatuor₁ ... concurrentes] tunc
        Oφ(*interlin.*)   lineas] *add.* mundi Mτ   lineas ... quatuor₂] *om.* Pσ Pφ   in] a
        Kδ   in ... plagas] *om.* Pξ   centro] medio Qη; *add.* vel in medio Oβ
               concurrentes] continentes Mτ Pω; continentes et concurrentes Rγ; *add.* ad Pκ Pχ Wζ;
        corr. in marg. from illeg. Oξ   quatuor₂] *om.* Xδ; 4ᵒʳ *many*   mundi] *add.* partes vel
        Fγ   plagas] *add.* de Fε   oppositas] *om.* Bε; opponas Pν; opposita Pκ Pχ; posite
        corr. to opposite Vη

12   indicantes] *om.* Nδ   scilicet] *om.* Cγ Cε Dη Eβ Eη Eσ Fα Fζ Kα Kδ Lβ Lδ Lη Lι Lκ Lμ
        Mδ Mη Mι Mπ Mτ Mυ Nγ Nδ Nε Oβ Oγ Oζ Oι Oϱ Oτ Oφ Oυ Pα Pβ Pδ Pμ Pν Pϱ Pξ Pσ
        Pφ Pω Qγ Qθ Qι Qλ Rδ Sα Sδ Sκ Tδ Vν Vo Vψ Wα Xβ Xδ   scilicet ... cetera] *om.* Eμ
        Mμ Nζ Pκ Pχ Qη Rγ Vμ Wζ Wμ   orientalem] orientale Dη Lε Lκ Pμ; *add.* orientali
        Kγ   occidentalem] *om.* Kθ Mν Oβ Oι Pδ; occidentale Dη Lε Lκ Pμ; oriente Eδ; orienti
        Mλ Rε Vβ; *add.* meridionalem, septentrionalem Bθ Eυ Kδ(*add.* plagarum) Mκ Qι Vν Vπ;
        add. occidentali Kγ   occidentalem ... similiter] *illeg.* Eϱ   et cetera] *om.* Bβ Bθ Eα
        Kα Mυ Oβ Pι Vι Vν Vπ Wλ; et aliqua Pϱ; etiam Pξ; meridionalem et septentrionalem
        plagis Rδ; meridionalem septemtrionalem Fγ Vσ; *ms.* Xα *ends*   Similiter] sicut Wλ
               operabis] operaberis Vβ Dδ Mη   in] *om.* Xβ; de Fα Mι Nζ Pκ Pχ Vμ Vo Wζ
        in nocte] *om.* Vι

12-13   per ... fixam] *om.* Vτ

12-18   Similiter ... predictas] *om.* Bκ

13   stellam fixam] stellas fixas Nζ   fixam] *om.* Bζ; *add.* de nocte Lζ

Then carefully place it on the ground [or place it horizontally] so that it [the rule or alidade] is not moved to either side; and you will have the four lines meeting in the centre of the astrolabe indicating the four [cardinal] compass points of the world directly opposite [each other], namely east, west, etc. Similarly you will work at night through a fixed star.

Vel[3] locata iam regula in dorso astrolabii, sursum versa eius facie, equidistanter
15 orizonti ut in proximo dictum est, fac umbram amborum angulorum pinnule cadere

14   *before* Vel] *add*. CAPITULUM DE EODEM SED ALITER Bθ Vπ(*add*. Rubrica); *add*. DE EODEM Eσ
        Pν Χδ; *add*. (ITEM Vβ) DE EODEM SED(*om*. Vψ; secundum Sη) ALITER(aliud Lβ) Cι Eβ Eη Fα
        Fβ Fζ Kα Lβ Lγ Lε Mδ Mη Mφ Nδ Nε(*add*. etc.) Oγ Oζ Oι Oξ Oτ Oυ Pα Pδ Pθ Pμ Pυ Pω
        Qβ(*add*. Capitulum) Qγ Qλ Rε Sδ Sη Sκ Tδ Vβ Vι Vψ Wα Wμ; *add*. DE EODEM DOCTRINA
        Oφ; *add*. DE EODEM SED ALIO MODO Pϙ; *add*. DE EODEM SED ALITER Oϙ(*add*. *in marg*. C. 23);
        add. ITEM ALITER DE EODEM ETC. Rδ; *add*. ITEM Mπ; *add*. ITEM ALITER DE EODEM UT SUPERIOR
        Κδ; *add. in marg*. c. 23 Sδ   Vel] *om*. Κθ Χδ; Aliter de eodem vel Lι; Et Fε; Item Dη; Sel
        corr. in marg. to Vel Pα; Videlicet Pκ Pχ; *add*. aliter Eμ; *add*. sic Bβ Vμ Vo   locata] loca
        Wι; positam Mι Nγ; *corr. from* loca Bγ; *add*. regula Cγ   iam] *om*. Lη Lι Vφ; illam Bβ;
        ut iam dictum est Mμ Nζ Pκ Pχ Vμ Vo Wζ   iam regula] *om*. Pξ   regula] ista
        Wα; rigula Nγ; tabula Qγ   astrolabii] abstrolabii Pα   sursum] *om*. Eμ
            sursum ... facie] ut eius superficie Dη   versa] versum Wζ   eius] *om*. Pκχ
            facie] faciem Eμ Nα; superficie Bδ Cγ Cι Dδ Eβ Eη Eσ Fα Fβ Kδ Kε Kι Lβ Lγ Lε Lη
        Lι Lκ Lμ Mι Mμ Mπ Mτ Mυ Nγ Nδ Nε Oγ Oζ Oξ Oι Oϙ Oτ Oυ Oφ Pα Pβ Pδ Pθ Pκ Pν
        Pξ Pσ Pφ Pχ Pω Qβ Qγ Qζ Qη Qθ Qι Qλ Rδ Sδ Sκ Tβ Tδ Vβ Vη Vo Vψ Wζ Wμ Χβ Χδ;
        superficiem Nζ Vμ   equidistanter] equidistans Pφ; equidistante Vη; equidistantis Eσ

14-18   Vel ... predictas] *om*. Bζ Bι Dγ Eα Eδ Eo Eϙ Gα Lζ Mγ Mλ Mν Oβ Pι Po Rα Sα Sβ Vν Vϙ
        Vτ Vφ; *add. in marg. later hand* Eζ Qμ

15   orizonti] orizonte Vη   in] *om*. Bγ Cη Eκ Eτ Oν Pγ Tβ Vη Vξ Wβ Wι; *del*. Lη   in
        proximo] *om*. Mμ; ut iam Nζ   proximo] primo Cι Pγ; *add*. capitulo Fγ; *add. illeg*. Vφ
            dictum] predictum Eλ   est] *om*. Κα Pξ   fac] *twice* Nε   umbram]
        umbramque Rε   amborum] *om*. Cγ   angulorum] *om*. Pβ   pinnule] *om*. Oϙ;
        blank Lβ Lκ; p[*blank*] Pα; pennule Pμ; pinnulle Mυ; pinule Mπ Qδ Sκ; plane Pφ; pnnile
        Bθ; prennile Mτ; presimilem/presimiliter Pυ; p^tnile *corr. in marg. to* pinnule Oζ; *add*. eius
        Mη   cadere] *om*. Pκ Pχ Qδ; *interlin*. Wζ; cadet Κθ

15-16   amborum ... umbrum{1/2}] *om*. Pν

15-17   amborum ... latus] tus dextrum et sinistrum Χδ

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[3] Many mss treat this as a new capitulum, with or without a title.

Or having already set the rule on the back of the astrolabe with its face turned upward, parallel to [or level with] the the horizon as was said in the previous section, make the shadow of the two sides of the vane fall

super duo latera regule, scilicet dextram umbram super latus dextrum, et sinistram umbram super sinistrum latus; et statim habebis quatuor lineas et quatuor plagas mundi predictas.

16   super duo] et Xβ   duo] *om.* Dη; 2 *many*   regule] regulis Pϱ; rigule Nγ
          umbram] *om.* Eζ; *add. interlin.* et sinistram Bε   super₂] ad Fγ   super₂ …
       dextrum] *om.* Pβ Pδ Pθ Pμ

16-17   scilicet … statim] et Dη   dextrum₁ … latus] *faded* Qλ; dextram et sinistram umbram
       super latus dextrum et sinistra super sinistrum Nε; dextrum umbram et sinistram
       umbram super latus dextrum Vη; dextram umbram(*add. in marg.* super latus dextrum Qζ)
       et sinistram umbram(*om.* Fβ Kε Kι Lι Mπ Nδ Oϱ Pδ Pϱ; *interlin.* Qζ Qη Tδ) super(sint Pφ)
       latus dextrum et sinistrum Bδ Cγ Cε Cι Dδ Eβ Eσ Fα Fβ Fε Fζ Kα Kδ Kε Lγ Lδ Lε Lη Lι
       Lκ Lμ(*add.* umbram) Mδ Mη Mπ Mυ(*add.* regule) Mφ(*add.* regule) Nγ Nδ Oγ Oζ Oι Oξ
       Oϱ Oτ Oυ Oφ Pα Pδ Pθ Pμ Pξ Pϱ Pσ Pφ Pω Qβ Qγ Qζ Qη Qθ Sδ Tβ Tδ Vι(*add.* regule)
       Vψ Wμ Xβ Zα; dextrum umbrum et sinistrum umbrum super latus dextrum et ita quod
       dextra super dextrum et sinistra super sinistrum Sκ; dextrum umbram et sinistram
       umbram super latus dextram et sinisstrum. Ita quod de sua dextra super dextram et
       sinistra super sinistrum Rδ; si(*om.* Wα) dextram umbram et sinistram Mτ Wα

17   umbram] *om.* Bθ Eζ Eλ Eμ Eυ Fγ Kγ Mκ Mo Nα Nζ Pτ Pυ Qδ Qμ Rε Sη Vβ Vσ Vφ Wλ
          umbram … latus] *om.* Lβ Pν Qι   super … latus] *om.* Bε   sinistrum latus]
       latus depresum et sinistrum Pβ   latus] *om.* Bθ Eλ Eμ Eυ Fγ Kγ Mo Nα Pτ Pυ Qδ Qμ
       Rε Sη Vβ Vπ Vσ Vφ Wλ; *add. in* regule Mμ; *add.* ita quod dextrum super dextrum et
       sinister super sinistrum Cε Cι Kε Mη Pδ Pθ Vψ; *add.* regule Pκ Pχ Wζ   statim]
       sinistrum Fβ   quatuor₁] *om.* Xβ   quatuor lineas et] *om.* Bδ Eζ Lδ Mτ Oγ
          lineas] *add.* plagas Vπ   lineas et] *om.* Wλ   et quatuor₂] et ad quatuor Rγ; in
       Dδ; per Pφ Oφ; vel Bε Cγ Cε Cι Dη Eβ Eη Eσ Fα Fβ Fε Fζ Kα Kδ Lβ Lγ Lε Lη Lι Lκ Lμ
       Mη Mι Mμ Mπ Mυ Mφ Nγ Nε Nζ Oζ Oι Oξ Oϱ Oτ Pα Pβ Pδ Pμ Pν Pϱ Pσ Pω Qβ Qγ Qδ
       Qθ Qι Qλ Rδ Sδ Sκ Tβ Tδ Vη Vι Vo Vψ Wα Xβ Zα; vel quatuor Nδ Pθ Pκ Pχ Vμ Wζ
          plagas] *om.* Vπ Xβ

17-18   lineas … predictas] mundi plagas Pξ; partes mundi Eμ

18   mundi] *om.* Lι   predictas] *om.* Bδ Rγ Rε; ostendentes(?) Vφ; supra dictas Kε Kι Mτ
       Qη Qζ; *add.* etc. Fε; *add.* indicantes Qδ; *add.* sicut Rδ; *ms* Lι *skips to Cap. 42*

along the two sides of the rule, that is the right shadow along the right side and the left shadow along the left side; and automatically you will have the four lines and the four [cardinal] compass points of the world, as mentioned above.

[Comment:

To find the 4 cardinal points of the compass at one's current location, take the altitude of the sun (at any given time) using the alidade, and then place the degree of the sun (along the ecliptic for that day) on the almucantar of that altitude. This point will then intersect with an azimuth line. Note how far this azimuth is east or west of the meridian (i.e., the vertical diameter).

Returning to the back of the astrolabe, set the alidade on that degree along the rim. Now set the astrolabe on a horizontal surface with its back facing up and, not letting the alidade move, rotate the whole astrolabe so that the sun's rays pass through the holes in the vanes (or fall along the alidade's centre line), that is, the alidade is pointing directly at the sun. The vertical and horizontal diameters on the back of the astrolabe will then point east/west and north/south.

Instead of letting the rays of the sun pass through the hole(s) in the vane(s), you can also turn the astrolabe so that the edges of the shadow of the vane toward the sun fall along the sides of the alidade, in order to line up the alidade (and astrolabe) with the sun.]

[CAPITULUM 20.] DE DECLINATIONE CUIUSLIBET GRADUS HABENDA

Si scire volueris declinationem cuiuslibet gradus signorum, pone eum super

Cap. 20] *om.* Lι

1   De ... habenda] *om.* Bγ Bδ Bε Bζ Bκ Cγ Cδ Cε Dδ Eα Eγ Eκ Eλ Eσ Eυ Fε Gα Kε Lζ Lκ Mα
       Mδ Mκ Mμ Mτ Nα Nζ Oβ Oυ Oσ Oχ Pι Pκ Pξ Pσ Pχ Pφ Qε Qη Qι Rγ Sα Sβ Sη Sθ Sι Sλ
       Tβ Vα Vη Vμ Vν Vσ Vτ Vυ Vφ Wγ Wζ Wλ Vo Xβ; *illeg.* Eζ; *faded* Eδ Fγ; Ad habendam
       declinationem cuiusque gradus Eo Eϱ Mγ Pτ(*add.* solis) Vξ; Ad inveniendum
       declinationem gradus cuiuslibet signi Lμ Qθ; Ad sciendum declinationem cuiusque
       gradus signorum Mλ; Capitulum 21ᵐ. De declinatione gradus solis Qδ; De declinatione
       graduum Cα; De declinatione graduum ab equinoctiali et stellarum similiter(*om.* Bη)
       Bη(*add. in marg.* 17) Cζ Eμ(*add. in marg.* 17ᵘˢ) Oη; De declinatione cuiusque gradus
       signorum [*illeg.*] linea Kγ(*later hand; add. in marg.* 20); De graduum declinatione Pζ(*marg.*)
       Vγ; De invenienda(inventione Vβ) declinatione cuiuslibet gradus signorum Bι(*add. in
       marg.* c 19ᵐ) Mν Vβ; De latitudine regionis Mπ[1]; Inventio declinationem cuiuslibet gradus
       signi Oφ; Invencio declinationis cuiusque gradus signorum(signi Qμ Wι; solis Rα) Dγ Kθ
       Po Rα Qμ Vϱ Wι; Si vis scire declinationem cuiuslibet gradus signorum Bβ   De] *om.*
       Mν   declinatione] invencione Fα   cuiuslibet] cuiuscumque Pϱ; cuiusque Bθ Eτ
       Rε Vπ Wβ Zα   gradus] *om.* Kα; *add.* signorum Bθ Eτ Mν Pδ Pυ Qβ Vι Vπ; *add.*
       zodiaci Kδ Rδ   habenda] *om.* Eτ Rε; signi Wβ; *add.* Capitulum Nδ Qβ; *add.* etc. Rδ;
       add. et stellarum fixarum Pβ; *add.* Rubrica Vπ   *add. in marg.* 20ᵐ Vφ; *add. in marg.* 22
       Vμ; *add. in marg.* 23 Mκ Pκ; *add. in marg.* C. 24 Oϱ Qζ(24ᵘˢ) Sδ

2   Si] *add.* autem Bη Bκ Cζ Eυ Fγ Lζ Lλ Mα Mκ Oη Oν Oϱ Oσ Oχ Pζ Sα Vβ(*interlin.*) Vσ
                declinationem] *om.* Sλ; *add.* solis Wβ   cuiuslibet] *illeg.* Wα; *rep.* Mμ; cuius Eζ
       Sλ(?); cuiuscumque Bκ Cα Cγ Dη Eβ Eη Fα Fβ Fζ Kδ Lβ Lδ Lε Lκ Lμ Mδ Mo Mφ Oι Oτ
       Oυ Oφ(*add. interlin.* vel cuiusvis) Pβ Pμ Pν Pσ Pφ Rγ Rδ Sα Sδ Tβ Tδ Vη Vψ Xδ; cuiusque
       Bγ Bζ Bι Cδ Cε Cι Eγ Eλ Eμ Eϱ Eτ Gα Lη Mγ Mη Mλ Mν Mμ Nε Oζ Oη Oν Oξ Oϱ Oσ
       Pα Pδ Pι Po Pϱ Qβ Qθ Qι Qλ Qμ Rα Rε Sι Sκ Vα Vν Vξ Vϱ Vφ Wβ Wζ Wι Zα; cuiusvis
       Bδ Bε Bη Cζ Cη Eα Eδ Eo Kθ Lζ(?) Pθ   gradus] *add.* solis Vo   signorum] *om.* Pϱ;
       signi Fγ; *add.* vel stellarum fixarum Mμ Nζ Qζ(*interlin.*) Pκ Pχ Wζ; *add. interlin.* zodiaci
       Tβ   eum] *om.* Cη Dδ Rγ; eam *some; interlin.* Bγ Pζ; gra eum Pι(*interlin.*); illud Vψ;
       ipsum gradum Eλ   super] versus Pζ

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[1] The titles for Cap. 20 and Cap. 21 have been switched in ms Mπ.

[CHAPTER 20.] ON FINDING THE DECLINATION OF ANY DEGREE [ALONG THE ECLIPTIC]

If you wish to know the declination of any degree of the ecliptic, set it on

lineam medii celi vel diei, et scito eius altitudinem ab orizonte; postea scito altitudinem
capitis Arietis et Libre in eadem linea. Deinde scito altitudinem utramque et differentia

3   lineam] *om*. Wλ; *marg*. Pν   medii celi] meridionali Lβ; moridionalem Lκ; *add*. gradu
         solis Dδ   medii ... vel] meridionali Kα   celi vel] *om*. Bδ Bκ Cδ Eγ Lζ Lκ Mα Mμ
         Oν Oσ Oχ Pζ Pι Pφ Qε Sθ Sι Sλ Vα Vβ(*add. interlin*. al' medii celi) Vϱ Vυ; *interlin*. Sβ; *add*.
         interlin. medie Pα; *add. in marg*. medie Oυ   vel diei] *om*. Bη Dη Lλ Mι Nγ Oη Oϱ Pξ
         Sα Vγ Vξ Wμ; *interlin*. Eμ; *ut corr. to* vel Mη; vel medii diei Cα Fε Oβ Xβ; vel meridiei
         Nζ; vel nadir diei Pω; *add*. quod est idem Fγ   scito₁] scias Cα; scita Mμ Mτ
              altitudinem₁] altitudine Mμ Mτ; altitudines Wλ; latitudinem Eα Vυ; *interlin*. per
         almucanth'ath Bγ   eius] *om*. Lλ Vγ Vυ   eius ... scito₂] *om*. Dη Mπ   ab] in
         Dδ; *add. illeg*. Kγ   ab ... altitudinem₂] *om*. Mη; *marg*. Qι   orizonte] oriente Cε Cη
         Lε Mτ Oσ Pγ Pκ Pχ Vξ Wζ; *corr. from* oiente Bγ; *add*. computando almutanterath Mι Nγ;
         add. oriente Qδ; *add*. per alumis numerus Zα; *add*. posite Vπ; *add*. vel orientale Fβ Oβ
         Pα(*interlin*.); *add*. scilicet Nα; *add. interlin*. id est orizonte orientali Kε Kι; *add. in marg*. non
         tunc assumas gradus sed in rethe Lε(*later hand*); *add. in marg*. non tunc assimas tunc
         gradus altitudinis sed in rethe Tδ   scito₂] *om*. Vγ Wλ; scias Cα; scies Eγ Mμ
              altitudinem₂] *om*. Mτ; *add*. est Fζ

3-4   eius ... scito] *om*. Pω

4   capitis] *om*. Fγ Pκ Pχ Qβ; capite Mτ; capitum Sκ   capitis ... altitudinem] *om*. Pν Pξ Xδ
              capitis ... utramque] scilicet equinoctialis utraque id est gradus et equinoctialis Bκ
              et₁] vel Bη Bι Cζ Dγ Eϱ Fε Kε Kι Lλ Mγ Mλ Mμ Mo Nα Oβ Oη Oϱ Oσ Oχ Pζ Pκ Pτ
              Pυ Pχ Qδ Qζ Qη Rα Sη Sθ Sι Vα Vμ Vo Vυ Vφ Wζ Wλ; aut Pι; et *corr. to* vel Wβ
                   Libre] *add*. id est equinoctialis Kδ Rδ; *add. interlin*. scilicet equinocialis Pθ   in]
         om. Wι   in eadem] *om*. Vσ   linea] *add*. ab oriente Oβ; *add*. medii celi Cα Eλ Mι
         Nγ   Deinde] Postea Eδ   scito] *marg*. Eζ; scias Cα; scita Mμ Mτ Pκ Pχ Qη Vμ Vo;
         add. differentiam Eζ(*marg*.) Pζ   scito ... differentia] *om*. Eλ   altitudinem]
         altitudine Mμ Mτ Pκ Pχ Qη Vμ Vo; *add*. est Pγ   altitudinem ... et₂] *om*. Eγ Sθ; *marg*.
         Sβ   utramque] utrasque Mμ; *corr. in marg. from* initiam Oξ; *add*. eum Mη; *add*. que est
         intra utrumque scilicet inter gradus signum quem vis et caput Arietis Mι Nγ   et₂] ad
         Rδ; tam altitudinem gradus in ista linea medii celi quam etiam altitudinem capitis Arietis
         seu Libre et istus scitas nuta duarum istarum altitudinum sive quia Cα; *add*. tunc Kα
              differentia] declinatio Mν; rᵃ Fβ; differentiam Rδ

4-5   Deinde ... linea] om. Vη   altitudinem ... ipsarum] differentiam
         utrarumque(utrumque Lλ) Lλ Mα Oχ Pζ Vβ Vγ; utramque altitudinem Sλ   et ...
         eius] qui erit de dirculo eiusdem Mμ

the line of the middle of the sky or of the day, and know its altitude above the horizon [using the almucantars]; afterwards know the altitude of the beginning of Aries and Libra on the same line. Then consider each altitude and the difference

5 ipsarum altitudinum est declinatio eius gradus ab equinoctiali linea. Si autem gradus
signi fuerit septentrionalis, est declinatio septentrionalis; si meridionalis, meridionalis.
Scito etiam quod gradus septentrionalium signorum sunt altiores equinoctio, quod est

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5   ipsarum] *om.* Eκ Rγ Vφ Xβ; eorum Vυ; ipsorum Mτ; istas Cα; utrarumque Sι; utriumque
           Eγ Sθ   altitudinum] *om.* Mo; altitudines Cα; latitudinem Oχ; add. id est subtrahe
           unum numerum ab alio et quod gradus/differentia(?) remanet Vo   est] que erit Eγ
           Lλ Mα Oχ Pζ Qε Sθ Sλ; que est Vβ   est ... eius] *om.* Bθ; *marg.* Mκ(huius)
                 declinatio eius] *om.* Vπ; differentia eius Mν   eius] *om.* Eλ Mμ Nζ Pβ Pκ Pχ Vμ
           Vo Wζ; eiusdem Fγ Rγ; huius Cζ Eμ Oη Vσ; illius Cα Wμ; eiusdem Cη Eκ Eτ Lλ Mα Mo
           Oβ Oι Pζ Pι Pτ Qε Sβ Vβ Vγ Wβ Wι   gradus₁] *om.* Bζ   ab ... linea] alia
           equinoctiali Dδ   linea] *om.* Fγ; add. que ducantur qū [*illeg.*] Zα   Si] *interlin.* Pκ
                 autem] enim Cα   gradus₂] *add.* ille Kα

5-6   Si ... fuerit] Si autem fuerit gradus | Si autem Sα

6   signi] *om.* Mλ   fuerit] *interlin.* Oγ; sit Pι; add. equalis Qη(*deleted?*)
                 septentrionalis₁] *om.* Pκ Pχ; septentrio Oǫ; add. tunc Lδ   est] erit Cα Cδ Dη Lλ
           Mμ Mτ Oγ Pζ Sθ; et Pγ; quod Bδ   est declinatio] *om.* Wβ   est ... septentrionalis₂]
           om. Wλ; in declinationem septentrionali Vo   est ... meridionalis₂] et si meridionalis
           Pι; et similiter de meridionali Nγ   declinatio] *om.* Eη; illa declinatio Cα; add. eum Rγ
                 septentrionalis₂] *om.* Bζ Oχ; *interlin.* Fβ   si] et Pζ; et si *many*; sive Oσ; add.
           autem Mo; add. signi Fγ; add. vero Rγ   si ... meridiana₂] et similiter de meridionali
           Mι; et simul meridiana Cε   meridionalis₁] *om.* Bζ; meridianus *some*; meridiani Cδ Eμ
           Oχ Pζ Sλ; add. declinatio est Gα Oβ Qη; add. erit Dη Mμ Mπ; add. est Lκ Lμ Mυ Mφ Ον
           Pσ Pφ Pω Qβ Qθ Rγ Vμ Zα; add. ipsa est Pβ; add. iste declinatio est Cα; add. signi Kα
                 meridionalis₂] *om.* Bδ Cγ Eo Kε Lβ Mτ Pγ Pκ Pχ Qζ Xβ; *interlin.* Wζ; declinatio erit
           meridionalis Lδ Oγ; et cetera Kι; medii celi vel medii diei Lκ; meridiana *many*;
           meridionali Vo

6-7   si ... septentrionalium] signorum Vι

7   Scito] Scias Cα; *illeg.* Pξ   quod₁] *om.* Mτ; quia Pφ; quot Cι Sλ   septentrionalium
           ... equinoctio] signorum septentrionalis signi est altior Mι   sunt] *om.* Mν; sicut Qγ;
           add. interlin. versus cuspidem Bγ   altiores] *add.* in Fγ; add. sunt quia magis
           appropinquantes ad cenich quam equinoctem altiores Nε   equinoctio] *om.* Oχ;
           equinoxio Oι; equi quia magis appropinguentes ad cenith quam equinoctium noctio Fβ;
           add. in almicantarath Fγ; add. quia(*add.* sunt Sκ) magis appropinguentes ad cenith
           zenit/zentith quam equinoctionem Cγ Nα Oυ(*marg.*) Sη Sκ(*marg.*) Vo; add. id est magis
           propinqua polo Mι Nγ   quod₂] ut Lκ   est] *om.* Fγ Mι Nγ

of their altitudes is its declination of the degree from the celestial equator. If however the degree of the sign were to the north, its declination is northern; if to the south, southern. And know that the degrees of the northern signs are higher than the [celestial equator] which is

in capite Arietis et eius opposito; et meridionalium inferiores, secundum declinationes eorum ab eo. Maior autem declinatio est in capite Cancri et Capricorni. Eodem modo invenies declinationem stellarum fixarum.

10

8   in] *om.* Fγ; a Eγ Kδ Kι Mμ Mτ Pφ Qζ   Arietis] *om.* Sι; *add.* et Libre Zα   et₁] qui Bθ; *add.* in Cδ   et₁ ... opposito] *om.* Cα; *corr. to* Libre Bγ; et(*om.* Oβ) ex opposito gradus signorum Mμ Oβ Qη; et Libre Fγ   eius] cum Libre Bβ; ex Kε Kι Mτ Pκ Pχ Vμ Vo; *add.* et ex Kα   opposito] oppositi Pζ; oppositum Vη; *add.* gradus signorum Nζ Pκ Pχ Wζ(*and del.*); *add.* quod est in Libra Cζ Oζ; *add.* scilicet Libre Cδ Qμ Zα; *add.* usque ad Libram que opponitur Arieti Mι; *add. interlin.* sunt Oφ   et₂] est Pθ; gradus signorum Vo; *add.* gradus Bθ Cα Eλ Eυ Fγ Mκ Rε Vπ Vσ Vτ; *add.* gradus(*interlin.*) signorum Vμ; *add.* signorum Pι   meridonalium] meridianorum *many*; *add.* gradus Oγ; *add.* gradus signorum Cζ Oι; *add.* graduum Bβ Kθ; *add.* signorum Qμ; *add.* signorum sunt Fγ; *add.* sunt Mκ Mμ Pκ Pχ Rε Vμ Vo Vσ Wζ   inferiores] *add.* sunt Bδ Bθ Cα Cγ Dδ Dη Eβ Eη Eσ Eυ Fα Fβ Fε Fζ Kα Kδ Kε(*interlin.*) Kι Lγ Lε Lμ Mδ Mη Mι Mπ Mτ Mυ Mφ Nγ Nδ Nε Nζ Oβ Oζ Oξ Oι Oτ Pα Pβ Pδ Pθ Pμ Pυ Pξ Pσ Pω Qβ Qγ Qδ Qη Qθ Qλ Rδ Sδ Sκ Tβ Tδ Vη Vπ Vφ(*interlin.*) Wμ Xβ Xδ; *add.* sunt equinoctio Lδ Oγ; *add. interlin.* versus limbum Bγ   secundum] sunt Bβ Lκ Qμ   declinationes] declinationem Mτ Qβ Oφ(*corr. interlin.* -nes) Vβ; *add.* id est per declinationem Cζ Oη

9   eorum] *om.* Eσ Qθ; eorundem Rγ; horarum Pγ   eorum ab eo] ipsarum ab equinocio Oβ; Libro scilicet equinoctiali Bκ   eorum ... declinatio] *om.* Eo   ab eo] *om.* Bε Eη   eo] equinoctiali predicto Kα Kε Kι Mτ Qζ; equinoctione Bζ Mμ Nζ Pκ Pχ Vμ Wζ; equinoctiali Vo; *add.* non differentiam et latitudinis maioris Cι; *add.* scilicet equinoctiale Lζ   Maior] aᵒʳ *some*; maxima Cδ; minor Oχ; q' Bη; *add. in marg.* Notabilia neccessaria ad sequentia Lζ   autem] *om.* Fγ] *rep.* Vυ; alia Oη; enim Bθ Eλ Qμ; *add.* eius Nδ   declinatio] *om.* Mμ Pκ Pχ Vμ Vo Wζ   est] *om.* Qι Nα; erit Oγ Sλ; *add.* declinatio Qη   est ... Captricorni] graduum iuxta Cancrum et Capricornum Fγ   in] a Kε Kι Mπ Mτ Qζ Rε   in capite] *om.* Nδ   Cancri et Capricorni] Capricorni et Cancri *some*   et] ad Kι Mτ Qζ   eodem] eo Pρ; eodemque Oχ Sθ Sι Sλ; *add.* autem Vα Vυ; *add.* quoque Bη Bκ Cδ Cζ Eγ Eμ Lζ Mα Mμ Oη Oρ Oφ Qε Vβ Vγ   modo] *om.* Kθ Mμ

9-10   eodem ... fixarum] *om.* Dη

10   invenies] *om.* Oχ; *add.* invenire possis Cζ   declinationem] in Fγ   fixarum] *om.* Kδ Nγ Nδ Oξ; *add.* precise(*?*) eodem modo operando ut dictum est Vμ; *add.* etc. Rδ; *add.* *3.5-line gloss* Cζ

through the beginning of Aries and its opposite [point]; and of the southern signs, lower, according to their declination from it. Moreover the greatest declination is at the beginning of Cancer and of Capricorn. By the same method you find the declination of the fixed stars.

[Comment:

To know the declination of some degree or point on the ecliptic, place that point over the meridian line and read its altitude (using the almucantars). Then place the beginning of Aries (or Libra) on the same meridian and read its altitude. The difference in altitudes will be the declination of the point from the equator.

The northern signs (Aries to Virgo) have northern declinations, and are above the equator; the southern signs (Libra to Pisces) have southern declinations, and are below the equator. The greatest declinations are at the beginning of Cancer (northern) and the beginning of Capricorn (southern).

Declinations of the fixed stars can be similarly found.]

[CAPITULUM 21.] DE ALTITUDINE POLI VEL LATITUDINE REGIONIS

Scito quod latitudo regionis sit latitudo cenith capitum eius ab equinoctiali

Cap. 21] *om* Lι

1 De ... regionis] *om.* Bγ Bδ Bε Bζ Cγ Cδ Cε Dδ Eα Eγ Eκ Eλ Eυ Fε Gα Kε Lζ Lκ Mα Mκ Mμ Mτ Nα Nζ Oβ Oν Oσ Oχ Pι Pκ Pξ Pσ Pφ Pχ Qε Qζ Qη Qι Rγ Sα Sβ Sι Sλ Tβ Vα Vη Vμ Vν Vo Vσ Vτ Vυ Vφ Wγ Wζ Wλ; *faded* Eδ Eϱ Fγ; *illeg.* Eζ; *marg.* Nε; Ad habendum latitudinem cuiusvis(*om.* Dη Vξ) regionis Dη Eo Vξ; Ad inveniendum latitudinem alicuius regionis Lμ; Ad precognoscendum ea que secuntur Mγ; Ad sciendum latitudinis regionis Vγ; Capitulum 22ᵐ. De latitudine cuiusque regionis Qδ; De altitudine poli Zα; De altitudine regionis quelibet invenienda Kγ(*later hand; add. in marg.* 21); De declinatione cuiuslibet gradus Mπ¹; De declinatione(*corr. in marg. to* latitudine) regionis invenienda Bη(*add. in marg.* 18); De invenienda latitudine regionis Dγ(*add.* Rubrica) Qθ(*marg.*) Rα(*add.* et cetera); De invenienda(*om.* Wι) latitudine cuiuslibet regionis Oφ Wι; De inventione latitudinis cuiusque regionis Vβ; De latitudine cuiusque regionis invenienda Kθ Mν Po Qμ Wβ; De latitudine poli vel regionis Oϱ; De latitudine regionis Rε: De latitudine regionis invenienda Cζ Eμ(*add. in marg.* 18ᵘˢ) Eτ Mλ; De latitudine regionis per gradum solis habendam Pτ; De latitudine regionis scientia caⁱᵒʳ/mⁱᵒʳ (?) Sη; De regionis latitudine Pζ(*marg.*); Habendam latitudinem regionis cuiuslibet sive elevationem poli Bι; Inventio latitudinis regionis vel elevationis poli Vϱ; Si latitudinem regionis scire volueris Bβ De altitudine] *om.* Oξ; De latitudine Kδ poli] *om.* Bκ Lε Pβ Pγ Tδ vel] *om.* Mη; a Nε; et Eη Pν; seu Cα latitudine] *om.* Kα; altitudine Rδ; declinatione cuiuscumque Mυ Vι; lat' Mη regionis] *add.* etc. Rδ; *add.* quod idem est habenda Mo; *add.* Rubrica/Rx Nδ Vπ; *ms.* Lδ *ends* *add. in marg.* 21ᵐ Vφ; *add. in marg.* 23 Vμ; *add. in marg.* 24 Mκ Pκ; *add. in marg.* C. 25 Oϱ Qζ(25ᵘˢ) Sδ

2 Scito] Notandus Vμ; Scias Cα; Sciendum Vo latitudo₁] altitudo Fβ Wβ regionis] *om.* Qβ Sδ; *add.* distancialis Qη; *add.* et altitudo poli Zα regionis sit latitudo] vel longitudo Mτ sit] *om.* Vα Vσ; est Dη Mμ Nζ Pκ Pϱ Pχ Qη Rε Vμ Wζ Xδ latitudo₂] *om.* Kα Vα Vσ; altitudo Mυ Mφ Oγ Vι Vτ Wα; *erased and add.* distantia Wζ distancia vel longitudo Cγ Dδ Kε Kι Qζ; longitudinis Sθ; longitudo Bθ Eϱ Fγ Mα Mγ Nζ Oβ Oφ(*corr. interlin.* al' latitudo) Oχ Pι Pκ Pφ Pχ Pϱ Qε Qη Rα Sβ Sι Vβ Vγ Vν Vo Vπ Vφ; longitudo vel latitudo Qμ; *corr. from* longitudo Eζ; *corr. to* longitudo Mμ; *add. interlin.* scilicet distancia Bγ cenith] *om.* Bη Sθ Xβ; *illeg.* Bκ; cenit Oσ Qε Qη Sβ Vυ Wλ; cent Mα; zenit Cγ Pκ PχVγ; zenith Bε Kγ Kδ Lκ Nα Qδ Sα Vφ; *add.* seu distancia cenith Cα capitum] *om.* Eκ Mμ Nζ Pκ Pχ Qζ Qη Rγ Vμ; *illeg.* Eϱ; capitis Oϱ Pι; civium/cunum Cη Dγ Eτ Mγ Mη Mλ Oβ Pτ Rα Rε Sα Vν Vϱ Vτ; *add.* civium Bγ Bθ Cζ(cunum) Eλ Eμ Eυ Lζ Mα Mκ Oι(*marg.*) Oϱ Oσ Oφ Oχ Pζ Pυ Pφ Qε Sβ Sθ Sι(*and del.*) Sλ Vβ Vπ Vσ Vυ; *add.* initium Lλ Vγ; *add. interlin.* id est zenit Bη capitum eius] *add. in marg.* Wζ eius] *om.* Bε Fε Kγ Mμ Mτ Nζ Pι Pκ Pχ Rγ Vμ Vo Wλ; *del.* Oι; cuius Wγ; cuiuscumque Eγ

2-4 Scito ... equalis] *marg.* Cδ

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¹ The titles for Cap. 21 and Cap. 20 have been switched in ms Mπ.

[CHAPTER 21.] ON THE ALTITUDE OF THE POLE OR THE LATITUDE OF A REGION

Know that the latitude of a region is the latitude of its overhead zenith from the celestial equator

circulo versus septentrionalem vel meridiem, que similis est altitudini poli
septentrionalis et depressioni eius opposite ab orizonte, que duo sunt semper equales.
5   Cum ergo latitudinem cuiusque regionis scire volueris, altitudinem solis in

3   circulo] *om.* Sβ; altitudo Pγ; linea vel circulo Bη Cζ Eμ Eυ   versus] *om.* Vα   vel]
        et Oφ(*corr. interlin. to* vel) Pφ; *add.* versus Eδ   vel meridiem] *om.* Eλ Sι   que] qui
        Lζ; *add.* distancia Cα; *add.* scilicet declinatio cenith ab equinoctiali Qμ   est] *om.* Eσ Fβ
        Mν Pξ Pφ Rδ Wλ   altitudini] latitudini Mη; *add.* solis Wγ

4   septentrionalis] *om.* Bθ Eυ Mκ Vπ Vσ; unius Dη; *add.* ab oriente Pφ Sα; *add.* ab orizonte
        Bη Bκ Cδ Cζ Eγ Eμ Lζ Lλ Mα Oι(*marg.*) Oν Oϱ Oσ Oφ Oχ Pι Qε Sβ Sθ Sι Sλ Vα Vβ Vγ
        Vυ; *add.* orizonte Pζ   et] vel Lμ Vμ Wζ; *add.* cumque Vι   et ... duo] ab orizonte
        et depressioni poli meridionalis qu~ terra, scilicet latitudo regionis elevatio poli arctici,
        depressio poli antarctici Wγ   depressioni] depressionalis Sα; p'nsioni Nγ   eius]
        rep. Eϱ; poli Vβ; *add. interlin.* poli Oι   eius opposite] *om.* Wι; alterius Dη; eius per
        oppositi Lκ; meridionali Sα; poli meridionalis(meridiam Sθ; meridionali Sι) sub eo Sθ Sι
        Sλ Vα Vυ Wμ; poli oppositi id est meridiani sub eo Vβ; *add.* poli australis Cα Oβ; *add.*
        predicto scilicet polo Mι   eius ... orizonte] meridionali sub eo Lζ Pζ; meridionalis
        sub eo Bκ Oν Oϱ(*add. in marg.* orizonte); poli meridionalis sub eo Bη Cδ Cζ Eμ Mα Oσ
        Oφ(*add. interlin.* scilicet oppositi) Oχ Pφ Qε Sβ Vγ; poli meridiani Eγ   oppositi] ex
        opposito Mτ Pκ Pχ Vμ; opposite Tβ Wζ   oppositi ab] ab opposito Vo   ab] sub
        Fγ Pι   orizonte] eo Sα; illius regionis Rε; oriente Pκ Pχ; *add.* eiusdem regionis Eλ;
        add. illius regionis Vτ; *add. interlin.* scilicet meridionali Oι   que] qui Wι; *add.* de Pγ;
        add. scilicet Oξ   que duo] quo sic Qη   que ... equales] que due partes similiter
        equales Lζ; que est similiter equales Mυ   duo] *om.* Bβ Fε Qβ; due Bι Eα Eμ Mγ Mη
        Mκ Nα Oβ Oϱ Pυ Qμ Sβ Sι Sκ Vα Vβ Vπ Wλ; 3 Mφ Vι; tres Lγ Mα Oχ Pζ Qε Sθ(?); tria
        Eγ; altitudo poli septentrionalis et depressio poli australis Cα; *add.* altitudines Wλ; *add.*
        partes Bθ Eυ Mκ Oν Vσ; *add.* scilicet elevatio et depressio Mι Nγ; *add. interlin.* distancie
        Bγ   sunt semper] se habent Fγ; simpliciter Eδ   semper] *om.* Bζ Eλ Mφ Vι Vσ;
        interlin. Kθ; in partes *corr. to* simpliciter Bγ; partes Bκ Cε; seui(?) Lβ; simplicit Bβ;
        simpliciter Mν Vξ Rγ Wι   equales] *om.* Cε; *add.* etc. Rδ; *ms* Oχ *ends*

5   Cum] *add.* utrique alti(?) Vo; *add. in marg.* Inventio altitudinis regionis Lζ; *add. in marg.* 1ᵃ
        regula Dδ   ergo] *om.* Cδ Mμ Nζ Pκ Pχ Wζ; autem Dη Gα; enim Mι Nγ; igitur Kι Mτ
        Oβ Qζ Vμ   latitudinem] altitudinem Bζ Cα Dγ Eδ Eζ Mν Nζ Oϱ Rα Sβ Vφ;
        longitudinem Mγ Vη   cuiusque] *om.* Dη Sι; alicuius Eα; cuius Eυ Pγ Pζ Sβ;
        cuiuscumque Cα Lη Qι Qθ Sλ Vη; cuiuslibet Cγ Eδ Eκ Eσ Fε Fγ Gα Kα Kθ Kι Mμ Mν
        Mo Mτ Nα Oβ Oγ Pδ Pκ Po Pτ Pυ Pχ Qδ Qζ Qη Rγ Rδ Rε Sκ Tβ Vβ Vo Vξ Vψ Wβ Wζ Wι
        Wλ Xβ; cuiusvis Bζ Bη Bι Bκ Cζ Dγ Eλ Eμ Eo Eυ Lγ Lζ Mα Mγ Oν Oσ Oφ Pι Qε Rα Vα
        Vγ Vυ Vφ   cuiusque ... altitudinem] *om.* Sθ Xδ   regionis] *om.* Eυ   scire]
        marg. Wζ   volueris] desideras Eκ; *add. in* Mν; *add.* scilicet Eδ   altitudinem]
        latitudinem Eσ   solis] *om.* Rα Wβ; poli *corr. in marg. to* solis Qδ; regionis Vτ   in]
        om. Pβ

toward the north or the south, which is similar to the altitude of the northern pole (and its opposite depression) from the horizon, which two are always equal.

Therefore when you wish to know the latitude of any region, consider the altitude of the sun

media die considera, quam minues de 90, si fuerit sol in initio Arietis et Libre, et quod est residuum erit latitudo regionis; tunc enim motus solis erit in equinoctiali linea. Si vero in alio gradu fuerit sol, eiusdem gradus declinationem considera per tabulam

6   media] ipsa *corr. interlin. to* media Eκ; medio *some*   medie die] meridie Bη(*add. interlin* media) Bθ Bκ Eυ Fγ Fε Lζ Mκ Nζ Vμ Vo Vπ Vσ Vψ; medio diei Cζ   considera] *om.* Rα; primo considera Cα; *add.* cum 11ᵐ canonem Vμ; *add.* per 2 canonem Bζ; *add.* per 11(ii?) canonem Oβ; *add.* per 12/12ᵐ canonem Eϙ Gα Nζ Vφ Wζ; *add.* per 13 Mτ; *add.* per 13/13ᵃᵐ canonem Kα Kε Kι Mμ Pκ Pχ Qζ Qη Vo; *add.* per hᵐra novm suppoⁿⁱ(?) Pι; *add.* quando sol est(fuerit Kδ) in primo Arietis vel Libre Kδ Pθ   quam] *om.* Oβ; quid Pγ; *add.* altitudinem solis Cα; *add.* tunc Vη   minues] *corr. interlin.* Vη; invenies Dγ Kδ Mυ Vσ; invenies *corr. in marg.*(*interlin.* Mη) *to* minues Cζ Mη   90] 10 gradibus Cα; ʟх Sθ; ʟх *corr. to* 90 Qε; nonaginta Lκ; nota 90 Fγ; *add.* gradibus Vα   90 si] quo Mγ   si fuerit] *om.* Pϙ; quando fuerit Rδ; si volueris Pξ   si ... Libre] *om.* Kδ   sol] *om.* Cζ Mν Mυ Mφ Vι Wα   in] *om.* Cζ Mυ Pγ Pζ Pι   initio] principio Rδ; stacione Sι   et₁] vel *many*

6-7   quod est] *om.* Bγ Bη Bκ Cδ Cζ Eγ Eμ Fε Kε Kι Lζ Lλ Mα Mι Mτ Nγ Oϙ Oσ Pζ Qε Qζ Sα Sβ Sθ Sλ Vα Vβ Vγ Vυ Wγ; *del.* Wζ; qrquod(?) Rγ

7   est] erit Eϙ Mμ Wλ; fuerit Dη Eo Nζ Oβ Pι Pκ Pχ Qη Vμ; si fuerit Vo   est residuum] remanet Cα   residuum] *add.* initii Arietis   erit] est Bη Bκ Cδ Eμ Lζ Oγ Oϙ Oσ Pϙ Vβ Vτ Vυ Wλ; *add.* ibi Pσ; *add.* post talem subtractionem Cα   latitudo] *om.* Qι; altitudo Vμ; habetur per latitudine Rγ; longitudino Dδ Lλ Mγ Vγ Vη   latitudo regionis] *marg.* Pβ   latitudo ... enim] *om.* Sη   regionis] *add.* illius Fε   enim] *om.* Eσ Fε Kθ Pδ Pϙ Wλ; *blank* Cγ; *add. illeg.* Sα   motus] *corr. from* magus(?) Pβ   motus solis] id est que sol est in primo gradu Arietis seu Libre esse Cα   solis] *om.* Pι Pκ Pχ Wζ; celi Bζ; eius Nζ   solis erit] *om.* Kα   erit₂] *om.* Rδ Sα   est Cα Mυ Oν Pγ   erit in equinoctiali] *illeg.* Cε   in] *om.* Wβ; ab Wγ   *before* Si] *add.* ᴅᴇ ᴀʟᴛɪᴛᴜᴅɪɴᴇ ʀᴇɢɪᴏɴɪѕ Cα   Si] *add. marg.* 2ª regula Dδ

8   vero] autem Dη; enim Nζ Sα; *add.* fuerit Oγ   alio] aliquo Bβ Pγ Qη; aliquo *corr. to* alio Pι; aliquo aliquo Oβ; illo Pμ; septentrionale Rγ   gradu] signo Bδ; *add.* linea Oβ   fuerit] *illeg.* Eα; erit Qθ; est Lμ Pι   fuerit ... gradus] *om.* Pγ   sol] solis quam primo gradu Arietis seu Libre Cα; *add.* scilicet(?) quod in principio Arietis vel Libre Pι   eiusdem] cuiusdem Mπ; eius Bη Bκ Cδ Cζ Eγ Eλ Eo Eυ Lζ Lλ Mα Mγ Oϙ Oσ Oφ Pζ Pφ Qε Sα Sβ Sθ Sι Sλ Vα Vγ Vν Vυ Wγ; illius Dη   gradus] *blank* Cγ; signi Nζ; *add.* solis Vμ Vo   declinationem] *om.* Nα; *add.* a linea equinoctiale Cα   considera] *add.* et illam declinationem potes Cα   per] *add. in marg.* Hec littera "Per tabulas" usque ad litteram "Quam minues" est addita Vβ   tabulam] liniam Eα; tabulas Bζ Kγ Pυ Qδ Rδ Sη Vβ Vι; *add.* gradus Qβ Sδ; *add.* que ponitur post quadrantem Eϙ Gα Rα(*add.* in) Vφ(*add. interlin.* scilicet)

8-9   considera ... vel] *om.* Mτ   per ... vel] *om.* Kε Kι Mμ Nζ Pι Qζ Qη Vμ Wζ   per ... datas] *om.* Bη Bκ Cδ Cζ Eγ Eμ Lζ Lλ Mα Oϙ Oσ Pζ Pφ Qε Sα Sθ Sι Sλ Vα Vγ Vυ Wγ; *marg.* Oφ Sβ   tabulam ... datas] regulas [*illeg.*] in canone [*illeg.*] precedente positas Pκ Pχ

at midday which you will subtract from 90 if the sun is in [the circle through] the beginning of Aries and Libra, and what is the remainder will be the latitude of the region, for then the motion of the sun will be on the celestian equator. If, however, the sun is in some other degree, settle on the declination of the same degree through a table

declinationis solis, vel per regulas ante datas; quam minues de altitudine solis in media

10   die, si fuerit septentrionalis; si vero meridionalis, adde illam. Et habebis altitudinem

initii Arietis in regione illa, quam subtrahes, sicut predictum est, a 90, et quod

9   declinationis ... datas] id est per regulam proximam declinationem solis cum per regulas
                omnis declinationis Kα   solis₁] *om.* Bβ Dη Eλ Fγ Mι Qβ Vϱ   vel] *om.* Mπ Wα; et
                Bζ Eι Kγ Qβ Qγ Vξ   vel ... solis₂] *om.* Cε Eκ   per] *om.* Mγ Oν Qδ   regulas]
                tabulas Eo; *add.* scilicet Vσ; *add. illeg.* Vo   regulas ... datas] *illeg.* Fγ   ante] *om.* Gα
                     datas] dictas Eα Mγ Mι Mτ Nγ Oγ Rε; *add.* capitulo proximo Vφ; *add.* cum caˢᵒ
                     proximo Gα; *add.* cum proximo Rα; *add.* in canone in medie precedenti Nζ Wζ(*add.*
                     proxim~); *add.* per precedentem et in medie Mι Nγ; *add.* proxime/proximo Mμ Mτ Kι Oβ
                     Pι Qζ Vμ Vo; *add.* que ponitur post quadrante Bζ; *add.* tᵒ procᵉnno Eϱ   quam] ista
                     declinatione inventa Cα; quas Pκ Pχ; *add.* declinationem Gα Mι Nγ Rγ   minues]
                     invenies Kδ Qβ; invenies *and corr. in marg. to* minues Cζ Sδ; minuta Mτ; *add.* eam Cα
                     de altitudine] *marg.* Sκ; declinatione Xδ; de latitudine Cζ Nζ; *add. interlin.* inventis
                     per regulam in dorso astrolabii Bγ   solis₂] *om.* Bζ   in] *om.* Bι; de Fα Mτ
                     medi1] medio *some*

9-10   in media die] *om.* Vo; in meridiana Bε; in meridie Fε Nζ Vμ

10   si₁] *om.* Mτ; *add.* gradus Oβ Pι Qη   si₁ ... septentrionalis] *marg.* Oφ(*add.* quod); *add.*
                vel adde illam Oϱ   fuerit] sit Bθ Bκ Fγ Lζ Mκ; *add.* declinatio Eλ Rε   si₂ ... illam]
                vel adde eam illi si fuerit meridionalis Bθ Mκ(addes) Vπ; vel(et Pφ) adde illam si fuerit
                meridiana Eγ Lλ Mα Oσ Pζ Pφ Qε Sα Sβ Sθ Sι Sλ Vβ Vγ Vυ; vel adde illam si fuerit
                meridionalis Oν; vel adde illi si fuerit meridionalis Bκ Lζ; vel adde si fuerit(sit Fγ)
                meridionalis Bε Dη Fγ Vα Wγ; vel adde si fuerit meridiana declinatio Cδ; vel addes
                eandem(eam Vσ; idem Cζ) si fuerit meridiana Bη Cζ Eμ Vσ   vero] *om.* Pσ Qθ Vσ;
                fuerit Oϱ; fuerit autem Mμ; *add.* fuerit Kε Kι Mτ Nζ Oβ Pκ Pχ Qζ Qη Wζ; *add.* fuerit in
                media die Vo   meridionalis] meridiana *many*; meridies Mτ; *add.* fuerit Rγ; *add.* id est
                in signis meridionalibus Kα   adde illam] *marg.* Oφ   illam] ad illam Zα; ei Mμ
                Nζ Pκ Pχ Vμ Vo Wζ; ei illam declinationem Qη; illi Lζ Vν; istam Kγ Kι Mτ; *add.*
                declinationem Oβ Qμ; *add.* declinationem(*add. and expunged* illius gradus) altitudini solis
                in media die Cα   et] *add.* tunc Oφ Pφ   habebis] invenies Pι   altitudinem]
                om. Bε Eη; latitudinem Qη; *add.* equinoctialis id est Vo; *add. in marg.* equinoctialis Qζ

11   initii] *om.* Dη Lμ Pσ Qθ Sλ; *marg.* Sδ; in initio Wλ   initii Arietis] *om.* Nζ Pκ Pχ; *marg.*
                Wζ; equinoctialis Mμ Vμ   Arietis] *add.* et Libre Bγ(*interlin.*) Nδ   illa] *om.* Lγ Pι;
                eius Bη; ista Kε Kι Mτ Nζ Pκ Pχ Vo Wζ   quam] *add.* altitudinem Arietis et Libre Gα;
                add. altitudinem inicii Arietis Cα   subtrahes] minues Mδ Nδ; subtrahas Gα Wλ
                     sicut] ut Bε Fγ Vα Vξ   sicut ... est] *om.* Nζ Pκ Pχ Wζ   predictum] dictum
                Bη Bθ Dη Eυ Fγ Kγ Kε Kι Mι Mκ Mτ Nγ Qζ Qη Sλ Tβ Vη Vμ Vo Vπ Vσ Wλ   est]
                om. Qε Xβ   a] de *some*   90] 10 gradibus Cα; LX Sθ; LX *corr. to* 90 Qε; *add.* gradibus
                Cδ Vα

11-12   et ... linea] et residuum erit latitudo Fγ

of solar declinations, or through the instructions given above [in Cap. 20]; this you will deduct from the altitude of the sun at midday if it is northern; if, on the other hand, it is southern, add it. And you will [then] have the altitude of [the sun at] the beginning of Aries in this region, which you will subtract, as said before, from 90, and what

remanserit est distancia regionis ab equinoctiali linea.

12   remanserit] post talem subtractionem Cα est] erit Bι Cζ Dη Eγ Lλ Mμ Nα Pβ Pζ Qε
        Sη Tβ Vγ Vη Vμ Vϱ Zα; est vel erit Cζ distancia] *add. interlin.* cenith Oφ
              distancia ... linea] altitudo poli et per conversus latitudo illius regionis Dη
              regionis] *om.* Nζ Pκ Pχ; *interlin.* Wζ; cenit Vη; cenith Tβ; *add.* illius Mτ; *add.* istius Kε
        Kι; *add. interlin.* id est cenith Qζ; *add. interlin.* latitudo Bη regionis ... linea] cenith ab
        equinoctialis vel latitudo regionis Oγ ab ... linea] *om.* Eσ; *illeg.* Cε equinoctiali]
        equinoxiali Oι linea] *om.* Mτ; *add.* vel latitudo regionis sive elevatio poli super
        orizontem qui idem sunt similitudo fac per stellas fixas Pι; *add. 4-line gloss* Cζ

remains is the distance of region from the celestian equator.

[Comment:

The latitude of a location is the angle between the equatorial circle and the zenith of the location, and is also equal to the angle between the horizon and the north (or south) pole.

When the sun is at an equinox, that is, on the equatorial circle, the latitude of a location will be the complement of the midday altitude of the sun, or 90º minus the altitude of the sun at midday.

If the sun is at some other point along the ecliptic, determine the declination of the sun for that day (as outlined in Cap. 20, or from tables), and if the sun is north of the equator (between the spring and autumn equinoxes) subtract this declination from the midday altitude; if it is south of the equator (between the autumn and spring equinoxes), add this declination to the midday altitude. This addition or subtraction adjusts the current observed midday altitude of the sun to the midday altitude of the sun at the equinoxes, which then can be subtracted from 90º, as before, which will then be the latitude of the location.]

[CAPITULUM 22.]¹ DE EODEM, SED ALITER, CAPITULUM

Vel si volueris accipere altitudinem cuiusvis stelle altiorem, et eius

Cap. 22] *om.* Lι Oη

1   De … capitulum] *om*: Bβ Bγ Bδ Bε Bζ Bη Bι Bκ Cγ Cδ Cε Cζ Cι Dδ Dη Dη Eα Eβ Eγ Eδ Eζ
Eη Eκ Eλ Eμ Eσ Eυ Fα Fβ Fγ Fε Fζ Gα Kα Kγ Kδ Kε Kε Kθ Kι Lβ Lγ Lε Lζ Lη Lκ Lλ Lμ
Mα Mδ Mι Mκ Mμ Mν Mo Mπ Mτ Mυ Mφ Nα Nγ Nδ Nε Nζ Oβ Oγ Oζ Oι Oν Oξ Oϱ
Oσ Oτ Oυ Oφ Pα Pβ Pγ Pζ Pθ Pι Pκ Pμ Pν Pξ Po Pϱ Pσ Pτ Pυ Pφ Pχ Pω Qβ Qγ Qδ Qε
Qζ Qη Qθ Qι Qλ Qμ Rα Rγ Rδ Rε Sα Sβ Sδ Sη Sθ Sι Sκ Sλ Tβ Tδ Vα Vβ Vγ Vη Vι Vμ Vν
Vo Vϱ Vσ Vτ Vυ Vφ Vψ Wα Wγ Wζ Wλ Wμ Xβ Xδ Zα; De altitudine poli Cα; De
altitudine poli in qualibet regione Wι; De eodem per stellam et declinationem eius [*cut
off*] Oφ(*marg*.); De eodem per stellas Vξ; De eodem per stellas fixas Eo Eϱ Mγ; De eodem
sed aliter Bθ Mη(*marg*.); De latitudine poli in qualibet regione Eτ Wβ   Capitulum]
om. Bθ; Rubrica Vπ   *add. in marg*. 25 Pκ; *add. in marg*. 26ᵘˢ Qζ

2   Vel] *interlin*. Wζ   Vel si] Et si Sλ; Si Kι Mμ Nζ Pξ Qη Vτ; Vel Oβ; *add. in marg*. 3ᵃ
regula Dδ   Vel … eius] Vel accipere alicuius stelle altiorum Si volueris eius Kι
      si volueris] suis lineis Sθ; *add*. hoc scire de nocte Vμ   accipere] accipe Sθ Sι Vφ
Wι; scire Mι Nγ   altitudinem] *om*. Cζ Kα; altitudinem poli altitudinem Eσ;
declinationem sua Vo; latitudinem Oσ; latitudinem per Mμ Nζ Oβ Pκ Pχ Qη; *add. interlin*.
in dorso astrolabii Bγ   cuiusvis] alicuius Kγ Lμ Pσ Qθ Sλ; alicuiuslibet Kε; cuius Bη
Cζ Oν Oφ Pγ Pφ; cuiuslibet Oβ Pκ Pχ Qη Sβ; cuiusque Eμ Mo Pυ; vel cuius Rα; *corr. from*
per cuilibet Vζ   cuiusvis stelle] *rep*. Fβ; alicuius regionis accipe altitudinem cuiusvis
stelle non occidentis in eadem regione Mι   cuiusvis … altiorem] stelle fixe
declinationem cuiusvis, fuerit Vμ; *corr. in marg. to* per cuiuslibet stelle fixe [*illeg*.] Qζ
      stelle] regionis *corr. in marg.* to stelle Oσ; stellarum Lμ Pσ Qθ; *add*. fixe Nζ; *add*. fixe
in linea meridiei Vζ; *add*. que apparet Qμ; *add. interlin*. fixe Bγ Pκ Pχ; *add*. non occidentis
in eadem(illa Pζ) regione Fε Pζ(*marg*.)   altiorem] *om*. Eυ; *marg*. Vζ; declinationem
Nζ(*add. in marg*. maximam) Oβ Pκ Pχ Qη; fixe Vo; fixe de occidentale Mμ; *add*.
meridionala Kα *add*. qui est divc(?) celi Zα; *add. interlin*. in meridie Bγ   eius] *om*. Pϱ

2-3   Vel … est] Vel aliter accipe altitudinem septentrionalem altiorem et videas quantitatem
declinationis eius ab equinoctiali in medio celi quam subtrahes a sua altiori altitudine vel
habebis initium Arietis et tunc ultraficat prius Fγ   si … considera] *marg*. Sβ   si …
est] si vero idem per stellas fixas scire placuerit Cδ; et fac ut prius Eλ Wγ(*om*. Vel)
      accipere … est] *om*. Cζ   cuiusvis … elongacionem] *om*. Bδ

2-4   Vel … regione] Si altitudinem poli scire volueris accipe altitudinem altiorem alicuius
stelle que stelle [*illeg*.] accidet in illa regione etiam accipe Cα   altiorem … stelle] *om*.
Dη

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¹ Most mss treat this as a continuation, without a break, of the previous chapter. For the sake of
continuity, I am maintaining Gunther's divisions into chapters.

[CHAPTER 22.] CHAPTER ON THE SAME, BUT DIFFERENT

Or if you wish to take the higher altitude of any star,

elongacionem ab equinoctiali linea considera, cum qua fac ut supra dictum est.
Quere quoque cuiusvis stelle non occidentis in eadem regione altitudinem altiorem et

3 elongacionem] longacionem Wβ; longitudinem Pυ; longitudinem *corr. to* elongationem
Tδ; *add.* altiorem Lμ; *add. interlin.* ponendo eam in linea meridiei Bγ   ab equinoctiali]
ab equinoxiali Oι; equinoctialem Mυ; ab orientali Mτ   linea] *interlin.* Kθ   linea
... qua] *om.* Mυ; et Pι   considera] *om.* Bθ Eλ Eo Eυ Eμ Lζ Lμ Mγ Mκ Oβ Pτ Qμ Tβ Vπ
vσ Wλ Zα; *interlin.* Sκ; *rep.* Lγ; Considerationem etiam habeas de eius altitudine altiori
Vμ   considera ... qua] *om.* Bη Bι Bκ Dγ Eα Eδ Kγ Kε Kι Mα Mo Mτ Nα Oφ(*add.*
interlin. cum qua) Pσ Pυ Pφ Qζ Qη Sη Sθ Sι Sλ Vα Vβ Vγ Vϱ Vυ Vφ; *add. in marg* Eζ(*later*
hand)   considera ... est] fac vel predictum est *corr. in marg. to* fac sicut predictum est
supra Oσ   cum qua] *om.* Nζ; *interlin.* Qμ; cum eius altitudinem altiorem Vo; et Eϱ Pζ
Pκ Pχ Qε Rα Sβ Vμ Wζ; et qua Mμ; *add.* et Qδ; *add. in marg.* 10-*line gloss* Bγ   cum ...
est] fac sicut predictam est Lζ Oν   fac] facit Bβ; fiat Pβ; *add. interlin.* cum illa Vφ
     ut] *rep.* Kθ; quod Lκ; sicut Bκ Fε Kε Kι Mι Nγ Qζ Qη   supra] *om.* Eμ Fε Kι Lμ
Mτ Pσ Pφ Qζ Qθ Tβ Vσ; prius Bβ Bδ Bε Cγ Cε Eβ Eη Fα Fβ Fζ Kα Lβ Lγ Lε Lη Lκ Mδ
Mη Mι Mτ Mυ Mφ Nγ Nδ Nε Oγ Oζ Oι Oξ Oτ Ou Pα Pβ Pθ Pμ Pν Pξ Pϱ Pω Qβ Qγ Qι
Qλ Rδ Sδ Sκ Tδ Vη Vι Wα Wμ Xβ Xδ Zα; superius Kδ; *add.* ut Eδ   dictum]
predictum Bη Bκ Kε Kι Mτ Qζ   dictum est] *om.* Lλ Mα Pζ Qε Sβ Sθ Vγ; *add.* Et nota
extra textum quod si altitudo fuerit ultra 90 accipias eam [*illeg.*] computando ultra cenity
Nζ; *add.* prius Fε Kθ Tβ; *add.* prius scilicet modo declinationem ab altitudine est
meridiana [*illeg.*] Eσ; *add. in marg.* que est declinatio ipsius stelle Sκ; *ms* Qι *ends*

4 Quere] Si autem [*illeg.*] vise scire, quere Zα   Quere quoque] Item quere Eγ Lλ Mα Pζ
Qε Sβ Sθ Vγ Wγ; Que Mτ; Quereris Cη; *add. interlin.* Vel Eμ; Vel quere Bγ Bζ Bθ Bκ Cη
Eκ Eλ Eτ Eυ Lζ Mγ Mκ Oβ Oν Oϱ(Vel *marg.*) Pγ Qη Qμ(*add.* quoque) Rγ Rε Vν Vξ Vπ
Vσ Vτ Wβ Wι; *corr. to* ^{Vel} quere Eζ; *add. in marg.* 4ᵃ regula Dδ   Quere ... cuiusvis]
Quere cuiusvis *corr. in marg. to* Quere quoque cuiusvis Oσ   Quere ... regione] Vel
quere stellam in illa regione que non occidit Fγ   quoque] *om.* Bη Cδ Cζ Eμ Kα Kε Kι
Pι Qζ Sα Sι Sλ Vα Zα; *marg.* Oφ; etiam Tβ Vη   cuiusvis] alicuius Mo; cuius Cζ Cη;
cuiuslibet Kε Kι Lλ Mα Mτ Pζ Qε Qζ Sβ Sθ Vγ Vν; cuiuscumque Oφ Sι Sλ Wγ; cuiusque
Bζ Bκ Eo Lζ Mγ Pυ Pφ Rε Vα Vβ(*add. interlin.* al' cuiuslibet); cuiusque vis Oϱ Sα
     stelle] *add.* gradus polum Mτ Qζ   non] in Dγ; numquam Kα   occidentis]
orientalis *corr. to* occidentalis Sλ; *add.* scilicet super apparentis Kε Kι; *add.* sed semper
apparentis Mτ Qζ   in ... regione] *om.* Dη   eadem] illa Sλ   regione] *om.* Pι;
add. in puncto opposito(?) Qζ   altitudinem] *add.* in linea meridiei Oγ; *add.* scilicet Dη
     altior] *om.* Nζ   et] ut altitudinem maioris arte super polum et eius depressioni
super polo quere altitudinem eius Qμ

4-5 altiorem et inferiorem] maiorem et minorem Eλ

examine its elongation from the celestial equator, and do with it as was said above. And seek out the higher and lower altitude of any star which does not set in the same region [i.e., never dips below the horizon]

5   inferiorem, et utriusque collecte simul tolle medietatem, que est altitudo poli in eadem
       regione.

       5   inferiorem] *om.* Zα(*add. 2.5 lines*); *add.* sui circuli quem facit die et nocte Mτ Qζ; *add.*
              altitudinem conversa aliorum et inferiorem eius altitudinem altiorem scilicet altitudinem
              versas a^{orum} et inferiorem eius altitudinem Oβ   et] et ab Wζ; *add.* quere Bκ Lζ
                     utriusque] utrumque Vη; *add.* altitudinis Cδ Oγ Qμ   collecte] *om.* Sι; colere Nα;
              collecto tollecto Mι Nγ   simul] *rep.* Wγ; in simul / insimul Bβ Bγ Cδ Cη Cι Dγ Eδ Eκ
              Eμ Eϱ Eτ Gα Kγ Kθ Lλ Mη Mμ Mν Nζ Oϱ Oσ Pγ Pδ Pζ Pι Pκ Pυ Pχ Sη Qδ Qε Qμ Rα Sα
              Sβ Sθ Sι Sκ Sλ Vα Vβ Vγ Vμ Vo Vφ Vψ Wβ Wζ Wι; insibilis Nα Pτ; in simili Vυ; in
              similis Wλ; similis Cγ   tolle] *om.* Bκ Lζ Mτ Pω; accipe Eγ Wγ; collecte Wβ(*and
              deleted*)   tolle medietatem] *interlin.* Kε   que] et illa meietas Fγ   que ... poli]
              om. Eδ   est] *om.* Qλ; erit Eμ Lγ Pζ Qε Sθ Wγ; *add.* ibi Oγ; *add.* vel erit Bη
                     altitudo] elevatio Kα; latitudo Fε Kγ Mμ Mτ Nζ Oβ Pκ Pχ Qζ Vμ Vo; *add. and del.*
              regioni Lγ   poli] *om.* Bι Bθ Dγ Eζ Eϱ Eυ Kγ Kε Kι Mκ Mμ Mτ Nζ Pι Pκ Pχ Vπ Vσ;
              interlin. Vφ   eadem] illa Fγ

       5-6   in ... regione] *om.* Oγ

       6   regione] *add.* etc. Fε; *add.* etc. Rδ; *add.* et est eadem cum(in Eυ) latitudine(longitudine Vπ)
              regionis Bκ Bθ Eλ Eυ Lζ(*marg.*) Mκ Oν Rε Vπ Vσ Vτ Vφ; *add.* et si altitudo maxima fuerit
              ultra 90 accipiaseam totam [*illeg.*] ultra zenit etc. Wζ; *add.* que est eius latitudo regionis
              Cδ

and take the mean of both collected at the same time, and this is the altitude of the pole in the same region.

[Comment:

Or you can take the highest altitude of a star, calculating its distance from the equatorial circle as noted before. Measure its highest and lowest declinations on the same day twelve hours apart, and the average of the two will be the altitude of the pole above the horizon at that location (and therefore the latitude of the region, as indicated in Cap. 21).]

[CAPITULUM 23.] DE NOTICIA TABULE ALMUCANTHARAT

Cap. 23] *om.* Bη Bι Bκ Cγ Cδ Cζ Dγ Eα Eγ Eζ Eκ Eμ Fε Lι Lλ Mα Oη Oσ Pζ Pτ Qε Rα Sβ Sθ Sι Sλ Vα Vγ Vϱ Vυ; *bottom marg.* Lζ Po Qμ

1   De ... almucantharat] *om.* Bγ Bδ Bε Bζ Cε Dδ Eλ Eυ Gα Kε Kθ Kι Lκ Mκ Mμ Mτ Nα Nζ
           Oβ Oυ Pγ Pι Pκ Pξ Po Pσ Pφ Pχ Qζ Qη Qμ Sα Tβ Vη Vμ Vν Vo Vσ Vτ Vφ Wζ Wλ;
           faded/illeg. Eδ Eϱ Fγ; Ad cognoscendem cuius regionis sit tabula Sη; Ad quam latitudinem
           facta sit alm~ Vξ; Ad quam latitudinem facta sit tabula almu~ Vι Wβ; Ad quam
           latitudinem facta sit tabula alm~ augeti'/iugeti' Mν; Ad quam latitudinem facta sit tabula
           alm~ facta Mυ; Ad quam latitudinem facta sit tabula astrolabii Lζ; Ad quam latitudinem
           tabula sit facta Eo Eτ Wι; Ad quam regionem facta sit tabula Mπ; Ad quam regionem
           facta sit tabula alm~ Qθ; Ad sciendum cuius latitudinis sit tabula Mλ; Cognitio ad [*illeg.*]
           regionis facta sit tabula Kγ(*later hand*; *add. in marg.* 22); Cognitio cuius regionis sit tabula
           latitudinis Oφ; Cap.^m 23^m Cuius regionis sit tabula Qδ; De inventione cenith latitudinis
           per alm~ Vψ; De latitudine ad quam est facta tabula alm~ Rε; De noticia ad quam
           latitudinam facta sit tabula alm~ Vβ; De rotulis matris ipsorum alm~ Zα; Dicitur ad quam
           regionem vel latitudinem facta sit tabula alm~ Lμ; Si vis scire ad quam altitudinem sit
           facta tabula alm~ Bβ; Si volueris scire ad quam latitudinem tabule sit facta Mγ; *add. in
           marg.* 22^m Vφ; *add. in marg.* 25 Mκ Wα; *add. in marg.* c. 26 Sδ; *add. in marg.* 27 Oϱ(C. 27) Vμ
                    tabule] *om.* Cα   almucantharat] *cut off* Fβ; almicantarath Oϱ Rδ; almicanterath
           Cα; almicantharatz Dη; almicantralis Bβ; almicantrat Kα; almu Wα; almucant' Fζ Lη;
           almucantarach Xβ; almucantarat Oξ Qβ; almucantarath Eη Eσ Kδ Lβ Lγ Mδ Nε Oγ Oι Pω
           Vβ; almucantat Cη; almucanth' Fα Mη Oζ Pδ Pθ; almucanthar Cι; almucantharach Pϱ;
           almucantharat Bθ Dη Fβ Mυ Oυ Pμ Sδ Sκ Vι Vπ; almucantharath Eβ Mo Nδ Oτ Pα Pν Pυ
           Qγ Qλ Tδ Vξ Wβ Wμ; almucanthdrath Mφ; almuc^at Lμ; almuchacarath Xδ;
           almuchantarath Vψ; almuchant'at Lε; almu^rat Qθ; almuscantarach Pβ; almutanterach Mι
           Nγ; almutantherat Mν; amucantharach Rε; *add.* Capitulum Nδ; *add.* Rubrica/Rx Bθ Pθ Vπ

[CHAPTER 23.] ON THE LABELING OF A PLATE WITH ALMUCANTARS

Si vis scire ad quam regionem vel latitudinem facta sit tabula almucantharat,

2   Si vis] Ni vis Eϱ; Si velis Mo Pυ Qη Rε Sη Vβ; Sive Eδ   ad quam] *rep.* Oυ
         regionem] altitudinem Wλ   regionem vel] *om.* Bβ Bγ Bζ Bθ Dη Eδ Eλ Eo Eτ Eυ
Fγ Gα Kγ Kθ Lζ Mγ Mκ Mλ Mμ Mν Mo Nα Nζ Oβ Oυ Pγ Pι Pκ Pμ Po Pυ Pχ Qδ Qμ Rγ
Rε Sη Vβ(*add. interlin.* al' regionem) Vμ Vν Vξ Vo Vπ Vτ Vφ Wβ Wζ(in r~ vel; *interlin.*)
Wι   regionem vel latitudinem] *om.* Qη   vel] *om.* Kε Kι Qζ; vel et Xβ   vel
latitudinem] *om.* Mτ Wλ   latitudinem] altitudine Pβ Rδ; regionis Mτ   sit] est Bθ
Eυ Fγ Mκ Pφ Rγ Sη Vν; *add.* in Cι   tabula] *om.* Bζ Cα Mμ; tabulam Qη; *add.* astrolabii
Tβ Vη Zα   almucantarath] *om.* Kε Kι Mμ Mτ Nζ Pκ Pχ Qη Vμ Vo Wζ; *illeg.* Pι; *corr.*
from almucantarathilis Vβ; almcanth Cι; almi^at Qζ; almic' Cε; almicantarah Kγ;
almicantarat Zα; almicantarath Fγ Oϱ Pσ Rδ; almicantarathil' Po; almicanterath Cα;
almicanth Bζ; almicanthar' Dη; almicantharat Eδ; almicantharath Tβ; almicantrat Kα;
almicantrialis Wλ; almicatharalis Bβ; almichancatach Mγ; almichant' Lκ; almichantarach
Kδ; almi^rach Gα; almi^th Vη; almuc' Eβ Mπ Nε; almucancarach Mκ; almucancarat Qθ;
almucant' Eσ Fα Fζ Lβ Lγ Lε Lη Lμ Oξ Oυ Pθ; almucant'a Qλ Wα; almucantarach Bδ Eη
Xβ; almucantarak Rγ; almucantarath Bθ Eλ Mδ Oγ Oι Pξ Pφ Pω Qμ Sδ; almucantaratilis
Sη Vν; almucantart Fε; almucanta^th Tδ; almucanterath Nα Oφ; almucanteratilis Qδ;
almucanth' Oζ Pγ Pδ Wι; almucanth'al' Bγ; almucanthal' Cη; almucantharach Pϱ Rε;
almucantharachilis Mλ; almucantharat Eτ Nδ Oτ Sκ; almucantharatales Oν;
almucantharatalis Kθ Mo; almucantharath Eϱ Eυ Fβ Mυ Pα Pμ Pν Qβ Vξ Vπ Wβ Wμ;
almucantharatilis Pυ; almucanthdrath Mφ; almucanth'th Vι; almucantrath Vτ; almucant^t
Lζ; almucha' Xδ; almuchant' Eo Sα; almuchantarath Vψ; almu^rath Pι; almuscntarach Pβ;
almut' Dδ Mη Oβ; almu^tac Qγ; almutanta' Mν; almutanterach Mι Nγ; almu^th Bε;
almuthantharat Vφ; almutrantac Cγ; *add.* ālis Mγ

2-3   vel … quot] *om.* Vσ

If you wish to know for which region or latitude a plate with almucantars has been made,

vide in linea meridiana quot almucantharat sint a circulo equinoctiali usque ad cenith,

3   vide] *add./del.* quot Vζ   vide … almucantharat] *marg.* Fζ; *rep.* Cε   in] quam Nζ
         in linea] aliam lineam Xδ; aliam lineam lineam Pν   in … meridiana] *om.* Bζ Bθ
Eδ Eλ Eo Eϱ Eυ Gα Kγ Kε Kι Lζ Mγ Mκ Mλ Mν Mo Mτ Oν Pι Po Pυ Qδ Qζ Qη Qμ Rε Vν
Vπ Vτ; *marg.* Vφ   meridiana] meridionali Bβ Oφ Pφ Vo; *add. interlin.* id est medii
celi Wβ   quot] *om.* Nζ; *interlin.* Wζ; quod Bδ Eδ Kγ Kε Lκ Mμ Qη Sκ Vπ Vτ; *add.*
gradus Vμ   almucantharat] almi^{at} Kι; almicancrath Mτ; almi^{at} Qζ Wζ; almi^{ath} Kε;
almi^{rat} Eδ; almi^{that} Wλ; almicant Kγ; almicantarach Kδ; almicantarat Z; almicantarath Fγ
Oϱ Pσ Rδ; almicanterath Cα; almicanthá Bε; almicanthar' Dη; almicantharath Tβ;
almicantrat Kα; almicantrath Vμ; almicantt' Vo; almichanch't Mγ; almichant' Lκ; almit'
Nζ; almi^{th} Vη; almi^{ut} Mμ; alm^{rat} Gα; almuc' Cε Mπ; almucant' Fα Fζ Lβ Lμ Oζ Qθ;
almucantarach Bδ Mκ Qγ Sη Xβ; almucantarak Rγ; almucantarath Eλ Lγ Mδ Oγ Oι Pξ Pφ
Pω Qδ Qμ Vβ Vν; almucantart Fε; almucanterath Nα Oφ; almucanth' Cι Eβ Lη Nε Pγ Wι
Wμ; almucanthaȓ Mλ; almucantharach Bβ Eϱ Pϱ Rε Wβ; almucantharat Nδ;
almucantharath Bγ Eτ Mυ Oν Oξ Oτ Pα Pδ Pθ Pμ Pν Pυ Qβ Qλ Sδ Tδ Vξ Vπ;
almucanthāth Cη; almucanthdrath Mφ; almucanth'th Vι; almucantrach Eη; almucant^{r}ath
Oυ; almucantrath Vτ; almuchancarach Xδ; almuchant' Sα; almuchantarach Bθ;
almuchantarath Fβ Vψ; almuchanth'a Eo; almuchantharat Lε Mo Sκ; almuc^{rat} Lζ; almu^{rath}
Pι; almuscantarach Pβ; almut' Dδ Eσ Oβ Pκ Pχ; almutantarach Mν; almutanterach Mι Nγ;
almutantharat Vφ; almu^{th} Bε; almuth Kθ; almuthantharaht Mη; almutharat Wα;
almutrantac Cγ; almu^{trath} Vσ; alentabuth Qη   sint] *om.* Kα; sit Bβ Mτ Pκ Pχ; *add.* a
linea seu Cα; *add.* super/supra MμBQζ   sint … cenith] *om.* Vσ   sint a circulo]
super angulo Vφ   a] *om.* Cα Kθ Lβ; ab Mδ; in Eδ Pϱ; *in corr. to* a Bζ; sumpta a Kι Qη;
super Kε Mτ   circulo] linea Bδ Fε Lκ Pξ   circulo equinoctiali] linea circuli
equinoctialis   equinoctiali] equinoxiali Bε Lμ Oι Vξ; septentrionalis *expunged* Mλ
         usque ad] ad Lζ Mτ; usque a Wι   cenith] ceneth Gα; cenit Bζ Fε Kα Lμ Mμ Vη
Wλ; çenith Qδ; zenit Eγ Pκ Pχ Wζ; zenith Bε Kγ Kε Lκ Pσ Sα Vφ; *add.* in linea meridiei
Lζ

see how many almucantars there are from the celestial equator to the zenith along the
meridian line,

vel ab axe ad orizontem in septentrione; et super tantam latitudinem facta est tabula.

4   ab] *om* Dδ Oβ; ad Lκ Oυ   axe] asse Mι Nγ; axi Oβ; *add*. in centro astolabii Zα; *add*.
        versus circulum Cancri Nζ Qη Wλ   ad] in Oυ; usque ad *many*; usque in Fε; *add*.
        interlin. usque Bγ   ad orizontem] verus circulum orizontis Vμ Vo   ad ...
        septentrionale] usque septentrionalem Vζ; versus circulum Cancri ad Capricornum Eo;
        versus circulum Cancri ad septentrionalem Bζ Bθ Eϱ Eυ Gα Kε Kι Mγ Mκ Mλ Mμ Mτ
        Oβ(*om*. ad) Pι Qζ Qμ Rε Vπ Vσ Vτ(*add*. usque ad orizontem ab liqe(?)) Vφ; versus
        circulum Cancri usque ad septentrionalem Fγ; versus circulum Cancri scilicet ad primum
        almut′ versus septentrionalem Pκ Pχ   orizontem] *om*. Nζ; orisontem Bβ; orientem Cε
        Lβ Nα   in] *om*. Nζ; ad Vμ Vo   in septentrione] *om*. Mι Nγ Qη
            septentrione] linea medie noctis Lζ; orizontem Lμ; septentrionem Bβ Mγ; ouc(?)
        corr. *in marg*. to septentrione Sκ; *add*. in [*illeg*.] parte Kα; *add*. in linea medie noctis Vμ Vo;
        add. quidam est Pι   et] *add*. habebis Kε Kι Mμ Mτ Qζ Pκ Pχ Qη   et ... tantam]
        om. Eλ   et ... latitudinem] habebis super quam altitudinem Vμ Vo   et ... tabula]
        om. Bδ; et habebis super quam latitudinem tabulam sit(est Wζ) facta et quot gradus
        sint(fuerint Wζ) in almit′(almi^at Wζ) tantum(totum Nζ) est latitudo ad quam facta est Nζ
        Wζ   tantam] *om*. Lγ; datam Vτ; illam Cζ Mη Oϱ Pα Sα; quam Mμ Mτ Pι Pκ Pχ Qη;
        quantam Eϱ Gα Kε Kι Qζ Vφ; totam Cα; *add*. illam Pξ   latitudinem] altitudinem Bζ
        Bθ Oγ Oϱ Pϱ Sα Vπ   est] *add*. hec Dη; *add*. illa Bε Cε Dδ Eη Eσ Fα Fε Fζ Kα Kδ Lβ
        Lη Mδ Mη Mι Mυ Mφ Nγ Nδ Nε Oγ Oξ Oϱ Oτ Oυ Pα Pβ Pδ Pθ Pμ Pν Pξ Pφ Pω Qγ Qθ
        Rδ Sα Sδ Tβ Vη Vι Vψ Xβ Zα; *add*. ille Oυ; *add*. in Cι   tabula] *om*. Mμ;
        almucantharath Vξ; regula Nα; *add*. cum dorso astrolabii et allidoda Tβ; *add*. et(id est Qη)
        quot gradus sint in alantabuth(almut′ Pκ Pχ) tot est latitudo ad quam facta est Pκ Pχ Qη;
        add. id est quot graduum super almucantharach(almi^ch Kε; almi^at Kι) tot est latitudo ad
        quam est facta latitudo Eϱ Gα Kε Kι; *add*. id est quot sint gradus almi^at tot est latitudo ad
        quam facta Qζ; *add*. id est quot gradus almutantharat tot est latitudo ad quam facta est
        Vφ; *add*. quare quot gradus sunt in almicanthrath(almicantrat Vo) tanta est latitudino ad
        quam facta est tabula Vμ Vo(*om*. tabula); *add*. *illeg*. Pι

or from the axis to the horizon in the north; and the plate is made for such a latitude.

5   Altitudo vero Arietis est tot graduum quot fuerint ab eodem circulo ad orizontem, vel a cenith ad axem.

5   altitudo] *om.* Vσ   vero] autem Bε   Arietis] *om.* Nζ; *add*. et Libre Pι   est] *add.* *interlin.* tantum Bγ   est tot] ostentur(?) Nα   tot] *om.* Lμ Qθ; quot Rγ
         graduum] gradus Mμ Nζ; *add*. no (= non/vero(?)) Vσ   quot] *om.* Qη; quod Bδ
         Gα Kγ Mν   fuerint] *om.* Eβ; sunt Bε Cε Eη Fε Lβ Lκ Oϱ Pφ Rδ Sα Wα Xβ; *add.*
         interlin. sunt Vβ   eodem] *add. interlin.* scilicet Arietis Bγ; *add. marg.* scilicet equali Kδ
             circulo] circulusque Pυ; *add*. almucantharath Oν; *add*. equinoctiali Lκ; *add*.
         equinoctialis que Qδ; *add*. scilicet equinoctiali Vτ; *add. interlin.* scilicet equinoctiali Qμ
             ad] usque ad Bβ Eδ Eλ Eυ Fγ Gα Kγ Kθ Mκ Mν Mo Nα Oν Pκ Pχ Qδ Qη Sη Vβ Vμ
         Vo Vπ Vτ Vφ Wζ Wλ; *add. interlin.* usque Bγ   ad ... orizontem] usque ad orientalem
         almucantharach Rε   orizontem] orisontem Bβ Bδ Lβ; orientalem almucantarath Eλ
         Pκ(almut') Pχ(almut') Vτ(almucantrath) Vφ(almuthantharat); orientem Cε Fζ Lη Mπ Pα
         Pμ Pϱ Pφ Wμ; orientem Oφ(*add. interlin.* al' orizontem) Sδ(*add. in marg.* orizontem); *add.*
         interlin al' orientem Vβ   a] *om.* Bε Eη Fε Fγ Qθ; ad Fβ Lβ Mη Nα Nδ Oβ Pα Sη

5-6   est ... axem] computata per almutanterach(*add.* sint a linea circuli Nγ) ab orizonte usque
         ad circulum equinoctial' cum tot graduum quot sint ab eodem circulo ab orizonte vel a
         cenich ad assem. Unde nota quod omnis regio habet latitudinem preterin regione qui est
         directe sub equinoctiali Mι Nγ   ad ... axem] equinoctiali usque ad primum almu^{rath}
         orientale Pι; id est equinoctiali Eo; scilicet equinoctiali Bζ; usque ad orientale almichanch'
         Mγ / almit' Nζ almi^t Mμ / almucantharach Eϱ / almucantarath Vν; vel almr^{rat} Gα;
         equinoctiali usque ad orientalem almith Kε/almi^{ath} Kι/almicancrath Mτ   vel ... axem]
         om. Pκ Pχ Wζ; alentabuth etc. Qη

6   cenith] cenit Kα Lμ Pφ Vη Wι Wλ; çenith Bδ Qδ; cenic Fζ; cen^t Lη; chenith Mπ; zenit Cγ;
         zenith Bε Kγ Lκ Pσ Sα; zinnith Qβ; *add*. capitum Mo Nα Sη Vβ; *add*. que est esiduum
         factus(?) Cε; *add*. regionis Kα   ad] usque ad Fγ Mη Vμ Vo Vσ Vφ Wλ; vel Sη; *add.*
         interlin. usque Bγ   ad axem] *om.* Qθ   axem] *add*. etc. Rδ; *add*. id Bβ; *add*. Nota:
         axis est polus vel equus in media astrolabio Kα; *add*. vel ad polum Kγ

Indeed the altitude [of the beginning] of Aries is as many degrees as are from the same circle to the horizon, or from the zenith to the axis.

[Comment:

To find which latitude a plate has been engraved, examine the number of almucantars counting along the meridian line from the zenith southwards (i.e., towards the top of the astrolabe) to the equatorial circle. ("Counting" means the number of engraved almucantars multiplied by the number of degrees between them.)

Similarly, the latitude would be the distance of the axis of the astrolabe north to the horizon; in other words, the almucantar on which the axis is set.

The "altitude of the beginning of Aries" is the altitude (to an observer at the latitude of the plate) of the intersection of the ecliptic and the equatorial circle which on an astrolabe is the complement of the latitude, and therefore the distance of the horizon to the equatorial circle or the zenith to the axis.]

[CAPITULUM 24.] DE HORA HABENDA PER TABULAS LATITUDINIS

Cap. 24] *om.* Cα Lι Oϱ

1   De … latitudinis] *om.* Bγ Bδ Bε Bζ Bκ Cγ Cδ Cε Dδ Dη Eα Eγ Eκ Eλ Eυ Fε Gα Kε Kι Mα
     Mκ Mμ Mτ Nα Nγ Nζ Oβ Oυ Oσ Pγ Pι Pκ Pξ Pσ Pφ Pχ Qε Qζ Qη Rγ Sη Sθ Sι Sλ Tβ Vα
     Vη Vμ Vν Vo Vσ Vτ Vυ Wγ Wζ Wλ; *faded/illeg.* Eδ Eϱ Fγ Lλ Mι; Ad inveniendum
     altitudinem regionis non scripte in astrolabio Qθ; Ad inveniendum horas altitudinis
     alicuius(*?*) regionis cuius latitudo ipsis tabulis astrolabii est descripta Lμ; Ad
     inveniendum horas in ima regione per tabulas alterius regionis Mλ; Ad quam
     latitudinem facta sit tabula almucantha't Vι; Cum in aliqua inventio hore in regione
     aliqua Wι; De appari scias per unam tabulam hore alicuius Eo Vξ; De horis habenda
     regione carente(*?*) tabula latitudinis Kγ(*later hand; add. in marg.* 23); Cap.ᵐ 29ᵐ De horis
     regionis carentis tabula Qδ; De inventione horarum per astrolabii [*illeg.*] non habere
     tabula Zα; De inventione hore et aliorum in regione per tabula(*!*) proximorum regionum
     Mυ; De inventione hore per non suam tabulam Rε; De [inven]tione tabula
     almucantharath Mφ; De opere astrolabium in descriptam Pζ(*marg.*); De opere astrolabii
     non ibi descripta regione Vγ; De opere astrolabii, non ibi descripta regione. De
     inventione hore, per non tabulam regionis Vβ(*add. interlin.* vel latitudinis; *add. in marg.*
     Hic subponit quod sciamus omnes latitudines non tamen horas quod bene est possibile.
     Et ita nota sunt tria, per que 4 invenientur.); Hoc latitudinis regionis Mπ; Inveniendo
     horarum in regione carente tabula latitudinis in astrolabio Bι(*add. in marg.* c 21ᵐ);
     Inveniendo hore in aliqua regione per non suam tabulam Dγ Oφ; Inventio horarum in
     regione cuius latitudo [*illeg.*] astrolabii minime est descripta Vϱ; Inventio horarum per
     astrolabii [*cut off*] Eτ; Inventio horarum per astrolabii tabulas regionis alterius Lζ(*marg.*);
     Inventio hore et aliorum in regione per tabulam proximorum regionum Mν Wβ; Inventio
     hore in aliqua regione per non suam tabulam Rα; Cap. 22. Inventio hore in maiore
     regione per non sua tabulam Sβ(*marg.*); Inventio hore in regione aliqua in non sua tabula
     Kθ Po Qμ; Inventio hore in regione aliqua per 2 tabulis regionum Pτ; Quando in regione
     cuius latitudinis tabula non habetur per alias tabulas poteris invenire Cζ; Quando in
     regione cuius latitudinis tabula non habetur quod alias tabulas astrolabii hore ipsius
     inveniendum Bη(*add. in marg.* 19); Qui in regione latitudinem tabula non habetur et per
     alias tabulas astrolabium horis ipsius inveniantur Oη; Quo modo in regione cuius
     latitudinis tabula non habetur per alias tabulas astrolabii hore ipsius inveniantur Eμ(*add.*
     in marg. 19ᵘˢ); Si per aliquem(*?*) astro[lab]ium vis scire horas Bβ; Ut operari scias per
     unam tabulam loco alterius Mγ; *add.* Rubrica/Rx Cη Mo Pμ; *add. in marg.* 23ᵐ Vφ; *add. in*
     marg. 25 Vμ; *add. in marg.* 26 Mκ Pκ Wα; *add. in marg.* 27ᵘˢ Qζ *add. in marg.* C. 27 Sδ
           hora habenda] horis inveniendis Cη   habenda] habendis Mo   tabulas]
     tabulam Eσ Mη Pδ Pυ Rδ Vψ; ·t· Sκ   latitudinis] *add.* Capitulum Nδ; *add.* que non est
     in astrolabio Lκ

[CHAPTER 24.] ON FINDING THE TIME BY THE LATITUDE PLATES

Cum in aliqua regione, cuius latitudo in tabulis astrolabii non fuerit descripta, volueris invenire per illud astrolabium horas, illius regionis latitudinis et latitudinis

2   Cum] Quando Qθ; *add.* autem Bκ Dη; Sciendo Lμ   in ... astrolabii] *om.* Eλ
         aliqua] aliquo *some*; qualibet Bζ Bθ Eλ Eo Eυ Fγ Mκ Mλ Vν Vπ Vσ Vτ   cuius]
         om. Pν Xδ; cuiusque Wγ   latitudo] altitudo Eσ; longitudo Pϱ; *add.* cum horis Kι Mμ
         Mτ Nζ Oβ Pκ Pχ Qζ Qη Vμ Vo Wζ; *add. in marg.* et cum horis Kε   in ... astrolabii]
         tractabunt astrologi Sθ   tabulis] tabelis Wγ; tabellis Eγ Mα   astrolabii] *om.* Bη
         Cζ Mγ Mλ Vτ; *interlin.* Rε; abstrolabii Pα; astrologia *corr. to* astrolabii Wα   non] *om.*
         Eζ Eβ Vσ   fuerit] est Cγ Eβ Eσ Fα Fβ Fε Fζ Lβ Lγ Lε Lκ Lη Lμ Mδ Mη Mι Mπ Mυ
         Mφ Nγ Nδ Nε Oγ(*interlin.*) Oζ Oι Oξ Oτ Oυ Pα Pθ Pκ Pμ Pχ Pω Qβ Qγ Rδ Tβ Vι Vψ Wα
         Wμ Xβ; sit Dη Sι Vη   descripta] *om.* Eυ; depicta Eκ; despecta Vτ; inscripta Mτ; non
         scripta Tδ; scripta Bθ Dη Mκ Mυ Mφ Pκ Pχ Qη Vι Vπ

2-3   non ... astrolabium] *om.* Cε

3   volueris] vis *some*; voluimus Eδ; si volueris Pκ Pχ   invenire] *add. interlin.* scire scilicet
         Bγ   illud] idem Lλ Mα Nζ Pζ Pι Vμ Wζ; istud Lκ Vα Vξ; *add. interlin.* al' idem Vβ
         astrolabium] abstrolabium Pα; *add.* illius regionis Eγ; *add.* supra quod non habes
         tabulam Nα   horas] hora Mτ   illius] *om.* Mπ Wζ; altitudinis illius Lμ Mμ; eius
         Oβ; illius cām Bζ; istius Kγ Qη Vμ   illius ... latitudinis₁] *om.* Fβ; illius regionis
         latitudinis illius regionis Kθ *marg.* Oυ   regionis] *om.* Vν; *add.* et regionis Oν; *add.*
         interlin. id est latitudinis Kι   regionis latitudinis] *illeg.* Lμ; regionis Kι(*add. interlin.* id
         est latitudinis)   latitudinis₁] *om.* Bζ Eα Eδ Kε Kι Lγ Mo Mτ Oη Pγ Sι Vα; altitudinis
         Bβ Oζ Pϱ Pφ Qζ(*interlin; add. in marg.* latitudinis) Qθ Vμ Vo; altitudinis et latitudinis Nζ;
         altitudinis latitudinis Pσ; invenire longitudinis Wγ; longitudinis Bη Bθ Bι Dγ Eγ Eκ Eτ
         Eυ Gα Pζ Pι Pτ Pυ Qδ Vπ Vϱ Vτ Wλ; longitudinis *corr. in marg. to* latitudinis Sκ;
         longitudinis latitudinis Bβ; *corr. to* longitudinis Eμ; *add.* maioris Mμ; *add.* ad quod non
         habes latitudinem in tabula astrolabii Oβ; *add.* regionis Kθ; *add.* regionis scilicet Cε; *add.*
         interlin. scire scilicet Bγ   latitudinis₂] altitudinisBβ Oι Pα Pβ Pξ Pϱ Qγ Qθ So Vι Wα;
         longitudinis Bη Cγ; *add.* maioris Bγ(*interlin.*) Nζ

When you wish to find the time by an astrolabe in any region whose latitude was not inscribed on the plates of the astrolabe, take note of the difference between the latitude of this region and

sibi propinquioris minoris ibi descripte nota differentiam. Deinde proportionem illius

5   differentie ad differentiam que est inter minorem latitudinem ibi descriptam et

4   sibi] *om.* Cε Kα Kε Kι Mμ Mτ Oη Pβ Pκ Pχ Qζ Qη Vη; scilicet Eδ   sibi ... minoris]
        differentiam altitudinis [*illeg.*] propinquioris maioris astrolabii et minoris Gα;
        erunt/etiam(*?*) maioris et minoris Pω; et maioris et minoris Cγ; maioris et latitudinis
        minoris propinquioris Vo; maioris propinquioris sibi et minoris Cη; maioris sibi
        propinquioris nota differentia et latitudinis maioris et minoris Kθ Tδ; minoris
        propinquiore Vμ; propinquioris sibi(*add.* minoris Oγ) nota differentiam et latitudinis
        etiam(*om.* Lμ) maioris et minoris Bδ Bε Eβ Eσ Fβ Eη Dη Fα Fζ Kδ Lβ Lγ Lε Lη Lκ Lμ Mδ
        Mπ Mυ Mφ Oγ Oζ Oξ Oτ Oυ Pδ Pθ Pμ Pν Pσ Qβ Qλ Sδ Vι Vψ Wμ Xδ; sibi propinquioris
        nota differentia regionis minoris *corr. to* latitudinis sibi propinquioris minoris Cδ; sibi
        propinquiores nota differentiam et latitudinis etiam maioris et minoris Bβ(latitudinem et)
        Fε Oι Pα Pξ Pϱ Qγ Qθ Rδ Sκ Wα Xβ   sibi ... descripte] minor proportionis ibi
        descripta *corr. in marg. to* regionis proportionis latitudinis etiam [maior]is et [minor]is ibi
        descreipte Wζ; propinquioris] propioris Pφ Oφ(*add. interlin.* al' propinquioris);
        proportionis Nζ; *add.* et latitudo in(etiam Nγ) maioris et Mι Nγ; *add.* maioris et Mo Pβ Pι
        Pτ Vτ Rε Wλ; *add.* regionis Qμ; *add.* super regionis et Nα; *add.* tam maioris quam Tβ Zα;
        add. interlin. al' propioris Vβ   minoris] *om.* Bζ Mτ; īmo Bη; *interlin.* Sλ   minoris
        ... descripte] illeg. maior quam minoris Vη   minoris ... differentiam] differentiam et
        latitudinem etiam maioris et minoris ibi descripte Nδ   ibi] *om.* Dδ; *interlin.* Oξ; id est
        Pβ; illi Eτ; illius Vτ; in tabula Vσ; sibi Dη Qδ Qε Wγ   ibi descripte] *om.* Dδ Mι Nα Tβ
        Zα; inde scripte Sθ   descripte] descriptam Qθ; descriptare Vμ; despecte Vτ; scripte
        Mτ; *add.* latitudine Eδ   nota] notam Cδ; numero Rδ   differentiam] *add.* vel
        latitudinis maiorum et minorum ibi descripta Kα; *add.* et latitudinis etiam maioris et
        minoris in astrolabio descripte nota differentiam Fγ; *add.* et latitudinis maioris et minoris
        si erit notam differentiam Rγ   Deinde] *add.* nota Mυ; *add.* vide Gα Pι   illius]
        istius Kγ Lλ Mα Oβ Qβ Vβ(*add. interlin.* illius) Vγ; *add.* scilicet latitudinis quesite ad
        latitudinem minorem Oγ

4-5   Deinde ... differentiam] *om.* Cγ Nε Pζ; *marg.* Oφ

5   differentie] *om.* Eσ; *add.* 1 line expansion Wλ   ad differentiam] *om.* Mo Nα Sη; *interlin.*
        Vβ; illius Vξ; *add.* scilicet prima ad secundam Dδ   que est] *om.* Oυ Qγ   est] *om.*
        Bδ   inter] intra Nγ   minorem] maiorem Gα Wγ; uxorem minorem Cη;[1]
        uxorem(*expunged*) minorem Bγ   latitudinem] *om.* Kθ; altitudinem Vη; *add.* scilicet
        propinquiorem Dδ   ibi] *om.* Bη Bζ Bι Bκ Cδ Cζ Dγ Eγ Eϱ Eυ Gα Kε Kι Eμ Lλ Mα Mγ
        Mλ Mμ Mτ Nζ Oη Oσ Pι Pκ Pξ Pϱ Pφ Pχ Qε Qζ Rα Sθ Sι Sλ Vα Vγ Vμ Vπ Vϱ Vτ Vυ Vφ
        Wζ; *interlin.* Vβ; et Bθ Cε; in tabula/tabulam Eλ Fγ Vν   ibi descriptam] *om.* Lζ Mκ
            descriptam] *del.* Vφ; *add. interlin.* in tabula Oφ

5-6   ibi ... maiorem] *om.* Vη   descriptam et maiorem] maiorem discriptam in tabula Bζ Bθ
        Eo Mγ Mλ Rε Vπ

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[1] Skeat (*Treatise on the Astrolabe* [1872], p. 105 – note to line 247): "The scribe seems to have been thinking of something else besides his work"!

of the lesser latitude [of a plate which is] engraved there closer to it. Then commit to memory the proportion of that difference to the difference which is between the lesser latitude [of the plate] engraved there and

maiorem, inter quas videlicet est latitudo regionis illius, memorie commenda. Postea
vero accepta solis altitudine in eadem regione, quere horas per latitudinem minorem, et

6   maiorem] ibidem scriptam et notam Kα; minorem Gα Wγ; *add*. deinde Eκ; *add*.
        descriptam in tabula Mκ; *add*. in tabulam Eυ Vτ; *add*. propinquiorem Dδ; *add*. vel Bη; *add*.
        interlin. descriptam Vφ   quas] *add*. latitudines Dδ; *add*. ut Nζ; *ms*. Vτ *ends*
            videlicet] *om*. Eλ Fε; *blank* Cγ; scilicet Fγ Pξ Qμ Vμ; videt Sι   videlicet ... illius]
        considera si videlicet est latitudo regionis Fβ   est] *interlin*. Oτ   est ... illius]
        altitudo Wλ   latitudo] altitudo Dη; longitudo Eλ; *corr. from* altitudo Sι   regionis
        illius] *om*. Eσ   illius] *om*. Bβ Bδ Bε Bι Cγ Cε Cι Dγ Dδ Dη Eβ Eζ Eη Fα Fγ Fε Fζ Kα
        Kγ Kδ Kθ Lε Lη Lμ Mδ Mζ Mη Mι Mν Mπ Mυ Mφ Nδ Nε Oγ Nγ Oυ Oζ Oξ Oτ Pα Pβ
        Pν Pξ Pϱ Pσ Pω Qβ Qγ Vι Qλ Rα Rδ Rε Sδ Sθ Sκ Tδ Vϱ Vφ Vψ Wα Xβ; *interlin*. Qμ; et Lκ;
        in qua fueris Kε(*add. interlin*. illius) Mσ Mτ Nα Pυ Qδ Sη; tunc queris(?) Pι; *add*. cuius
        horas queris Bθ Bκ Cδ(*interlin*.) Eυ Fγ Lζ Mκ Oν Vπ Vσ Vφ(*marg*.); *add*. in qua fueris Kι
        Qζ Vβ(*interlin*.)   illius ... comenda] illius cuius horas queris Oι(*interlin*.); tue Gα
           commenda] commendanda Mφ Pϱ Pφ Qη commendatur Nγ   Postea] Preterea
        Fγ

7   vero] *om*. Eγ Vγ   accepta] accipe Mτ; *add. interlin*. secundum ascensionem Sβ
           solis] *add. and del*. declinatione Vφ   altitudine] altitudinem Mτ Oτ; latitudine
        Mυ Vι   regione] *om*. Oβ; *add*. in que es(!) Qμ   quere] que Mα Vβ; queras Bκ Fγ
        Kε Mτ Qζ   horas] *add. interlin*. per 4 canone^2 Sβ   latitudinem] altitudinem Fε Lμ
        Pβ Vα Vo; latitudines Sι; *corr. from* altitudinem Oγ   minorem] maiorem Gα; minoris
        Sι; *add*. que scilicet sit inter tabulas Mι

7-8   minorem ... latitudinem₂] *om*. Wα   et ... maiorem] *om*. Lλ Pφ Vγ; *marg*. Oφ   et ...
        harum] istorum horarum in qua earum quas invenes per canonem 7^m vel per almuri Mμ

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2 If this is a reference to the *Practica,* it should more likely be to Cap. 3 rather than Cap. 4. The
capitula in ms Sβ are not numbered and this reference seems to have been added by a later hand.

and the greater, between which is clearly the latitude of this region. Afterwards having taken the altitude of the sun in that region, ascertain the hours [i.e., the time] by the lesser latitude, and

similiter per latitudinem maiorem, et harum horarum diversarum differentie tolle partem secundum proportionem differentie superius sumptam; quam partem addes

8   similiter] *om.* Bζ Eo Mγ Tβ Zα   similiter per] *om.* Mλ Rε Vη   latitudinem] altitudinem Pβ Sβ Vμ Vo   maiorem] *add.* minorem Pι   maiorem et] *om.* Nδ   et harum] *om.* Cγ Lκ Pβ Sκ Vα; *illeg.* Gα   harum] *om.* Mη Vξ; illarum Oσ Vυ; istarum Bγ Cζ Eϱ Kγ Lλ Mα Nζ Oβ Oη Pζ Pι Pκ Pχ Qε Qη Rα Sθ Vγ Vφ Wγ Wζ; istarum relinquarum Eo Qμ; reli(n)quarum Bθ Bι Bκ Cδ Dγ(?) Eυ Fγ Lζ Mγ Oφ Pφ Sι Sλ Vν Vπ Vϱ; utrarum Sβ Vσ; *add. interlin.* istarum Vβ; *add. in marg.* reliquarum Vφ   harum horarum] relinquarum Bζ; *add. in* quam divisarum quas invenies per alium canonem [*illeg.*] per alium vel per almuri Vμ; *add. in* quam quas invenies per canonem 7$^{\mathrm{m}}$ et istarum Wζ   diversarum] *om.* Gα Eϱ Pι Rγ; *marg.* Sβ; et quantum(quantitate Pι; quantitatum(*!*) Vφ) earum quas invenies per canonem 7^3 vel per almuri diversarum horarum Eϱ Pι Vφ; in quantum quas invenies per canonem 7$^{\mathrm{m}}$ et illarum diversarum horarum Nζ Pκ Pχ; *add.* et quantum earum quas invenies per canonem sept$^{\mathrm{em}}$ vel per almuri diversarum horarum Kα; et quas invenies per canonem 7$^{\mathrm{m}}$ vel per almuri divisorum horarum Vo; *add.* horarum Wζ   diversarum differentie] divisarum horarum differentie Vμ] quantitatem earum(*om.* Mτ) quas invenies per canonem 7$^{\mathrm{m}}$ per almuri diversarum horarum de que differentia Kι Mτ Qζ Qη; *del. and add. in marg.* quantitatem earum quas invenies per canonem 7$^{\mathrm{m}}$ vel per almuri diversarum horarum differentie Kε   differentie] *om.* Cε; *interlin.* Qλ; *blank* Cγ; de Mν; differentiarum Cγ Dη Fα Lβ Lγ Lμ Mφ   tolle] quantitatem quos inveniens per 7$^{\mathrm{um}}$ canonem per almuri de que differentie Oβ

9   partem] *om.* Vυ; *marg.* Oσ; *add.* proportionalem Bβ Bγ Cη Eκ Eτ Kε Kι Mτ Oβ Oν Pγ Qζ Rγ Vξ Vo Wβ Wι   secundum] *interlin.* Qγ; *add.* quod Nα   secundum proportionem] *om.* Cι Oυ   secundum ... partem$_2$] *om.* Nε   differentie] *illeg* Nα Rδ; differentiarum Cγ Dη Fε Nδ Pβ Tβ Xδ   superius] *om.* Mμ Nζ Pκ Pχ Wζ; *corr. from* superioris Rα; prius Bε Kα Vξ   superius sumptam] tunc [*illeg*] et minorem ad differentiam maiorem et minorum Oβ   sumptam] *interlin.* Qζ; differentiarum Xδ; positarum vel sumptarum Dη; scriptam Kα; scripte Mτ; sumptarum Cγ Eσ Fα Fε Lβ Lγ Mδ Mφ Nγ Nδ Oζ Oι Oτ Pβ Pδ Pν Tβ; sumpte Oη Wγ   quam] quot Lκ   partem] partes Bζ   addes] addas Bη Fγ Mυ Rδ Vη; adde Fε Mτ Nζ Vμ Vo Wζ Xβ; addis Cε Eσ; reddas Nα

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³ These references in various mss to the "7$^{\mathrm{th}}$ canon" do match up with the contents of Cap. 7 of the *Practica*.

similarly at the latitude of the greater, and of the difference between these diverse hours [or times] take a [proportional] part according to the proportion of the difference [in latitude]; taken above which part you will add

10   horis minoris latitudinis, si fuerint pauciores horis maioris latitudinis, vel subtrahes ab
     eisdem, si fuerint plures; et que tunc remanserint erunt hore illius regionis. Similiter
     facies in horis noctis et in aliis operibus.

10   horis₁] *om.* Bθ Lκ Vπ; *interlin.* Eκ; ad horas Vo; hore Bκ Sλ   horis minoris] horum
minorem Kα   minoris] *corr. from* maioris Lζ   latitudinis₁] *illeg.* Nα; altitudinis
Eδ; *add.* vel subtrahes ab eisdem Qθ   si] *add.* vero Mμ   si ... latitudinis₂] *om.* Eα
Eλ Mγ Mλ Nα Pζ Pι Pφ Sι Vυ; *interlin.* Eκ(si] scilicet)   pauciores] minores Kε Kι Mτ;
corr. from plures Qθ   horis₂] *om.* Gα Wλ; hore Kδ Mμ   latitudinis₂] *om.* Bη Cζ Eμ
Fγ   subtrahes] *om.* Bη; subtrahas Oη; subtrahe Mτ   ab] *om.* Sη; ad Vπ; *add.* ipsis
Pν

10-11   si ... eisdem] *om.* Mν   pauciores ... fuerit] *om.* Eυ

11   eisdem] eadem Mη Pφ; eis Bε Pκ Pχ Vψ; eiusdem Lκ; eodem Kγ; istam Kα   que
tunc] *illeg.* Nα   tunc] *om.* Xδ   remanserint] *add.* hore Bδ Cγ Cε Cι Dδ Dη Eβ Eη
Eσ Fα Kα Kδ Lγ Lε Lκ Lη Mδ Mη Mι Mπ Mυ Mφ Nγ Nδ Oγ Oζ Oι Oτ Oυ Pα Pβ Pδ Pθ
Pμ Pν Pω Qβ Qγ Qλ RδSδ Tβ Tδ Vη Vι Vψ Wα Wμ Xβ Xδ Zα   erunt] *om.* Nζ Pϱ
    illius] *om.* Oι; eius Zα; istius Kγ Nζ   regionis] *add.* in quo est Bβ

12   facies in] *illeg.* Nα; fac Nζ Wγ; facias in Vη   in₁] de Kε Kι Mμ Mτ Nζ Pκ Pχ Qζ Vμ
Vo Wζ   in horis] minoris Mν   horis] *om.* Bζ   noctis] *add.* per stellas Cδ
    et ... operibus] *om.* Kε Kι; *marg.* Qζ; *illeg.* Vμ; a mays a peribus Kα(?); et cetera RΥ
    et in₂] vel Pφ   in₂] *om.* Eκ; de Vo   operibus] *om.* Bκ; *illeg.* Wα;
operationibus Dη Kγ Lγ Lη Mδ Mη Mμ Nγ Oβ Oγ Oι Pβ Pδ Pθ Pξ Pϱ Qβ Qγ Qη Qθ Sδ
Sκ Tβ Tδ Vη Vι Vo Vψ Wμ Zα; operacionibus Mφ Tβ; operonibus Lβ Oτ Pα; *add.*
ascendente et in arcu diei Qμ; *add.* et in ascendente et in arcu diei Oφ(*add. in marg.* et in
ascensionibus) Pη; *add.* in ascendente arcus diei Eυ Mκ Pτ(arcu); *add.* in ascendente et in
arcu diei Bζ Eo Vν; *add.* in ascendente et in ortu diei Mγ; *add.* in ascendente in arcu diei
Bθ Eλ Vπ Wλ; *add.* in ascendente in arcu diei et ista [illeg.] subponit quod aliquas
altitudinem poli in illam regionem Fγ; *add.* ut in ascendente et arcu diei Eμ; *add.* ut in
ascendente et in arcu diei Bη Oη Sι Vσ; *add.* ut in ascensionibus et in arcu diei et cetera
Mλ; *add.* ut in ascendente et in ascentionibus in arcum diei etc. Rε; *add.* ut in ascendente
in arcu diei Cζ; *add.* vero in scientia arcus diei vel noctis acci^{do} proportion' et in scientia
altitudinis medii diei sum̄do proportionalr~ secundum quod dictum est Cδ(?); *add. 8-line
gloss* Cζ; *add. 13-line gloss* Vσ

to the hours of the lesser latitude, if they are fewer than the hours of the greater latitude, or you will subtract from the same, if they are more; and what then remains will be the hours of this region. Similarly you will do this for the hours of the night and in other calculations.

[Comment:

       If you do not have a plate for your astrolabe which matches your latitude and you still wish to know the time, take the plate for the next greater latitude and the plate for the next lesser latitude. Note the proportional differences between the latitudes of these two plates and your own latitude.

       Next measure the altitude of the sun and calculate the time using both (the greater and lesser latitudes) plates. Then divide the difference between these times according to the proportions calculated for the latitudes, and this will be the time at your latitude.]

[CAPITULUM 25.] AD HABENDUM GRADUM SOLIS IGNOTUM

Cap. 25] *om.* Bε Fγ Kγ Lι

1   Ad ... ignotum] *om.* Bγ Bδ Bε Cγ Cδ Cε Dδ Eα Eγ Eκ Eλ Eυ Fε Gα Kε Kι Lκ Mα Mκ Mμ Mτ Nα Nζ Oβ Oν Oσ Pγ Pζ Pι Pκ Pξ Pσ Pφ Pχ Qε Qζ Qη Qθ Rγ Sθ Sι Sλ Tβ Vα Vη Vμ Vν Vo Vσ Vυ Vφ Wγ Wζ Wλ; *faded/illeg.* Eδ Eζ Eϱ; Ad habendum gradum solis quolibet die per alh~ Lμ; Ad inveniendum gradum solis per alh~ Dη Mπ; De cognoscione gradus solis ignoti per altitudinem solis in meridiei Bη(*add. in marg.* 20) Cζ Eμ(*marg. and add.* 20us) Oη; De gradu solis ignoto habendo Cη; De gradu solis ignoto per alh~ habendo Mo; De gradu solis per alh~ inveniendo Eτ Mλ Mυ Vι Wβ; De gradu solis inveniendo per alh~ Sη; De inventione gradus solis Vβ; De inventione gradus solis per alh~ Rε Zα(*add.* rethe); 19. Item de inveniendo gradum solis Lλ; Item de inveniendo gradum solis Vγ; Inventio gradus solis alia arte Mγ; Inventio gradus solis alia arte qua prius dicta Vξ; Inventio gradus solis ignoti alio modo Lζ(*marg.*); Inventio gradus solis per alh~ comucor Po; Inventio gradus solis per alh~ Pτ Qμ Rα Sβ(*marg.; add.* C. 23) Vϱ Wι; Inventio gradus solis per alh~ quolibet die anni Dγ Oφ; Inventio gradus solis per alh~ Bι(*add. in marg.* c. 2[*cut off*]; *add. in marg.* Idem docetur in 13 capitulo unum superficie); Inventio graduum solis per alh~ Kθ; Si gradum solis per alh~ vis invenire Bβ; *add.* Capitulum Qβ; *add.* etc. Rδ; *add.* Rubrica Nδ; *add. in marg.* 24^m Vφ; *add. in marg.* 26 Vμ; *add. in marg.* 27 Mκ Pχ Wα; *add. in marg.* C. 28 Qζ(28us) Oϱ Sδ

           alh~ = alhantabuz] Lμ Mπ Mo Vι; alantabuth Vϱ; alchantabuch Sη; alenkabut Dγ; alhā Bι; alhancabuch Rε; alhancabutz Oφ; alhancabuz Pτ; alhantabat Dη; alhantabut Bβ; alhantabuth Po Qμ Sβ; alhanthabuth Mλ Wβ Wι; alhanthabuz Eτ Mυ; alhentabuth Zα; almuthanthath Kθ

      Ad habendum] *rep.* Mη

[CHAPTER 25.] TO ASCERTAIN THE UNKNOWN DEGREE OF THE SUN [ALONG THE ECLIPTIC]

Cum qualibet die gradum solis per alhantabuz volueris invenire, altitudinem

2   Cum] Si Bθ Vμ Vσ; *add.* autem Bκ; *add.* in Bζ Bι Kδ Vϱ   Cum ... invenire] Si volueris
         scire gradum solis per alntabuch seu per rete quod idem est Cα   qualibet] quamlibet
         Vo; quamque Kα; quolibet Nγ Vμ   die] *om.* Fζ Vγ Vμ Vo; de Pγ; hore Eδ
              gradum] gradus Xβ; *corr. from* graduum Bγ   solis] *om.* Mη Pγ; *add.* gradum Vυ
              per] *om.* Nα   alhantabuz] *illeg.* Oξ; ahentabuth Mμ; alanbur Vα; alacanbuth Vϱ;
         alancabuch Sη Vν; alancabut Mα Vγ; alancabuth Mλ Oφ Pυ Vβ; alancabuz Bκ Cδ Lζ Mγ
         Oσ Sλ; alanchabuth Eμ; alantabut Bζ Eo Fε Vυ; alantabuth Bθ Bι Cζ Eυ Pφ Sι Vπ Vσ;
         alantabuz Bδ; alanthabuz Xδ; alanzabut Wγ; alatabuth Nα; alatabuz Cγ; alcanbuth Eγ;
         alcantabut Rδ; aleiᵗⁱbuch *corr. in marg. to* alentibuth id est rethe Wζ; alencabuch Gα;
         alencabuth Nζ Qη Sβ; alentabuth Rα; alenthabuth Vφ; alentibuth/~buch Pκ Pχ;
         alhalcabuch Eσ; alhancabuch Dδ Rε; alhancabuth Mκ; alhancabuz Qθ; alhanchabuth Mτ
         Pτ; alhantab~ Kα; alhantab3 Oυ; alhantabor Pϱ; alhantabū Vψ; alhantabuch Qμ;
         alhantabur Pν Tδ; alhantabus Nε Pσ; alhantabut Bη Oη Pι; alhantabuth Dη Eα Eδ Eζ Eτ
         Mν Mo Oν Po Qδ Rγ Vξ Vo; alhantabutz Mφ Vι; alhantabuz Cι Eβ Eη Fα Fβ Kδ Lβ Lγ Lε
         Fζ Lμ Mδ Mι Mπ Mυ Nγ Nδ Oγ Oζ Oτ Pα Pβ Pθ Pμ Pξ Pω Qγ Qλ Sδ Xβ(*add. interlin.*
         illeg.); alhantabᶻ Lη; alhanthabuch Kθ Wβ; alhanthabuth Bβ Bγ Cη Wι; alhanthabuz Lκ
         Pδ; alhentabuth Tβ Zα; allancabut Lλ; allancabuz Pζ; allantabud Eκ; allantabut Oϱ;
         allantabuz Qβ Wα; allatabuth Qζ; allencabuch Eϱ; allenchabuch Dγ; allentabuth Kε;
         allenthabuth Kι; almucantarath Eλ; almuth' Mη; antabus Wλ; antabuth Pγ; anthabuz Sκ;
         elentabuth Oβ; elentebuth Vμ; hanc tabulam Cε; halhetabuth Vη; *add.* id est per
         retem(recte Cγ) Cγ Mι; *add. interlin.* id est rethe Fβ; *add.* tunc Lη   volueris] *add.* scire
         vel Cι   invenire] *om.* Lκ; scire Nζ

When you wish to find the degree of the sun on whatever day by the hantabuz [i.e., rete],

eius in media die considera, quam notabis in almucantharat in meridiana linea; tunc
quartam circuli signorum in qua fuerit sol gira; et gradus qui continget notam
5   altitudinis in meridiana linea est gradus solis.

3   ius] *om.* Eλ Lη; solis Cα Eα Mα Pι   media die] meridie Kε Mτ Qζ Qθ   die] *om.*
Lµ Oη; nocte die Eϱ; *add.* in quarta altitudinis per altitudinem et solem Bζ
considera] considerabis Pϱ   notabis] *rep.* Mτ; notes Pϱ   in₂] *om.* Mη Nζ
almucantharat] *illeg.* Eη; alenthabuth Qη; almiᵃᵗ Kε Kι Qζ Wζ; almicanch' Mγ;
almicancrath Mτ; almicantarach Gα Kδ; almicantarat Bκ Zα; almicantarath Bβ Pσ Rδ;
almicantaraz Cδ(*add. interlin.* sue altitudinis) Oη; almicanterath Cα; almicanthar' Dη;
almicantharath Tβ; almicantrat Kα; almicantrath Vµ; almichanth' Lκ; almiʳᵃᵗ Eδ; almirath
Eα; almit' Nζ; almiᵗʰ Vη; almiᵗʰᵃᵗ Wλ; almiᵘᵗ Mµ: almuᵃᶜʰ Qµ; almuc' Mπ; almucanᵃᵗ Bη;
almucan|cantharach Wβ; almucancarath Vϱ; almucanch' Dγ; almucant' Fα Lµ Oζ Qθ Vo;
almucantar Eσ Oσ; almucantarach Bδ Mκ Sη; almucantarak Rγ; almucantarat Eγ Eκ Pζ
Qε Sθ Sλ; almucantarath Bθ Bι Eλ Fζ Lλ Mδ Nα Oγ Oι Oϱ Pξ Pυ Pφ Pω Qδ Qλ Sβ Vα Vβ
Vγ Vν Wγ Xβ; almucantart Fε; almucantaᵗʰ Tδ; almucanteᵗʰ Oφ; almucanth' Cι Eβ Lγ Lη
Mλ Nε Wι Wµ; almucantha' Pγ; almucantharac Qγ; almucantharach Eβ Pϱ Rε;
almucantharat Cζ Mα; almucantharath Bγ Cη Eτ Eυ Fβ Lβ Lε Mo Mυ Mφ Nδ Oν Oξ Oτ
Pα Pµ Pν Pτ Qβ Rα Sδ Vι Vξ Vπ; almucantʳᵃᶻ Lζ; almucath'Bζ; almucatharath Pθ; almuch
Kθ; almuchan' Xδ; almuchantarath Vψ Wα; almuchant'at Oυ; almuchanth' Eo;
almuchanthabuz Cε; almuchantharath Pδ; almuchantratz Eµ; almuʳᵃᵗʰ Eζ Pι Po Vσ;
almuscantarath Pβ; almut' Oβ Pκ Pχ; almutantarach Mν Sι; almutantaraz Vυ;
almutanterach Mι Nγ; almuth Dδ; almuthanthtarat Vφ; almuthanthtarath Mη; almutrātac
Cγ; *add.* mmne ine Eζ(?)   in₃] *om.* Kι Qζ; et Nγ   in₃ ... linea] *om.* Sι
meridiana] media Pϱ   linea] *om.* Pτ Qδ; *add.* id est in linea medii celi Rε
tunc] *om.* Eδ; aut Oϱ

3-4   tunc ... signorum] *illeg.* Oξ   tunc ... gira] *om.* Pι

4   quartam] 4ᵃᵐ *some*; 4ᵃᵐ *corr. to illeg.* Eκ; iv Lβ; quam Xβ; *add.* partem Vo   quartam ...
et] *om.* Dη   circuli] anguli Oϱ Vα   circuli signorum] *om.* Mι Nγ Vξ
signorum] *om.* Bδ Cα Cγ Cι Eβ Eη Eσ Fα Fε Fζ Kδ Lβ Lη Lκ Lµ Mδ Mπ Mυ Nδ Nε
Oτ Oυ Pα Pβ Pδ Pµ Pν Pξ Pϱ Pσ Pω Qλ Rδ Rε Sκ Vη Vι Vψ Wµ Xβ Xδ Zα; *marg.* Oι
qua] qua *some*   fuerit] est Gα   sol gira] longyza(!) Wι   gira] *om.* Oη Sλ
Vµ; *lacuna* Vo; gyra Bβ Bγ Bζ Cα Eζ Eϱ Eσ Eτ Kε Lκ Mλ Mµ Mτ Pγ Po Qη Rγ Sη Vφ Wζ;
gyram *corr. to* gira Eκ; g[*blank*] Mδ; *add.* id est volve Nζ   contingit] continet Eα Mλ
Nδ Po; contingit Bθ Cγ Dη Pφ Sη Vν Vξ Vπ Vϱ   notam] *om.* Mτ; *add.* almicantrat Kα

4-5   circuli ... est] *om.* Eδ   et ... linea] cognoasam a's(?) continget illam latitudinem
meridiana linea et ille gradus in zodiaco quam tanget gradum altitudinis Cα

5   altitudinis] *om.* Cε; *add.* facta in almutanterach Nγ; *add.* in almutanterach Mι; *add.* solis Vµ
in] *om.* Eo Pι; *interlin.* Pζ; et Sι   meridiana] media Bγ Cη Pγ Vξ Wβ; *add.* sua Eη
linea] *om.* Bζ Pφ; *add.* finem(?) Fε; *add.* super [*blank*] Sκ   est] *om.* Kα; ad Pγ; erit
(*rep.*) Vψ; factam erit Mα Pζ Qε Sβ Sθ Vβ; *add.* 4 Po; *add. interlin.* factam erit Oφ
solis] quesitus Mµ Nζ Pκ Pχ Vµ Vo Wζ; *add.* et cetera Oβ; *add.* quesitas etc. Qη; *add.*
7.5-*line gloss* Cζ

consider its altitude in the middle of the day, which you will mark on the almucantar at the midday line; then turn the quarter of the circle of signs in which the sun was; and the degree which will touch the mark of the altitude in the middle line is the degree of the sun.

[Comment:

To ascertain where along the ecliptic the sun is on a particular day, measure the height of the sun at noon. Note that position on the meridian line (from the zenith to the south, that is, towards the top of the astrolabe) using the almucantars. Then rotate the rete so that the circle of the ecliptic intersects with the meridian and the noted almucantar and this will give the degree of the sun along the ecliptic, or in the zodiac.

Note that for any noon-day altitude there are two possible positions along the ecliptic, equidistant from the solstices, so one chooses the obvious sign given the season of the year, e.g. Pisces in the late winter or Libra in the autumn.]

[CAPITULUM 26.] DE LONGITUDINE INTER DUAS REGIONES HABENDA PER ECLIPSIM

　　　Longitudo regionis ab alia est distancia meridiani circuli unius a meridiano circulo alterius. Cumque volueris scire longitudinem inter duas regiones, considera

Cap. 26] *om.* Lι

1　　　De ... eclipsim] *om.* Bγ Bδ Bε Bζ Bκ Cγ Cδ Cε Dδ Eα Eγ Eκ Eλ Eυ Fε Kε Kι Lκ Mα Mκ Mμ Mτ Nα Nζ Oβ Oυ Oσ Pγ Pι Pκ Pξ Pσ Pφ Pχ Qε Qζ Qη Rγ Sη Sθ Sι Sλ Tβ Vα Vη Vμ Vν Vo Vσ Vυ Vφ Wγ Wζ Wλ; *faded/illeg.* Eδ Eζ Eϱ Fγ; Ad cognoscendum longitudinem regionis Eo; Ad inveniendum latitudinis inter duas regiones Lμ Qθ; Ad sciendum longitudinem et latitudinem civitatis Dη; 2° De distancia longitudinis regionis ab alia Lλ; De distancia longitudinis unius regionis ab alia Vγ; De latitudinibus regionum inveniendas per eclipsim lune Mν; De longitudine inter duas regiones per eclipsim lune Mυ Pδ(lunarem); De longitudine inter regiones Mι Nγ; De longitudine invenienda Eτ; De longitudine regionis Bη(*add. in marg.* 23) Cζ Eμ(*marg, add.* 21us) Mτ Oη Pζ Zα; Cap.^m 26^m De longitudine regionis habenda Qδ Mλ Oψ; De longitudine regionis invenienda Dγ Pτ Rε Sβ(*marg.; add.* 24); De longitudine regionum invenienda Rα; De longitudine regionis invenienda per eclipsim lune Kγ(*later hand; add. in marg.* 24); De longitudinibus regionuum inveniendas per eclipsim lune Wβ; Inventio distantie 2 regionum Bι(*add. in marg.* c. 2[*cut off*]); Inventio distancie regionis Vϱ; Inventio distancie regionum inter se Kθ Qμ Wι; Inventio longitudinis inter 2 loca Lζ(*marg.*); Inventio longitudinis regionis Xβ; Nota de longitudine regionis Cα; Que per scientia oportet ad sequentia (?) Gα; Que pre sci[ri] oportet ad sequentia h' Mγ; Que presciri oportet ad sequentia ad sciendum longitudinem regionis Vξ; Si scire vis longitudinem inter te et aliam regionem Bβ; *add. in marg.* 27 Vμ; *add. in marg.* 28 Mκ Pκ Wα; *add. in marg.* C. 29 Oϱ Qζ(29us) Sδ　　　　　duas] 2 / 2^{as} *some*　　　　habenda] *om.* Bθ Cι Eη Lε Nε Pθ Pυ Rδ Tδ Vι　　　　habenda ... eclipsim] *om.* Kα Kδ Mη　　　　per eclipsim] *cut off* Fβ　　　　eclipsim] echȳ Pθ; eclipticum Mδ; eclypsim Mφ; eclypticam Vψ; lineam eclipcam. Capitulum Mo; *add.* lune Vβ; *add.* lunarem Bθ Mη; *add.* Rubrica Vπ; *add.* I° et cetera Nε

2　　　Longitudo] Scire quod longitudo unius Cδ; *add.* autem Cε; *add.* unius Bκ Dη Lζ Nζ Sκ(*marg.*) Wμ　　　　regionis] *add.* unius Fγ　　　　ab] *om.* Eϱ; *rep.* Qλ Wα　　　　ab alia] ad allia Mγ　　　　alia] altera Mτ; ea Sλ; illa Fζ Nα Wγ; *add.* linea Oη　　　　meridiani] *rep.* Pμ; meridiana in Mα　　　　meridiani ... unius] illius Pφ　　　　circuli] *rep.* Oη　　　　unius] *om.* Eγ Oϱ; illius Bζ Bη Cδ Eλ Eμ Eo Lλ Mα Mγ Oη Oι Oφ(*add. in marg.* al' unius) Qε Sθ Sι Sλ Vα Vγ Vν Wγ; *add.* regionis Vμ; *add. interlin.* illius Vβ　　　　a meridiano] anni Lκ

2-3　　Longitudo ... alterius] *marg.* Cδ(*later hand*) Lζ

3　　　circulo] *om.* Eγ Lζ Zα　　　　alterius] *add. in* equinoctiali Mυ Mφ Vι　　　　Cumque] Cum Cδ Dγ Eζ Lζ Mυ Mφ Pν Qζ; Cum ergo Vμ; Cum igitur Bκ Mτ; Quantamque(?) ergo Vo Wζ; *add.* ergo Mμ Nζ Oβ; *add.* igitur Pκ Pχ Qη　　　　scire] *add.* altitudinem Kα　　　　longitudinem] *corr. from* altitudinem Wι; *add.* regionis Bζ　　　　inter ... regiones] regionis Qη　　　　duas] *om.* Mι Mτ Nγ Sι; 2 / 2^{as} / duos *some*; *add. and del.* longitudines Pθ　　　　regiones] *om.* Bζ; *interlin.* Eo　　　　considera] *om.* Sι; *add.* eclipsim Oβ

3-10　　cumque ... tabula] *om.* Cα

[CHAPTER 26.] ON FINDING THE DISTANCE [IN LONGITUDE] BETWEEN TWO REGIONS BY AN
        ECLIPSE

The longitude of a region from any other is the distance of the meridian circle of
one from the meridian circle of the other. And when you wish to know the distance
between two regions, consider

initium eclipsis lunaris, per quot horas equales distet a medio precedentis diei in
utrisque regionibus. Deinde minue horas unius regionis de horis alterius, et que
remanserint erunt hore longitudinis inter utrasque. Multiplica itaque eas in 15, et
habebis quot gradus sit earum longitudo ab invicem.

5

4   initium] *om.* Eσ   eclipsis] circulis Bδ; ecclipsis Qδ; elipsim mensis(?) Mπ; eclisis Fε;
eclypsis Mφ Qζ   lunaris] *blank* Sθ; lunarum Pκ Pχ; lune Pφ Oφ Wγ; lune *and add.*
interlin. lunaris Vβ; *add.* quia hanc habes frequentius Bζ; *add. illeg.* Pι   quot] quod Bδ
Bζ Eσ Kγ Kκ Lβ Rδ Sκ   horas equales] *om.* Eσ   equales] *om.* Bδ Bε Cγ Cε Cι Dδ
Eβ Fα Fβ Fε Kδ Lγ Lη Fζ Lμ Mη Mπ Mυ Mφ Oδ Nα Nγ Nε Pα Pδ Pθ Pμ Pξ Pω Qβ Qγ
Qθ Qλ Rδ Sκ Tβ Vη Vι Vψ Wα Xβ Xδ Zα; *marg.* Oι; *interlin.* Oτ; *add.* hoc distet quare
arabes incipiant dies suum a media Vπ; *add.* luna Eγ   distet] differt Qε; dispatet Mδ;
disperet Nδ; distat Mγ Mτ Mν Oβ Pζ   a medio] *blank* Cγ; a medii Fγ; a meridiano Eα
Pκ Pχ Wλ; a meridie Mτ Wζ; meridie Xβ; *add.* diei Bθ Bκ; *add.* meridie Nγ   diei] *om.*
Pα Pκ Pχ Vμ

5   utrisque] uterusque Oη; utriusque Bβ Bθ Oϱ   Deinde] *om.* Mτ; Inerum Lλ(*add.*
interlin. al' deinde); Iterum Vγ; Post Dη   Deinde ... regionis] *om.* Eη Kδ Lβ Lκ Oυ Pθ
Pμ Pν Pω Qγ Qλ Rδ Wα Xδ; *marg.* Lε Oξ Oι(*add.* inventas) Oτ Pα; Ita Fζ   minue]
inventas Pκ Pχ; minuas Gα Kε Kι Mo Mτ Mυ; minues Mφ; minuas *corr. to* minue Rα; in
horas Mν; move Vα; subtrahe Mμ Nζ Vμ Vo   horas] *add.* inventas Mμ Nζ Vμ Vo
regionis] *om.* Dη Oζ Pϱ; *add.* ad horis Mτ; *add.* inventas Lλ Oφ(*interlin.*) Sβ Sθ
Vβ(*interlin.*) Vγ; *add.* inventis Mα Oϱ Pζ(*add. in marg.* de horis alterius); *add.* si minoris Zα
de] ab Rγ Vo   de horis] *rep.* Pξ   horis] *add.* regionis Oφ Pφ Wγ
alterius] *add.* divide vel subtrahe Pκ Pχ; *add.* regionis Kε Qζ Rγ Vξ   que] quod
Sλ; quot Mκ Vξ

6   remanserint] *add.* hore Mδ Nδ   erunt] *om.* Mη   longitudinis] *om.* Kα; latitudinis
Sκ   inter] in Nζ Pϱ Tβ   inter utrasque] *om.* Pα; *add.* quos Mμ; *add.* regiones
Oφ(*marg.*) Vo Vφ(*interlin.*)   multiplica] coliplica Wα; multiplicata Eγ
multiplica ... in] Quas multiplica per Nζ Pκ Pχ(*om.* quas) Vμ Vo Wζ   itaque]
om. Fγ; *interlin.* Oσ   itaque eas] *om.* Eγ Mμ Qη; 13 easVψ; atque eas Kδ; eas Bζ Mλ
Nα Oφ Vν Wλ; ergo ea Dη; gⁱ eis Cδ; istas eas Cε; ita ea Cη; ita eas Kα Mη; itaque Eκ Eτ
Xδ Vβ; ita^que ea Bγ; itaque ea Bη Bι Bκ Dγ Eδ Eζ Eμ Fα Lζ Po Pυ Oφ Sη Sλ Vα Vξ Vϱ;
itaque eos Bβ Dδ Eβ Eη; itaque etiam Pγ; -que eas Kε Kι; utique eas Sι   in] *twice* Mκ;
per Bβ Eσ Fε Fγ Mμ Mτ Qζ Qη Qθ Rε; *add. interlin.* al' per Oφ   in 15] *illeg.* Nα
15] *rep.* Vπ; quindecim Mτ Vη; xv Sθ; 5 15 Bθ; 12 Bκ; 75 *corr. in marg. to* 15 Mη

7   habebis] *add.* per Kε Kι Pι Qζ Vμ Vo   habebis ... invicem] proveniet gradus per quos
una regio est magis orientalior quam alia Fγ   quot] quemVψ; quod Bδ Bζ Cδ Eσ Vη;
tot Wλ; *add./del.* horas Vo   quot gradus] *illeg.* Eζ   gradus] graduum Bδ Dη Eβ
Eγ Fα Eσ Fζ Lβ Lη Lλ Lμ Mα Mδ Mλ Mυ Mφ Nε Oϱ Oη Ου Pζ Pμ Pν Qβ Qε Qλ Sκ Sλ
Tβ Vβ Vγ Vν Vψ Wμ Xδ Zα; *corr. to* gradibus Bγ   sit] *om.* Vη; sint Mδ Vϱ
earum] *om.* Fε; horarum Oϱ   longitudo] latitudo Kα Kγ; latitudo *corr. to*
longitudo Sλ   ab] *om.* Sβ; *interlin.* Pν; *marg.* Po; ad Pγ   ab invicem] *om.* Bη Eγ Kδ
Lλ Mα Pζ Qε Sθ Sλ   invicem] *blank* Rδ; initio Bκ Mλ Vν Wγ

the beginning of a lunar eclipse, by how many equal hours it is distant from noon of the previous day in both regions. Then substract the hours of one region from the hours of the other, and what remains are the hours of longitude between both. Therefore multiply them by 15, you will ascertain the number of degrees of their distance from each other.

Longitudines autem quarundam regionum, id est, elongationes circulorum
eorum meridianorum a meridiano circulo ultime regionis habitabilis in occidente, et
10   earum latitudines id est distancias ab equinoctiali circulo notabimus in quadam tabula.

8   Longitudines] Initio longitudinis Bζ; Verumtamen(Verumptamen Mα Qε) longitudines
        Eγ Lλ Mα Qε Vβ   autem] *om.* Bγ Bζ Bη Bθ Bι Bκ Cγ Cζ Cη Dγ Eα Eγ Eδ Eζ Eκ Eλ
        Eμ Eo Eϱ Eτ Fγ Gα Kγ Kε Kι Lζ Lλ Lμ Mα Mλ Mμ Mν Mo Mτ Mυ Mφ Nα Nζ Oβ Oη Oν
        Oϱ Pγ Pζ Pκ Po Pτ Pυ Pφ Pχ Qδ Qε Qζ Qη Qμ Rα Rε Sβ Sη Sθ Sι Sλ Vα Vβ Vγ Vι Vν Vξ
        Vπ Vϱ Vφ Wα Wβ Wγ Wζ Wι Wλ; vero Oσ Vυ; *add. in marg. illeg.* Rγ   quarundam]
        earumdem Cγ; quarum Pω   quarundam regionum] quarum de regione Eσ   id]
        illeg. Bι; *om.* Bη Gα; hoc Bγ Cη Eκ Eτ Nα Pτ Rγ Sη Vβ(*add. interlin.* al' id est) Vξ Wι Wλ
                id est] *om.* Bδ; et Bζ Dγ Eγ Cζ Eδ Eζ Eμ Eo Eϱ Kε Kι Kθ Mγ Mλ Mν Mo Mτ Oβ Oη
        Oφ(*add. interlin.* al' id est) Po Pυ Pφ Qδ Qζ Qη Rα Sι Vν Vϱ Vφ Wβ Zα; eum Pγ
                elongationes] elongationem Mo; longitudines Eα Pϱ Qη Wγ   circulorum] *om.*
        Cζ Eμ Nζ Oη Pκ Pχ Wζ

8-9   regionum ... circulum] *om.* Pω

8-10   Longitudines ... tabula] Potes etiam habere longitudines civitatum per tabulas de
        longitudinibus et latitudinibus regionum Dη

9   eorum] *om.* Kα Vν; earum *many*; ipsarum Vμ; suorum Wγ; *add. illeg.* Zα
                meridianorum] *rep.* Pϱ; meridianarum Eσ   a] *om.* Xβ; de Kδ   a ... circulo]
        om. Bθ Vπ   circulo] *om.* Bδ Bε Cγ Cε Cι Dδ Eβ Eη Eσ Fα Fβ Fε Fζ Kδ Lβ Lγ Lε Lη Lκ
        Lμ Mδ Mη Mπ Mυ Mφ Nγ Nδ Nε Oγ Oξ Pα Pβ Pδ Pμ Pν Pϱ Pσ Qβ Qγ Qθ Qλ Rδ Sδ Sκ
        Tβ Tδ Vη Vψ Wα Xβ Xδ Zα; *interlin.* Oι   ultima] *blank* Vϱ   regionis] regiones Oϱ
                habitabilis] *marg.* Eδ; hebit Lκ; inhabitabilis Kγ; intabulis Qδ   in] *add.* parte Gα
                in occidente] *om.* Eζ   occidente] oriente Fγ; *add.* posite Eγ Eλ Mα Oι(*interlin.*)
        Oϱ Oφ(*interlin.*) Pζ Qε Sβ Sθ Sλ Vβ(*interlin.*) Vγ Wγ

10   latitudines] altitudines Eα Eδ Mτ Oϱ Po; longitudines Cη Dγ Eκ Eτ Mι Nγ Pγ Qγ;
        longitudines *corr. to* latitudines Bγ   id est] *om.* Cγ Wλ; et Bγ Cη Eκ Eτ Mμ Mτ Nζ Pγ
        Pκ Pτ Pχ Rγ Sλ Vμ Vν Vξ Vo Vϱ Wι; et cetera Oβ Qη; in Bβ; scilicet *few*; *add.* earum Eλ Fα
                distancias] *add.* earum Lη   equinoctiali] *add.* usque ad comuni(*?*) ab axe usque
        circulum Cancri Qζ   circulo] *om.* Wβ Zα   notabimus] notabis Mγ Sι; notavimus
        Fα Pϱ Sθ; numerobimus(*rep.*) hoc Rδ; vocabimus Lκ   quadam] reliqua Oγ
                tabula] figura tabula Cε Mη; tabulla Mγ; *add.* astronomie Bθ Eλ Eυ Gγ Mκ Oν Vπ
        Vσ; *add.* astronomie et longitudine poli Wλ; *add.* astronomine vel per altitudi Mλ; *add.*
        astronomie vel per altitudinem poli Pτ; *add.* astronomine vel(*om.* Eo; scilicet Vφ) per
        altitudinem poli Bζ Eo Fγ Vν Vφ(*marg.*); *add.* etc. Qη; *add.* Nota quod longitudo
        consideratur secundum unam(diem Nγ) que est ab oriente in occidentem quomodo etiam
        est via solis Mι Nγ; *add.* Nota quod longitudo directe(*?*) transversio(*?*) que est super
        equinoctiale latitudo vero directe(*?*) ab uno polo versus alium Cγ; *add.* subscripta et
        superius inscripti [*illeg.*] Kγ;[1] *add.* sufficenter Bγ Cη Eκ Eτ Mγ Pγ Rγ Vξ Wι; *add. 2 lines*
        Cα

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[1] In ms Kγ there is a table of latitudes and longitudes for 24 cities (fol. 30[vb]).

The longitudes, however, of specific regions, that is, the distances of their meridian circles from the meridian circle of the farthest region habitable region in the west, and their latitudes, that is, distances from the celestial equator we will note in a certain table.

[Comment:

Finding the difference in longitude between two regions involves working from some same event visible in each place; here a lunar eclipse is suggested.

Knowing the time (in equal hours) that has elapsed in each location between the beginning of the eclipse and the previous local noon allows the user to calculate the time it has taken for the sun to move from one region to the other. Multiplying these (equal) hours by 15 gives the difference in longitude in degrees.

The text notes that there is a table which gives the comparative longitudes of various places including the most westerly known habitable region (usually taken to be the Canary Islands), but such a table is found in very few mss.[2]]

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[2] As noted, such a table is found in mss Kδ Rδ and Lζ, although the table might also be found in other mss unrelated to the *Practica* text.

[ADDENDUM 26]

inserted in Kδ Rδ:

	g^s	m^a
Latitudo Tholeti	40	8
Latitudo Montis Pesulani	44	4
Latitudo Parisii	48	8
Longitudo Tholeti a vero occidenti	28	30
Differentia ab occidente habitabili	11	0

g^s m^a] *om.* Rδ   Tholeti$_{1,2}$] Hioleti Kδ   40 8] 40 Rδ   Pesulani] Phessulani Rδ
    44 4] *corr. from* 44 8 Rδ   48 8] *corr. from* 48 4 Rδ   Differentia] *illeg.* Rδ

inserted in Lζ:

Nomina regionum	longitudo		latitudo	
	g^{us}	m^a	g^{us}	m^a
Alexandria	51	20	31	0
Irhlm	56	0	32	0
Cremona	48	30	44	22
Perisi'us	40	47	49	6
Tholetum	28	30	40[39]	0[51]
Marsilia				
Floriara				
Tholosa	40	47	42	45

[Note: in ms Fε, on fol. 36r following the end of the *Practica*, is a list of latitudes and longitudes for 80 places, from England down to Spain and North Africa, and across to Jerusalem.]

ADDENDUM 26

inserted in Kδ:

	degrees	minutes
Latitude of Toledo	40	8
Latitude of Montpellier	44	4
Latitude of Paris	48	8
Longitude of Toledo from the very west	28	30
Difference from the habitable west	11	0

inserted in Lζ:

Name of the region	longitude degrees	minutes	latitude degrees	minutes
Alexandria	51	20	31	0
Jerusalem	56	0	32	0
Cremona	48	30	44	22
Paris	40	47	49	6
Toledo	28	30	40^{39}	0^{51}
Marseille				
Florence				
Tolosa	40	47	42	45

[CAPITULUM 27.] DE EODEM IN MILIARIBUS

Si quot miliaria sint inter duas regiones a se invicem distantes noscere queris, longitudinem et latitudinem inter utrasque considera. Deinde longitudinem in se

Cap. 27] *om.* Cα Lι

1   De … miliaribus] *om.* Bγ Bδ Bε Bζ Bκ Cγ Cδ Dδ Dη Eα Eγ Eκ Eλ Eυ Fε Kε Kι Lκ Mα Mκ Mμ Mτ Nα Nζ Oβ Oν Oσ Pξ Pγ Pδ Pι Pκ Pσ Pφ Pχ Qε Qζ Qη Qθ Rγ Sθ Sι Sλ Tβ Vα Vη Vμ Vν Vo Vσ Vυ Vφ Wγ Wζ Wλ; *faded/illeg.* Eδ Eζ Eϱ Fγ; Ad inveniendum distantiam inter 2 loca Eo; Ad sciendum quot miliaribus due regiones a se distant Bι(distent; *add. in marg.* c. 23) Vϱ; Ad sciendum quot miliaria sunt inter duas(*om.* Rε) regiones Mν Rε Vβ(*add. in marg.* Quot miliariorum sit duarum regionum intervallum); Capitulum 27ᵐ De distantia regionum Qδ; De distancia regionum invenienda Dγ Oφ Rα Sβ(*marg.*; *add.* 25); De distantiis civitatum Zα; De eodem Mι Nγ; Quod miliaria sint inter 2 regiones inveni~ Kγ(*later hand*; *add. in marg.* 25); Quot miliaria Mπ; Quot miliaria sint inter loca regiones Bη(*add. in marg.* 22); Quot miliaria sint inter duas/2 regiones Cζ Eδ(*marg.*) Eμ(*add. in marg.* 22ᵘˢ) Eτ Kθ Mλ(*add.* qualibet) Oη Pζ(*marg.*) Oo Qμ Vι Wβ Wι; Quot miliaria sint inter regiones Vξ; 21. Quot miliariorum sint inter [*illeg.*] duarum regionum Lλ; Quot miliaria sint inter Mυ(*add. in marg.* duas regiones); Quot miliaria sint inter regiones distantes Pτ; Quot sint miliaria inter loca Lζ; Quot sint miliaria inter duas regiones Sη; Quot sint miliaria inter duas regiones a se distantes Lμ; Quot miliariorum sit intervallum duarum regionum Vγ; Si scire volueris quot sint miliaria inter regiones Mγ; Si vis numerum miliarium scire inter regiones Bβ; *add.* capitulum Cη Mo; *add.* etc. Rδ; *add.* Rubrica/Rx Bθ Vϱ; *add. in marg.* 25ᵐ Vφ; *add. in marg.* 28 Vμ; *add. in marg.* 29 Mκ Pχ; *add. in marg.* C. 30 Oϱ Sδ

2   Si] *om.* Mυ Vι; Ci Dγ; Cum autem Vμ; Ut si Fγ; Vis scire Sκ; *add.* autem Bη Bκ Cδ Cζ Dγ Dη Eγ Eμ Gα Kε Kι Lζ Lλ Mα Mμ Mτ Nζ Oβ Oη Oν Oϱ Oσ Oφ Pζ Pι Pκ Pφ Pχ Qε Qζ Qη Rα Sβ Sθ Sι Sλ Vα Vβ Vo Vϱ Vυ Vφ Wγ Wζ   quot] quod Bδ Kγ Sκ Vη; tot Vυ
        sint] *om.* Bη Cζ Eμ Kθ Vυ   duas] 2 / 2ᵃˢ *many*; *illeg.* Dη; et Sη; II Oβ
        regiones] *marg.* Mκ   a] ad Eα Fε Xβ; scilicet a Eκ   a … invicem] *om.* Eσ
        a … distantes] *om.* Cδ Oσ Rγ Vυ   se] te Sι   invicem] *om.* Bβ Bζ Eγ Eλ Eϱ Eυ Fγ Mκ Mμ Mo Pζ Pι Qδ Qη Rα Sβ Sη Vβ Vγ Vσ Vφ Wγ   invicem distantes] *om.* Bη Bι Bκ Cζ Dγ Eo Lζ Mα Mγ Oη Pφ Sθ Sι Sλ Vα Vν Vϱ; *marg.* Oφ; distantibus Nζ
        distantes] *interlin.* Eμ; *add.* si Mυ Vι   noscere] cognoscere Bθ Eυ Fγ Kκ Vπ; nosse Vϱ   noscere queris] scire volueris Kθ Tβ Vη Zα   queris] *om.* Dδ; velis quere Pκ Pχ; volueris quere Vμ

2-9   noscere … queris] *om.* Pξ(*entire capitulum added in bottom margin, later hand*)

3   longitudinem₁ et latitudinem] *om.* Pμ; *add. illeg.* Sλ   et latitudinem] *om.* Cδ Gα Mμ; *rep.* Eλ; et altitudinem Eα; et similiter latitudinem Pι   inter] *om.* Kγ Mν Mo Po Rε Sη; in Gα Vo   utrasque] utramque Bδ Bζ Eβ Dη Kγ Lγ Lε Mν Mφ Nε Oγ Oυ Po Pϱ Qβ Rδ Sη Vι Wα; utramque regionem Eυ Mκ Vπ; utrarumque Rε   considera] *add.* et latitudinem Gα Mμ; *add.* 7.5-line insert Fβ   Deinde] *om.* Pγ   longitudinem₂] latitudinem Kε Mτ   in] a Dγ   in se] noste Lκ

[CHAPTER 27.] ON THE SAME IN *MILIARIA* [ROMAN MILES][1]

If you seek to know how many *miliaria* are between two regions distant one from the other consider the longitude and the latitude between the two. Then add the longitude

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[1] *Miliarium*: "1000 [of something]". In terms of distance, it is 1000 paces, each consisting of 5 Roman feet, hence a distance of 5000 Roman feet. The Roman foot is generally taken to be about 296 millimetres, and a Roman mile would be 1,480 metres, i.e., 1.48 km.

ductam latitudini in se multiplicate aggrega. Et collecte exinde sume tolle radicem, et

5   unicuique gradui ipsius radicis et dimidio da centum miliaria; et per tot miliaria distat

4   ductam] ducta Gα; inducta Kδ; *add*. multiplicatam Zα   ductam ... se] *marg*. Oξ
         latitudini] longitudini Mτ   in] *om*. Pγ   se] *add*. aggregate Nζ; *add*. similiter
         Wβ   multiplicate] aggregate Bδ; ducte Eγ Wγ; multiplicare Sι; multiplicatur Nγ; *add*.
         considera et O; *add*. et illa similiter Wβ   aggrega] adde Pϱ; adgrega Mι Nγ; congrega
         Nα; coniuncta(?) et adde Zα   et₁] in Mη   collecte] collige Cη Eκ Mγ; ab collecta
         Pϱ; colerice Cε; collecte sumes Kι; collectione Mη Pν; collectum Xβ; huius(?) collecti Vμ;
         tollecte Mν; tollēm Kε; tollere Bβ; *add*. ducte Lκ   collige ... radicem] collecte sume cɫ
         in quem radicem Eγ   exinde] *om*. Fε Mo Rε; *illeg*. Pτ Qλ Vη; in Lμ Mι Mπ Pυ Vξ Vψ;
         inde Bβ Bγ Bδ Bε Bθ Bκ Cγ Cε Cη Cι Dδ Dη Eα Eβ Eδ Eζ Eη Eκ Eσ Eτ Eυ Fα Fβ Fγ Fζ Kα
         Kγ Kδ Lβ Lγ Lε Lζ Lη Lκ Mδ Mη Mκ Mν Nα Nδ Nε Oβ Oζ Oι Oξ Oυ Oτ Pα Pβ Pγ Pδ Pθ
         Pμ Pν Po Pξ Pϱ Pσ Pω Qβ Qγ Qθ Qμ Rδ Sδ Sη Sκ Tβ Tδ Vγ Vι Vμ Vπ Vσ Wα Wι Xβ Xδ
         Zα; in se Nγ Rγ Wβ; vide Oγ   exinde ... tolle] *illeg*. Oν   sume] *om*. Gα Pι;
         sumpte Kθ; *add*. per additione Mυ Vι   tolle] *om*. Kδ Mλ Rδ Vσ; Deinde quere Vμ Vo;
         extrahe Tβ; queras Nζ; quere Bζ Bι Bκ Cδ Cζ Dγ Eγ Eλ Eμ Eo Eυ Fγ Fε Gα Kγ Kε Kι Lζ
         Lλ Mα Mγ Mμ Mτ Oη Oϱ Oσ Oφ Pζ Pι Pκ Pσ Pφ Pχ Qε Qζ Qη Qμ Rα Rε Sβ Sι Sλ Vα Vβ
         Vγ Vν Vπ Vϱ Vυ Vφ Wγ Wζ; in quere Bη; *add*. extrahe Zα; *add. interlin*. quere Oι
         tolle radicem] *illeg*. Mκ   radicem] *add*. quadratam Bβ Bε Eλ(?) Kε Kι
         Mλ(*interlin*.) Mμ Mτ Nζ Pι Pκ Pχ Qδ Qη(*interlin*.) Sκ(*marg*.) Tβ Vμ Vσ Wζ; *add*.
         quadratam collatem Vo; *add*. scilicet quadratam Vη Zα; *add. interlin*. id est quadratam Vβ

5   unicuique] *add*. que Rδ; *add*. radicem Bζ; *add*. scilicet Zα   ipsius radicis] *om*. Bη Cζ Eμ
         et₁] *om*. Mν Nζ; ad Mμ; cum Kε Qζ   ipsius ... demidio] *om*. Fγ   demidio]
         om. Gα; adimid' Mυ; dimidendo Nζ; *add*. gradui Zα   da] *om*. Vα; das Cγ; diei Mγ
         centum] 100 *some*; c *some*; *add. interlin*. 100 Vβ; *add. interlin*. al' 90 Kε   miliaria₁]
         millearia Oη; *add*. vel 16 teutonita Kγ; *add*. [*illeg*.] vel 16 teutonica Zα   et₂] *add*. que
         collecta fuerint Cζ Eμ Eυ Kγ Kε Mλ Mμ Vν Wγ(*add*. suma); *add*. que(*add. in marg*. quot
         Mκ) collecta fuerint miliaria Mκ Nα Pτ Sη Vπ; *add*. quod collecta fuerint Oβ Oη Pι Qζ;
         add. quot(*add*. miliaria Cδ Fγ Vμ Vo; *add. interlin*. al' que Oφ) collecta fuerint Bζ Cδ Dγ Eo
         Eϱ Fγ Kι Lζ Lλ Mα Mγ Mτ Nζ Oι(*marg*.) Oν Oϱ Oσ Oφ Pζ Pκ Pυ Pφ Pχ Qδ(*add*. milliaria)
         Qε Qη Qμ Rα Rε(*add*. miliaria) Sβ Sθ Sι Sλ Vα Vβ(*add. interlin*. miliaria) Vγ Vμ Vo Vϱ
         Vσ(*add*. milaria) Vυ Vφ Wζ Wλ(*add*. milliaria); *add*. quot(que Bθ Eγ Eλ) collecta fuerit
         suma Bη Bθ Bι Bκ Bγ Eλ   et₂ ... miliaria₂] *om*. Oζ Pϱ Rγ; *faded/illeg*. Gα   per] *om*.
         Fε Mτ   tot] *add*. enim Mo   miliaria₂] *om*. Bγ Bζ Bι Bκ Cδ Eγ Eκ Eυ Eα Eζ Eμ Eo
         Eϱ Eτ Kγ Kε Kθ Lζ Lλ Mα Mγ Mλ Mν Mτ Nζ Oβ Oη Oϱ Oσ Pγ Pζ Pκ Pξ Pτ Pφ Pχ Qζ
         Qη Rα Rε Sη Sθ Sι Sλ Vα Vβ Vγ Vν Vξ Vπ Vϱ Vσ Vυ Wβ Wζ Wι Wλ; regionum Mυ Pι
         distat] *rep*. Eβ; distabit Vγ; distat ɟ distat Rδ

taken [i.e., multiplied] by itself to the latitude multiplied by itself. And take the square root from the combined sum, and for each degree and a half of this root give 100 *miliara*; and by so many *miliaria* is

una regionum ab alia.

Si autem earum latitudo fuerit eadem, fac cum gradu longitudinis tantum sicut debet fieri cum gradu radicis. Si vero longitudo fuerit una, fac cum latitudine tantum,

6 una] *marg.* Sκ; *add.* illarum Vσ; *add.* quoque Sλ   regionum] *om.* Fγ Pι; earum Eγ Kγ
    Mo Nα Pτ Pυ Qδ Sη Wγ Wλ; illarum regionum Bθ Eυ Mκ Mλ Vπ; ipsarum regionum Bη
    Cδ Cζ Eλ Eμ Eo Lλ Mα Mγ Oη Oφ(*add. interlin.* al' illarum) Pζ Pφ Qε Qμ Sβ Sθ Sι Vγ Vν;
    ipsorum Vβ(*add. interlin.* regionum); istarum regionum Bκ Lζ Pφ; pars ipsarum regionum
    Vυ; regio Bε Cη Dδ Dη Eα Eδ Eη Fζ Kα Kδ Kε Kι Mν Mτ Oβ Oγ Pγ Pξ Po Pϱ Vξ; regio
    corr. to regionum Qγ; regio *corr. from* regionum Bγ   ab] *illeg.* Oν; altera Pϱ; et Bθ Vπ
      alia] altera Vμ

7 Si] *add. in marg.* 27 Pκ   autem] vero Eυ   earum] *om.* Cε Kα Pι; ipsarum Bζ Eo
    latitudo] longitudo Dγ; *add.* earum Eσ   fuerit] fuit Nε; sit Vξ   eadem] *om.*
    Mγ Vγ; ea | eadem Eκ; in eadem Eζ Lκ   fac] *om.* Mμ Qη Wζ; *marg.* Kε; facies Oϱ; fiat
    Eσ; tunc Vμ   fac ... tantum] cum gradu longitudinis tantum debes operari Pκ Pχ
      cum] in Vα   gradu] gradibus Bη Bκ Cγ Cδ Cζ Eγ Eμ Lζ Lλ Mα Mκ Mτ Oβ Oη
    Oι Oϱ Oσ Pζ Sλ Tβ Vα Vβ(*add. interlin* al' gradu) Vη Vσ Vυ Vφ Wγ; *add.* latitudinis Sη
      gradu longitudinis] longitudine Dη   longitudinis] latitudinis Wλ
      tantum] *om.* Bζ Eλ Sθ; tunc Qη   tantum sicut] debes operari sicut dictum est
    Wζ   sicut] *om.* Nζ Qη; *interlin.* Eζ; *add.* dictum est Mμ Oι(*interlin.*) Oϱ Pκ Pχ

7-8 tantum ... radicis] *om.* Eδ   sicut ... fieri] *rep.* Oν   sicut ... gradu] debes operari
    sicut dictum est in gradibus Vμ

7-9 Si ... queris] *om.* Xδ

8 debet] deb[er]es Sι; deberet Bβ Bθ Eα Kγ Mo Mτ Po Pτ Pυ Qδ Qμ Sη Vπ; deb'nt Mν;
    dēret Kθ; dictum est debere Bζ Bη Bι Bκ Cδ Cζ Dγ Eγ Eμ Eo Eϱ Lζ Lλ Mα Mγ Mλ Oη Oν
    Oσ Oφ Pζ Pι Pφ Rα Rε Sβ Sθ Sλ Vα Vβ Vγ Vϱ Vυ Vφ Wγ; dictum est deberet Eζ Gα Kι
    Qζ; dictum est per debet Kε; dictum est quod debet Mτ; ductum est deb'es Sι; est debere
    Vν; oportet Pα   fieri] operari Mμ; *add.* sicut dictum est Qη   fieri ... gradu]
    operari sicut dictum est in gradibus Nζ Vo   cum₁] in Pφ Sι   cum gradu] cum
    gradibus Eγ Mκ Mτ Oι Oν Pι Pκ Pχ Qζ Tβ Vβ(*add. interlin* al' gradu) Vη Vσ Vφ Zα; de
    gradibus Qη; in gradibus Bη Bκ Cγ Cζ Dγ Eμ Eϱ Gα Lζ Lλ Mα MμOη Oφ Pζ Qε Rα Sβ
    Sθ Sλ Vα Vγ Vϱ Vυ Wζ; ut dictum est de gradibus Oβ   vero] *om.* Mτ; autem Wγ;
    eadem Vξ   longitudo] longitudo latitudo Sι; *add. interlin* al' latitudo Oφ   fuerit]
    est Fγ; fuit Nγ   una] *om.* Cγ; eadem Eγ Eυ Mκ Nα Vσ Wγ   fac] facias Nζ; facies
    many; facies *rep.* Vϱ   cum₂] *add.* etiam Eδ   latitudine] longitudine Dγ Qζ Tβ Wγ
    Wλ; longitudine *corr. in marg. to* latitudine Zα   tantum] *om.* Eγ Vφ; sicut cum radice
    Wγ; tunc Qη

one region distant from the other.

If, however their latitude is the same, treat a degree of longitude just as a degree of the root ought to be treated. If, however, the longitude is the same, treat it as with the latitude

et invenies quod queris.

9   invenies ... queris] *illeg.* Pκ Pχ; habis quesitum Vξ   quod] idem quod Rγ; quot Cγ;
           add. tu Mo Nα Pυ Sη   queris] scideras Sι; scire desideras Bζ Bη Bκ Cδ Cζ Dγ Eγ Eλ
           Eμ Eo Eϱ Gα Kε Kι Lλ Mα Mγ Mλ Mμ Mτ Nζ Oη Oν Oϱ Oσ Oφ Pζ Pφ Qε Qζ Qη Rα Rε
           Sβ Sθ Sλ Vα Vβ Vγ Vμ Vν Vo Vϱ Vυ Vφ Wγ Wζ; scire desideras et scito Pι; *add.* De
           ascensionibus signorum in circulo obliquo Mo; *add.* est finis illius etc. etc. Kγ; *add.* etc. Rδ;
           add. chapter by Iohannes de Calamonte[2] *(1.5 folia, ff. 64ʳ-64ᵛ; f. 65v blank)*: "Canon docens
           utilitatem tabule regionum subscripta" Vβ(*add. in marg.* Hanc litteram ego Johannis de
           Calomonte cum sua tabula inmediate subscripta addidi)

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[2] For Iohannes de Calamonte, see note to *Comp.*, Cap. 7 line 9.

and you will find what you seek.

[Comment:

  To calculate the distance in Roman miles between two points, ascertain the latitude and longitude of each, and the difference in degrees between them. Then, (following Pythagoras's theorem), multiply the difference in longitude by itself and add to it the difference in latitude multiplied by itself; take the square root of the sum. Then multiply each degree and a half by 100 and this will be the distance in Roman miles.

  If the two places have the same latitude, simply multiply each degree and a half of longitude by 100; if they have the same longitude, multiply each degree and half of latitude by 100.

  Note: This is not really accurate since a degree of longitude varies when measured at the equator (maximum, where it equals a degree of latitude, ignoring the slightly non-spherical shape of the earth) and when measured at the poles (minimum, i.e., 0). And even when the length of the degree is standard (along the equator, along a meridian, or along a great circle), this calculation gives an earth circumference of about 35,500 km when in reality it is just over 40,000 km.]

[CAPITULUM 28.] DE ASCENSIONIBUS SIGNORUM IN CIRCULO DIRECTO

Si autem ascensiones signorum in circulo directo scire desideras, initium
cuiusvis signi super lineam meridianam pone, et locum almuri in margine nota. Postea

Cap. 28] *om.* Lι; *two versions* Cζ₁ Cζ₂

1   De ... directo] *om.* Bγ Bδ Bε Bζ Bκ Cα Cγ Cδ Cε Dδ Eα Eγ Eκ Eλ Eσ Eυ Fε Gα Kε Kι Lζ Lκ
         Mα Mκ Mμ Mτ Nζ Oν Pγ Pδ Pι Pκ Pσ Pφ Pχ Rγ Sη Sθ Sι Sλ Tβ Vα Vη Vμ Vν Vo Vσ Vυ
         Vφ Wγ Wζ Wλ; *faded/illeg.* Eδ Eζ Eϱ Fγ; *marg.* Eδ Eμ(*add.* 27ᵘˢ) Pζ; Ad habendum
         ascensiones signorum in circulo directo Bι(*add. in marg.* cᵐ. 24); Ad inveniendum
         ascensiones signorum Mγ; Ad inveniendum ascensiones signorum in circulo directo Eo
         Lμ Pτ Vξ; Ascensiones signorum in circulo directo Mπ Vϱ; De ascensione signorum in
         circulo directo Cζ₁ Cζ₂; De ascensione signorum in circulo recto Kγ(*later hand; add. in*
         marg. 26); De scientia ascensionum signorum in circulo recto Dη; Inventio ascensionis
         signorum in circulo directo Dγ Oφ Rα Sβ(*marg.; add.* C. 29); Scientia ascensionis
         signorum in circulo directo Cη; Si vis invenire ascensiones singnorum(!) Bβ; *add.* Rubrica
         Vπ; *add. in marg.* Cap.ᵐ Lζ; *add. in marg.* 27 Bη; *add. in marg.* 29 Vμ; *add. in marg.* 30 Mκ
         Wα; *add. in marg.* C. 31 Oϱ Qζ(31ᵘˢ) Sδ   De] Cap.ᵐ 28 De Qδ; 25 De Lλ
                 signorum] *om.* Mλ   circulo directo] zodiaco Xβ   directo] recto EτPβ Qθ;
         add. sciendis Bθ Mη   ascensionibus] ascensu Zα   *ms* Kγ *ends*

2   Si autem] Cum Kι   Si ... desideras] *om.* Pξ Vγ   autem] *om.* Bζ Cα Eλ Mγ Oφ Pφ
         Rε Sι Vμ Vν Vo; volueris Mτ   ascensiones] *add.* circulorum Eλ   signorum] *om.*
         Bκ Kα Mτ Rα   directo] *om.* Mτ; recto Pβ Pκ Pχ Vμ; recto *corr. to* dyrecto Dγ; *add.*
         equinoctiali Zα; *add.* id est meridiano Dδ   scire] *om.* Lμ Pκ Pφ Pχ   desideras]
         om. Bζ; consideras Kα; volueris Bη Cζ₁ Cζ₂ Eμ Mμ Mτ Nζ Oη Qη Vη Vμ Vo Wζ Wι Zα

3   cuiusvis] cuius Cε Eγ Oη Sθ; cuius [*illeg.*] vis Rδ; cuiuscumque Cα; cuiusque Pφ Rε;
         cuiuscumque *corr. to* cuiusvis Wγ; eius Bβ   signi] *add.* 29 Bζ   super] *corr.*
         interlin. from per Nδ   lineam] latitudinem Eζ; *add. in marg.* locum almuri in margine
         pone Oξ; *ms* Xγ *restarts*   meridianum] *add.* ascensus igitur ipsorum in linea medii
         celi similis ascensioni est ipsorum in circulo equinoctiali Bζ   pone] *add.* ascensus
         igitur ipsorum in circulo equinoctiali pone Vφ; *add.* ascensus igitur ipsorum in linea
         medii diei, similils est asenccioni ipsorum in cirulo equinoctiale Pι   locum] notam
         Vo; *add.* in Lλ Pζ Sβ Sθ Sλ   locum ... margine] *om.* Kδ Oξ   almuri] almurni Nδ;
         add. interlin. al' almucantarath Oφ   margine] limbo Fγ; loco Vo; *add.* astrolabii Dδ
                 nota] *om.* Pφ; pone et nota Cα Cγ Dδ Eβ Fα Fβ Kα Lβ Lε Lη Lκ Fζ Mπ Oγ Oζ Oι Oτ
         Oυ Pα Pβ Pμ Pν Pξ Pϱ Pω Qγ Qλ Rδ Sδ Tδ Wα Xδ; *corr. from* pone et nota Lγ; vero Mτ;
         add. cum incausto Dδ; *add.* et vero et Eσ; *add.* quod Mπ   Postea] et Bη Cζ₁ Cζ₂ Eμ Oη

3-6   lineam ... signorum] *ms* Xγ *damaged and unreadable*

[CHAPTER 28.] ON THE RISINGS OF THE SIGNS IN THE DIRECT CIRCLE [I.E. VIS-A-VIS THE
          EQUATORIAL CIRCLE]

However, if you wish to known the risings of the signs in the direct circle, place
the beginning of any sign on the meridian line, and note the place of the indicator- muri
on the rim. Afterwards

move rethe donec finis signi cadat super lineam meridiei, et gradus quibus movebitur
almuri erunt ascensiones eiusdem signi; et similiter facies ad quamlibet portionem
circuli signorum.

4   move] *om.* Vγ; pone Dδ; *corr. from* pone Fγ   rethe] recte Lκ Vγ Vϙ; retam Mι Nγ; rete
some   finis] ainis Eo   finis signi] *om.* Mτ   cadat] sit Bζ Bκ Cδ Cζ$_1$ Cζ$_2$ Eγ Eμ
Eo Lζ Mγ Mλ Oη Oϙ Oσ Oφ(*add. interlin.* al' cadat in linea) Pζ Pφ Qε Rε Sβ Sθ Sι Sλ Vα
Vβ(*add. interlin.* cadat) Vγ Vυ Wγ; sunt Mα   super] per Bβ Kθ(*add. interlin.* id est
super); supra Fγ Lκ; *add.* eandem Vo Wγ; *ms* Lκ *ends*   super lineam] in linea Lμ
      lineam] *om.* Eκ   meridiei] medii celi Fγ; meridiana *corr. to* meridie Lμ;
meridianam Cα Nα Pυ Zα; *add.* nam(*expunged*) Oυ; *add. interlin.* [meridi]anam Vβ
      gradus] *om.* Lμ; gradibus Bβ; gradum Pγ quibus] cuius Eυ; quilibet Pφ   quibus
movebitur] *rep.* Cη   movebitur] movebatur in margine Vo; moveantur Vμ; movetur
Eα Kδ Nα Nζ Qθ

4-5   gradus ... signi] interum locum almuri nota. Tunc gradus que sint inter illas duas notas
erunt ascensiones Wμ

5   almuri] *om.* Pι; *add.* in limbo Qμ; *add.* in margine Dδ Oφ(*interlin.*); *add.* :: gradus inter
fuerint almuri Oβ(*?*)   erunt] *rep.* Mλ; sunt Bδ   ascensiones] ascendentes Cα; *add.*
interlin. recte Vμ   eiusdem signi] *illeg.* Pω; *om.* Bδ Bε Cα Cγ Cε Cι Dη Eβ Eη Eμ Eσ
Fα Fβ Fε Fζ Kα Kδ Kε Lβ Lγ Lε Lζ Lη Lμ Mα Mδ Mη Mι Mπ Nδ Nε Oγ Oζ Oξ Oτ Pα Pβ
Pδ Pθ Pμ Pξ Pϙ Pσ Qγ Qθ Qλ Rδ Sδ Sκ Tδ Vψ Wα Xβ Xδ; *marg.* Oι; signorum in circulo
meridiano Dδ(*add. in marg. illeg.*); super rethis circulum Mυ Mφ Vι   signi] *om.* Bζ Bη
Eλ Eo   similiter] *rep.* Oβ   facies] *om.* Qγ; facias Nζ Vμ   quamlibet] *add.*
illeg. Mκ   portionem] *om.* Kα; partem Wγ; proportionem Bζ

5-6   ascensiones ... signorum] *om.* Sι

6   circuli] *om.* Qθ   signorum] *om.* Bγ Bζ Bη Bθ Bι Bκ Cδ Cζ$_1$ Cζ$_2$ Cη Dγ Eγ Eδ Eζ Eκ Eλ
Eo Eϙ Eτ Eυ Fβ Fγ Gα Kι Lγ Lλ Mγ Mκ Mμ Mν Nζ Oσ Mo Oη Oν Oϙ Pζ Pι Pκ Po Pτ Pυ
Pχ Qε Qμ Rα Rγ Sβ Sη Sθ Sλ Vα Vγ Vν Vπ Vσ Vυ Vφ Wβ Wι Wλ; *add.* etc. Qη Rδ; *add.*
^{va}ad quam habet portionem circuli signorum^{cat} Nε; *add.* Vel pones novellam super
utrumque arcus(*add.* dati Pυ). Et gradus limbi intercepti sunt eius ascensiones. Pυ Vβ(*add.*
in marg. Hic littera "Vel pones" et cetera est addita); *add.* Vel pone novellam(nolvellam
Rε) super utrumque terminum (fraicium*?* Sη) arcus dati et gradus limbi intercepti sunt
eius ascensiones Nα Qδ Rε Sη; *add.* 8 *lines* Cα

turn the rete until the end of the sign falls on the meridian line, and the degrees by which the indicator-muri will be moved will be the rising of the same sign; and you will do this similarly for any portion of the circle of signs.

[Comment:

Essentially this is about measuring the projection of a section of the ecliptic against the equatorial circle, or, for instance, how far has the sun moved vis-à-vis the equator when it has moved through a full sign along the ecliptic. In modern terms it would be the difference in right ascension between the beginning and end of that section/sign.

One places the beginning of the section/sign on the meridian circle, and notes the position along the rim where the indicator-muri at the beginning of Capricorn rests; then one rotates the rete until the end of the section/sign is over the meridian line. The amount that the indicator-muri moves along the rim will be the amount of ascension.]

[CAPITULUM 29.] DE ASCENSIONIBUS SIGNORUM IN CIRCULO OBLIQUO

Ascensiones autem signorum in qualibet regione sic poteris invenire: move

Cap. 29] *om.* Lι; *illeg.* Xγ; *two versions* Cζ₁ Cζ₂

1 De ... obliquo] *om.* Bγ Bδ Bε Bζ Bκ Cγ Cδ Cε Eα Eγ Eδ Eη Eλ Eκ Eυ Fε Gα Kε Kι Lζ Mα Mκ Mμ Mτ Nα Nζ Oσ Oυ Pγ Pι Pκ Pξ Pσ Pφ Pχ Qε Qη Sη Sθ Sι Sλ Tβ Vα Vη Vμ Vν Vo Vσ Vυ Vφ Wγ Wζ Wλ; *faded/illeg.* Eζ Eϱ Fγ; Ad idem in circulo obliquo Eo; Ad inveniendum ascensiones signorum in circulo obliquo Vξ; Ad inveniendum ascensiones signorum(singnorum Bβ) in qualibet regione Bβ Lμ Qθ; Ad inveniendum elevationes signorum in circulo obliquo Pδ; Ad sciendum ascensiones signorum in circulo obliquo Dη; Ad sciendum elevationes(elevacionem Vπ) signorum in circulo obliquo Bθ Pυ Vπ; Ascensiones signorum in qualibet regione Mπ Oη Vϱ; De ascensionibus regionum Pζ(*marg.*); 26 De ascensionibus signorum in qualibet regione Lλ; De ascensione signorum in qualibet regione Vγ; De ascensione signorum in qualibet regione in orizonte obliquo Cζ₁ Cζ₂; De ascensione signorum in circulo obliquo Eμ(*marg; add.* 28ᵘˢ); De eisdem in circulo obliquo Rγ; De eisdem in circulo obliquo inveniendis Mυ Vι; De eodem circulo obliquo Pτ; De eodem in circulo obliquo Eτ Wβ Wι; De eodem in circulo obliquo in qualibet regione Mγ; De ortu et occasu signorum in qualibet regione Mλ; Inventio ascensionum eorumdem in qualibet regione Bι(*add. in marg.* c. 25); C. 30. Inventio ascensionum in circulo obliquo Sβ(*marg.*); Inventio ascensionum signorum in circulo obliquo Dγ; Inventio earundem in(de Kθ) circulo obliquo Kθ Po Qμ Rα; *add. in marg.* Cap.ᵐ Lζ; *add. in marg.* 28 Pα; *add. in marg.* 30 Vμ; *add. in marg.* 31 Mκ Wα Pκ; *add. in marg.* Oϱ(C. 32) Qζ(32ᵘˢ) Sδ(c.32)   De] *add.* regionum Vβ   signorum] *om.* Oβ   obliquo] signorum Cα; *add.* Capitulum Nδ; *add.* et cetera/etc. Oβ Rδ

2 Ascensiones ... regione] *om.* Vγ   autem] *om.* Bζ Cα Eγ Eo Eσ Kε Kι Mγ Mλ Mτ Pφ Qζ Rγ Rε Sι Vν Wβ Wγ Wλ; *add.* et occasus Bθ Eυ Mκ Pδ Pι Vπ Vσ   signorum] *om.* Bε Bκ Dη Eη Kδ Kθ Rδ; *add.* a quantum movetur quodlibet signum in qua totum ascendat super orizon Dδ; *add.* et occasus eorundem Bζ Eλ Eo Fγ Gα Mγ Mλ Oφ(*marg.*) Pκ(eorum) Pτ Pχ(eorum) Qη Rε Vμ Vν Wζ Wλ; *add.* in circulo obliquo et Mη Zα; *add. interlin.* et occasus Vφ; *add. interlin.* id est in circulo obliquo Tβ   signorum in] in circulo obliquo Nε   regione] *add.* et occasu Kα; *add.* et occasu eorundem Kε Kι Mμ Mτ Nζ Oβ Qζ Vo; *add.* in circulo obliquo Fγ   sic] *om.* Kε Kι Mλ Qζ; si Pφ; signorum Mτ; *add.* eis Vγ   invenire] investigare Eϱ; *add.* pone initium signi super oriçonem, deinde Dγ Wγ; *add.* pone initium signi super primum almiᵃᵗʰ oriçontem, deinde in oriente Kι; *add.* pone initium signi super primum almicancrath(almiᵃᵗ Lμ Qζ Qθ; almuᵗʰ Qη)in oriente et Lμ Mτ Qζ Qη Qθ; *add. in marg.* al' littera sic hic: pone initium signi super primum almucantarat in oriente Oφ   move] abmove Fε; exne/eperne Oν

2-3 move ... signi] initio alicuius signi in orizonte in partem orentale et noto almuri move rethe Pι

[CHAPTER 29.] ON THE RISINGS OF THE SIGNS IN THE OBLIQUE CIRCLE [I.E., VIS-A-VIS THE HORIZON]

However, you will be able to find the rising of the signs for any region thus: move

rethe ab initio signi usque ad finem eiusdem, et gradus quibus movetur almuri in
margine erunt ascensiones signi in eadem regione; movebis enim signum in orizontis

3   rethe] rete *some*; regulam recte Cδ(*add. interlin.* vel rethe); retam Mι; *add.* in polo
         almucantharach quod idem est quod oriçon Rε   initio] *add.* illius Vo   signi]
         cuiusvis de duodecem signis Mι Nγ; signius Bθ; *add.* eius Vπ; *add.* illius Wζ; *add.* in oriz
         Nζ; *add.* istius Vμ; *add.* istius in orizontis linea Kε Kι Qζ; *add.* scilicet lineam orizontis Dδ;
         add. super lineam orizontis orientalis et primi almitatr' Oβ; *add.* super lineam orizontis
         vel primi alencabuth Qη; *add. in marg.* in orizonte Sκ   usque ad] *illeg.* Oσ; ad Bκ Cδ
         Cζ₁ Cζ₂ Dγ Eμ Eϱ Kε Kι Lζ Oϱ Pι Sι Sλ Vα; et Nζ; in Mα Oι Oφ Pζ Qζ Sθ Vγ; illius ad
         orizontem et Pκ Pχ; illius in orizontem et Mμ; illius in orizontis linea ad Mτ; usque Eκ;
         usque in Bε Bθ Cε Cι Dδ Eη Eλ Eσ Fβ Fε Kδ Lβ Lγ Lμ Mδ Mη Mι Mλ Mν Nγ Nε Oτ Ου
         Pα Pβ Pδ Pθ Pμ Pξ Po Pϱ Pσ Pτ Pυ Pω Qβ Qγ Qδ Qθ Rδ Sδ Sη Vι Vμ Vν Vξ Vπ Vσ Vφ
         Wα Wζ Wλ Xβ Xδ; ut in Bζ Mγ   usque ... eiusdem] in fine illius Lλ Qε Sβ
                 finem] lineam Bι(*add. in marg.* orizontis ex parte orientalis) Dγ; lineam orizontis ex
         parte orientalis Vϱ   eiusdem] eius Sθ; illius Mα Pζ Vγ; ipsius Eα Eγ Wγ; *add.* et
         finem motus almuri in limbo Dδ; *add.* et obliquum orizontem Vo; *add.* in orizonte Vμ; *add.*
         in orizonte parte *illeg.* Wζ; *add.* signi Eδ Pι; *add.* supra orizontem Nα; *add. interlin* al' illius
         Vβ   quibus] quilibet Lβ; quilibet *expunged* Fζ   quibus movetur] quos dist~ Pι
                 movetur] mo^t Pφ; motus Bκ Lζ; move Bθ; movebitur Bε Cα Cγ Cε Cι Dδ Eβ Eγ Eη
         Eϱ Fα Fβ Fγ Fζ Kα Lε Lη Lλ Mδ Mη Mι Mτ Mυ Nγ Nδ Nε Nζ Oγ Oζ Oν Oτ Ου Pβ Pδ Pζ
         Pμ Pϱ Pω Qγ Qε Qλ Sθ Tβ Vη Vψ Wα Wγ Xβ Zα; movebis *corr. to* movebitur Vβ;
         movebuntur Mν; movētur Kδ   almuri] scilicet almuri Fα(*marg.*); *add. interlin.* al'
         almucanta^{rat} Oφ   in] *om.* Bθ Vπ

3-4   usque ... signi] *marg.* Oι

4   margine] *interlin.* Wζ; marginem Mτ; ymagine Fγ   erunt] erit Pζ; *add.* asig Bθ
                 erunt ... regione] *marg.* Oφ   signi] *om.* Mγ; ipsius signi Eλ; muri Nα; signorum
         Bγ Cη Eκ Eτ Pγ Pτ Rγ Wι Wλ   eadem] *om.* Bη   movebis] movebitur Cε Dγ Pα
                 enim] *om.* Eα; autem Bβ Bδ Bε Bη Cα Cγ Cε Cζ₁ Cζ₂ Cι Dδ Dη Eβ Eη Eλ Eμ Eσ Fβ
         Fε Kα Kδ Lγ Lε Lμ Mδ Mη Mι Mπ Mφ Nδ Nε Oγ Oζ Oη Oξ Oτ Ου Pα Pγ Pδ Pθ Pμ Pν
         Pξ Pϱ Pσ Pω Qβ Qθ Qλ Sκ Tβ Tδ Vη Vι Vν Vo Vσ Wα Wμ Xβ Zα; cuīvis Bθ Eυ; etiam Eϱ;
         add. his Eλ   in₂] *om.* Eα Eγ; *add.* orizonte sive Fβ   in orizontis] *om.* Mυ
                 orizontis] *om.* Fγ; orientis Mo(*add. in marg.* al' orizontis); orisontis Bβ; oriçontis
         scilicet Eγ; orizonte scilicet in Cα; orizontem in Vν

4-5   movebis ... orientali] *om.* Gα Vφ   movebis ... ascensionem] *om.* Kε Kι Mμ Mτ Nζ Oβ
         Pι Pκ Pχ Qζ Qη Vμ

the rete from the beginning of the sign to the end of the same and the degrees by which the indicator-muri is moved along the rim will be the risings of the sign in the same region; for you will move the sign in

5   parte orientali, ut scias eius ascensionem. Ut autem scias eius moram in occasu, movebis illud in orizontis parte occidentali; ita etiam fiet in qualibet circuli portione.

          Gradibus etiam ascensionum divisis per 15, et residuo pro horis fractionibus

5   parte orientali] partem orientalem Bζ Pξ Pφ Vν; partis orientalis Rε   orientali] *om.* Vψ   ut₁] ac Mι Nγ; et Eη Eκ; hic Sη; ubi Pθ Rδ   ut scias₁] *rep.* Lλ; ut ascias Fγ; ut scies Cε   ascensionem] ascensiones Eμ Lλ Pγ Xβ: *add.* per motum almuri Qμ   Ut₂] *interlin.* Sκ; Si Gα; Uñ Cε   autem] *om.* Wβ   eius₂] *om.* Mμ Nζ Pκ Pχ Wζ; *add. and del.* ascensionem Wι   moram] moras Pκ Pχ Wγ; motum Nδ; motus Cγ; *rep.* Wβ   in occasu] *om.* Cα   occasu] occidente Bδ Bε Cγ Dδ Dη Eη Fζ Kα Kδ Lβ Lγ Lε Lη Lμ Mι Mυ Nγ Nδ Nε Nζ Oζ Oυ Pα Pκ Pμ Pν Pϱ Pσ Pχ Pω Qγ Rδ Tβ Vη Vψ Wζ Wμ Xβ Zα   movebis] move Vμ Vo; movebitur Cε Dη Mo Oν Pα; ponito Pι

5-6   orientali ... parte] o*m.* Eγ   ut₁ ... occidentali] *om.* Cι Dγ; Et in parte occidentali ut scias mor~a(?) in descendent~ Fγ

6   illud] *om.* Bδ Bε Cγ Cε Eα Eβ Eη Eσ Fα Fζ Kα Lβ Lγ Mδ Mι Mυ Nγ Nδ Nε Oζ Oτ Oυ Pα Pβ Pθ Pμ Pν Pξ Pϱ Pσ Pω Qβ Qγ Qθ Qλ Rδ Sδ Sκ Tβ Tδ Vη Vψ Wα Wμ Xβ Xδ Zα; *interlin.* Oι; illum Mα; initio signi Pι; signum Cα Dη; *add.* signum Sθ Vφ(*interlin.*)   illud in] *om.* Mη; illius Lμ; ipsis Fε   in ... occidentali] in occidente in parte orizontis oal' Cα; in orizontem partem occidentalem Nζ; parte orientis occidentalia Kδ   orizontis] *om.* Oυ; orientis Rδ; orisontis Bβ; orizonte versus Mτ; *add.* per Bζ; *add.* versus Kε Kι Qζ Qη   parte] *om.* Fε Lε; *add.* in Qμ   parte occidentali] partem occidentalem Bβ Bζ Oφ Vν; parte orientali Nε; *add.* et nōto almuri ut prius move rethe ad finem eiusdem signi Pι   etiam] *om.* Fγ Mo; autem Cι Vβ; ut Lβ   fiet] *om.* Nα; fac Mτ; facies Bθ Eυ(?) Fγ Mκ Vπ Vσ; fiat Mι Mμ Nγ Nζ Qη Vη Vμ Wζ   quilibet] gradibus Bζ; *add.* parte et Bκ; *add.* signi vel Oβ   circuli] orientali Cγ; signi Kε Kι Mμ Mτ Nζ Pκ Pχ Qζ Qη   circuli portione] *corr. in marg. from* precedente(?) signi Wζ   portione] *om.* Vψ; per portione Kα; proportione Bζ Cι Dγ Oϱ Qμ Rα Sλ Vσ; *add. in marg.* Nota: quilibet gradus valet 4ᵒʳ minuta et 15 gradus unum horam Tβ

7   Gradibus] In gradibus Kδ; Si grad[ibus] Kε Mτ Qζ; *corr. to* gradum Sκ; *add. in marg.* Hec littera "Gradibus" cum duobus capitulis imediate subsequentibus videlicet "Ut habeas noticiam stillarum" et cetera et "Scire volens gradum stelle" sunt addita Vβ   etiam] *om.* Eμ Kε Kθ Mτ Nζ Pκ Pχ Qζ Qη Rα; *interlin.* Wζ; autem Lζ; et Vπ   ascensionum] *om.* Cα; *interlin.* Eμ; ascendentibus Vo; ascensionis Mτ; divisionum Eα   divisis] diviseris Mτ; divisio Pγ; divisionis Pδ   15] *add.* apperent hore equales in quibus ascendit Fγ   residuo] residuas Pκ Pχ; residuum Mτ Vσ; *add.* hore Lε; *add.* quod remanet Tβ Vη; *add.* quod videmus(?) Zα   residuo ... horas] residuas partes hore Nζ Wζ   pro] *om.* Lε; partes Kκ Pχ; per Mη; quod Wλ   pro horis] post hore Dγ; pro unius hore Oβ Qη   horis] hore Bζ Bθ Fε Kδ Mτ Nδ Oτ Qδ Rγ; *add. interlin.* id est ascensionis Oγ   fractionibus] *illeg.* Kθ; ascensionibus Xβ; fractionem Mo; *add.* ob' Cε

7-8   residuo ... equales] residuum fiat pro fractionibus horarum Fγγ

7-10   Gradibus ... regione] *om.* Bη Bκ Cδ Cζ₁ Cζ₂ Eγ Lλ Mα Oη Oσ Qε Sθ Sι Sλ Vα Vυ Wγ; *marg.* Lζ; *top marg.* Sβ   per ... regione] *marg.* Eμ

the eastern part of the horizon, so that you know its rising. However, in order for you to know its delay in {time of} setting, you will move it to the western part of the horizon; also it will be done thus in whatever part of the circle.

As well if the degrees of the risings are divided by 15, and the residue reckoned as fractions of an hour,

computato, habebis horas equales; vel eis divisis per numerum graduum hore inequalis, patebit per quot horas naturales vel inequales cum fractionibus, quodlibet signum vel
10   planeta vel quelibet portio ascendat vel occidat in qualibet regione.

8   computato] *illeg.* Nα; *rep.* Mυ; computa Nζ; computatis Mλ   habebis … equales] *om.*
         Eo Mγ Vν   equales] *add.* et minuta hore Mλ Oφ(*interlin.*); *add.* per quod ascendit Zα
              vel] *om.* Pκ Pχ   vel … inequales] *rep.* Eη   eis] eas Mτ; eius Mγ Qη   per
         … gradum] *illeg.* Nα(*add.* id est)   hore] *add. interlin.* scilicet per 12 Wα   hore
         inequalis] *om.* Eυ; meridionales Bβ   inequalis] equalis Pγ; naturales Qη

8-9   computato … fractionibus] *om.* Pϱ

8-10   hore … regione] 12 patet per quot horas inequales ascendit et resdiuum fiat per suis
         fractionibus et sic patet per quot horis equalis ut inequalis ascendat vel occidat quodlibet
         signum vel quelibet portio signi Fγ

9   patebit] habebit Bζ; *corr. from illeg.* Oδ   patebit … inequales] *om.* Qη   quot] *om.*
         Fε Kα; quas Pγ; quod Bδ Bζ Eσ Lβ Mμ Mπ Nζ   horas … inequales] *illeg.* Nα
              naturales] *om.* Vμ; equales Bβ Kι   vel₁] *om.* Oφ Vμ; et Bζ Mν Oβ   vel
         inequales] *om.* Rγ Rε Sη; *interlin.* Vβ   inequales] equales Cγ Kε Pδ; innaturales Dη;
         meridionales Pκ Pχ Wζ   cum fractionibus] *om.* Mo; *add.* signorum Vϱ
              quodlibet] *lacuna* Vσ; quod Eυ; quotlibet Eη Mυ   signum] *om.* Vϱ

9-10   vel … regione] *cut off in marg., illeg.* Eμ

10   planeta] plura Mγ Nδ Nε Pυ Pω; *add.* quelibet Kα; *add. interlin.* scilicet signa Vβ
              planeta vel] *om.* Eσ   vel₁] aut Kε Kι Qη; et Kδ Rδ   vel quelibet] *om.* Fβ
              quelibet] que hoc *corr. in marg. to* quelibet Sκ; *add.* proportio~ Mυ   portio] *add.*
         circuli Vo   vel occidat] *om.* Vϱ   occidat] ascendat Pκ Pχ; descendat Rγ
              regione] *add.* etc. Fε Nε Rδ; *add.* Si autem scire volueris divide [*illeg.*] die per 12 Zα;
         add. in marg. hic deficiuntur 2 capitula Lζ;[1] *add. 8 lines* Cα

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you will have the equal hours; or if they [the degrees of the rising] are divided by the number of degrees of an unequal hour, it will show by how many natural or unequal hours with fractions, a given sign or planet or whatever portion [of the sky] rises or sets in whatever region.

[Comment:

To measure the rising (or setting) of a sign (or planet or any part of the sky) vis-à-vis the "oblique circle" (i.e., the horizon), set the beginning of the sign on the horizon (in the east) and note its position along the outer rim using the indicator-muri on the rete (at the beginning of Capricorn). Then move the rete so that the end of the sign, etc., crosses the horizon and then see how far the indicator-muri has moved along the rim. Do the same along the western horizon for the descent or setting of a sign.

To find the length of time for the rising or setting, divide the degrees of the point of rising by 15 to give the number of equal hours (and fraction thereof). Or divide the degree of the point of rising by the number of degrees in an unequal hour (for that day) to give the number of unequal hours (and fraction thereof).]

[CAPITULUM 30.] DE NOTICIA STELLARUM INCOGNITARUM POSITARUM IN ASTROLABIO

Ut habeatis noticiam stellarum incognitarum que posite sunt in astrolabio, sume

Cap. 30] *om.* Bη Cδ Cζ Eγ Eκ Lι Lλ Mα Oη Oσ Pζ Qε Sθ Sι Sλ Vα Vγ Vυ; *marg.* Eμ Lζ Sβ;

1   De ... astrolabio] *om.* Bγ Bδ Bε Bζ Bκ Cγ Cε Dδ Eα Eλ Eμ Eo Eυ Fε Gα Kε Kι Lζ Mκ Mμ Mo Mτ Nα Nζ Oβ Oι Oν Pγ Pι Pκ Pξ Pσ Pχ Pφ Qη Qθ Rγ Sη Tβ Vη Vμ Vν Vo Vσ Vφ Wζ Wλ Xγ; *faded/illeg.* Eδ Eζ Eϱ Fγ Sβ; Ad cognoscendum stellas descriptas in astrolabio Vξ; Ad cognoscendum stellas descriptas in instrumento Mγ; Ad cognoscendum stellas positas in astrolabio Pτ; Ad habendum noticiam stellarum incognitarum Lμ; Ad habendum noticiam stellarum incognitarum in astrolabio Mλ; Ad habendum noticiam stelle ignote in astrolabio posite Bι(*add. in marg.* c. 26); Cognitio stellarum ignotarum in astrolabio positarum Kθ Po Qμ; De cognitione stellarum incognitarum Qδ Zα; De cognitione stellarum incognitarum que sunt in astrolabio Kδ; De cognitione stellarum ignotarum Pυ Vπ(*add.* Rubrica); De cognicione stellarum positarum in astrolabio id est in celo Oγ; De inventione stellarum incognitarum in astrolabio Rε; De noticia habenda stellarum incognitarum Dη; De noticia stellarum Mπ; Inventio stellarum incognitarum in astrolabio Dγ Oφ Rα(*add.* positarum); Noticia stellarum incognitarum in astrolabio Wι; Noticia stellarum incognitarum in astrolabiis positarum Mυ; Noticia stellarum incognitarum per stellas notas in astrolabio Vϱ; Si vis agnoscere stelas ignotas positas in rethi Bβ; *add. in marg.* 31 Vμ; *add. in marg.* 32 Mκ Pκ Wα; *add. in marg.* 33 Oϱ(C. 33) Qζ(33ᵘˢ) Sδ(c. 33)   De] *om.* Eτ Vι Wβ Mν   noticia] cognitione Bθ Cι Mη Nε Pδ Pθ Rδ Vψ   positarum in astrolabio] *om.* Kα Xβ; Rubrica/Rx Bθ Nδ   astrolabio] abstrolabio Pα; stralabio Pβ; *add.* etc. Nε Rδ

2   Ut] Et Bθ Lβ Pξ; *add.* autem Mυ Mφ Vι   habeatis] habeas Bι Dγ Eo Lε Mλ Mτ Nα Nγ Oτ Oζ Pφ Rγ Rε Zα; hōas Vσ   noticiam] *om.* Mτ; *rep. in marg.* Fβ; cognitionem Rγ   stellarum] *om.* Nε; *add. and del.* fixarum Eα   incognitarum] inconitarum Dγ; ignotarum Nα; ignotarum fixarum Fγ; *add. in* qulibet regione Dδ   incognitarum que] *illeg.* Gα   que posite sunt] positarum Bε Bκ Lζ Wβ   astrolabio] abstrolabio Pα; asstrolapsu Mπ; stralabio Pβ

2-3   sume primo] post Pϱ

[CHAPTER 30.] ON KNOWLEDGE OF UNKNOWN STARS POSITIONED IN AN ASTROLABE

In order that you have knowledge of unknown stars which are positioned on an astrolabe, first take

primo altitudinem alicuius stelle note, et pone eam in almucantharat super similem
altitudinem. Postea vide stellam quam volueris scire, super quantam altitudinem iaceat

3   primo] prius Mτ Qθ Pξ   primo ... alicuius] *illeg.* Gα   altitudinem] latitudinem
         Rα   alicuius] *om.* Kδ Pξ Rδ Wλ; *add.* postea Qζ   stelle] *om.* Pτ; *add.* tibi Dδ Fγ Gα
         Vφ(*interlin.*); *add. interlin.* fixe Wζ   note] *om.* Mμ Nζ Pκ Pχ Vμ; *interlin.* Wζ; nocte
         Cγ; in nocte Pγ; *add.* scilicet altitudinem qua est notisima(?) Stellarum qui est in fine
         thanus(?) Zα; *add.* tibi Vσ; *add. interlin.* per altitudinem Oτ   note et pone] notate Pυ
               et] sed Eα   eam] illam stellam notam Cα   in] *om.* Cα; super Eμ
         almucantharat] *illeg.* Xγ; altitudine Eo; alencabuth Qη; aalmucantrach Sη; almi^at Qζ
         Wζ; almicancrath Mτ; almicant~ Vo; almicantarach Kδ; almicantarath Fγ Oϱ Rδ;
         almicantaratz Bκ; almicanteras Cα; almican^th Pσ; almicantharat Eδ Zα; almicantharath Bβ
         Po Tβ; almicantharatz Dη; almicantrat Kα Vη; almicantrath Vμ; almicat' Oβ; almichanch'
         Mγ; almit' Nζ; almit Mμ; almi^th Bε Kε; almi^ath Ki; almi^that Wλ; almu' Lμ; almuc' Mπ;
         almucanc' Eμ; almucancarach Mκ; almucant' Dδ Eβ Fα Lη Lμ Qθ; almucantar' Rγ;
         almucantarach Bδ Mν Xβ; almucantarat Lζ Vν; almucantarath Bθ Eα Eλ Lγ Mδ Oγ Oι Oν
         Oφ Pφ Pω Qμ Tδ Vβ Vϱ; almucantart Fε; almucanta^th Eζ; almucant'ath Oυ;
         almucanterath Nα; almucanth' Bι Mλ Nε Pγ Pδ Pθ Rα Sβ Vι Wμ; almucantha^at Pξ;
         almucanth^al Bζ; almucantharach Cι Eϱ Pϱ Rε; almucantharat Lβ Oζ Sκ; almucantharath
         Eυ Fβ Fζ Lε Mo Mυ Nδ Oξ Pα Pμ Pν Pτ Qβ Qγ Qλ Vξ Vπ Wβ; almucanth'ath Bγ Cη;
         almucanthdrath Mφ; almucantherat Pυ; almucantherath Qδ; almucantl'ath' Wι;
         almucatharath Sδ; almuch Kθ; almu^ch' Dγ; almucha Xδ; almuchantararath Vo Vψ;
         almuchanth Cε; almuchantharath Wα; almu^rath Eτ Pι; aluscantarath Pβ; almut' Eσ Pκ Pχ;
         almutantarat Vφ; almutanterach Mι Nγ; almuthant' Mη; almutrantac   similem] *om.*
         Eδ; consimilem Cα

3-7   in ... quam] *illeg.* Gα

4   altitudinem₁] gradum Pκ Pχ; *add. and del.* stelle note et pone Kδ   Postea] *om.* Mo
               Postea ... altitudinem₂] *om.* Nε Wβ   vide] sume Eα; videas Mτ   quam ...
         scire] de qua quere considera Cα   quam] quamcumque Pι; *add.* margine Pφ
               scire] *om.* Cγ Dδ Oβ; *illeg.* Pι; *add.* in astrolabio Kε(*interlin.*) Kι Mτ Qζ Qη
               super] *om.* Wα; per Eϱ Kα Kε Kι Mτ Nζ Pκ Pχ Qζ Qη Sβ Wζ   altitudinem₂]
         latitudinem Fζ Rα; partem Oϱ; *add.* q^c Eσ

the altitude of any known star, and place it among the almucantars on [one of] a similar altitude. After this examine the star which you wish to know, on which altitude

5   inter almucantharat, et in qua parte sit, scilicet, in oriente vel occidente; quo viso,

5   inter] *om.* Eo Eτ; in Eδ Mτ Qδ Vσ; super Bδ Cγ Cε Cι Eα Eβ Eη Fα Fβ Fε Kα Kδ Lβ Lε Lη
           Mδ Mη Mπ Nα Nδ Nε Nζ Oι Oϱ Oφ(*add. in marg.* al' inter) Pκ Pχ Qγ Qθ Qλ Rδ Sδ Sκ Oγ
           Oζ Pδ Oυ Pθ Pμ Pν Pφ Qβ Tβ Vη Vι Wα Wζ Wμ Xβ Xδ Zα; *add. interlin.* super Vβ
                  inter ... sit] *illeg.* Xγ   almucantharat] *illeg.* Oν; alencabuth Qη; alm Eμ; almi^at Kε
           Qζ Wζ; almi^ath Kι; almicancrath Mτ; almicant~ Vo; almicantarach Kδ; almicantarat Fγ Zα;
           almicantarat' Oϱ) almicantarath Rδ; almicantaraz Bκ; almicanteras Cα; almican^th Pσ;
           almicantharat Eδ; almicantharath Bβ Tβ; almicantharatz Dη; almicantrat Kα; almicantrath
           Vμ; almicat' Oβ; almichanch' Mγ; almit' Nζ; almi^t Mμ; almi^th Bε; almi^that Wλ; almit^th Vη;
           almu^ac Eo; almuc' Cε Mπ Oζ; almucan Dδ; almucancarach Mκ; almucandrath Mφ;
           almucanrath Bθ; almucant' Eβ Eσ Lη Lμ Qθ; almucantaharath *corr. to* almucantharath Eζ;
           almucantaht Lβ; almucantarach Bδ Mν Xβ; almucantarak Rγ; almucantarat Lζ Vν;
           almucantarath Eα Eη Eλ Fζ Lγ Mδ Nα Oγ Oι Pξ Pω Qγ Qδ Qλ Vβ; almucantart Fε;
           almucant'ath Oυ; almucanth' Bι Cι Mλ Pγ Pδ Pτ Rα Sβ Vϱ Wμ; almucantharach Eϱ Pϱ Rε;
           almucantharat Bζ Pυ; almucantharath Eυ Fβ Lε Mo Mυ Nδ Oξ Oτ Pα Pθ Pμ Pν Po Qβ Sδ
           Vπ Wβ; almucantha^t Tδ; almucanthāth Cη; almucanth'ath Bγ; almucantherath Oφ;
           almucanth't Vι Wι; almucātac Cγ; almuch Kθ; almu^ch' Dγ; almucha Xδ; almuchntarath Vψ
           Wα; almu^rath Eτ Pι Qμ Vξ Vσ; almuscantarath Pβ; almut' Mη Nε Pκ Pχ; almutantarat Vφ;
           almutanterach Mι Nγ; *add. and del.* super similem altitudinem Fγ   et] etiam Bκ Lζ
                  et ... scilicet] *add. 2 extraneous lines* Cα   sit] *om.* Bε; sunt Qδ; mundi(?) Eλ; *add.*
           sui Bθ   scilicet] *om.* Bδ Mτ Nε Qζ Vo; sive Dδ Fγ Kε Kι Mμ Mτ Nζ Pκ Pϱ Wζ; sive
           scilicet sit Mκ Vσ; sive sit Eo; vel Cγ; *add.* si Bβ Eδ Eζ Mν; *add.* sit Bθ; *add.* sive Bζ Bι Dγ
           Eυ Nα Pι Pτ Pυ Rα Sβ Vβ Vϱ   scilicet in oriente] *om.* Pχ   scilicet ... occidente]
           om. Eμ; sive scilicet sit in oriente Vπ   in₂] *om.* Bε Mμ Pϱ Vo   vel] sive Bι Kε Kι
           Lβ(*interlin.*) Vo; sive in Bζ Dδ Fγ Mμ Mτ Nα Nζ Pι Pκ Pτ Pχ Qζ Qη Rε Sη Vν Vϱ Vφ Wζ
           Xγ; *add.* in Bγ Cγ Eα Eo Eτ Eυ Lμ Mπ Mυ Mφ Nγ Oβ Oζ Pγ Pξ Po Pυ Qβ Sδ Tβ Vβ
                  vel occidente] *om.* Bθ Lζ   quo viso] qua visa Eη; quo facto Mτ

5-6   quo ... occidente] *om.* Eζ Eo

among the almucantars it lies and in what part it is, that is, in the east or in the west; having seen this

pone regulam in dorso astrolabii super eandem altitudinem, et verte illud astrolabium ad eandem plagam celi in qua accepisti stellam; et maior stella quam vides per foramina regule ipsa est quam queris.

6   regulam] eam Cη Eτ Pγ Wι; eam *del. and add. interlin.* regulam Bγ; rigulam Nγ   in] *om.* Kθ; *add.* eo Cγ   illud astrolabii] regulam Pκ Pχ; astrolabii] *om.* Dη; abstrolabii Pα; astralabii Pβ; suspenso astrolabio Vσ   astrolabii ... altitudinem] *illeg.* Xγ   super] *add.* latitudinem vel Oβ   super ... altitudinem] *om.* Bκ Dγ Eδ Eϱ Lζ Mν Po Qμ Rα Sβ; *marg.* Bι Vφ; super suam altitudinem Mλ(*marg.*)   super ... verte] *om.* Eζ   eandem] *om.* Pδ; iiiitam Bβ; illam Bδ Bε Cα Cγ Cε Dγ Eα Eβ Eη Eμ Eσ Fα Fβ Fε Fζ Kα Kδ Lβ(*add. interlin.* eodem) Lγ Lε Lη Lμ Mδ Mη Mι Mπ Mυ Mφ Nδ Oγ Oζ Oι Oξ Oϱ Oτ Oυ Pα Pβ Pθ Pμ Pν Pξ Pϱ Pφ Pω Qβ Qγ Qθ Rδ Sδ Sκ Tβ Tδ Vη Vι Vψ Wα Wμ Xβ Xδ Zα; similem Pι; suam Mλ; *add. interlin.* illam Vβ   et] *add.* suspenso astrolabio Bζ Bθ Eλ Eo Eυ Mγ Pτ Rε Vν Vπ Wλ Xγ; *add.* [*illeg.*] fixa Pι   et verte] et non verte Pν Xδ; et sivõ Mι Nγ; verteque Bκ Lζ   verte] *marg.* Pι; suspenso Mκ   verte illud] verte regulam et verte regulam Kε   illud] *om.* Bε Cα Vη Wμ Zα; id Rγ; idem Pγ; ipsam Fγ; regulam Kι Mμ Nζ Oβ Qζ Qη Vμ Vo Wζ   astrolabium] *om.* Bγ Bζ Bθ Bι Bκ Cη Dγ Dδ Eδ Eζ Eλ Eμ Eo Eϱ Eτ Eυ Gα Kε Kθ Kι Lζ Mλ Mμ Mν Mo Nα Nζ Oβ Oν Pγ Pι Po Pτ Pυ Qδ Qζ Qη Rα Rγ Sβ Sη Vμ Vν Vξ Vπ Vϱ Vo Wβ Wζ Wλ; *interlin.* Vβ; abstrolabium Pα; astrolabium Pβ; suspenso astrolabio Fγ; *add. illeg.* Mκ

7   ad] per Mτ; super Qη   eandem] *add.* partem Mυ; *add.* regionem Eσ   plagam] per longam Mτ   celi] *om.* Eμ Fε Mι   qua] quo Pφ; *add.* parte Vπ   accepisti ... stella] *illeg.* Xγ   stellam] altitudinem stelle Pϱ; *add.* et almucantarath Eλ; *add.* ignotam Kε Kι Mμ Mτ Nζ Oβ Pκ Pχ Qζ Qη Vμ Vo Wζ; *add.* inter almucantharach Rε; *add.* quam queris Pι; *add.* in qu~ [*illeg.*] est astrolabio Zα   et] *add.* etiam Fβ   maior stella] *illeg.* Cα;maiorem stellam Kι Mτ Qζ Qη   vides] videbis Rγ

8   regule] *om.* Bζ Cγ Vσ; rigule Nγ; tabule in regula Rγ; *interlin.* Kε (*add. and del.* vides)   ipsa] *om.* Pδ; enim Vo; illa Cγ Dη Eα Eσ Fα Fβ Fε Fζ Kα Lε Lβ Lη Mδ Mπ Mυ Mφ Nδ Oζ Oι Oξ Oϱ Oτ Oφ Pα Pβ Pμ Pν Pξ Pϱ Pσ Pω Qγ Qθ Qλ Sδ Tδ Vη Wα Wμ Xβ Xδ Zα; illa stella Pφ Qβ; ille Bδ Dδ Eβ Eη Oυ Vβ; stelle Mη   ipsa est] *om.* Nε; *interlin.* Qμ; est illa est illa Lγ; *add.* illa Vo; *add.* stella Bζ   ipsa ... queris] est illa quesita Oγ   quam] qua Eσ   queris] *add.* etc. Rδ; *add.* [*illeg.*] fit per solem ad eius ortum et occasum Cα

place the rule/alidade on the back of the astrolabe on the same altitude, and turn this astrolabe to the same area of the sky in which you have observed the star; and the larger star which you see through the pin-holes of the rule is the very one you seek.

[Comment:

  If you find a star engraved on the rete of an astrolabe which you do not recognize, observe in the sky the altitude a star you do know. Plot this star on the rete (it may already be there) along the almucantar of the appropriate altitude. Then compare the unknown star with this, as to its altitude and whether it is east or west of the known star.

  Setting the alidade on the back of the astrolabe to the altitude of the unknown star, look through the pin-holes at the part of the sky that it should be in (i.e., east or west of your known star), and the largest star you then see through the pin-holes (at that altitude and in that region) will be the unidentified star in the rete. (By examining the constellation in the sky in which the unidentified star is found, you should be able to figure out which star it is.)]

[CAPITULUM 31.] DE COGNITIONE STELLARUM INCOGNITARUM NON POSITARUM IN
  ASTROLABIO

Scire volens gradum stelle ignote in astrolabio non posite vel planete, expecta

Cap. 31] *om.* Bη Cδ Cζ Eγ Lι Lλ Mα Oη Oσ Pζ Qε Sθ Sι Sλ Vα Vγ Vυ; *marg.* Eμ Lζ Sβ

1   cognitione] noticia Cη Eη Mδ Mo Qβ   positarum] *om.* Pι

1-2   De ... astrolabio] *om*: Bγ Bδ Bε Bζ Bκ Cγ Cε Dδ Dη Eα Eκ Eλ Eμ Eo Eσ Eυ Fε Gα Kε Kι Lζ
         Mι Mκ Mμ Mτ Nα Nγ Nζ Oβ Oν Pγ Pι Pκ Pξ Pσ Pχ Pφ Qη Rγ Sη Tβ Vη Vμ Vν Vσ Vφ
         Wζ Wλ Xγ; *faded/illeg.* Eδ Eζ Eϱ Fγ; *Ad cognoscendum stellas non descriptis in astrolabii*
         Vξ; *Ad habendum gradum stelle ignote in astrolabio non posite* Mλ; *Ad inveniendum
         gradum stelle ignote* Qθ; *Ad noscendum stellas non descriptis in instrumento* Mγ; *De
         cognitione stellarum fixarum in quo gradu non positarum in astrolabio* Cα ; *De
         cognitione stellarum incognitarum non*(interlin. Lε) *positarum in astrolabio* Fβ Fζ Lβ Lγ
         Lε Lη Mφ Oγ Oζ Oξ Pβ(astralabio); *De cognoscendum gradum stelle non descripte in
         astrolabio* Pτ; *De gradu stelle ignote* Mπ; *De gradu stelle in astrolabio non posite* Eτ
         Mν(*add. illeg./faded*) Rε Wβ; *De gradu stelle in astrolabiis non posite vel de cognitione
         stellarum incognitarum non positarum in astrolabio* Mυ Vι; *De gradu stelle posite in
         astrolabio* Wι; *De inveniendum gradum stelle ignote in astrolabio non positione* Lμ; *De
         noticia gradus stelle incognite habenda* Xβ; *De stellis ingnotis cognoscendis* Bθ Pυ
         Vπ(*add*. Rubrica); *De vero motu stellarum* Zα; *Inventio gradus stelle in astrolabio non
         posite* Dγ Oφ Rα Sβ(*marg.; add*. Cᵒ 31); *Inventio stelle ignote in astrolabio non posite*
         Bι(*add. in marg.* c 28); *Noticia gradus stelle vel planete ignoti* Vϱ; *Scientia stellarum
         ignotarum in astrolabio non positarum* Kθ Q; *Si vis scire gradum stelle in astrolabio non
         posito* Bβ; *add. in marg.* 32 Vμ; *add. in marg.* 33 Mκ Pχ Wα; *add. in marg.* 34 Oϱ(C. 34)
         Qδ(34ᵘˢ) Sδ(c. 34)   incognitarum] *add.* sed Pω

2   astrolabio] abstrolabio Pα; rethi Nε; *add.* etc. Rδ

3   Scire volens] Et si scire velles Bκ; Scire volueris Qδ; Si desidere volens Cα; Si forci(?) scire
         volueris Pϱ; Si scire velis Lε; Si scire vis Kε Kι Mτ Qζ; Si scire volens Eδ Eζ Pκ Po Pχ; Si
         scire volueris Mι Nγ Qη Tδ Wβ; Si vero vis scire Dη; Si vis scire Eκ Fε; Si volueris Mμ; Si
         volueris scire Nζ Vμ Wζ   Scire ... gradum] *om.* Bι   gradum] *om.* Bζ; gradus Pκ
         Pχ; grande Bθ   ignote] *om.* Eσ; insignite Pφ; *add. interlin.* vel incognite Vβ   in]
         per Cε   astrolabio] abstrolabio Pα; astralabio Pβ   non] *om.* Eo; *rep.* Vη; ut. Pφ
             posite] imposite Oγ   planete] plure Nε   expecta] *interlin.* Oφ; del. Xβ;
         especta Bζ; expectabis Pϱ; exspecta *many*

[CHAPTER 31.] ON KNOWLEDGE OF UNKNOWN STARS NOT POSITIONED IN AN ASTROLABE

When wishing to know the degree of an unknown star or planet not positioned in an astrolabe, wait

donec ille planeta vel stella sit in meridie. Deinde visa aliqua stella cuius locum pro

5　　certo scias et astrolabio insignita, secundum eius altitudinem rethe dispone, ponendo

4　　　　donec] *add.* in rethi Nε　　　donec ... vel] *illeg.* Xγ　　　ille] *om.* Dη Eυ Nζ; illa[1] *many;*
　　　　ista Kε Kι Wζ; iste Bδ Gα Nα Pτ　　　planeta vel] *om.* Bζ Eo Mγ Pκ Pχ; plure vel Nε
　　　　vel] *om.* Dγ Mλ; in Pγ　　　vel stella₁] *om.* Pα; *interlin.* Pσ; vel ista stella Nζ
　　　　sit] fuerit Lμ Oφ Qθ; sint Vσ　　　sit ... stellam] *interlin.* Oφ　　　in meridie] *om.*
　　　　Pμ　　　meridie] oriente vel meridie Eα; *add.* in altitudine maiori Dδ; *add. interlin.* id est
　　　　in linea meridiana Tβ　　　Deinde] de illis Bβ; *add. interlin.* videndo per foramina Vξ
　　　　aliqua] *om.* Eo Qδ; *corr. from* aliquam Sκ; alia Bκ　　　stella₂] *marg.* Rα; *add.* in
　　　　astrolabio inscripta Nζ Pκ Pχ Wζ; *add.* quam vides Cι　　　cuius] eius Bβ

4-5　　pro certo] certe Pκ Pχ

5　　　　scias] scio Eσ; scis Nζ　　　scias ... insignita] *illeg.* Xγ　　　et] in Bδ Bε Bκ Cα Cγ Eβ Eη
　　　　Eλ Eμ Eσ Fα Fγ Fε Lβ Lε Lζ Mδ Mτ Mυ Mφ Nα Oζ Oϱ Pβ Pμ Pϱ Pσ Qβ Qλ Sκ Vι Vξ Vϱ
　　　　Vψ Wα Wβ Xβ Xδ Zα; que in Lζ; *add.* in Oτ　　　et ... insignita] *om.* Nζ Pκ Pχ Wζ
　　　　astrolabio] abstrolabio Pα; stralabio Pβ　　　insignita] *om.* Fγ Wμ; *illeg.* Gα Xγ;
　　　　infigura *corr. in marg. to* insignita Oξ; inscripta Kε Kι Mμ Mτ Nζ Qζ Qη; inscriptum Vμ;
　　　　insignit~ Eo; insignita *corr. to* signᵃta Bθ; insignite Bζ Bι Cα Cε Cη Dγ Eδ Eζ Eκ Eμ Eϱ Eσ
　　　　Eτ Eυ Mγ Mη Mλ Mν Nε Oβ Oυ Pγ Po Pτ Pυ Qμ Rα Sβ Vν Vϱ Vφ Wβ Wι; insignite *del.*
　　　　and add. interlin. signata Bγ; insignito Cι Mo Pι; insignitum Vξ(*corr. to* insignite?) signat~
　　　　Dη; signata Nα Rε Vπ; signate Bβ Bκ Eλ Kθ Lζ　　　altitudinem] *corr. to* latitudinem Vβ;
　　　　latitudinem Mμ Wλ(*add.* fac)　　　eius] *om.* Dγ Eλ Lγ Mπ Mτ Nα Oζ Oξ Pδ Pι
　　　　rethe] *om.* Vη; recte Bζ; rete *some*　　　dispone] disposite *corr. to* dispone Oι; *add.*
　　　　rethe Bζ; *add.* scilicet Pι　　　dispone ponendo] disponendo Xβ　　　ponendo]
　　　　movendo Wμ; pone Kα Lγ

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[1] *Planeta, -ae* is masculine in classical Latin but medieval scribes sometimes treated it as feminine because it is a first declension substantive. As well, if *stella* and *planeta* are reversed, *illa* would modify *stella*.

until this planet or star is on the meridian. Then observe some star whose position you know for certain and has been marked on the astrolabe, set in the rete according to its altitude, placing

stellam inter almucantharat super similem altitudinem; et in directo gradus signorum

6   stellam inter] *om.* Mτ   inter] *om.* Pν Pω Vη Xδ; et super Mη; in des inter super Cε;
         super Bδ Cγ Cι Dδ Dη Eη Fα Fε Kδ Lβ Lγ Lη Mι Mυ Nα Oζ Oϱ Oτ Oφ(*add. interlin* al'
         inter) Pβ Pδ Pθ Pμ Pξ Pϱ Pσ Pφ Qβ Qγ Qδ Qθ Rδ Sδ Sη Tβ Tδ Vι Vψ Wα Wβ Wμ Xβ Zα;
         super id est inter Kα; *add. interlin.* super Vβ; *ms* Rγ *ends*   inter … similem] *illeg.* Xγ
              almucantharat] *om.* Pω; *illeg.* Gα Mκ; alcantharath Eζ Po; alencabuth Qη; almi^at Kε
         Kι Qζ Wζ; almicanch' Mγ; almicantarach Kδ; almicantarat Zα; almicantarath Fγ Oϱ Rδ;
         almicantaraz Bκ; almicanteras Cα; almican^th Pσ; almicantharath Tβ; almicantharatz Dη;
         almicantha'th Bβ; almicantrath Mτ Vμ; almi^rat Eα; almit' Nζ Oβ; almi^t Mμ; almi^th Vη;
         almi^that Wλ; almu^ath Qμ; almuc' Cε Dδ Mπ; almucancarach Sη; almucancth' Eυ; almucant'
         Eβ Lβ Lη Lμ Oζ Pθ Qθ; almucantarach Bδ Mν Xβ; almucantarat Eκ Lζ Vν; almucantarath
         Bι Bθ Eα Eη Eλ Fζ Mδ Nα Oγ Oι Pφ Vβ Vϱ Vψ; almucantart Fε; almucanth' Cι Fα Mλ Pγ
         Pδ Pτ Rα Sβ Wμ; almucantharach Eϱ Pϱ Rε; almucantharat Bζ Pυ Sκ; almucantharath Bγ
         Eυ Fβ Lε Mo Mυ Nδ Oξ Oτ Oυ Pα Pμ Pν Qβ Qλ Sδ Vπ Wβ; almucantha^th Tδ;
         almucanthath Eτ; almucanthdrath Mφ; almucantherath Oφ; almucanthrath Oν;
         almucanth't Vι Wι; almucantrat Kα; almuch Kθ Nε; almu^chʼ Dγ; almucha Xδ;
         almuchantarath Qδ Vσ; almuchanthath Wα; almuchanthāth Cη; almu^rath Pι Qγ Vξ;
         almuscantarath Pβ; almut' Eσ Pκ Pχ; almutantarat Vφ; almutanterach Mι Nγ;
         almutantNh' Mη; almu^th Bε; almuth^ar Eo; almutra^at Pξ; almutrātac Cγ   super] *add.*
         interlin. suam Wζ   in] *om.* Cη Eκ Wι; *interlin.* Bγ Sκ   in directo] edirecto Eτ; sā
         directo illius Cα   gradus] *rep.* Mμ; gradu Bθ Nζ Pκ Pχ Wζ   signorum] *om.*
         Kε(*add. in marg.* signorum et gradus); signi Rε; *add.* et gradus Kι Mτ Oβ Qζ Qη
              similem] consimilem Vμ; *add.* suam Pι

the star among the almucantars on a similar altitude; and in line with the degree of the signs

qui erit in linea medii celi erit stella de qua dubitas, et est longitudo eius nota; latitudo

7   qui] et Pξ   qui erit] *del. and add. interlin.* extītis Bγ   erit₁] est Dη Kα Tβ Wβ
         linea] *om.* Bζ; libra Bβ; signo Mμ   linea medii] medio Eμ   medii celi] *om.*
Wμ   celi] *om.* Eκ   erit₂] *om.* Nε   stella] gradus stelle Kθ Mυ Mφ Vι   de
... eius] *illeg.* Xγ   qua] *om.* Cε   dubitas] dubitabas Bβ Cγ   et] *add.* etiam Fγ
         est] *om.* Mτ Oβ Vβ; erit Pι Oφ sic erit Dη Rε   longitudo] altitudo Pω; *add.* celi
Bζ   eius] *om.* Bε Dδ Eη Kα Lμ Mυ Mφ Nε Oγ Oτ Pα Pι Qθ Qμ Vι   eius nota]
om. Bβ; *add. 2 lines* Eϙ   eius ... latitudo] *om.* Eζ Vσ   nota] sic nota Vμ; *add.* qui est
in medio celi Fγ; *add.* qui tunc est in linea medii celi Wλ; *add.* ut supra Pι; *add.* Scito enim
gradum signi₁ nota₁ est₁ eius₁ distancia₁ a primo signi₂. Si autem est₂ eius₂ longitudo₁
nota₂ erit₁ eius₃ distancia₂ a primo puncto Arietis erit₄ nota₃ secundum hec est₃ longitudo₂
Gα Kι Mμ Oβ Pι Pκ Pχ Qζ Qη Vμ Vφ Wζ
         nota₁] non Pι   nota₁ ... distancia₁] *illeg.* Gα   distancia₁] *add. interlin.* id est
         longitudo Kι   signi₂] *add.* Arietis Qη   signi₂ ... primo] *om.* Pι   Si]
         Hoc Vφ   Si ... secundum] *om.* Nζ   Si ... est₃] Arietis. Si hec distancia Oβ
         autem] vero Vμ   nota₂ erit eius] *illeg.* Gα   erit₁] *om.* Qη; est etiam
         Vφ; et Kι Qζ   eius₃] *add.* longitudo sive Vμ   distancia₂] *add.* et nota Qη;
         add. nota Kι Pκ Pχ Qζ   puncto] Gα Vμ; *om.* Pκ Pχ Wζ   erit₄] *om.* Gα Mμ
         Qζ Qη   erit₄ ... secunda] *om.* Vφ   erit₄ ... est] quia hec eius Pι; sive a
         primo puncto eius et Pκ Wζ(eius] *interlin.*); sive a primo puncto Pχ   nota₃]
         om. Mμ Qζ Qη   est₃] om. Oβ; *add.* eius Vφ   est₃ longitudo] *illeg.* Gα
                 longitudo₂] distancia Kι Oβ Qζ Qη
latitudo] *om.* Kα; *marg.* Kι; hoc Nζ; illa latitudo Vξ; longitudo Oβ(*add.* id est latitudo) Qζ
Qη(*add.* scilicet latitudo); *add.* appellatur Gα Kι Mμ Nζ Oβ Pι Pκ Pχ Qζ Qη Wζ; *add. and
del.* appellatur Vφ; *add.* autem Bε Tβ Vη Zα; *add.* eius Eλ Eμ Fε Mμ Nζ Oβ Pκ Pχ Qζ Qη
Tβ Vη Vμ Wζ Zα; *add.* hic / hoc Mμ Nζ Pκ Pχ Qζ Wζ; *add.* hoc modo Vμ; *add.* nota Mδ
Nδ; *add.* vero Mo

7-8   et ... equinoctialem] *om.* Cα

which will be in the line of the middle of the sky will be the star about which you have doubts, and its longitude is marked; its latitude

patet, computatis almucantharat a nota illius altitudinis usque ad equinoctialem. Potes

8   computatis] computando Fε Lβ Mγ Nγ Nε O γ Oϱ Oυ Pδ Pϱ Qβ Qγ Wβ; computaris Mγ;
        quare computando Fγ   almucantharat] *illeg.* Eβ Xγ; alencabuth Qη; almi^{at} Wζ; almi^{ath}
        Kι; almicantarach Kδ; almicantarath Fγ Oϱ Rδ Zα; almicanth Pσ; almicanthar′ Dη;
        almicantharath Bβ Tβ; almicantrath Gα Vμ; almic^{at} Qζ; almichanch′ Mγ; almi^{rat} Eδ; almit′
        Nζ; almi^t Bκ; almith Bε Vη; almi^{that} Wλ; almi$^{tt~}$ Mμ; almuc′ Cε Dδ Lμ Mη Mπ Nε;
        almucan^{ath} Pξ; almucancarach Sη; almucancarath Mκ; almucant′ Eκ Eμ Fα Lη Oζ Pθ;
        almucan^{tam} Dγ; almucantarach Xβ; almucantarat Vν; almucantarath Bθ Bι Eλ Fζ Lγ Mδ
        Nα Oγ Oι Oξ Oτ Pφ Pω Qδ Vβ Vϱ Vψ; almucantarh^a Eη; almucantart Fε; almucant′at Qθ;
        almucanth′ Cι Lβ Mλ Pγ Pδ Pτ Rα Sβ Wμ; almucantharach Eϱ Pϱ Rε; almucantharat Bζ
        Pυ Qγ Sκ; almucantharath Eζ Eτ Eυ Fβ Lε Mo Mυ Nδ Oν Pα Qλ Sδ Pμ Pν Qβ Tδ Vξ Vπ
        Wβ; almucanth′ath Bγ Cη; almucanthdrath Mφ; almucanth′t Wι; almucanth′th Vι;
        almuch Bδ Kθ; almucha Xδ; almuchantarath Oυ; almuchantharat Vφ; almuchantharath
        Wα; almu^{rath} Pι Qμ Vσ; almurath Mν Po; almuscantrach Pβ; almut′ Eσ Lζ Oβ; almut~ Nζ
        Pκ Pχ; almutanterach Mι Nγ; almuth Oφ; almuth Eα; almuth^{ar} Eo; almutrātac Cγ   a]
        quod Oβ   a ... illius] *illeg.* Gα   nota] *add. interlin* al′ numero Vβ   illius] *om.*
        Pι; alius Wβ; eius Mμ; ista Qη; istius Kι Nζ; istius stelle Oβ; similitudinis Eo Mγ Vν; *add.*
        est almucntharach a nota illius Pϱ   altitudinis] *illeg.* Qζ; latitudinis Lμ Mμ Mν Pω Rα
        Xδ; *add.* scilicet(?) stelle incognite Zα   usque ad] ad Fε Mι; *add.* eius Pκ Pχ
            equinoctialem] *add.* Scito enim occasu solis et$_1$ quantus fuerit per nadir vel almuri
        oportet videre super quam altitudinem cadet in almicantharat stella$_1$ rethis. Deinde
        sumpta simili altitudine in dorso per regulam stella$_2$ maior et$_2$ notabilior quam ibidem
        per foramina regule tue videris erit nota Eϱ Gα Kι Mμ Nζ Oβ Pι Pκ Pχ Qζ Qη Vμ Vφ Wζ
            enim] *om.* Nζ   solis] *illeg.* Gα   nadir] nadyr Pι Qη Vφ   vel] et Nζ
            Vφ   almuri] *add.* si Eϱ Vφ   oportet] si oportet Gα Pι; *add.* te Vμ
            videre] vide Vφ   videre super] *illeg.* Gα   almicantharat] alen^{buth};
            Qη; almi^{at} Qζ Wζ; almi^{ath} Kι; almicantarach Nζ; almicantrath Vμ; almi^{rath} Gα;
            almit~ Oβ; almi$^{tt~}$ Mμ; almucantharach Eϱ; almut~ Pκ Pχ; almutantarat Vφ almuth
            Pι   stella$_1$] *twice* Gα   rethis] *illeg.* Gα   sumpta] *om.* Pχ   simili]
            om. Qη   altitudine] *om.* Oβ   dorso] *add.* astrolabii Kι Vμ   stella$_2$]
            illeg. Gα   et$_2$] vel Gζ Pιι   notabilior] minor Pι; nota minor Pκ Pχ Wζ
            ibidem] idem Gα Kι Pι Qζ Qη; vides Oβ   per] *add.* ambo Pι
            foramina] *add.* duo Gα Kι Oβ Qζ   regule] duarum pinarum Pι; duo
            pinule Eϱ   regule ... nota] *illeg.* Gα   tue] *om.* Eϱ Kι Oβ Pι Qζ; *add.* duo
            punctorum Vφ; *add.* secunda Qη   videris] vides Nζ Pκ Pχ
        Potes] Nota et Potes Vφ; Postea Fβ; Poteris Kε Mτ; Similiter potes Mμ Mυ Mφ Vι

8-9   computatis ... etiam] *om.* Kα   ad ... occasum] *illeg.* Xγ   Potes etiam] Sic etiam
        poteris Gα Kι Mμ Nζ Oβ Pκ Pχ Qζ Qη Vμ Wζ

is obvious, the almucantars having been counted from the mark of this altitude unto the celestial equator. As well you can

etiam per occasum solis rethe disponere, si nullam stellam cognoveris. Et sic cognosces

10   omnes stellas.

9   etiam] *om.* Kε Lβ Oβ Qζ   per] *om.* Pϱ; *add. and del.* ortum Fγ   occasum] locum
        Eα; occasionem Dγ   solis] *add.* per Lβ   rethe] *om.* Nα; recte Bζ; recthe Vϱ; rete
        some; add. tuum Bβ Bγ Bδ Bζ Bη Cδ Cε Cζ Cη Eβ Eγ Eδ Eκ Eλ Eo Eτ Fβ Fγ Lε Lκ Oυ Vξ
        Wι Wλ   disponere] deponere Eυ; disponeas Oγ   si nullam] per simillam Vϱ;
        sed nullam Vσ   nullam] *om.* Dδ   stellam] *om.* Bζ Eλ Mμ Nζ Pκ Pχ Vμ Vσ
            cognoveris] noveris Gα; *add.* tu Sη   et sic] et^c Eυ Kε Oβ Pκ Pχ Vη Zα   sic]
        om. Vμ; si Vψ; *add.* quoque Bζ   cognosces] *add.* tu Vβ

10   omnes] *om.* Mπ; inemēē Nα   stellas] *om.* Bε; *add.* etc. Rδ; *add.* fixas et alias item Bκ;
        add. ideo(?) et c. Nε; *add.* in rethe positas Bβ; *add.* scilicet accipiendo altitudinem alicuius
        stelle note Tβ Vη; *add. 2.5 lines* Zα

place [it] on the rete by the setting of the sun, if you know no star. And so you will know all the stars.

[Comment:

If you find a star which you do not recognize and is not engraved on the rete of an astrolabe, observe its altitude in the sky when it is on the meridian line. Then having observed at that same time some star which you do know (and is engraved on the astrolabe) set the rete so that this known star is on its appropriate almucantar. Then the unknown star will be on the centre-line of the astrolabe, and you can read its "longitude"[2] along the ecliptic where the ecliptic crosses the centre line. Its latitude is found by counting the almucantars from the equatorial circle up to the altitude observed.

If there is no star visible that you know, you can set it on the rete using the point where the sun sets that day.]

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[2] This actually is mediation, the point on the ecliptic which crosses the meridian at the same time as the star.

[CAPITULUM 32.] AD SCIENDUM IN QUO GRADU SIGNI LUNA SIT

Cum in quo gradu signi luna sit scire volueris, altitudinem lune considera; et

Cap. 32] *om.* Lι; *two versions* Cζ₁ Cζ₂

1   Ad ... sit] *om.* Bγ Bδ Bε Bζ Bκ Cα Cγ Cδ Cε Dδ Eα Eγ Eκ Eλ Eo Eσ Eυ Fε Gα Kε Kι Mα
         Mκ Mμ Mτ Nα Nζ Oν Oσ Oυ Pγ Pδ Pι Pκ Pξ Pσ Pφ Pχ Qε Qζ Qη Sη Sθ Sι Sλ Tβ Vα Vη
         Vμ Vν Vσ Vυ Vφ Wγ Wζ Wλ Xγ; *faded/illeg.* Eδ Eζ Eϱ Fγ; Ad habendam lunam in quo
         signi Vξ; Ad inveniendum gradum signi in quo est luna Qθ; Ad inveniendum in quo
         gradu sit luna Vι Wι; Ad sciendum locum lune Dη; De gradu lune et planitarum Bη(*add.*
         in marg. 29) Cζ₁ Cζ₂ Eμ(*add. in marg.* 30 ᵘˢ) Oη Pζ(*marg.*); De(27. De Lγ) gradu lune et
         planitarum in signis Lλ Vγ; De loco lune inveniendo, Rx Qδ; De loco lune vel cuiusvis
         planete Zα; In quo gradu lune sit luna Mν; In quo gradu signi sit luna vel planeta Mγ Pτ;
         In quo signo sit luna Mπ; Inveniendo in quo gradu signi sit luna Eτ; Inventio gradus lune
         Vϱ; Inventio gradus signi lune vel alicuius planite Dγ Oφ Rα Sβ(*marg.; add.* c. 33);
         Qualiter inveniatur in quo gradu signi luna sit Pϱ; Regula ad sciendum in quo gradu
         signi sit luna Bι; Si scire volueris in quo gradu singni(*!*) sit luna Bβ;*add. in marg.* Hec
         regula subponit quod nulla sit latitudo lune quod raro est. Vel in directo eius erit gradus
         eius per circulum denotatus transiens per polos orbis signorum Vβ; *add. in marg.* Nota: 1ᵉ
         canon est verus qū planeta fuerit in linea ecliptica Tβ; *add. in marg.* 33 Vμ; *add. in marg.* 34
         Mκ Pκ Wα; *add. in marg.* 35 Oϱ(C.35) Qζ(35ᵘˢ) Sδ(Cᵒ 35)   Ad] *om.* Mλ
                  sciendum] inveniendum Lμ Wβ   signi] *om.* Bθ   luna] *om.* Fζ   sit] *om.*
         Pϱ; *add.* Capulum Nδ; *add.* Rubrica/Rx Cη Mo PμVβ Vπ

2   Cum] Si Cα; *add.* autem Bκ; *add.* igitur Oφ   Cum ... scire] Gradus signi in quo sit
         luna si invenire Fε   in] *om.* Nε   gradu signi] signo Wγ   signi] *om.* Mμ Nζ
         Oβ Pκ Pσ Pχ Qε Wζ; *interlin.* Lζ   signi ... sit] fuerit sic luna Wβ   luna] alius
         planeta luna Vβ; stella Cη; *add.* vel planeta Tβ   sit] *add.* vel planeata Vη; *add.* vel
         planeta Zα   volueris] desiderans Qθ; desideras Bκ Dδ Eκ Eτ Lζ Lμ   altitudinem]
         altitudines Bζ   lune] *om.* Dδ Eγ; *corr. interlin from* linee Sκ   considera] *om.* Lβ;
         accipe Cα   et] *add.* pone Mα Qη

2-3   et ... in₁] in parte Pϱ   et ... parte] et eam in almucath in parte in qua fuerit nota.
         Utramque altitudinem accipe, scilicet lune, alicuius stelle in nocte eodem hora Sκ(*marg;*
         later hand)

[CHAPTER 32.] TO KNOW IN WHICH DEGREE OF A SIGN THE MOON IS

When you wish to know in which degree of a sign the moon is, determine the altitude of the moon; and

eam in almucantharat in parte in qua fuerit nota. Deinde stellam aliquam in rethi
constitutam super altitudinem suam in eadem hora cum altitudine lune acceptam, in

3   almucantharat] *illeg*. Eγ Xγ; alencabuth Qη; almi^at Kε Kι Qζ Wζ; almicancrath Mτ;
almican^rat Bκ; almicant′ Eσ; almicantrach Kδ; almicantarat Zα; almicantarath Bβ Fγ Rδ;
almicantaraz Cδ Oη; almicanteris Cα; almican^th Pσ; almicanthar′ Dη; almicantharath Tβ;
almicantrath Vμ; almichanch′ Mγ; almi^rat Eδ; almi^rath Gα; almit′ Nζ Oβ; almi^th Bε Vη;
almi^that Wλ; almi^tt Mμ; almuc′ Cε Mπ Nε Pθ; almucan^at Bη; almucan^ath Pξ; almucancarach
Sη; almucant′ Fα Lμ Oζ; almucantarat Cζ_2 Oϱ Pζ; almucantarath Bθ Bι Fζ Lγ Lλ Mδ Mκ
Nα Oγ Oι Oν Oτ Pφ Pω Qδ Qγ Sβ Vα Vβ Vν Vϱ Vψ Wγ Xβ; almucantaraz Cζ_1 Oσ;
almucantart Fε; almucan^th Dγ Oφ; almucanth′ Eβ Eη Lβ Lη Mλ Pγ Pδ Pτ Rα Wβ Wμ;
almucantharach Eϱ Pϱ Rε; almucantharat Wι; almucanth′arat Bζ; almucantharath Eτ Eυ
Fβ Lε Mo Mυ Nδ Oξ Oυ Pα Pμ Pν Po Pυ Qβ Qλ Sδ Tδ Vπ; almucantharaz Eμ Mα;
almucanthat Cι; almucanth′ath Bγ Cη; almucanthdrath Mφ; almucanth′th Vι; almucantrat
Kα; almucarat Qε; almucata′t Eκ; almuch Kθ; almu^ch Bδ; almuchacarath Xδ;
almuchantharat Wα; almuch^at Eo; almuc^raz Lζ; almu^rath Pι Vξ Vσ; almuscantarach Pβ;
almut~ Pκ Pχ; almu^t Dδ Mη; almutantarach Sι; almutantarat Vφ; almutantarath Mν;
almutantaraz Vυ; almutanterach Mι Nγ; almuth Eα; almutrātac Cγ   in_2] *om*. Fε Wγ
       in parte] *om*. Eη Oγ Oτ Pϱ; *marg*. Pι   in_3] *om*. Oη Oϱ Pζ Sβ Sλ Vα Vγ Vξ Xδ; de
Mπ   fuerit] sint / fuit Oυ Pμ; sit Bε Pϱ; *add*. luna Cα; *add*. Si fuerit in parte occidentali
vel orientali Sι   nota] *om*. Bζ   Deinde] *rep*. Vυ; *add*. capias altitudinem Cα
       stellam] *om*. Bβ; *add*. fixam Cα   aliquam] *illeg*. Oξ; aliam Eσ Vα; alteram Vυ
       in_4] *om*. Bη Bκ Cγ Cζ_2 Eγ Eμ Fε   rethi] recte Vα; rete *some*; rethe Bκ Cα Nγ Oφ
Pν Pτ Sι; rethe in rethi Oυ

3-5   nota ... fuerit] *om*. Pγ

4   constitutam] constatutam Eσ; statuatur Cε; statuta Nγ; statutam Bδ Cι Dη Eα Eβ Eη Fα Fε
Fζ Kα Kδ Lβ Lγ Lε Lη Lμ Mδ Mη Mι Mπ Mυ Mφ Nδ Oγ Oζ Oι Oσ Oτ Pβ Pδ Pθ Pμ Pν
Pξ Pϱ Pσ Qβ Qγ Qθ Qλ Rδ Sδ Sκ Tβ Tδ Vη Vι Vψ Wα Xβ Xδ Zα; centrum illius stelle in
almicanters Cα   super] si vero Oϱ; *add*. similem Pι   altitudinem] *om*. Pκ Pχ;
altitudines Bζ; *ms* Wα *inserts a list (fol. 90v) of latitudes and longitudes of various cities*
       suum ... altitudine] *rep*. Eλ   in ... hora] ei Bθ   hora] *om*. Mν Vπ; *interlin*.
Mκ   cum] *interlin*. Vπ   cum ... lune] *om*. Cα   suum] *add*. *interlin*. id est stelle
Vβ   lune] *om*. Rδ; linee Oβ   acceptam] accepta Bζ Cζ_1 Cζ_2 Dη Eλ Eμ Eo Kι Lλ
Mτ Nγ Oη Vγ; acceptum Rα; *add*. in qua accipebatur altitudo sume Cα

mark it in the almucantars in the part in which it is [i.e., east or west]. Then place some star in the rete located on its altitude measured in the same hour as the altitude of the moon [was measured], in

5 parte qua fuerit, pone; et gradus circuli zodiaci qui ceciderit inter almucantharat super notam altitudinis lune, erit gradus lune. Si autem apparuerit in die, idem facies cum

5 parte] *add.* in Bβ Bζ Cα Dδ Eσ Fγ Fζ Gα Kα Mo Nα Nζ Oφ(*interlin*) Pδ Pι Pκ Pχ Qη Sη Tβ Vμ Vϱ Vψ Zα   qua] *om.* Lγ; in qua Mμ   fuerit] *add.* illa stella Pφ Oφ Wγ; *add.* parte Vψ   pone] nota Dη   et] duos Nα; tunc Cα; *corr. from* in Sκ   et ... almucantharat] *om.* Bβ   gradus] signum gradum Qζ   circuli] *om.* Cα Cγ Dη Mμ Nζ Pκ Pχ Qη Vμ   zodiaci] *om.* Eγ; çodiaci Nγ; çodici Bδ; zodyaci Fβ Pκ Vη Wι qui] et Pξ; que qui Pθ   ceciderit] fuerit et ceciderit Mδ Nδ; occidit Mτ inter] in Bδ Bε Bκ Cδ Cε Cζ₁ Cι Eβ Fε Fζ Lβ Lε Lλ Mδ Mι Mμ Mπ Mτ Nδ Nε Oγ Oϱ Oφ Pδ Pκ Pμ Pν Pϱ Pσ Pφ Pχ Qε Qθ Rδ Sη Sκ Vη Vμ Vυ Wγ Wζ Xβ; in altitudine Fβ; super Dη   almucantharat] *illeg.* Xγ; alencabuth Qη; almi^{at} Kε Kι Qζ Wζ; almicancrath Mτ; almicantarach Kδ; almicantarat Zα; almicantarath Fγ Rδ; almicantaraz Cδ Oη; almicanteras Cα; almicantharath Tβ; almicantrath Vμ; almichanch' Mγ; almi^{rat} Eδ Gα; almi^{raz} Bκ; almit' Nζ; almi^{t} Mμ; almi^{th} Bε Pσ Vη; almi^{that} W; almu^{ath} Qμ; almuc' Cι Mπ Mη Nε; almucancarach Sη; almucant' Fα Lμ Oζ Pθ Qθ; almucantarach Xβ; almucantararat Pζ; almucantarat Oϱ Qε Sθ Sλ; almucantarath Bθ Eλ Eυ Fζ Lγ Lλ Mδ Mκ Nα Nδ Oγ Oι Oυ Pα Pφ Pω Qγ Qδ Sβ Vα Vβ Vν Vψ Wγ; almucantaraz Cζ₁ Cζ₂ Oσ; almucantart Fε; almucant'at Eκ; almucanth' Bι Dγ Eβ Lη Mλ Pγ Pδ Pτ Rα Vι Vϱ Wμ; almucanthar' Dη; almucantharach Eϱ Pϱ Rε; almucantharat Bζ Mα Sκ; almucantharath Bγ Cη Eη Fβ Lε Mo Mυ Oξ Oτ Oυ Pμ Pν Qβ Qλ Sδ Tδ Vπ Wβ; almucantharaz Eμ; almucanthdrath Mφ; almucantherat Pυ; almucantherath Oφ; almucanth't Wι; almucantrat Kα; almuc^{at} Bη; almu^{cat} Eγ; almuch Kθ; almuc^{h} Bδ; almucha Xδ; almucrū Cε; almuitantarach Sι; almuka^{ath} Pξ; almu^{rath} Eζ Eτ Mν Pι Po Vξ Vσ; almuscantarach Pβ; almut'Eσ Pκ Pχ; almu^{t} Dδ Oβ; almutantarat Vφ; almutanterach Mι Nγ; almutanteraz Vυ; almuth Eα; almuth^{ac} Eo; almutrātac Cγ; altm̄chanthat Wα   super] *rep.* Qδ

6 notam] *om.* Bγ Cη Eκ Eτ Pγ Wι   altitudinis] altitudinem Cη Eκ Kι; altitudinem *corr. in marg. to* notam altitudinis Bγ; latitudinis Oη Rα   lune₁] *om.* Xγ; linee Mτ; *corr. from* nota Kε; *add.* note Oβ; *add.* sol Cζ   erit] eritque Cι; erunt Wγ; est Mτ; et Kα Pγ erit ... lune₂] *om.* Pκ Pχ Qβ Wλ; *marg.* Pθ; sol Cζ₁ Cζ₂   lune₂] *om.* Bζ Bι Dγ Eδ Eζ Eo Eϱ Gα Mγ Mν Mo Nα Qμ Rα Vν Vϱ; *interlin.* Qδ; eius Bη Bθ Cγ Cδ Eγ Eλ Eμ Eυ Fγ Lζ(*add. interlin.* lune) Lλ Mα Mκ(*interlin.*) Ov Oϱ Oσ(*add. interlin.* scilicet lune) Oφ Pζ Pι Pφ Qε Rε Sθ Sι Sλ Vα Vβ Vγ Vπ Vσ Vυ Wγ; eius scilicet lune Bκ; solis Oη; *add. in marg.* Si luna non habeat latitudinem Bγ   autem] *om.* Sι; *add.* luna Cα; *add. interlin.* scilicet luna Vβ   apparuerit] opparuit Cη; pervenit Nζ; *add.* luna Sι   in die idem] idem in die Sι; in dictonem Nα   idem] *om.* Eo; illud Dη   facies] fac Mτ Qζ; facias Lμ Nζ Vμ   cum] *om.* Nζ

6-7 cum altitudine] *om.* Pσ Qθ

the part which it is; and the degree of the circle of the zodiac which falls between the almucantars on the mark of the altitude of the moon will be the degree of the moon. If however it appears in the daytime, you will do the same with

altitudine illius et altitudine solis. Considera igitur cuius signi sit gradus. Idem[1] poteris quoque eodem modo planetarum loca investigare, si eorum altitudinem in nocte poteris notare.

7   illius] *illeg.* Gα; eius Pι Sθ Zα; eius in die Dη; ipsius Mμ Nζ Oβ Pκ Pχ Vμ Wζ Wλ; istius
         Kε Qη; *add.* lune Pδ; *add. interlin.* scilicet lune Vβ   illius et altitudine] *om.* Kα Mτ
              illius ... solis] solis et lune Rε   illius ... idem] *marg.* Qδ   et] *add.* cum Eλ
         et altitudine₂] *rep.* Pι   altitudine₂] altitudinem Mτ; altitudinis Rδ; *corr. from*
         latitudine Sθ   solis] *om.* Wλ   Considera ... gradus] *om.* Cα Pι   igitur] *om.* Bη
         Cγ Eγ Wγ; ergo *few*   cuius signi] *interlin.* Vφ; cum Fε   signi] *om.* Mι Nγ; *add.*
         idem Dδ   sit] *add.* ille Bε   sit ... idem] sic idem gradus. Vσ Vυ; sit idem gradus
         Bθ Bκ Eτ Eυ Lζ Mκ   gradus] *om* Wγ; *add.* iste(*om.* Mμ; eius Oβ) et habebis quod
         queris per Kε Kι Mμ Nζ Oβ Pκ Pχ Qζ Vμ(*om.* per) Wζ; *add.* sit iste et habebis quod queris
         per Mτ   Idem] *om.* Bε Cα Cδ Cζ₁ Cζ₂ Dδ Dη Kδ Lη Oη Pβ Pι Vα Vγ Vξ; *erased* Bγ;
         iste et habebis quod queris per illud Qη; *add.* gradus etiam Fγ   poteris] *add.* idem Vϱ

7-8   poteris quoque] poterisque Fγ

8   quoque] *om.* Kδ Kε Kι Oγ Pκ Pφ Pχ Qζ Qη Wζ; et Wβ; -que Dδ Pβ; etiam Cα Mβ Nζ Vμ;
         add. in Lλ Qγ Vγ   quoque ... modo] *om.* Mτ   eodem modo] eodem mē modo
         Mη; modo Bε; per idem Bι Vϱ; *add. interlin.* aliarum Bγ Cα   planetarum] pl'a Dγ;
         pluarum Nε   loca] *om.* Eλ; locum Mα   investigare] *marg.* Sβ   si] *om.* Nε; sic
         Mo   si eorum] et Bζ; eorum Eo; si earum *some*; si hororum Wβ   altitudinem]
         altitudines Lλ Mα Sθ Sλ Vμ; *add.* eorum Eλ   in] etiam. Bζ   in nocte] *om.* Eυ Sι
         Vπ Vσ   poteris] *add.* invenire vel Kε Kι Mτ Qζ

8-9   poteris notare] *om.* Mκ

9   notare] invenire Cα Pσ; *add.* sequitur Bβ; *add.* [*illeg.*] hec regula non est omnis vera
         quando scilicet luna habet latitudinem ad eclipta Dδ

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[1] Scribes are undecided as to whether *idem* begins the next sentence or finishes the proceeding one; sense can be made for either reading. But *idem* beginning a sentence is more normal than ending one.

its altitude and the altitude of the sun. Therefore consider of which sign is the degree. Likewise you will also be able to discover in the same way the location of the planets, if you will be able to measure their altitude at night.

[Comment:

      In order to determine in which degree in which sign the moon (or a planet) is, measure the altitude of the moon and at the same time the altitude of a nearby star (a star which is engraved or marked on the rete of the astrolabe). Then set the rete by positioning the star on the appropriate almucantar (either to the east or the west according to the observation), and then read on the ecliptic the sign and degree where the ecliptic crosses the almucantar of the moon. Again choose the sign according to whether the moon is to the east or to the west. This will be the position of the moon vis-à-vis the ecliptic.]

[CAPITULUM 33.] DE LOCO LUNE INVENIENDO

Cum in quo gradu signi sit luna scire desideras, quot dies habeat mensis lunaris

Cap. 33] *om.* Kι Lζ Lι Oν Pι Sλ Wλ; *in bottom marg. with insertion mark* Kε; *two versions*: Cζ₁ Cζ₂ Oφ₁
Oφ₂ Vφ₁ Vφ₂(*bottom marg.*)

1   De ... inveniendo] *om.* Bγ Bδ Bε Bζ Bκ Cα Cγ Cδ Cε Dδ Dη Eα Eγ Eκ Eλ Eo Eσ Eυ Fε Gα
         Kε Lζ Lη Mα Mκ Mμ Mτ Pγ Nα Nζ Oβ Oσ Pκ Pν Pξ Pσ Pτ Pφ Pχ Qε Qη Sη Sθ Sι Tβ Vα
         Vη Vμ Vν Vσ Vυ Vφ₁ Wγ Wζ Wλ Xγ; *faded* Eδ Eϱ Fγ; Ad inveniendum in quo signo
         sit(*add.* sol Eζ) luna Eζ Kθ Po Qμ Vξ; Ad sciendum in quo gradus signi sit luna Lε Tδ; Ad
         sciendum in quo signo sit luna Rε Vγ; Alia regula in quo signo sit luna Bι(*add. in marg.* C.
         34); Cum vis scire in quo sing(= signo) sit luna Bβ; 31. Cum volueris scire in quo signo sit
         luna Lλ; De gradu signi lune Zα; De eodem loco lune inveniendo Vπ; De eodem scilicet
         loco lune inveniendo Pυ; De(Cap. 40 De Sβ) inventione loci lune per etatem eius Dγ Rα
         Sβ(*marg., later hand*); De loco lune per regulam compt~ Mλ; De notiticia in quo gradu sit
         luna Oφ₁; De signis lune Pζ(*marg., later hand*); Eodem loco inveniendo lune Bθ; In quo
         signo sit luna Mγ; In quo signo sit luna per computationem Bη(*add. in marg.* 34) Cζ₁ Cζ₂
         Eμ(*marg.; add.* 34ᵘˢ); Inventio loci lune per eius etatem Oφ₂; Item aliter de eadem de loco
         lune inveniendo Mυ Vι(de de); Item aliter in quo gradu signi sit luna Mν Vβ; Item aliter
         potes invenire in quo Wι; Item de eadem alio modo Vβ; Item de eodem Lμ Qθ; Item de
         loco lune habendo. Rubrica Mo; Modus sciendi in quo signo est luna Vϱ; Qualiter
         inveniatur locus lune Pϱ; Ut aliter in quo gradu signi sit luna Eτ;*add. in marg.* Istud
         capitulum est super additum "Cum in quo signo sit luna" et cetera cum duobus capitulis
         immediate sequentibus videlicet "Loca planetarum" et cetera et "Scire volens" et cetera
         Vβ; *add. in marg.* 34 Vμ; *add. in marg.* 35 Mκ Pκ; *add. in marg.* 36 Oϱ(C. 36) Qζ(36us) Sδ(Cᵒ
         36)   De] *add.* eodem scilicet Pδ   lune] *add.* computa Xβ   inveniendo] *add.*
         Capitulum Cη; *add.* etc. Rδ; *add.* Rubrica Nδ

2   Cum] Item cum Dη; Si Fγ Vσ; Quando Vμ   Cum ... luna] Gradus signi in quo sit
         luna si Fε   Cum ... desideras] Cum(*add.* vero Bκ) volueris scire in quo signo sit(fuit
         Sι *marg.*) luna Bζ Bκ Lζ Mα Mγ Oσ Oφ₂ Pζ Pφ Qε Sι Vν Vυ Vφ₂; Et vis scire in signo sit
         luna Vπ; Scito Vγ; Si ergo(*om.* Bθ) vis scire in quo signo sit luna Bθ Eυ; Vel sicut Cα
                 in] *om.* Mτ   quo] *om.* Pμ; quod Pξ; quot Vα   gradu signi] gradu Bγ(*add.*
         interlin. signo vel) Bη Cγ Cε Cη Dη Eτ Nδ; sic Gα; signi Bε Bη Cγ; signo Bβ Bι Cζ₁ Cζ₂ Eγ
         Eδ Eζ Eλ Eμ Eϱ Lλ Mκ Mμ Mν Mo Nζ Oβ Pκ Po Pτ Pυ Pχ Qη Rα Rε Sβ Sθ Vα Vβ(*add.*
         interlin al' gradu signi) Vμ Vσ Vφ₁ Wγ Wλ Xγ; *add. interlin.* s͞p͞p̄ 2ᵐ meᵐ motum Tβ
                 luna] *add.* aliter Bε   scire] *add.* cum Gα   desideras] optam Pϱ; vis/volueris
         Bη Cγ Cδ Cζ₁ Cζ₂ Eγ Eλ Eμ Eo Eτ Fγ Kα Kθ Lε Lλ Mκ Mλ Nζ Oη Oϱ Pτ Rε Sβ Sθ Tδ Vα
         Vσ Wγ Wλ Xγ Xδ   quot] quod Bδ Eδ Eϱ Gα Kα Lβ Mν Qη   habeat] habet Mτ;
         add. in marg. id est quot sit dies ano|vilaᵒ Bη   mensis] *om.* Sθ   lunaris] *om.*
         Bγ(*add. interlin.* luna); inter didane inter quos et pontem diem sumarum Kα

2-6   Cum ... gradus] *om.* Pν

[CHAPTER 33.] ON FINDING THE LOCATION OF THE MOON

When you wish to find in which degree of a sign the moon is, consider how many days of the lunar month it has [i.e., has passed]

in eadem die considera; quibus duplicatis, quod collectum fuerit distribue dando

3   in] *om.* Vυ; et Mτ; *add. interlin.* luna Bγ   in ... die] *om.* Bθ Eυ Mκ Pκ Pχ Vπ Vσ Wζ; et
         de eisdem diebus Nζ; id est que sit etas lune Vμ   eadem] ea Mλ Oϱ Oσ Pφ Sθ Vα Vυ
             eadem die] illa Mγ   considera] *om.* Cγ Vγ; *marg.* Sβ; scias Pβ; scito Bζ Bκ Cδ
         Cζ₁ Cζ₂ Eγ Eλ Eμ Lζ Lλ Mα Mγ Mλ Oϱ Oσ Pζ Pφ Qε Rε Sθ Sι Vα Vν Vυ Wγ; vide Pϱ;
         add. et duplica Vβ; *add.* et mūāndo a sig^ti post 9īrtom Zα   quibus] *om.* Nζ; diebus Kε;
         et eiusdem diebus Pκ Pχ Vμ Wζ; quicque Sθ; *add.* diebus Gα Sι   quibus duplicatis]
         duplicatis diebus adde 5 et Mμ Qζ Qη; multiplicatis diebus adde 5 et Mτ   duplicatis]
         considera Eδ; divide Tβ; duplicate Vμ; duplicatum Nγ; multiplicatis Vυ; *add.* adde Oη
         Qδ; *add.* adde id est Eσ; *add.* adde(addito Oβ) 5/quinque/ᴠ et Bζ Bη Bθ Bι Cα Cγ Cδ Cζ₁
         Cζ₂ Dγ Eγ Eλ Eμ Eo Eϱ Eυ Fγ Gα Kε Lλ Mα Mγ Mκ Nζ Oβ Oι(*marg.*) Oϱ Oσ Oφ₁ Oφ₂ Pκ
         Pτ Pζ Pφ Pχ Pω Qε Rα Rε Sβ Sθ Sι Vα Vβ(*interlin*) Vγ Vμ Vν(quintam) Vπ Vσ Vυ Vφ₂
         Wγ Wζ Wι Wλ Xβ Xγ; *add.* adde 20 Vφ₁; *add.* ei Bκ; *add. interlin* al' duplatis Vβ
             quod] *om.* Mι Nγ; quot Eυ   quod ... distribue] *om.* Fε   distribue] adde
         signis Vφ₂; descripte Nδ; divide Zα; *add.* et divide per quinque Oβ; *add.* id est divide per
         5 Dη; *add.* per 5/quinque Bβ Bγ Cη Eδ Eζ Eτ Fγ Kθ Mμ Mν Nα Oγ Pγ Po Qμ(*interlin.*) Vμ
         Vξ Wβ; *add.* per 5 scilicet Eσ; *add.* per [*erasure*] 5 Eκ; *add.* per 5 scilicet dando et cetera
         divide per 5 dando cuicumque signo unum quintam Fβ; *add.* signis Bη Bθ Bι Bκ Cα Cγ
         Cδ Cζ₂ Dγ Eγ Eλ Eμ Eϱ Eυ Gα Kε Lζ Mα Mγ Mκ Mλ Mτ Oη Oι Oϱ Oσ Oφ₁(*interlin.*) Oφ₂
         Pζ Pφ Qε Qζ Qη Qμ Rα(*marg.*) Rε Sβ Sθ Sι Vα Vγ Vν Vπ Vϱ Vσ Vυ Vφ₁ Wγ; *add.* singulis
         Eo; *add. in marg.* Etatem linie dupla super addito quinque eru'que dabis signo quo lune
         capit o'igo ac reliquis finis numerus dat h^c tibi Tβ   distribue dando] distribuendo Pτ
             dando] *om.* Cδ Mν; singularis Bζ; *add.* uni Gα

3-4   quod ... signo₁] adde Kα   quod ... 5] *marg.* Cζ₂   dando ... signo] per Nζ Pκ Pχ;
         divide(*interlin.*) per Wζ   dando ... incipias] *illeg.* Xγ

[up to] the day in question; after doubling this, divide up what has been calculated by giving

cuilibet signo 5. Et incipias a signo in quo fuerit sol, et ubi finierit numerus in eodem

5   signo est luna. Et si remanserit unum infra 5, iam perambulavit luna 6 gradus; et si 2

4   cuilibet] cuique Bζ Bη Dγ Eκ Eλ Eμ Eo Eϱ Gα Lλ Lμ Mα Mγ Mλ Mo Nα Oη Oσ Oφ₂ Pζ
Po Pσ Pυ Pφ Qδ Qθ Rα Rε Sη Sθ Sι Vα Vγ Vι Vν Vυ Vφ₁ Wι Wλ; unicui[*illeg.*] Rδ;
unicuique Bε Cα Cδ Cε Dδ Eα Eβ Eη Eσ Fα Fβ Fγ Fε Fζ Kδ Kε Lβ Lγ Lε Lη Mδ Mη Mμ
Mφ Nγ Nδ Nε Oβ Oζ Oξ Oτ Oυ Oφ₁ Pα Pβ Pδ Pθ Pμ Pξ Pϱ Pω Qβ Qζ Qη Qλ Sβ Sδ Sκ
Tβ Tδ Vβ Vη Vμ Vφ₂ Wα Wμ Xβ Xδ Zα; unum Bδ   signo₁] *om.* Bζ Bη Bθ Bι Cγ Cδ
Cζ₁ Cζ₂ Dγ Eγ Eλ Eμ Eo Eϱ Eυ Gα Kε Lζ Lλ Mα Mγ Mκ Mλ Mμ Mτ Oη Oϱ Oσ Oφ₂ Qη
Pζ Pτ Pφ Qζ Rα Sβ Sθ Sι Vγ Vν Vπ Vϱ Vσ Vυ Vφ₁ Vφ₂ Wγ; gradu Vη; signorum Fε Nα
Sη   5] *om.* Dγ Mν Pτ Sθ Wλ; 5ᵃᵐ Dη; quinque *some*; v Qε Qθ; *add.* dies Kδ Pθ Rδ; *add.*
gradus Vξ Zα; *add.* scilicet quintam Oβ   5 ... signo₂] *om.* Xδ   incipias] incipiendo
Cγ Eγ Qμ Wγ; incipies Bι Cα Cζ₁ Cζ₂ Mλ Oη; invenies Mτ   signo₂] gradu signi Kδ
Rδ; signis Bι; *add.* et gradu Vγ   in₁] illius Lμ   in quo] et quo Qζ; ubi Vξ
     fuerit] fuit Wγ   sol] *om.* Lζ; coniuncta soli Wγ; coniuncta solis Cγ; in tempere
coniunctionis Dη Fγ(*om.* in); scilicet qūīctia vide tῆ prius Bκ; solis Qδ(*add. in marg.*
coniuncta); *add.* ipse commentione Zα; *add.* ipse commentive et a gradu illius signi Kα;
add. quando fuit in coniunctione cum luna Rε   et₂] in quo Sη   ubi] *add.* sit sol
cumquo gradu Bκ   finierit] finieritur Bκ; finietur Bζ Mλ Sι; finitur Nζ; fuerit Nδ
     numerus] *add.* graduum Kδ   eodem] iitar(?) Oβ; illos Fγ

4-5   in₂ ... signo] *rep.* Vχ; ibi Vφ₂

5   signo] *om.* Dδ Vσ; grad~ Rδ; loco Gα Kε Qζ Qη; *add. interlin* id est in signo sequenti Pα;
add. sequenti Oβ   est] erit Mμ Nζ Pκ Pχ Qε Sβ Sθ Wγ   est luna] *om.* Rδ
     luna₁] sol luna Eμ; *add.* in eodem gradu Kδ   Et ... luna₂]*om.* Vμ   si] *rep.* Rδ
     unum]¹ *om.* Bθ Eυ Vπ Vϱ; *interlin.* Mκ; 1 *some*; id est Bγ Cη Eγ Eδ Eζ Eλ Eτ Pγ;
unius dies Kδ Rδ; *add.* dies Pθ   infra] in Wγ; super Bβ Vβ(*add. interlin* infra); ultᵃ Fε
Mι Nγ   5] *om.* Bη; quinque *some*; v Qε Qθ Sθ; ·i· Cε; 51 Pξ; *add.* si unum Bθ Vπ; *add.*
interlin. id est, ipsi(?) quintas post signum Pα   iam] cum Mτ; illam Kα
     perambulavit] perambulat Bβ; *corr. from* perambulat Sκ   luna₂] *om.* Vγ; *add.* per
Mυ Xδ   6] sex *some*; VI Qε Sβ; 5 Mδ Nδ   gradus] *add.* illius signi Pϱ; *add.* illius
signi in quo est Cα; *add.* de signo quod non complete pertransunt luna Kε Mτ Qζ; *add.*
sequitur Bβ   si₂] *om.* Bζ Nα Qη; *add.* perambulavit Eλ; *add.* vero Fγ   2] 2° / duo
many; c2o(!) Vσ; remanserit Qη; vero Sθ; *add.* est Sι; *add.* infra quinque perambulavis Oη;
add. remanserint perambulavit Fγ Kε Mτ Qζ

5-6   et₁ ... gradus] *3.5-line replacement* Oβ   et₂ ... gradus] *om.* Cη; *marg.* Bγ

¹ Many manuscripts appear to have"·i·" here, that is "id est", but this is most likely a mistake for,
or a sloppily written, ".1." for "unum".

5 [units] to each sign. And you should begin from the sign in which the sun was [at the beginning of the lunar month], and where the number finishes in the same sign is the moon. And if one from the 5 [units] remains, the moon has already travelled 6 degrees [in the sign]; and if 2 [units remain then]

12; et ita usque in 5. Semper pro quolibet uno residuo pone 6 gradus.

6   12] *om.* Fβ; XII Pζ Qε Sβ Sθ; 10 Mι Nγ; 23 Vϱ; 52 Qδ; in 12 Wγ; *add.* et si 3, 18 Zα; *add.*
          gradus Cα Fγ Mτ Oη Vφ₂ Vυ   et ... gradus] etc. Nζ; et si 3 18, si 4 24, si 5 totum
          signum vel domum unum Vγ; gradus et cetera de aliis. Etatem lune duplica post addito
          quinque. Quinque dabis signo quo lune cepit origo. De reliquis finis numer~ dabit hic tᶜ
          suarum Kε; gradus et cetera de aliis. Etatem lune duplica post addito 5. Quinque dabis
          signo que lune cepit origo. Ac reliquis finis unum dabit hac c suarum Qζ; gradus et
          cetera. unius(*expunged*) etatem lune duplica post addito quinque. Quinque dabis signa
          quo lune cepit origo. Ac reliquis finis numer~ dabit h' tibi lunam etc. Mτ; *add. in marg.*
          tatem lune duplica post addito quinque. [Q]uinque dabis signo quo lune cepit origo Qδ
                  ita] *om.* Lζ; sic Bκ Fγ Kδ Oφ₂ Pφ Rδ Sη; sicut Mφ   usque in 5] in aliis Qη
                  in] *om.* Tδ; ad Cα Cγ Eγ Gα Kα Lλ Oη Pφ Rε Vα Vφ₁   5] quinque *some*; 5ᵐ Cα;
          v Qε Qθ Sβ; *add. interlin.* .a. in 12 Lζ; *add.* ita quod Vμ   Semper] Propter Bκ Lμ;
          scilicet Bι Vϱ   Semper pro] *illeg.* Vι   Semper ... gradus] *om.* Cγ Cδ Eγ Fε Lλ Pζ
          Pτ Sθ Wγ; *illeg.* Mα   pro] *om.* Pκ Pχ Wβ; in Mυ; quo Cε; quod Mμ   pro
          quolibet] *om.* Nα   quolibet] *om.* Bε Bκ Eκ Qη Rε Vυ Vφ₂; quodlibet Mλ; reliquo Qδ;
          add. signo Oγ   uno] *om.* Bδ Eα Lμ Mλ; id est Mo; limbo Wι; unoquoque Bε Eλ Rε;
          add. remanserunt perambulavit Kε   residuo] *om.* Mo; desiduo Kα; *add.* puncta(*?*) Qμ
                  pone] *om.* Qη Vξ; ponendo Mι Nγ; *add.* unius Eη   6] sex *some*   gradus] *add.*
          et patebit tibi quod desideras Vμ; *add.* etc. Rδ; *add.* universus. Etatem lune duplicata post
          addito quinque. Quinque dabis signo quo lune cepit origo. Et sic invenies signum quo
          lune movatur Fγ Vφ₂; *add. 3.5 lines* Zα; *add. 5 lines* Cα; *ms* Cα *ends; an extraneous chapter*
          [DE RE PERDITA INVENIENDA] *is found here in 7 mss: see Appendix.*[2]

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[2] This material is also sometimes found elsewhere: see Appendix.

12 [degrees]; and so on up to 5. Always take 6 degrees for every single [unit] remaining.

[Comment:

The moon moves 360 degrees along the ecliptic in a lunar month, or 30 degrees (one sign) in 2.5 days, or 12 degrees in one day. Since dividing 30 (days) by 12 (signs) is complicated, the suggestion is to double the days that have passed and divide this by 5 to produce 5 "units" for each sign.

To find the position of the moon on any day, take the number days that have passed since the beginning of the lunar month (the "new" moon), double this and divide by 5. Starting with the position of the sun (along the ecliptic) at the time of the new moon (when the sun and the moon are at the same point along the ecliptic), count off these groups of 5 units along the ecliptic, each one being a sign.

When all the units have been distributed along the ecliptic, the last unit will be the position of the moon in whatever sign you have ended in. There will probably be some remainder of units (between 1 and 4), and in each one of these the moon will have travelled 6 degrees, so you can then calculate how far the moon has moved in the last sign.

As an example, if it is 16 July and the lunar month began on 25 June, the lunar month is 21 days old; you double the 21 and divide by 5 to produce 8 with a remainder of 2. If on 25 June the sun was in 4° of Cancer, then counting from this point you will be arrive at 4° of Pisces. Since there is a remainder of 2, the moon will have moved another 12 degrees and its position will therefore be 16° of Pisces.

Note: the fact that you begin the calculation from the position of the sun at the beginning of that lunar month means that issues of co-ordinating the solar and lunar calendars do not arise; the starting point is always a new "observation" of the two together. Again the fact that the lunar month is only (approximately) 29.25 days long also becomes irrelevant (or at least undetectable).]

[CAPITULUM 34.] DE LOCIS PLANETARUM INVENIENDIS

Loca planetarum poteris alio modo investigare, verius. Sume altitudinem planete quando est iuxta lineam medii celi, et serva eam. Item, sume ad eandem horam

Cap. 34] *om.* Bη Cδ Cζ Eγ Fε Lι Lλ Mα Oη Oσ Pζ Qε Sθ Sι Sλ Vα Vγ Vυ; *bottom marg.* Eμ Lζ Sβ; *upper marg.* Qμ; *add. extra capitulum in bottom marg.* Vβ: Istud capitulum "si vis scire" est additum: ARGUMENTUM IN QUO SIGNO LUNA COTIDIE PER SUAM ESTATEM SECUNDUM QUOD ASSEQUITUR SOLEM. Si vis scire in quo signo sit luna ... .

1   De ... inveniendis] *om.* Bγ Bδ Bε Bζ Bκ Cγ Cε Dδ Eα Eκ Eλ Eμ Eo Gα Kε Kι Lζ Mκ Mμ Mτ Nα Nζ Oβ Oν Pγ Pι Pκ Pν Pξ Pσ Pφ Pχ Qη Sη Tβ Vη Vμ Vν Vσ Vφ Wζ Wλ Xγ; *faded/illeg.* Eδ Eζ Eϱ Fγ; Ad inveniendum loca planetarum Qθ Vξ; Ad inveniendum vera loca omnium planetarum Dη; Ad investigandum loca planetarum Eτ Lμ; Aliter ad habendum loca planetarum Bι(*add. in marg.* c. 29); Aliter modus equandi planetis Kθ Po; De investigatione locarum(loca Mυ) planetarum Mν Mυ Vι Wβ; De locis planetarum aliter Rα; Cap. 34 De locus planetarum aliter Sβ; De locis planetarum aliter et verius Mλ; Inventio locarum planetarum aliter Mγ Pτ Vϱ; Investigatio aliorum planetarum Wι; Si loca planetarum vis scire Bβ; *add. in marg.* 35 Vμ; *add. in marg.* 36 Mκ Pκ; *add. in marg.* 37 Oϱ(C.37) Qζ(37us) Sδ(C° 37)   planetarum] *add.* unie Oυ   inveniendis] *om.* Kα Mι Mπ Nγ Oφ₁ Rε Xβ Zα; aliter Dγ; *add.* Rubrica Vπ; *add.* sequitur. Capitulum Mo   *add. in marg.* Oϱ: Hic deficitunt 2 capitula videlicet "De locis planetarum non inveniendis"et "De latitudine planetarum a via solis" quere inferioris. Capitula 37 et 38.[1]

2   Loca] Nota Bδ Eδ Kι; *add. illeg.* Zα   planetarum] *add.* pois Pμ   poteris] poterit Cδ; *add.* in   poteris ... modo] volens Cγ   alio modo] *om.* Eμ Fγ Xδ; *illeg.* Fε Gα; aliter Eκ; aliter et alio modo Vξ   investigare] *om.* Bζ; invenire Eμ Gα Mμ Mτ Nζ Pκ Pχ Vμ Wζ; *add.* et [*illeg.*] et Eκ   verius] *om.* Bκ Cγ Cε Lζ Oβ Vη; *illeg.* Bε; *blank* Xδ; et melius Nα Sη; et verius *many*; melior et verius Pτ; melius et verius Oγ; si vis Wμ; sic melius Eμ; *add.* endis Qδ; *add.* euđ pon°s Eη(*?*); scilicet verius Kα   Sume] Sumpive(*?*) Kθ

3   planete] *om.* Pφ   quando] qui Mυ   est] *om.* Eζ Wβ   iuxta] ante Qδ Rε Sη; in Pυ; *corr. in marg. from* in Oζ; *add. interlin.* id est ante Tβ   lineam] altitudinem Pι   celi] *add.* de nocte Mμ Vμ   serva] *marg.* Oξ Wα   Item] Et Eμ   Item sume] *om.* Vσ   sume] *om.* Eo; summit Rδ; sumpive Kθ   ad] *om.* Bβ Bε Cι Eη Eσ Vβ Vη; *interlin* Kι; in Bδ Pκ   ad eadem] *om.* Pχ   ad ... horam] eadem hora Nδ Nε Oϱ Tβ Xβ   horam] *om.* Kδ Rδ; *illeg.* Nα

3-4   ad ... ascendens] ascendens(*add. in* Eα) eadem hora Cγ Cε Cι Dδ Dη Eα Eβ Fα Fβ Fζ Kα Kδ Lβ Lγ Lε Lη Lμ Mδ Mη Mι Mπ Mυ Mφ Nγ Oγ Oζ Oι Oτ Oφ₁ Rα Pβ Pδ Pθ Pμ Pν Pξ Pϱ Pσ Pφ Qβ Qγ Qθ Qλ Sδ Sκ Tδ Vι Wα Xδ Zα

3-5   serva ... et] *om.* Lζ

_____

[1] This marginal note in Oϱ signals to the reader that Cap. 34 and Cap. 35 are to be found at the end of the text on fol. 21ᵛ, after Cap. 47.

[CHAPTER 34.] ON FINDING THE LOCATIONS OF THE PLANETS

You will be able to discover the locations of the planets in another, more accurate way. Take the altitude of the planet when it is near the line of the middle of the sky, and keep [*or* make note of] it. Likewise at the same hour take

ascendens per aliquam stellarum fixarum, et hoc serva etiam cum hora. Posthec vide
5   quando ille planeta incipiat descendere a linea medii celi, et sume eius altitudinem
quando sit equalis altitudini prius sumpte ante lineam medii celi; et iterum in eadem
hora sume ascendens et horam per aliquam stellam fixam. Deinde sume medium inter

4   ascendens] *om.* Mν   per] *om.* Cε; ad Vπ   per ... cum] *om.* Kδ Rδ   stellarum]
stellam Bζ   stellarum fixarum] stellam fixam Mι Nγ; *add.* scilicet computando
gradus eius in almicantarath Fγ; *add.* scilicet computando gradus eius in almithat scilicet
in quo gradu est Wλ; *add.* si non fieret de luna potest fieri de die per solem Eμ   et ...
hora] et in quo gradu est hoc serva Fγ   hoc] *om.* Kα Mτ   serva] *om.* Wλ; *add.* id
est signi(*?*) motus in limbi Zα   serva ... hora] *illeg.* Nα   etiam] *om.* Eλ Mγ Mμ
Nζ Pκ Wζ Zα; ī Cε   etiam cum hora] *om.* Xβ   hora] *om.* Bζ; horis Bδ Eα
Posthec] Postea *many*; Post hoc *some*; Et Mτ

4-7   per ... horam] *om.* Pχ

5   quando] an Pφ; cum Bδ Bε Bζ Bθ Cγ Cε Cι Dη Eα Eβ Eη Eσ Fα Fβ Fε Fζ Kα Kδ Lβ Lγ Lε
Lη Mδ Mη Mι Mπ Mυ Mφ Nγ Nδ Nε Oγ Oζ Oι Oξ Oϱ Oτ Oυ Oφ₁ Pα Pβ Pθ Pμ Pν Pϱ Pσ
Pω Qγ Qθ Qλ Rδ Sκ Tβ Tδ Vβ(*add. interlin.* quando) Vη Vι Vπ Vψ Wα Wμ Xβ Xδ Zα
ille] *om.* Lβ; illa *some*; idem Pι; ipse Dη; ista Nζ Wζ; iste Kε Nα Pτ Qη   incipiat]
incipiant Bθ Vπ; incipiet Cγ Eκ Nγ   planeta] *om.* Nζ   incipiat ... et] *illeg.* Nα
descendere] ascendere Bβ Kα Nζ   linea medii] medio Bε   medii celi]
meridiana Eμ   celi] *om.* Mτ; *add. illeg.* Oν   et] *add. in marg.* iterum in eadem
horum Sκ   sume] supive Kθ   eius] *om.* Eκ Mν Qη; illius Kα

5-6   et ... celi] *om.* Kδ Pφ; *marg.* Oφ₁

6   quando ... altitudini] *om.* Vϱ   sit] est Bβ Eκ; fuerit Eλ Vσ; sit vel fit Oφ₁; *corr. in marg.*
to fuerit Mκ   sit ... celi] est in altitudinem similem prius Eμ   equalis] similis Dη
altitudini] *add.* eius Nζ Pκ Wζ; *add.* sue Pι; *add.* ut Mδ Nδ   sumpte] summet Rδ;
suscepte Eυ   celi] *om.* Bζ Mμ   interim] totum Fβ   in] *interlin.* Mo   in
eadem] *om.* Cγ

6-7   interim ... stellam] sume eius altitudinem quando sit equalis altitudini prius sumpte ante
lineam Nγ

7   hora] *om.* Kα   sume₁] accipies Bδ Eα; summit Rδ   ascendens] ascendentem Pϱ
et] in Pϱ   et horam] *om.* Mμ Nζ Qη Vμ Pκ Wζ; in eadem hora Xβ   per ...
fixam] *om.* Eμ   aliquam] quam Pγ   stellam] *om.* Nε   stellam fixam]
stellarum fixarum Kε Kι Mτ; *add.* signi transitam(*?*) almuri in limbi Zα; *add.* ut prius Pι;
add. illeg. Gα   sume₂] summit Rδ   medium] *interlin.* Kε; media Oϱ; *add.* gradum
Eμ

the rising by any one of the fixed stars, and keep [*or* make note of] this also with the time. After this observe when this planet begins to descend from the mid-sky line, and take observe its altitude when it is equal to the altitude when observed earlier before [it reached] the mid-sky line, and again at the same hour observe the rising and the hour by some fixed star. Next assume the mean between

ascendens primum et secundum per almuri in limbo; et gradus qui ceciderit tunc super lineam medii celi, in illo est planeta.

8   ascendens] *om.* Bζ   et₁] *add.* ascendens Mι Nγ; *add.* medium Vσ   secundum] 2ᵐ Kδ Mτ Vβ   almuri] almucantrat Kα; *add.* et pone almuri super medie graduum ab ipso per [*illeg.*] suorum Ga   limbo] labro Mι Nγ; lymbo Mφ Qζ; *add.* et pone illud medium in oriente super orizontem Vψ   qui] et Pξ; *add.* ascendent Zα
        ceciderit] caderit Eo   tunc] *om.* Eλ Mυ Pκ Pφ Pχ Sβ Vσ   super] in Bθ Bκ Eυ Lζ Mκ Qμ Vμ Vπ Vσ; inter Bζ Eo

9   lineam medii] medio Bκ Lζ   medii celi] meridiana Eμ; *add.* tunc Xβ   in illo] est gradus in quo Rε; illa Kα Oϱ Xβ; ille est in quo Vν; in illa Eη Lβ Oυ Pβ Pν Qγ Qθ Sδ; in ipso Fε; in isto Mυ Vι Wα; in quo Eλ; *add.* loco Nζ Pκ Pχ   in ... planeta] est gradus planete Pι; est ille in quo est planeta Mτ; locum planete quod queris Oγ   illo] *add.* gradu Fγ   illo est] aliquo Qη   planeta] *add.* etc. Fε Mπ Rδ Vπ; *add.* quesitus Pφ; *add. illeg.* Zα

the first rising and the second using the indicator-muri on the rim; and the degree which then falls on the mid-sky line, there is the planet.

[Comment:

This "more accurate" way of finding the positions of planets involves observing the planet in question at some altitude just before it reaches the mid-sky meridian, and again at the same altitude after it has passed the meridian and begun its descent. At the same time as these observations are made one also observes the rising of a star. One next takes the mean position between these two risings, and sets that degree of the ecliptic on the horizon; the point on the ecliptic which is then on the meridian will be the "longitude" of the planet.

Note: this is not completely accurate since the point of rising does not change its degree uniformly over time, and therefore the point sought is not necessarily the mean between the two. The error is minimal if the two observations are made when the planet is near the meridian, but this is not an ideal time to make the observations of altitude, since the closer the planet is to the meridian, the less its altitude changes over time and therefore the more difficult it is to know when the planet is at exactly the same altitude for the two observations.[2]]

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[2] See J.D. North, *Chaucer's Universe* (Oxford: Clarendon Press 1988), pp. 68-69 and note 26.

[CAPITULUM 35.] DE LATITUDINE PLANETARUM A VIA SOLIS

Scire volens utrum planeta sit australis vel septentrionalis a via solis, considera utrum altitudo quam sumpsisti quando erat prope lineam medii celi sit equalis

Cap. 35] *om.* Bη Bκ Cδ Cζ Eγ Eμ Lι Lλ Lμ Mα Oη Oϱ Oσ Pζ Qε Sθ Sι Sλ Vα Vγ Vυ; *bottom marg.* Lζ Sβ

1   De ... solis] *om.* Bγ Bδ Bε Bζ Cγ Cε Dδ Dη Eα Eκ Eλ Eo Eυ Fε Gα Kε Kι Lζ Mκ Mμ Mτ Nα
        Nζ Oβ Oν Pγ Pι Pκ Pξ Pσ Pφ Pχ Qη Sη Tβ Vη Vμ Vν Vσ Vφ Wζ Wλ Xγ; *faded/illeg.* Eδ Eζ
        Eϱ Fγ Pτ; Ad inveniendum latitudinem planetarum Kθ Po; Ad inveniendum utrum
        planeta sit septentrionalis vel australis Qθ; De altitudinibus et parte latitudinis habenda
        Wι; De inveniendo latitudinem planetarum Qμ; De locis planetarum inveniendis Pν;[1] De
        latitudine planetarum Cι Eσ Sκ; De latitudine planetarum a via etiam solis. Rx Mo; De
        latitudine planetarum ab ecliptica Dγ Oφ Rα Rε Sβ(Cᵒ 35 De ...); De latitudinibus
        planetarum et parte latitudinis invenienda Eτ Mν Wβ; De latitudinibus planetarum et
        parte latitudinis habenda vel de latitudine planetrum a via solis Mυ Vι; De
        retrogradatione planetarum *corr. to* De planetarum latitudine Zα; De sciendum
        latitudinem planetarum a via solis Mλ; Inventio latitudinis planete a via solis Bι(*add. in
        marg.* c. 30); Planeta sit australis Mπ; Sciencia latitudinis planetarum et in qua parte Vϱ; Si
        vis scire utrum planeta sit australis vel meridialis Bβ; Ut scias latitudinem et partem
        latitudinis Mγ; Ut scias per latitudinem totum partem latitudinis Vξ; *add. in marg.* 36 Vμ;
        add. in marg. 37 Mκ Pκ; *add. in marg.* 38 Oϱ(C.38) Qζ Sδ(Cᵒ 38)   latitudine] altitudine
        Xβ   solis] *add.* Capitulum Nδ; invenienda Cη Fζ Oξ Vβ; *add.* Rubrica/Rx Bθ Pμ Qβ
        Vπ

2   Scire volens] Scire volueris Mι Qδ; Si autem vis scire Dη; Si scire volens Eδ; Si scire
        volueris Kε Kι Nζ Pκ Pχ Qζ Vμ Wβ Wζ Wι Wλ; Si scire volueris scire Mτ; Si vis scire Bε
        Eη Fε Oγ Oτ   utrum] *om.* Vσ   planeta] *interlin.* Wζ   planeta sit] plasit Sκ
             sit] *om.* Cε   australis] haustralis Rε   vel] *om.* Bδ; aut *some*; sive Kα   a]
        om. Bε; ab Eβ; et Bδ; in Cη   a ... solis] *om.* Oζ Pϱ Rε   solis] *add.* primo Nα
             considera] *rep.* Eκ

3   utrum] inter Nε   altitudo] altitudinem Qβ; latitudo Fε; *add.* planete Cε; *add. interlin.*
        solis Oι   altitudo quam] illeg. Xγ   quam sumpsisti] sumpta Cγ   sumpsisti]
        assumpsisti Wλ   quando] *add.* illud planeta Oγ; *add. in marg.* planeta Sκ   erat]
        add. in linea Zα   prope] iuxta Eκ   prope ... celi] in linea meridiana Nα Rε Sη
             medii] *om.* Pξ; *rep.* Pχ   medii celi] meridianam Pυ Vβ(*add. interlin* al' medii
        celi)   celi] *blank* Mo   sit] et Lη Oζ

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[1] This is the rubric for Cap. 34 which is missing from ms Pν so its rubric has shifted to here.

[CHAPTER 35.] ON FINDING THE LATITUDE OF PLANETS FROM THE PATH OF THE SUN

If you wish to know whether a planet is south or north of the path of the sun, consider whether the altitude which you observed when it [i.e., the sun] was near the line of the middle of the sky is equal

altitudini gradus in quo est planeta, vel maior, vel minor. Si enim est equalis, tunc
5   directe est in via solis, et nullam habet latitudinem. Si autem altitudo planete sit maior
quam gradus in quo est [sol], tunc planeta est septentrionalis a via solis; si minor, tunc
est australis; et tantum declinat a via solis quantum est maior vel minor illa altitudo.

4   gradus in] *om.* Bδ; graduum in Eδ   in quo] cum Pχ; cum quo Pκ   est₁] *interlin.*
Oι; *add.* positus Eo   est₁ ... minor] *illeg.* Xγ   planeta] plura Vσ; sol Cε Fγ Rε
vel₁] *om.* Qβ; *interlin.* Oξ; et Pν; *add.* est Gα   si ... est₂] *blank* Bδ   si ...
equalis] *om.* Lγ   enim] *om.* Cγ Eτ Fγ Mτ Pξ Vμ; vero Bε Eη   est₂] *om.* Bζ Bι Cγ
Eτ Lζ Nζ Pι Pφ Rα Sβ Vϱ Wζ; sit Nε Pκ Pχ   tunc] *om.* Rε; *marg.* Oξ; *add.* enim Bζ Vν

5   directe] *om.* Fγ; directus Bδ; recte Eσ Oϱ   in] *om.* Mπ Wλ; *marg.* Oι   via solis]
ecliptica Fγ   et ... latitudinem] *om.* Oγ   latitudinem] altitudinem Mυ Pκ Pχ Xβ;
add. solis Bζ   latitudinem ... autem] *illeg.* Xγ   Si] Sed si Pκ Pχ Vμ Wζ
autem] *om.* Bδ Cγ Cι Eα Eβ Eυ Fα Fβ Kε Kι Lγ Lε Lη Mη Mκ Mμ Mo Mπ Mυ Nγ
Nδ Nε Oγ Oζ Oξ Oϱ Oφ Pβ Pθ Pσ Qγ Qη Qλ Rδ Sδ Tβ Tδ Vβ Vη Vμ Vπ Vσ Vψ Wμ;
vero Pϱ Zα   autem ... sit] vero Pξ   altitudo] latitudo Kδ Qθ Pι; *marg.* Rα; *add.*
interlin. al' latitudo Oφ   planete] *om.* Eσ   sit] est Bδ Bζ Bθ Cγ Cε Dη Eα Eβ Eo
Eυ Fβ Fε Fζ Gα Kα Kι Lβ Lγ Lε Lζ Mκ Mμ Mπ Mτ Mυ Mφ Nγ Oζ Oξ Oι Oτ Oφ(*add.*
interlin. sit) Pβ Pδ Pκ Pμ Pν Pϱ Pσ Pτ Pχ Pω Qγ Qδ Qη Qλ Sκ Tβ Vβ Vη Vν Vφ Xβ Xδ
maior] *add.* vel Pδ

5-6   et ... solis] *om.* Bε Eη Nα   autem ... [sol]] maioris Eτ

5-7   maior ... australis] minor tunc est australis. Si maior tunc est septentrionalis Vξ

6   quam] *add.* planeta Bζ   quam ... [sol]] *om.* Pξ   in quo] *om.* Fγ; *marg.* Qδ   sol]
Cε Fγ Rε; *om.* Dη Fε; planeta Bβ Bγ Bδ Bζ Bθ Bι Cγ Cζ Cη Cι Dγ Dδ Eα Eβ Eδ Eζ Eκ Eλ
Eo Eϱ Eσ Eυ Fα Fβ Fζ Gα Kα Kδ Kε Kθ Kι Lβ Lγ Lε Lζ Lη Lκ Mγ Mδ Mι Mκ Mλ Mμ Mν
Mo Mπ Mτ Mυ Mφ Nγ Nδ Nε Nζ Oβ Oγ Oζ Oι Oν Oξ Oϱ Oτ Oυ Oφ Pα Pβ Pγ Pδ Pθ Pι
Pκ Pμ Pν Po Pϱ Pσ Pτ Pυ Pφ Pχ Pω Qβ Qγ Qδ Qζ Qη Qθ Qλ Qμ Rα Rδ Sβ Sδ Sη Sκ Tβ
Tδ Vβ Vη Vι Vμ Vν Vπ Vϱ Vσ Vφ Vψ Wα Wβ Wζ Wι Wλ Wμ Xγ Xβ Xδ Zα   tunc₁]
om. Lε   tunc planeta] *om.* Eo Oγ Vη   timc₁ ... solis] om. Eζ   septentrionalis]
declinis versus septentrionem Pϱ   a via solis] *om.* Eυ Xγ Wι; a ecliptica Eλ; a motu
solis Pφ; in viam Oβ   si] sed Pγ Vσ; *add.* autem Dη Pϱ; *add.* est Kα   tunc₂] *om.*
Fγ; est tunc planeta Pϱ

7   est₁] *om.* Pκ Pχ Wζ   australis] haustralis Rε; *add.* quare Oβ; *add. in marg.* si maior
septentrionalis Bε   et ... declinat] *illeg.* Xγ   declinat] *om.* Lε; declinabit Nζ;
deviat Nγ; *add.* altitudo illa Bβ   solis] *om.* Mμ; *add.* versus meridiem Vζ
quantum] *corr. to* quanto Bγ   illa altitudo] *om.* Bβ Bγ Bζ Bθ Bι Cη Dγ Dδ Eδ Eζ
Eκ Eλ Eo Eϱ Eτ Eυ Fγ Gα Kθ Kι Lζ Mγ Mκ Mλ Mμ Mν Oβ Oν Pγ Pι Pκ Po Pχ Qμ Rα Rε
Sβ Vμ Vν Vξ Vπ Vϱ Vσ Vφ Wζ Wι Wλ Xγ; altitudo Mυ Mφ Nα Nγ Pω Vι; est altitudo
Lγ; etc. Nζ; illa latitudo Eσ Kα Vβ; *add.* etc. Rδ

to the altitude of the degree in which the planet is, or greater or less. For if it is equal, then it is directly in the path of the sun and has no latitude [vis-a-vis the sun]. However, if the altitude of the planet is greater than the degree in which the [sun][2] is, then the planet is north of the path of the sun; if less then it is southern; and it is so much distant from the path of the sun as much as that altitude is greater or lesser.

[Comment:
        This is fairly straightforward. Measure the altitude of the planet vis-à-vis the ecliptic and of the sun when each passes the middle of the sky, and compare the two. If the two altitudes are equal, the planet is on the ecliptic. If the altitude of the planet is greater, it is to the north; if it is less, it is to the south. And the difference in altitudes will be the distance of the planet from the ecliptic.]

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[2] Nearly all the manuscripts read "planeta", but to make sense of the sentence, the altitude of the planet (the subject of the sentence) must be compared with that of the sun; hence my amendment.

[CAPITULUM 36.] DE RETROGRADATIONE VEL DIRECTIONE PLANETARUM
　　　　Utrum planeta sit retrogradus vel directus sic poteris inquirere; cuiusvis eorum

Cap. 36] *om.* Lι; *two versions* Cζ$_1$ Cζ$_2$

1　　　　De … planetarum] *om.* Bγ Bδ Bε Bζ Cγ Cδ Cε Dδ Dη Eα Eγ Eκ Eλ Eυ Gα Kε Kι Lζ Mκ Mμ
　　　　Mτ Nα Nζ Oβ Oν Oϱ Oσ Pγ Pι Pκ Pξ Pσ Pφ Pχ Qη Sβ Sη Sθ Sι Sλ Tβ Vα Vη Vμ Vν Vσ
　　　　Vυ Vφ Wγ Wζ Wλ Wμ Xγ; *marg. later hand* Sδ(C. 36 De …); *faded* Eδ Eo Eϱ Fγ Qε; Ad
　　　　inveniendum retrogradationem vel di Wι; Ad inveniendum ut(sic Lμ) planeta sit
　　　　retrogradus vel directus Lμ Mν; Ad inveniendum utrum planeta sit retrogradus Wβ; Ad
　　　　inveniendum utrum planeta sit retrogradus stationis vel directus Mυ Vι; Ad sciendum
　　　　utrum planeta sit retrogradus vel directus Bι(*add. in marg.* C. 31) Vβ(*add.* vel stationarius);
　　　　De directione et retrogradacione planetarum Cη; De rectitudine vel divisione planetarum
　　　　Kθ Mη; De(28 De Lλ) retrogradatione eorum Lλ Pζ(*marg., later hand*); De retrogradatione
　　　　planetarum Bη Cζ$_1$ Cζ$_2$ Oη Vγ Zα; De retrogradacione planetarum et directione Cι; De
　　　　retrogradatione vel rectione planetarum. Rubrica Bθ; Inventio directionis stationis(*add.* et
　　　　Vξ) retrograditionis Mγ Pτ(*add.* planete) Vξ; Scientia retrogradionis planetarum Vϱ; Si
　　　　vis scire utrum planeta sit retrogradus vel directus Bβ; Utrum planeta sit retrogradus
　　　　Mπ; Utrum planeta sit retrogradus vel directus Mλ Qθ(*later hand*); *add.* Rubrica Qβ; *add.*
　　　　in marg. Si planeta est Vμretro~ vel directa Oφ; *add. in marg.* 30 Bη; *add. in marg.* 37 Vμ;
　　　　add. in marg. 38 Mκ Pκ; *add. in marg.* 39 Oϱ(C.39) Qζ(39us) Sδ(C° 39; *later hand*)　　　　vel]
　　　　et Eσ Kα Rε　　　　directione] rectione Vπ　　　　statione Mo

2　　　　Utrum] Ut cum Pφ; *add.* autem Bη Bκ Cγ Cδ Cζ$_1$ Cζ$_2$ Dη Eγ Lζ Mα Oη Oσ Qε Qμ Sβ Sθ
　　　　Sλ Vα Vυ Wγ; *add.* ergo Lλ Vγ　　　　planeta] *om.* Qε Sβ Sλ; plura *corr. iterlin. to* planeta
　　　　Nε　　　　planeta … directus] planete sint retrogradi Cγ Eγ; planete sint retrogradi vel
　　　　directi Mα Pζ; sint retrogradi vel directi Cδ Lλ Sθ　　　　sit] sint Sλ Vγ　　　　vel] *rep.* Rδ;
　　　　aut Cζ$_1$ Cζ$_2$ Oη　　　　vel directus] *om.* Eυ Wγ　　　　directus] durus Mη; *add.* vel
　　　　stationarius Rε　　　　sic] si Mμ　　　　poteris] *om.* Bκ Lζ; potes Pφ Sι　　　　inquirere]
　　　　aquizere Pσ; inquiras Bκ Lζ; invenire Eα Kε Kι Lε Mμ Mτ Nζ Oβ Pκ Pϱ Pχ Qζ Qη Rε Vμ
　　　　Wγ Wζ; invenire seu inquirere Lε Tδ; investigare Cζ$_1$ Cζ$_2$ Fγ Oη; *add.* accipe Eγ Wγ
　　　　　　　　cuiusvis] cuius Cδ Cε Lζ Mo Mπ Pσ Pυ Sθ; quibus Wλ　　　　eorum] *om.* Bζ Fε Mμ
　　　　Nζ Pκ Pχ Wζ; earum *some*; eius Vη; planete Pϱ Vμ

2-3　　　eorum … altitudinem$_2$] *illeg.* Xγ

[CHAPTER 36.] CONCERNING THE RETROGRADE OR FORWARD [MOTION] OF THE PLANETS

You will be able to determine whether a planet is retrograde or direct [i.e., prograde] thus: commit to memory the altitude [i.e., position][1] of anyone of them

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[1] As explained in the comment at the end of the capitulum, what really determines retrograde as opposed to prograde/direct motion is how the longitude of the planet changes rather than its latitude (or altitude); but the two can be related and one can determine the change in former by means of a change in the latter.

altitudinem et altitudinem stelle quoque fixe memorie commenda. Deinde post tertiam
noctem vel quartam, in qua est sensibilis motus, cum stelle fuerint in simili altitudine
5   prime altitudini et altitudinem planete considera. Que, si fuerit minor sua altitudine

3   altitudinem₁] altitudo Sι; *add.* considaram Kε Kι Mμ Mτ Nζ Pκ Pχ Qζ Qη Vμ Wζ   et]
     illeg. Pσ; vel Qβ   et altitudinem₂] *om.* Mυ Tβ Vι Zα; tam planete Pι; vel latitudinem
     Pω   altitudinem₂] *om.* Mφ; *illeg.* Wβ; etiam Pϙ; latitudinem Bε Cι Dη Eβ Eη Eσ Fε Fζ
     Lβ Lμ Mδ Mη Mι Mπ Nγ Nδ Nε Oξ(*add. in marg.* vel altitudinem) Oτ(*corr. later hand in*
     marg. to altitudinem) Oυ Pα Pβ Pδ Pν Pξ Pσ Qβ Qγ Qλ Vψ Wμ; *add.* querere Rε; *add. in*
     marg. alicuius Oι; *corr. from* latitudinem Wα   stelle] stellarum Pγ; *corr. from* stellarum
     Lζ   quoque] *om.* Bη Cζ₁ Cζ₂ Eϙ Fγ Fε Kε Kδ Kι Lγ Mμ Mτ Nζ Oγ Oη Pκ Pϙ Pχ Qζ
     Qη Rα Sι Vμ Wγ Wζ; quo[*illeg.*] (= quoquo?) *corr. to* quo Bθ; alicuius Cδ Oβ Sλ Vσ; aliquo
     Dλ; cuiuslibet Cγ Eγ Lλ Mα Pζ Qε Sβ Sθ Vγ; cuiusvis Dη; quorum *corr. interlin. to*
     alicuius Mκ; *corr. to* alicuius Bγ   fixe] *om.* Fγ; *add.* quas Vμ; *add. in marg.* sive posite
     in astrolabio sive non Qμ   memorie] in memoria Mα; *add.* quoque Pυ
          commenda] manda Pϙ   post] *illeg.* Wγ; super Kα; *add.* etiam Oβ   tertiam]
     interlin. Kθ; 3 / 3ᵃ / 3ᵃᵐ *some*

4   vel] et Sθ   vel ... motus] *illeg.* Xγ   quartam] 4 / 4ᵃᵐ *some*   in₁ ... motus] *om.*
     Bη Bκ Cγ Cδ Cζ₁ Cζ₂ Dη Lζ Lλ Mα Oη Oϙ Oσ Oφ Pζ Pφ Qε Sθ Sι Sλ Vα Vγ Vυ Wγ;
     marg. Sβ; in qua not~ est sensibilis motus Vβ(*interlin.*)   qua] *om.* Wλ; quam Kα; quo
     Kε Kι   est] *om.* Cε   sensibilis] *illeg.* Gα Mμ; *blank* Sδ(*add. in marg. later hand*
     sensibilis); sensibillis Mγ; septentrionalis Wμ; solis Kα Mπ; *add.* eius Pκ Pχ   motus]
     add. planete Zα   cum] *om.* Dδ   cum stelle] *om.* Pκ Pχ   stelle] *add.* fixe
     Bγ(*interlin.*) Eλ Rε Vμ Wζ   stelle fuerint] stella fuerit Bη Bκ Cγ Cδ Cζ₁ Cζ₂ Eα Eγ Eμ
     Lζ Lλ Mα Oγ Oι Oσ Oφ Pζ Pι Qε Qζ Sβ Sθ Sι Sλ Vα Vβ Vγ Vυ Vφ Wλ; stellam fuerit Bδ
          fuerint] *om.* Kα   simili] consimili Nζ Pκ Pχ Wζ; similia Pζ; smilli Mγ
          simili altitudine] *illeg.* Oβ; similitudine Mo Pω Vψ

4-5 simili ... altitudine] similitudine prime altitudinis Bδ Bε Cι Eβ Eη Eσ Fα Fζ Kα Lβ Lγ Lε
     Lη Mη Mι Mπ Mυ Mφ Nγ Nδ Nε Oγ Oζ Oξ Oτ Oυ Pα Pβ Pγ Pδ Pθ Pν Pξ Pϙ Pσ Qβ Qγ
     Qθ Qλ Sδ Sκ Tβ Tδ Vι Wα Wμ Xβ Xδ

5   prime] *om.* Bκ; primi Vη   altitudini] *om.* Cγ Eγ Kδ Lλ Mα Qδ Sθ Sλ Vγ Wγ; *marg.*
     Sβ; altitudinis Bβ Kθ Oι Oφ(*add. in marg.* in qua sensibilis est motus) Rδ   altitudini et
     altitudinem] altitudine Pζ; altitudinem Qε; altitudinis Nγ   et] eiusdem Tβ Vη Zα;
     etiam Bζ Dγ Mγ Mν Mo Nα Oϙ Pζ Pκ Pχ Vξ; *add.* tunc Vμ; *add.* tunc etiam Pι
          altitudinem] altitudinem(*erased*) altitudinem et altitudinis Pγ; altitudini Wι;
     latitudinem Eυ; *add.* etiam Bθ Bκ Cγ Cδ Cζ₂ Eυ Lζ Lλ Mα Mκ Oη Oσ Oφ Qε Sβ Sλ Vα Vβ
     Vγ Vπ Vσ Vυ   planete] plane Cγ   Que ... minor] *illeg.* Xγ   si] *om.* Mo;
     interlin. Nζ Rα; sit Mμ Pγ Vπ   fuerit] *om.* Oϙ; sit Nζ; *add. interlin.* altitudo Kθ
          minor] in altitudinem Qε; maior Gα Kε Mμ Mτ Nζ Qζ Qλ Vμ; melior Bθ; *add. in*
     Wβ; *add.* melior Vπ   altitudine] *om.* Qε; *add. in marg.* al' latitudine Oφ

5-6 si ... directus] *rep.* Mν   minor ... fuerit₂] *om.* Eo

and also the altitude [i.e., position] of a fixed star. Then after a third or fourth night, during which there is perceived motion [vis-á-vis the background of fixed stars], when the stars are at a similar altitude [i.e., position] as the first altitude [i.e., position], observe also the altitude [i.e., position] of the planet. Then if it is less than its first altitude [i.e., position],

prima, planeta est directus, si fuerit in parte orientali; et si fuerit in parte occidentali, retrogradus. Et si secunda altitudo planete fuerit maior prima, est retrogradus, si hora

6   prima] *om.* Eδ; post .e. Nε; primus Nζ; prius Pκ Pχ Wζ   est] *om.* Nε Vη; erit Eγ Lλ
           Mα Pζ Qε Sβ Tβ Vγ; sumpta est Nζ Pκ Pχ Wζ; *add.* planeta Pι   directus] *illeg.* Pκ;
           retrogradus Kε Kι Mμ Mτ Nζ Pχ Qζ Qη Vμ Wζ   si₁] *add.* vero Pϱ   si₁ ...
           orientali] *om.* Bη; *rep.* Vϱ   fuerit₁] *add.* planeta Nα Pυ Rε Sη Vβ   in₁ ...
           occidentali] circuli Vγ   orientali] occidentali Nε; orientalis Nα; *add.* si tunc altitudo
           planete fuerit maior Gε   et ... occidentali] *om.* Lη Pϱ; *marg.* Oι; est Oζ Wμ   si₂]
           hic *or* hoc Nα   fuerit₂] *om.* Nδ; fuerat Sθ; vero Fε Sλ; *add.* planeta Nα Pυ Sη Vβ
                   parte₂] *om.* Cδ Eγ Fε Sβ Sλ   occidentali] *om.* Pι; occidentalis Nα; orientali Nε;
           septentrionali Mo Pυ; *add.* erit Cγ Eγ Wγ; *add.* est Bβ Bδ Cι Dη Eβ Eη Eλ Eσ Fγ Fε Fζ Lβ
           Lγ Lε Lμ Mδ Mη Mι Mκ Mo Mυ Mφ Nα Nγ Nδ Oγ Oι Oξ Oτ Oυ Pβ Pδ Pθ Pν Pξ Pϱ Pσ
           Qγ Qθ Qλ Rδ Rε Sδ Sη Sκ Sλ Tβ Tδ Vβ Vη Vι Vμ Vσ Vψ Wα Xδ; *add.* fuerit Zα; *add.*
           planeta est Gε

7   retrogradus₁] *om.* Wλ; *marg.* Xβ; directus Kε Kι Mμ Mτ Nζ Qζ Qη Vμ Wζ; directus est Pκ
           Pχ   retrogradus₁ ... prima] *om.* Bθ Cε Cζ₁ Cζ₂ Fα Kα Mπ Oβ Oη Pυ Vπ   Et si] si
           vero Oϱ Rε Vβ(*add. interlin.* al' Et si) Wγ   Et ... retrogradus₂] *om.* Oφ   si₁] *add.*
           autem Cδ; *add.* vera Pζ; *add.* vero Bη Bκ Cγ Eγ Lζ Lλ Mα Qε Sβ Sθ Sι Sλ Vα Vγ Vυ
                   secunda] *om.* Eυ Mκ; *marg.* Wα; 2ᵃ *some*; sua Wβ   planete] *om.* Bη Dδ
                   fuerit] est Eα Mδ Nδ   maior] *add.* altitudine Vη   prima] sic prima Fβ; ut
           Fζ; *add.* altitudine Cγ Oγ Sι Zα   est] *om.* Oξ; erit Eγ Mα Pβ Pζ Qε Sβ Vβ Vγ Wγ; erit
           interque (?) Cγ; esse Kε; *add.* planeta Oφ Pι   retrogradus₂] *add.* et. Vψ   si₂] *add.*
           in Rε

7-8   et ... directus] Consimile modo(*om.* Qζ Qξ) poteris invenire si altitudo fuerit minor,
           utrum planeta sit retrogradus vel directus Kε Kι Mμ Mτ Nζ Pκ Pχ Qζ Qη Vμ Wζ

the planet is progressing if it is in the east; and if it is in the west [it is] retrogressing. And if the second altitude [i.e., position] of the planet is greater than the first, it is retrogressing if the time

accepte altitudinis fuerit ex parte orientis; et si fuerit ex parte occidentis, est directus.
Oppositum autem de partibus noveris esse in luna.

8   altitudinis] latitudinis Qβ Sδ; *add*. planete Wλ   fuerit₁] fuerat Oη Oϱ Sθ Sλ   ex₁]
           in Bκ Cγ Cδ Fγ Lζ Lλ Lμ Mα Oσ Pζ Pν Pσ Qε Sβ Sθ Sλ Vυ; in *corr. to.* ex Cζ; planete in
           Wγ   orientis] orientali Cγ   orientis ... parte₂] *om.* Kα Lη   et si] *om.* Fε
              et ... occidentis] *om.* Nγ; *twice* Pι   et ... est] *om.* Mι Mo; erit   et ... directus]
           om. Vϱ   si] *om.* Bη Bθ Vπ; sic Wι   fuerit₂] *om.* Sλ; fuerat Sθ   ex₂] a Bε Cε Eβ
           Fα Fζ Lβ Lγ Mη Nδ Nε Oξ Oτ Oυ Pβ Pδ Pθ Pϱ Pω Qγ Sδ Sθ Sκ Tδ; in Bκ Cδ Dγ Eγ Eϱ Fγ
           Lζ Lλ Lμ Mα Mδ Mλ Pι Pν Pσ Qε Qθ Rα Sβ Sι Sλ Vα Vγ Vυ Vφ   parte₂] *marg.* Wα
              est] *om.* Bζ Bι Bκ Cδ Cζ₁ Dγ Dδ Eα Eδ Eζ Eϱ Fγ Gα Kθ Lζ Lλ Mα Mγ Mλ Nα Oβ Oσ
           Oη Oν Oϱ Oφ Pζ Pθ Pι Po Pυ Qδ Qε Rα Sη Sθ Sι Sλ Vα Vβ Vγ Vι Vξ Vυ Vφ Xγ Wλ; erit
           Bδ Cγ Cι Dη Eβ Eγ Eη Fα Fβ Fζ Kδ Lγ Lη Mδ Mη Mι Mπ Mφ Nγ Nε Oζ Oγ Oξ Oτ Oυ
           Pα Pβ Pδ Pϱ Pσ Pω Qβ Qγ Rδ Sδ Sκ Tβ Tδ Vψ Wα Wγ Wμ Xβ

9   Oppositum ... luna] *om.* Bη Cγ Cδ Cζ₁ Eγ Eκ Eλ Kε Kι Lα Mα Mμ Mτ Nζ Oη Oσ Pζ Pκ Pφ
           Pχ Qε Qζ Qη Sθ Sι Sλ Vα Vβ Vγ Vυ Wγ Wζ; *marg.* Lζ   Oppositum ... partibus] Si
           autem est [*illeg.*] oppositum sunt Gα   autem] *om.* Fγ   autem ... noveris] *om.* Eβ
              autem ... esse] videbis Dη   de partibus] *om.* Vμ; *illeg.* Oβ; ceteri Qδ; *excised* Sκ
              de ... noveris] videbis Bδ Bε Dδ Eη Eσ Fα Fβ Fε Fζ Kα Kδ Lβ Lγ Lε Lη Lμ Mδ Mι
           Mπ Mυ Mφ Nγ Nδ Oγ Oζ Oι Oξ Oϱ Oτ Oυ Pα Pβ Pθ Pν Pξ Pϱ Pσ Pω Qβ Qγ Qθ Qλ Rδ
           Sδ Tβ Tδ Vη Vι Vυ Wα Wμ Xβ Xδ Zα   de ... in] est Rε   noveris] n(*add. blank*)
           Mo; videbis Cε Cι Nε Pδ Sκ; videtis Vψ   Noveris ... luna] de luna quia epiciclus
           vadit econtra Fγ   esse] *om.* Kα Tβ Vη Vμ Zα; et Xβ   in] de Dδ Vμ; ibi Bβ
              luna] *add.* etc. Vη; *add.* Sequitur Bβ; *add.* quia [*illeg.*] Zα; *add. 3.5 lines* Cζ₁; *add. 4.5
           lines* Cζ₂

of the altitude [i.e., position], when taken, is on the eastern side, and it is progressing if it were on the western side.

However, you should know [that] the opposite of the positions to be [the case] for the moon.

[Comment:

In terms of (apparent) retrograde or direct (prograde) motion of a planet, the use of the altitude of a planet can be confusing. Normally, what one wants to know is how the longitude of the planet is changing – increasing with prograde motion as it moves through the zodiac in the same direction as the sun, or decreasing with retrograde motion. However, changes in longitude can (sometimes) be deduced by measuring changes in altitudes over a few days.

The reference point is the altitude (i.e., the position) of some star or stars which should be the same whenever the planet is observed; this ensures that one is making observations at the same time of day (or night). Two observations of the planet's altitude are taken several days apart (so that the motion of a planet against the background of fixed stars is distinguishable). It is not actually necessary to relate these changes in altitude to precise changes in longitudes; one simply follows the formula that if the planet is in the east and its altitude decreases, it is prograde or direct; if the altitude increases, it is retrograde. On the other hand, if the planet is in the west and its altitude decreases it is retrograde; if it increases it is prograde/direct.

A major problem with this process is the difficulty of observing the changes in altitude since that change is going to be very slight, and probably outside the range of accuracy of the astrolabe. As well, as many commentators have noted,[2] the process itself is not always correct. The situation when the planet is stationary (when it is about to change directions) is not considered. Nor is the situation when the planet is on one side of the meridian for one observation, and on the other side for the second. As well, the declination of a planet (and therefore its latitude and altitude) changes during its orbit because of the obliquity of its orbit to the ecliptic; and this obviously is not related to a change of direction of motion. Pseudo-Māshā'allāh's instructions work in many, but not all circumstances.

The reference to the moon in the last sentence is a confusion since the moon does not show "retrograde" (or reversed) motion as do the planets. The comment might stem from the fact that while the deferent circles for the planets in the Ptolemaic model move forward from west to east (carrying them through the signs of the zodiac) with occasional backward ("retrograde") motion caused by their epicycles, the deferent circle for the moon is in the opposite direction (i.e., in the direction of planetary retrograde motion), with no epicyclic reversal. (The motion "forward" and "backward"of the moon on its epicycle only slows or speeds up its absolute motion from east to west.) The statement about "retrograde" motion for the moon may simply refer to the overall direction of its orbit, rather than that it reverses that direction. (This is probably why a number of manuscripts omit this line. Indeed it is possible that it was not part of the original text at all but might have been added later by some scribe/editor who did not understand the phenomenon.)[3]]

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[2] E.g., North, *Chaucer's Universe*, pp. 70-71.

[3] See Francis S. Benjamin, jr., and G. J. Toomer, *Campanus of Novara and Medieval Planetary Theory*: Theorica planetarum (Madison: University of Wisconsin Press, 1971), pp. 175 and 391 (note 36).

[CAPITULUM 37.] DE EQUATIONE 12 DOMORUM PER ASTROLABIUM

Cum 12 domos volueris adequare, gradum ascendentem super lineam octave

Cap. 37] *om.* Lι; *two versions* Cζ₁ Cζ₂; *ms* Qα *resumes*

1   De ... astrolabium] *om.* Bγ Bδ Bε Bζ Bκ Cγ Cδ Cε Dδ Eα Eγ Eδ Eκ Eλ Eϱ Eυ Fε Gα Kε Kι
         Lζ Mα Mκ Mμ Nα Nζ Oβ Oν Oσ Pγ Pι Pσ Pξ Pφ Qα Qε Qη Sη Sθ Sι Sλ Tβ Vα Vη Vν Vσ
         Vυ Vφ Wγ Wλ Xγ; *faded* Fγ Qε; *marg.* Cζ₁ Eμ Pζ(*later hand*) Pθ Sβ(*later hand*); Canon
         equatione domus Vϱ; De 12 domorum Mπ; De equatione domorum Eσ; De equatione 12
         domorum planetarum Kθ; De equatione XII per domorum planeta Eζ; Doctrina de
         adequatione duodecim domorum Bι(*add. marg.* C. 32); Quo debeas adequatione 12 domos
         Lμ; Quo debet adequari 12 domos Qθ(*later hand*); Si 12 domus planetarum volueris
         adequare Bβ; *add. in marg.* 30 Lλ; *add. in marg.* 31 Bη; *add. in marg.* C. 37. Sβ(*later hand*);
         add. in marg. 39 Mκ Pκ; *add. in marg.* 40 Oϱ(C. 40) Qζ(4[0]ᵘˢ) Sδ(Cᵒ 40, *later hand*); *add. 1 line*
         Zα(*illeg.*)   equatione] adequatione Cζ₁ Cζ₂ Mν Mυ Vβ Vι Wι Xδ; equationibus Mo Mτ
              12] *om.* Eo Lε Mφ Tδ; *illeg.* Wα; duodecim Dγ Dη Pϱ Pω; XII Po Sβ; 22 12 Mι
              domorum] *add.* celi Kδ Rδ   per astrolabium] *om.* Bη Dγ Eμ Eo Mγ Mι Oη Pζ
         Mν Mo Mτ Nγ Oφ Rα Rε Sβ Vξ Zα; accidentalium Mλ; lune Cζ₁ Cζ₂; per astro Wι; per
         horas duplicatas Pτ; planetarum Qμ; sive signorum Vγ; *add.* etc. Rδ; *add.* Rubrica/Rx Qβ
         Vπ;

1-12   De ... sexte] *rewritten* Pκ Pχ Vμ Wζ; *see below,* "Appendix 37: Version B"

2   Cum] *add.* autem Bι Bκ; *add.* etiam Eγ; *add. in* Zα   12] XII Bζ Eζ Pζ Pϱ Qε Sβ;
         duodecim Gα Mα Oη Oι Pω Vψ; domorum Pβ   adequare] equare Bκ Dη Eγ Eσ Fγ
         Lζ Mτ Qα Vυ; equare *corr. interlin. to* adequare Oν; quacumque hora equare Mι Nγ; *add.*
         et scire Gα; *add.* per astrolabium Xδ; *add.* scias gradum ascendentis et pone eum super
         prime almit'(almiᵗᵗ Mμ) in oriente et est initium prime(secunde Mμ) domus, et eius nadir
         est initium 7ᵐᵉ domus; et tunc vide gradum(*add.* cadentem Mμ) super lineam medie
         noctis et est initium 2ᵉ(4ᵉ Mμ) domus et eius nadir cadens super lineam meridiam est
         initium 10ᵐᵉ domus. Hec 4ᵒʳ domus dividuntur anguli. Postea Mμ Nζ   gradum]
         gradus Bκ Oϱ Vα; graduum Pβ   ascendentem] *illeg.* Mα; ascendentis Bκ Lζ Lλ Oϱ
         Oσ Pζ Sθ Sι Sλ Vα Vυ; assendentis Nγ; *add.* per tertium rancōēm(?) inventus Pι; *add.*
         terminalem Rε; *add. interlin.* al' -tis Vβ   lineam] *om.* Sλ; finem Bκ Cγ Cδ Cζ₁ Cζ₂
         Eκ(*add. interlin.* vel lineam) Eυ Lζ Lλ Mα Mμ Nζ Oσ Oφ(*add. in marg.* al' lineam) Pζ Pι Qε
         Sβ Sθ Vα Vγ Vυ Wβ Xγ Xδ; *add.* finalem Eλ; *add.* finis Kε Kι Qζ Qη; *add.* finis Mτ; *add.*
         scilicet finem Bθ Vβ; *add.* super finem Vπ; *add.* vel super finem Qμ; *add. interlin.* finem Pα
              octave] 8ᵉ / 8 / 8ᵛᵉ *some*; 6 Pγ; 9ᵉ Bβ; gradus Pν; *add.* in finem Mo

2-3   super ... ceciderit] *marg.* Qθ   octave ... lineam] *om.* Nε

[CHAPTER 37.] ON THE EQUATION OF THE 12 HOUSES BY AN ASTROLABE

    When you wish to equate [i.e., "cast"][1] the 12 houses, place the ascending degree on the eighth

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[1] The medieval term for casting the houses is "equalization", or "finding the equation of the houses" (from the Arabic). See Josep Casulleras and Jan P. Hogendijk, "Progressions, Rays and Houses in Medieval Islamic Astrology: A Mathematical Classification," *Suhayl*, 11 (2012), p. 39; Josep Casulleras, "The Instruments and the Exercises of Astrology in the Medieval Arabic Tradition," *Archives Internationales d'Histoire des Sciences*, 63 (2013), p. 517. See also below, the comment to this capitulum.

hore pone; tunc gradus qui ceciderit super lineam medie noctis est initium secunde
domus. Deinde reducto gradu ascendentis ad finem 10ᵉ hore, gradus inventus super
5   predictam lineam medie noctis est initium tertie domus. Reduces quoque eundem

3   hore] *add.* inequale Kα; *add.* scilicet finem octave hore Zα; *add. illeg.* finem Oβ   pone]
         add. et super ultimam lineam 8ᵉ hore quod due hore equivalent Xᵉ domus Dδ   tunc]
         et Bε Mμ Nζ Pι; etiam Vα; super Bη; *add. interlin. illeg.* Pφ   gradus] *om.* Eσ; gradum
         Mτ; *add.* super finem 8ᵉ hore Vη; *add.* zodiaci Zα   super] supra *some*; in Bε
             super lineam] *twice* Mο; *corr. to* super finem Mκ   lineam] *marg.* Oη; centrum Cγ
             medie] medii Eυ; *add. interlin.* id est sexta hora Mο   est] *om.* Bζ; erit Cγ Lλ Pζ
         Qε Sβ Sθ Wγ   initium] *marg.* Kα   secunde] *blank* Sλ; 2 / 2ᵉ *some*; *erased* Oϱ) 3
         corr. in marg. to 2ᵉ Kα; 12 / 12ᵉ Dγ Eα; *corr. from* 12 Eδ

4   domus] *add.* et eius nadir in linea meridiana est initium 8ᵛᵉ domus. Mμ Nζ   Deinde
         ... gradu] Iterum pone gradum Mμ Nζ   reducto] deducto Bκ Lζ Nα Sη Sι; inducto
         Vη; reduc Eγ Rδ; relicto Mο; sit eundem Pι   gradu] gradibus Cι; gradum Mν;
         graduum Kα   gradu ascendentis] *om.* Oβ   ascendentis] ascendente Nα;
         ascensionis Mλ; a secund[e] Wλ; *add.* prius dicti Mι Nγ; *add. in marg.* al' ascensionis Oφ
             ad] super Mμ Nζ Pι   finem] lineam Bζ Eο Mμ Nζ Pφ Vv; lineam finalem Eλ
         Rε; *add. interlin.* vel lineam Vβ   10ᵉ] 10 / 10ᵐᵉ *some*; decime Mα Mγ Mλ Pϱ Tβ Vv Wμ;
         X Mμ Qε Sβ; Xᵉ Fγ Fε Pζ Sθ   gradus] gradum quod Kε Qζ Qη; tunc gradus Mμ; *add.*
         quem Wβ   inventus] *illeg.* Mα; invenies Dγ Eα Eδ Kε Mv Nγ Oβ Qε Qμ; inveniens
         Bκ Oν Pζ Vπ; inventione Eζ; quem invenies Kι Mτ; qui ceciderit Mμ Nζ; quo invenies Cγ;
         quod invenies Eγ Qζ Qη Wγ; veniens Bθ Bκ Cζ₁ Cζ² Eλ Eϱ Eυ Gα Lζ Lλ Mγ Mκ Mλ Oϱ
         Oφ Pι Pφ Rα Sθ Sι Vβ(*add. interlin.* inventus) Vσ   inventus super] que tang~ Fγ
             super] ad Bη; in Bε; supra Mα

5   predictam] *om.* Fε Mμ Nζ Wλ; dictam Eσ Mτ Nγ Pϱ Qε   lineam ... noctis] *om.* Mκ
             medie noctis] *om.* Bζ Bθ Bκ Cγ Eγ Eλ Eο Eυ Lζ Lλ Mα Mγ Mλ Oφ Pζ Pφ Qα Qε Sθ
         Sι Vγ Vv Vπ Vσ Wγ; *marg.* Sβ; *interlin.* Oσ(*add.* scilicet); *add.* veniens Kα   est] *interlin.*
         Lγ; erit Cγ Lλ Mα Mμ Pζ Qε Sθ Sι; et Pθ   initium] *add.* secunde domus; *repeat*
         Deinde ... initium (*ll. 4-5*) Oϱ   tertie] 3 / 3ᵉ *some*; secunde Cδ Sλ; 2ᵉ Qζ   tertie
         domus] a' 7ᵉ domus 3ᵉ Lγ   domus] *add.* Deinde reducto gradu ascendentis(*interlin.*)
         ad finem 10 hore gradus veniens super predictam lineam Cδ; *add.* et eius nadir(nadyr
         Mμ) in linea meridiana est initium 9ⁿᵉ domus Nζ; *add.* et spacium in zodiaco inter
         modum est spacium domus et illo modo intelligas de aliis spaciis domorum Dδ; *ms* Sλ
         ends (Cap. 42-44 are found earlier in the ms)   Reduces] Reduc Eγ Vγ; reducens Eϱ Mη
             Reduces quoque] Reducesque Lη Pι   eundem] *om.* Eλ

5-6   eundem gradum] eiusdem gradus Oη

5-7   Reduces ... domus] *om.* Mμ Nζ

hour [line]; then the degree which will have fallen on the mid-night line is the beginning of the second house. Then the degree of the ascendant having been returned to the end of the 10th hour,[2] the degree found on the aforementioned mid-night line is the beginning of the third house. And you will also move the same

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[2] The tenth hour is from 9 to 10; therefore the end of the tenth hour is the tenth hour line itself.

gradum ad orizontem orientalem, et erit eius nadir in orizonte occidentis; gradus vero in eadem prenominata linea existens erit initium quarte domus. Pones etiam nadir

6   gradum] *add*. ascendentem Cγ Eγ Oβ Oσ(*marg*.) Pι Wγ; *add*. "domus chart" Bβ; *add*. *interlin*. scilicet ascendentis Vβ   ad] *add*. eiusdem Oβ   orizontem] corizontem Bθ; occidentem Bδ; orisontem Bβ; orizonta Fα Fζ   orizontem orientalem] orientem orizontem orientalem Mν; orizonta orientalem Oτ; orizonte orientale Cγ
            orientalem] occidentalem Vψ; occidentalem *corr. to* orientalem Zα   orientalem ... orizonte] *marg*. Bβ   et ... occidente] *om*. Oβ   erit] *om*. Bε Cγ Cι Dη Eσ Fα Fβ Fζ Kδ Kε Lβ Lγ Lε Lη Lμ Mπ Mυ Nα Nδ Nε Oγ Oυ Pβ Pδ Pθ Pν Pϙ Pω Qγ Qθ Sδ Sη Tβ Vη Vι Vψ Wα Wμ Xβ; est Bζ Bδ Bη Bθ Bκ Cδ Cζ₁ Cζ₂ Eυ Gα Lζ Mγ Mλ Mo Oη Oϙ Oφ Pτ Pφ Qδ Sι Vα Vβ Vν Vπ Vφ Xγ Wλ; vel Mτ Qζ Qη   erit ... occidentis] *om*. Fε Mι Nγ
            eius] *om*. Bζ Pα Zα   eius ... occidentis] *om*. Qα   nadir] gaudair Sκ; gnadair Cι Fβ Pδ Pθ Qλ Wα; gnadayr Cε Mη Nε Vψ; gnadir Dδ Mπ Rδ; nadair Bθ Bι Dη Eβ Eδ Eζ Eμ Fα Lβ Lγ Lη Mν Mυ Mφ Oζ Oι Oξ Oϙ Oτ Oυ Pα Pξ Po Pσ Pυ Pω Qγ Qδ Qμ Sδ Sη Tδ Vβ Vι Vν Vπ Vϙ Vυ Xγ; nadair *corr. to* nadir Mκ; nadar Oγ; nadayr Cδ Cη Fζ Lε Lζ Mγ Oσ Pγ Pτ Qβ Wι; nadyr Mδ Oν Oφ Qη Qθ Vξ Vσ Wλ Xδ   orizonte] orizontem Mν Mτ   occidente] *illeg*. Kα; orientale Pι   vero] *om*. Fε Oβ Pι Qα; autem Bε; quoque Eα Mι Nγ Oι; *add. interlin*. id est nadair Pζ

6-7   vero ... existens] iterum in linea medie noctas Fγ

7   in] *om*. Cζ₂   eadem] *om*. Bε Fε Mκ Vπ Vϙ Vσ Xδ; ea Nγ   prenominata] *om*. Kθ Oβ; dicta Fε; medie noctis Bβ Cγ Eα Eδ Eγ Eζ Mν Pι Po Wγ; predicta Vγ; prenota sive prenominata Vσ; prenotata Cε Cζ₁ Cζ₂ Nγ; prenotata sive prenominata Bθ Eυ Mκ Vπ; scilicet(*interlin*.) medie noctis Wβ; *add*. medie noctis Vη; *add. interlin*. scilicet medie noctis Bι Bε   linea] *add*. medie noctis Fε Kα Qμ Rε Vξ Wμ Xβ Zα; *add*. meridionali Sι; *add*. scilicet medie noctis Dγ Oβ Oι(*marg*.) Oσ(*interlin*.) Pω(*interlin*.) Vβ(*interlin*.)
            existens] *om*. Qθ   erit] est Dδ Dη Fγ Kα Oσ Pι Wλ   quarte] 4 / 4ᵉ / 4ᵗᵉ *some*   domus] *om*. Bδ Cι Eσ Fβ Fζ Kα Lβ Lγ Lε Lη Lμ Mη Mπ Nδ Nε Oζ Oξ Oτ Oυ Pα Pβ Pθ Pν Pϙ Qθ Qλ Rδ Sδ Sκ Tδ Vη Wα Wμ Xβ Xδ Zα; *marg*. Oι   Pones] Deinde pone Pι; Pone Vφ; Ponas Eσ; Ponens Vα; *add*. igitur Kι   etiam] *om*. Cζ₂; eius Tβ; ergo Vγ; igitur Kε Mτ Mφ Vι; iterum Mμ Nζ; *add*. grad~ Sι Vφ   nadir] gaudayr Sκ; gnad' Mπ; gnadair Cι Fβ Pδ Pθ Qλ W; gnadayr Cε Mη Nε Vψ; gnadir Rδ; nadair Bι Dη Eβ Eδ Eζ Eυ Fα Lβ Lγ Lε Lη Mν Mφ Mυ Nδ Oζ Oι Oξ Oτ Oυ Pα Po Pσ Pω Qβ Qε Qμ Sδ Sη Tδ Vβ Vι Vν Vπ Vϙ Vυ; nadair *corr. to* nadir Mκ; nadar Oγ; nadayr Bγ Bκ Cδ Cη Lζ Mγ Oσ Pγ Pτ Qγ Qδ Wι Xδ; nardir Bδ Mι Nγ; nadyr Kθ Mδ Mμ Oφ Pι Qθ Vξ Vσ Wλ

7-12   eadem ... sexte] *damaged/illeg*. Xγ³

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³ From fol. 19ᵛ onwards in ms Xγ, whatever text which might be there is illegible due to damage to the ms.

degree back toward the eastern horizon, and its nadir will be on the western horizon; indeed the degree lying on the same aforementioned line will be the beginning of the fourth house. Also you will place the nadir

gradus ascendentis super finem secunde hore, et tunc predicta linea indicabit tibi
initium quinte domus. Si autem posueris idem nadir super finem quarte hore, cadet
10   initium sexte domus super eandem lineam medie noctis. Initium autem septime domus

8   ascendentis] a secund[e] Wλ   super] *om.* Cι   finem] *om.* Eγ Eυ; eam Lμ
        secunde] 2 / 2ᵉ *some*; tercie *corr. in marg. to* secunde Sκ   hore] *om.* Oζ Pϱ; *add.* ᵍˡᵒ
hoc est per duas horas plus ˢᵃ Vβ   et tunc] in Pγ; Item Vπ   tunc] *om.* Dη Qθ;
gradu~ in Pι; *add.* hoc est per duas horas plus Oφ Pφ; *add.* planeta in Bε   tunc … tibi]
gradus cadens super lineam medie noctis est Mμ Nζ   predicta] dicta Eκ; predictam
Qβ; predictum Mι Nγ; *add.* scilicet Fα   linea] *om.* Cε Fβ Fζ Lβ Lγ Lε Lμ Mδ Mη Mι
Mo Mπ Nα Nγ Nδ Oξ Oυ Pβ Pδ Pθ Pν Pσ Pυ Pω Qβ Qγ Qθ Qλ(*add. interlin.* scilicet linea
medie noctis) Sη Tδ Vη Vψ Xδ; *interlin.* Oτ; *marg.* Oι Wα; *add.* medie noctis Dδ Fε Pξ Rε
Xβ Wγ Zα; *add.* medie noctis existens Pι; *add.* scilicet(*om.* Fα) medie noctis seu anguli
terre per gradus qui tunc super eam ceciderit Eσ Fα; *add.* scilicet medie noctis Oβ
Vβ(*interlin.*)   tibi] *om.* Bε Bζ Eλ Mγ Mλ Pι Vν

9   initium] *marg.* Qλ; principium Lλ Mα Eγ Pζ Qα Sβ Sθ Wγ; *corr. from* gradus Qη; *add.*
interlin. principium Vβ   quinte] 5 / 5ᵗᵉ *some*; V Qε   domus] *marg.* Oι; *add.* et eius
nadir in linea meridiana est initium 11ᵐᵉ domus Nζ   Si] Cum Wβ   Si … idem]
Iterum pone Nζ   Si … finem] *om.* Vη   posueris] possuerint Sι; posuerimus Mα;
posuis Lβ   idem] *om.* Bκ   nadir] gnadair Cι Cλ Fβ Pδ Pθ Wα; gnadayr Cε Mη
Nε Vψ; gnadir Rδ; gnadyr Sκ; gnaⁱʳ Mπ; nad' Gα; nadair Bι Dη Eα Eβ Eδ Eζ Eυ Fα Lβ Lγ
Lε Lη Mν Mφ Mυ Nδ Oζ Oι Oξ Oϱ Oτ Oυ Pα Po Pϱ Pσ Pω Qα Qβ Qγ Qμ Sδ Sη Tδ Vβ
Vν Vπ Vϱ Vυ; nadair *corr. to* nadir Mκ; nadar Oγ; nadayr Bγ Cδ Cη Fζ Lζ Pγ Qδ Wι Xδ;
nadyr Bκ Cζ₁ Pι Qθ Vξ Vσ Vφ Wλ; nardir Mι Nγ; *add.* ascendentis Mμ Nζ Zα; *add.*
gradus ascendentis Bη; *add.* scilicet gradus ascendentis Dδ Vβ(*interlin.*)   finem] eam
corr. interlin. to finem Lμ   quarte] 4 / 4ᵗᵉ *some*; IIII Qε   hore] *om.* Pι; *add.* super
lineam medie noctis Bε   cadet] erit Eλ Vπ; erit eadum Bη

9-10   initium … noctis] *om.* Pξ   domus … sexte] *bottom marg, illeg.* Pτ   cadet… noctis]
initium 6ᵉ domus est super eandem regulam in 4 noctis 6 Pν

9-12   et gradus cadens super lineam medie noctis erit initium 6ᵉ domus et eius nadir in linea
meridiana est initium 12 domus. Et sic habebis 12(omnes Mμ) domos. Mμ Nζ

10   initium₁] *om.* Eυ   sexte] 6ᵉ / 6ᵗᵉ *some*; VI Qε; VIᵉ Sβ; *twice* Qα   super] si Cζ1
        super … noctis] *om.* Bε   eandem] *om.* Cγ Eγ Fγ Lλ Mα Mτ Pζ Qε Qζ Qη Sβ Sθ
Vγ Kε; dictam Fε; predictam Bη Cζ₁ Cζ₂ Oη   lineam] regulam Bδ Cι Eη Fα Fβ Fζ Lβ
Lγ Lε Lη Mη Mι Mo Mπ Mφ Nγ Nδ Oζ Oξ Oτ Oυ Pα(*corr. in marg. to* lineam) Pβ Pδ Pθ
Pϱ Pσ Pυ Pω Qβ Qγ Qθ Qλ Sδ Sη Sκ Tδ Vψ Wα Xβ Xδ   medie] *om.* Vυ; in 4 Xδ
        noctis] *add.* Et tunc semper nadir graduum super initia oppositarum domorum,
quare scilicet Fγ; *add.* gradus initium prima domus est principium gradus ascendentis et
ducat usque ad initium 2ᵉ domus et nam/iam habemus 6 domus complete Dδ
        Initium₂] Ita initium Cι   autem] *om.* Fγ Oζ Pϱ Vπ; vero Eo   septime] 7 / 7ᵉ
some; VII Pζ Qε; VIIᵉ Sβ; 2ᵉ Vα

of the ascendant degree on the end of the second hour, and then the aforesaid line will indicate to you the beginning of the fifth house. If however you have placed the same nadir on the end of the fourth hour, the beginning of the sixth house will fall on the same mid-night line. However the start of the seventh house

est nadir ascendentis. Et initium octave nadir secunde; principium none nadir tercie; et

11   est] erit Sβ; *add.* grad~ Pξ   nadir₁] g~ Rδ; ganadyr Χδ; gnadair Cι Fβ Pδ Pθ Qλ Sκ Wα; gnadayr Cε Mη Nε Vψ; gnadir Mπ; nadair Bθ Bι Dη Eβ Eδ Eζ Eυ Fα Fζ Lβ Lγ Lε Lη Mν Mυ Mφ Nδ Oζ Oι Oξ Oϱ Oτ Oυ Pα Pν Pξ Po Pϱ Pσ Pυ Qα Qβ Qγ Qμ Sδ Sη Tδ Vβ Vν Vπ Vϱ Vυ; nadair *corr. to* nadir Mκ; nadar Oγ; nadayr Bγ Bκ Cδ Cη Pγ Pτ Pω Wι; nadyr Mγ Mδ Oσ Oφ Qδ Vσ Vφ Wλ; nardir Mι Nγ; *add.* gradus Fγ; *add.* prime Rε; *add.* prime id est Eλ; *add.* prime scilicet Oβ Pι; *add. and del.* secunde principium Sθ   ascendentis] prime Kα Kε Kι Mτ Qζ Qη; protūdt(?) procendentis *corr. to.* accendentis Bζ; *add.* et sic de aliis Fγ   Et₁ … tercie] *om.* Qγ   octave] 8ᵉ / 8ᵛᵉ *some*; VIII Pζ Qε Sθ; VIIIᵉ Sβ; *add.* domus Nα Oγ; *add.* domus est Oβ; *add.* est Dδ Eσ Fβ(*interlin.*) Fγ Kε Kι Mα Mτ Mυ Mφ Pβ Vγ Wμ   nadir₂] gᵃdayr Cε; gandayr Χδ; gnadair Cι Fβ Lβ Pα Pδ Pθ Qλ Wα; gnadayr Mη Nε Sκ Vψ; gnadir Rδ; gnaⁱʳ Mπ; nadair Bθ Bι Dη Eβ Eδ Eζ Eυ Fα Lγ Lε Lη Mν Mυ Mφ Nδ Oζ Oι Oξ Oϱ Oτ Oυ Pν Pξ Po Pϱ Pσ Qα Qβ Qγ Qμ Sδ Sη Tδ Vβ Vι Vν Vπ Vϱ Vυ; nadair *corr. to* nadir Mκ; nadar Oγ; nadayr Bγ Bκ Cδ Cη Fζ Lζ Pγ Pτ Wι; nadyr Kθ Mγ Mδ Oσ Oφ Pι Pω Qδ Vσ Vφ Wλ; nardir Mι Vγ   secunde] 2ᵉ *some*; *add.* domus Fγ   principium] *om.* Vσ; principiumque Wλ; initium Eλ Mτ; *add.* autem Bθ; *add.* quoque Bζ Bη Bκ Cδ Cζ₁ Cζ₂ Lγ Lζ Mα Mγ Mλ Oη Oσ Oφ Pζ Qα Qε Qμ Rε Sβ Sθ Vα Vβ Vι Vπ Vυ; *add.* vero Kε Qη; *add.* vero 2ᵉ Oβ   none] 9ᵉ / 9ⁿᵉ *some*; IX Pζ Qε; IXᵉ Sβ; autem cum Eυ; none vel 9ᵉ Mν; *add.* est Eσ Kε Mγ Mτ Oβ Qζ Pφ Rε Qη Tβ Vγ Wγ   none nadir] quoque Sι   nadir₃] gandayr Χδ; gnad Cε; gnad' Mη; gnadair Cι Fβ Lβ Pδ Pθ Qλ Wη; gnadayr Nε Sκ Vψ; gnadir Rδ; gnaⁱʳ Mπ; nadair Bθ Bι Dη Eβ Eδ Eζ Eυ Fα Fζ Lγ Lε Lη Mυ Mφ Nδ Oζ Oξ Oϱ Oυ Pα Pν Pξ Po Pϱ Pσ Qα Qβ Qμ Sδ Sη Tδ Vβ Vν Vπ Vϱ Vυ; nadar Oγ; nadayr Bγ Bκ Cδ Cη Oσ Pγ Pτ Pω Qδ Wι; nadyr Kθ Mγ Mδ Oφ Vσ Vφ Wλ; nardir Mι Nγ   tercie] *om.* Qε; 3ᵉ *some*   et₂] ᵉ.2. Nε; *add.* principium Cγ Eγ Kε Kι Qζ Qη Vγ Wγ; *add.* initium Mτ; *add.* nadyr Vφ; *add.* principium principium vero Oβ; *add. in marg.* initium Bγ

11-12 secunde … nadir₁] *om.* Wβ   principium … quarte] *om.* Lμ Qθ   principium … Principium] *om.* Mκ(*add. in marg.* [*cut off*] 9ᵉ nadyr 3ᵉ, [*cut off*] 10ᵉ nadyr 4ᵉ)   tercie … nadir₁] *om.* Eβ Pξ

is the nadir of the ascension. And the start of the eighth is the nadir of the second; the beginning of the ninth is the nadir of the third; and

decime nadir quarte. Principium undecime nadir quinte et duodecime nadir sexte.

12   decime] *om.* Oη; 10ᵉ / 10ᵐᵉ *some*; X Qε; Xᵉ Fε Pζ Sβ Sθ; pricipium Xᵉ Fγ; ideo *corr. interlin to* 10ᵉ Sκ; *add.* domus initium est Mo; *add.* est Eσ Kε Mτ Oβ Qζ Qη Vγ Wγ   nadir₁] *om.* Cδ Fε Vξ; gandayr Xδ; gna Mπ; gnᵃd' Mη; gnada Cε; gnadair Cι Fβ Lβ Pδ Pθ Qλ Wα; gnadayr Nε Sκ Vψ; gnadir Rδ; nadair Bι Dη Eδ Eζ Eυ Fα Fζ Lγ Lε Lη Mν Mυ Mφ Nδ Oζ Oι Oξ Oϱ Oτ Oυ Pα Pν Pϱ Pσ Po Pυ Qα Qβ Qγ Qμ Sδ Sη Tδ Vβ Vν Vπ Vϱ Vυ; nadar Oγ; nadayr Bγ Bκ Cη Lζ Oσ Pγ Pτ Pω Qδ Wι; nadyr Mδ Pι Vσ Vφ; nardir Mι Nγ Wλ; initium Qη Kε   quarte] 4ᵉ *some*; IIIIᵉ Sβ   quarte ... nadir₂] *om.* Pτ Pυ Wλ   Principium] *om.* Bη Cζ₁ Cζ₂ Bκ Eλ Eo Eσ Fε Lζ Lκ Mγ Nα Nδ Oη Sη Vν Vσ Xδ; et Bδ Bζ Eυ Mδ Nλ Oφ Pξ Pφ Rε Sι Vσ; initium Mτ Pι; *add.* vero Cδ Qα Vβ   Principium undecime] 11ᵉ vero principium Vα; Undecime(XIᵉ Pζ) vero principium erit Mα Oσ(est) Pζ Qε Vυ   Principium ... quinte] *om.* Bθ; et 11ᵉ nady[*cut off*] Qδ(*marg.*); et nadir 5ᵉ est principium 11ᵉ domus Mo   Principium ... duodecime] et 5ᵉ et 2ᵉ Vπ; et secunde Pϱ   undecime]⁴ *illeg.* Eη; 11ᵉ / 11ᵐᵉ *some*; XI Eγ; XIᵉ Fγ Sθ; 2ᵉ / secunde Dγ Dδ Eδ Mν Po Tβ Tδ Vϱ; 13ᵉ Pγ; *add.* erit Sβ Sθ; *add.* est Cδ Kε Kι Mτ Oβ Qα Qζ Qη Rε Vγ Wγ; *add.* vero Lλ Oϱ Qα Sβ   undecime nadir] *marg.* Wα(gnadair)   nadir₂] gnad' Cε Mη; gnadair Cι Fβ Pδ Pθ; gnadayr Nε Sκ Vψ; gnadir Rδ; gnaⁱʳ Mπ; nadair Bι Dη Eβ Eδ Eυ Fα Lβ Lγ Lε Lη Mδ Mν Mυ Mφ Oζ Oι Oξ Oϱ Oτ Oσ Oφ Oυ Pα Pν Pξ Po Pσ Qα Qβ Qγ Qμ Sδ Sη Tδ Vβ Vι Vν Vϱ Vυ; nadar Oγ; nadayr Bγ Cδ Cη Eκ; nadyr Fζ Lζ Mγ Pγ Pι Pω Vσ Vφ Wι Xδ; nardir Nγ   nadir₂ quinte] *om.* Eζ   quinte] *om.* Lγ; 5ᵉ *some*; V Qε; Vᵉ Sβ; 6 Pν   quinte ... nadir₃] *om.* Sκ(*add. in marg. later hand* 5ᵉ et 12ᵉ gnadir)   et] initium Mτ; principium Cγ Eγ; *add.* principium Kι Oβ Qζ Qη Wγ; *add. in marg.* initium Bγ   et ... sexte] *rep.* Nα   duodecime] 12ᵉ / 12ᵐᵉ *some*; XII Eγ Qε Sβ; XIIᵉ Pζ Sθ; duoᵐᵉ Sι; 13 Pγ; principium XIIᵉ Fγ; *add.* est Kε Mτ Oβ Wγ; *add.* principium est Pξ   duodecime ... sexte] Et nadir 6ᵉ domus est initium 12ᵉ domus Mo   nadir₃] gᵃdayr Cε; gnad' Mη; gnadair Cι Fβ Lβ Pα Pδ Pθ Qλ Wα; gnadayr Nε Vψ; gnadir Mπ Rδ; nadair Bθ Bι Dη Eβ Eδ Eζ Eυ Fα Lγ Lε Lη Mν Mυ Mφ Nδ Oζ Oι Oξ Oϱ Oτ Oυ Pβ Pν Po Pϱ Pσ Qα Qβ Qγ Qμ Sδ Sη Tδ Vβ Vν Vπ Vϱ Vυ; nadar Oγ; naday Qδ; nadayir Oσ; nadayr Bγ Bκ Cδ Cη Fζ Lζ Pγ Pτ Pω Wι Xδ; nadyr Mγ Mδ Oφ Pι Vξ Vσ Vφ Wλ; nardir Mι Nγ; initium Kι; *add.* initium Qη   sexte] 6ᵉ / 6ᵗᵉ some; VI Qε; VIᵉ Pζ; *add.* domus Pι; *add.* est Qζ; *add.* Sequitur Bβ; *add.* a scilicet scet/soet(*?*) ad 8ᵐ prime finis nadir 6 finem sequentes finem quarte nadir [*illeg.*] Kα; *add.* et sic invenies quod queris Nα; *ms* Qα *continues with other astrolabe material*

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⁴ "Undecime", if abbreviated to "11ᵉ", could lead a copyist to write "secunde" instead, mistaking the eleven for the roman numeral "II".

of the tenth the nadir of the fourth. The beginning of the eleventh [is] the nadir of the fifth, and of the twelfth the nadir of the sixth.

[ADDENDUM 37]

add. Bβ:

Capricornus Aquarius	– domus Saturni
Pisces Sagitarius	– domus Jovis
Aries Scorpius	– domus Martis
Leo	– domus solis
Libra Chancus(*!*)	– domus Veneris
Virgo Gemini	– domus Mercurius
Taurus	– domus lune

[ADDENDUM 37]

Capricorn   – home of Saturn
Aquarius

Pisces   – home of Jupiter
Sagitarius

Aries   – home of Mars
Scorpios

Leo   – home of the sun

Libra   – home of Venus
Cancer

Virgo   – home of Mercury
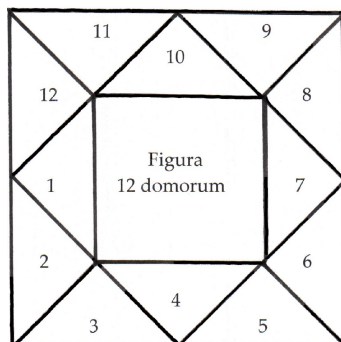Gemini

Taurus   – home of the moon

[FIGURA 37]

Figura 12 domorum

[*Complete diagram*] Bζ(*later hand*) Bι Eκ Kθ Lζ Mλ Nδ Nζ(f. 114ᵛ) Oξ Oυ Oφ Po Pω Qγ Qλ
Rδ Rε Sβ Sδ(*later hand*) Zα
[*Outline only*] Mδ Wι

Figura 12 domorum] Eκ(duodecim) Lζ Nδ Oξ Oυ Oφ Qγ Qλ Po Pω; *om*. Bζ Lζ Mλ Sβ Sδ Zα;
Figura dispositionis 12 domorum Rε; Figura duodecim domorum accidentalium Mλ
Quatuor anguli cardinales Nζ; Sequitur figura duodecim domorum quia hic non intransat[5] etc.
etc. Rδ; Sᵘ(= Sequitur?) 12 domorum planetarum Kθ; Tabula 12 domorum Bι

1/1ᵃ] Cap[ricornus] 3 Bζ; 1ᵗᵃ domus Oξ; 1ᵃ/prima domus Kθ Nδ Oυ Pω Qγ Qλ Rδ Rε; Prima
domus vel ascendens Mλ   2/2ᵃ] *om*. Qλ; Aq[uarius] 13 Bζ; *add*. domus Rε   3/3ᵃ] *om*. Qλ;
Pis[ces] 13 Bζ; *add*. domus Rε   4/4ᵃ] *om*. Qλ; Tauri 13 Bζ; *add*. domus Rε; *add*. angulus terre Rε
          5/5ᵃ] *om*. Bζ Qλ; *add*. domus Rε   6/6ᵃ] *om*. Qλ; Cancer 28 Bζ; 16ᵃ Eκ; *add*. domus Rε
          7/7ᵃ] *om*. Qλ; Gemi[ni] 16 Bζ; *add*. domus Rε   8/8ᵃ¹] *om*. Qλ; *illeg*. 3 Bζ; *add*. domus Rε
          9/9ᵃ] *om*. Qλ; Leo 13 Bζ; *add*. domus Rε   10/10ᵃ] *om*. Qλ; Vi[r]g[o] 13 Bζ; *add*. domus Rε
          11/11ᵃ] *om*. Qλ; Scor[pio] 8 Bζ; *add*. domus Rε   12/12ᵃ] *om*. Qλ; 2 Zα; Scor[pio] 28 Bζ;
add. domus Rε

add. Exm [=Exemplum?] 3 Cap[ricornus] ascendens Bζ   12, 1, 2] *add*. oriente Zα   3, 4, 5]
add. occidente Zα

[This diagram appears (mainly in the margins) in the manuscripts indicated. It presents diagram-
matically the order of the houses around the heavens beginning with the first house at sunrise in
the east.
    It should also be noted that this diagram was often used to lay out the positions of the
planets, sun and moon at a specific point in time whenever an astrologer was developing a
horoscope.[6]]

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[5] In ms Rδ, this legend falls at the bottom of a column where there is no space for the diagram; it
therefore appears at the top of the next column.

[6] See North, *Horoscopes and History*, p. 2.

[Appendix 37: Version B]

mss Pκ Pχ Vμ Wζ

Cum 12 domos celi volueris adequare, sciras gradum ascendentis et pone eum super primum almucantharat in oriente, et est initium prime domus; et eius nadir est initium 7me domus. Et tunc vide gradum cadentem super lineam medie noctis, et est initium 4^{e} domus; et eius nadir cadens super lineam meridiei et initium 10^{e} domus. Et hec quatuor domus dicuntur anguli.

5

Postea pone gradum ascendentis super finem octave hore et gradus qui ceciderit super lineam medie noctis est initium 2^{e} domus; et eius nadir in linea meridana est initum 8^{ve} domus. Item pone gradum ascendentis super lineam 10^{e} hore, tunc gradus qui ceciderit super lineam medie noctis est initium 3^{e} domus; et eius nadir in linea meridiana erit initium none domus.

10

Item pone nadir gradus ascendentis super finem 2^{e} hore, et gradus cadens super lineam medie noctis erit initium 5^{e} domus; et eius nadir in linea meridiana est initium 11me domus. Postea pone nadir gradus ascendentis super finem 4^{e} hore et gradus cadens super lineam medie noctis erit initium 6^{e} domus; et eius nadir in linea meridiana erit initium 12^{e} domus. Et sic habebis omnes domus.

15

1   celi] *om.* Pκ Pχ Wζ   ascendentis] ascendentem Vμ

2   almucantharat] almi^{at} Wζ; almicantrath Vμ; almut~ Pκ Pχ

3   cadentem] *om.* Pκ Pχ Wζ

6   ascendentis] ascendentem Vμ   finem] *corr. interlin. from* similem Pκ   octave] *add. interlin.* 2° Pκ Pχ   hore] *add. interlin.* post medium noctem Pκ Pχ

8   10^{e}] *add. interlin.* 4 / 4te Pκ Pχ

9   est] erit Pκ Pχ Wζ

10   erit] est Pκ Pχ Wζ

11   2^{e}] 8^{e} Pχ

12   5^{e}] 4^{e} Vμ

12-13   et ... domus] *om.* Pκ Pχ

13   11me] 12 Wζ   Postea] Item Pκ Wζ   gradus] *om.* Wζ   4^{e}] *add. interlin.* 10^{e}Pκ

14   erit$_2$] est Wζ

15   sic] *om.* Pκ Vμ   domus$_2$] *add.* equatus Vμ

[Comment:

When casting a horoscope, the astrologer begins with the day and time of the event (birth, battle, etc.) and the positions of the sun, stars and planets at that time. The sky itself is divided into twelve "houses", each two unequal hours long, beginning at the "ascendant" (the point along the ecliptic rising above the horizon at the chosen time). Astrologers agree on the four main points of division – the ascendant (beginning of the first house), mid-heaven where the ecliptic intersects with the meridian in its upper culmination (beginning of the tenth house), the descendant or the point on the ecliptic setting at the same time (seventh house) and the point on the ecliptic intersecting with the meridian in its lower culmination (fourth house). The issue then becomes, how to divide these sections into their three sub-sections.

Early astrological systems considered the houses to be the entire segment of the ecliptic marked off by any one zodiacal sign, with the beginning of the houses set at the beginnings of the signs. But later systems, including the one being dealt with here (now known as the "standard" method) set the beginning of the first house at the degree of the zodiacal sign of the ascendant and work from there; so if at the time of the horoscope the ascendant is in the 20th degree of Taurus, then the first house begins at Taurus 20°.

As a result of the daily rotation of the earth (or, for this text, the equivalent but opposite motion of the sphere of the fixed stars) the houses move and change continually. Time is measured along the equator by means of the right-ascension circles through the poles and at right angles to the equator. Thus the houses are actually measured along the equator and their beginnings and ends are plotted on the ecliptic (and relative to the signs of the zodiac) by circles of right ascension. The houses, of course, are not equivalent to the zodiacal signs (of 30 degrees) because they are equal divisions along the celestial equator of either the arc of the day or the arc of the night (thus defining the unequal hours), and when the right ascensions of these points are extended to the ecliptic they produce unequal divisions of the ecliptic. It should also be noted that the division of the sky into houses using an astrolabe also depends on the latitude of the plate being used. (In my example I use a plate for the latitude of 42°.)

To properly relate the 2-hour arcs of the equator with the signs of the zodiac (along the ecliptic) one uses the central vertical line of the astrolabe. Obviously setting the ascendant on the mid-sky line of the astrolabe (the 6th hour line, from the centre down to the north or bottom rim) produces the beginning of the first house at the ascendant itself (Taurus 20°). The next step is to rotate the rete so that Taurus 20° is on the 8th hour line, and the next house – the second – will begin where the ecliptic intersects with the mid-sky line, i.e., Gemini 14°. Moving the ascendant (Taurus 20°) to the 10th hour line, the third house will begin where the ecliptic intersects with the mid-sky line, Cancer 6°. Again, moving the rete back so that the ascendant is on the 12th hour line, i.e., the horizon, the fourth house will begin at the ecliptic/mid-sky line intersection, Cancer 28°.

Since hour lines are not inscribed in the top half of the astrolabe (above the horizon line), one has to work with the opposite point from the ascendant (its "nadir") on the right or western side of the astrolabe, i.e., Scorpio 20°. Placing the "nadir of the ascendant" (Scorpio 20°) on the 2nd hour line, the fifth house will begin at the ecliptic/mid-sky line intersection, Virgo 4°. Placing the nadir on the 4th hour line, the sixth house will begin at Libra 12°.

The nadir of the ascendant itself is the beginning of the seventh house (Scorpio 20°). And the nadirs (or opposites) of the beginnings of each of the first set of houses, will begin the rest of the houses: the nadir/opposite of the second house will be the beginning of the eighth house (Sagittarius 14°); of the third house will be the beginning of the ninth house (Capricorn 6°); of the fourth house will be the beginning of the tenth house (Capricorn 28°); of the fifth house will be

the beginning of the eleventh house (Pisces 4º); and the nadir of the sixth house will be the beginning of the twelfth house (Aries 12º).

By knowing what part or parts of the zodiac is or are found in a particular house (i.e., the 2-hour time slot for which a horoscope is being cast) one can then interpret the influences of that part of the zodiac (and of the celestial objects found in it at that time) when preparing the final horoscope.

The "casting" (or finding the equation of) astrological houses has been studied in detail by John North and E.S. Kennedy. North classifies this method of casting the houses as the Standard Method (Rotating Rete).[7]]

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[7] J.D. North, *Horoscopes and History* (London: Warburg Institute, 1986), and E.S. Kennedy, "The Astrological Houses as Defined by Medieval Islamic Astronomers," in Josep Casulleras and Julio Samsó, *From Baghdad to Barcelona: Studies in the Islamic Exact Sciences in Honour of Prof. Juan Vernet* (Barcelona: Instituto "Millàs Vallicrosa", 1996) 2: 535-578; reprinted in Kennedy, *Astronomy and Astrology in the Medieval Islamic World* (Aldershot: Variorum, 1998). For the Standard Method (Rotating Rete and Fixed Rete), see especially North, pp. 58-59, and Kennedy, pp. 538-540.

I would like to acknowledge and thank Josep Casulleras and Julio Samsó for their help in analysing Capitula 37 to 40.

[CAPITULUM 38.] DE EODEM, SED ALITER

Item, habito ascendente et aliis tribus angulis, pone regulam noviter super rethe

Cap. 38] *om.* Bζ Bη Bι Bκ Cδ Cζ₁ Cζ₂ Dγ Eγ Eo Eϱ Fε Gα Lι Lλ Mα Mγ Oη Oσ Pζ Pι Pκ Pχ Qε Qμ Rα Sβ Sθ Sι Vα Vγ Vν Vϱ Vυ; *marg.* Mλ; *upper marg.* Vφ(*fol. 17ʳ*); *lower marg.* Eμ(*fol. 61ʳ*)

1   De ... aliter] *om.* Bβ Bγ Bδ Cγ Cε Dδ Eα Eδ Eζ Eκ Eλ Eμ Eυ Mκ Mλ Mμ Mν Mτ Nα Nζ Oβ
         Oν Pγ Pξ Po Pσ Pφ Qη Rε Sη Tβ Vη Vμ Vπ Vσ Wζ Xβ; *faded* Fγ; [*illeg.*] de eodem Lμ; Ad
         equatio 12 domorum alia per allidadam novellam Kι Qζ; Aliter Mι Nγ; Aliter ad idem
         Vξ; Capitulum aliud de eodem Bε; De adequatione 12 domorum per novellam Mυ Vβ Vι
         Wι; De altera Mπ(*add. interlin. illeg.*); De earundem adequatione per novellam Pτ; De
         eodem alio modo Kα(*add.* Capitulum) Pϱ; De eodem per aliam formam Zα; De eodem
         per allidadam nuper super rethe constatutam Mλ; De eodem secundem alium.
         Capitulum Pβ; De equationem 12 domorum per novellam Wβ; De equationibus
         domorum sed aliter Bθ Pδ; Item aliter de eodem Dη; Item de eodem Kθ Lμ Oφ(*add. in
         marg.* De eodem) Qθ(*later hand*); Item de eodem licet aliter etc. Rδ; Item de equationibus
         12 domorum habito ascendente Mo; *add. in marg.* 39 Vμ; *add. in marg.* 40 Mκ Pκ; *add. in
         marg.* 41 Oϱ(C. 41) Sδ(Cᵒ 41, *later hand*); *add. in marg.* Istud capitulum "Habito
         ascendente" etc. est superadditum cum duabus capitulis immediate subscriptibus,
         videlicet "Si autem aspectus" etc. et "Radiationum alia dextra" etc. Vβ   sed] *om.* Oγ;
         et Mη; scilicet Kδ; sit Fβ   aliter] *illeg.* Fβ Pν; aliut Lβ; *add.* Capitularum Pν; *add.*
         Capitulum Cη Eη Kδ Lε Mη Nε Oι Oξ Oτ Oυ Pα Pθ Pυ Qβ Qγ Qλ Sδ Sκ Tδ Wα; *add.*
         Rubrica Qδ

2   Item] *om.* Bδ Bε Cγ Cε Cι Dη Eβ Eη Eσ Fα Fβ Fε Fζ Kα Kδ Lβ Lγ Lε Lη Mδ Mη Mι Mμ
         Mπ Mφ Mυ Nγ Nδ Nε Nζ Oγ Oζ Oι Oξ Oϱ Oτ Oυ Oφ Pα Pβ Pθ Pκ Pν Pξ Pϱ Pσ Pφ Pχ
         Pω Qβ Qγ Qζ Qθ Qλ Rδ Sδ Sκ Tβ Tδ Sδ Vβ Vη Vι Vμ Vν Vψ Wβ Wζ Wμ Zα; Notationem
         fractionem 12 domorum q' sic fit Oβ   Item habito] Scito Eμ Kι Lμ; Adequatio 12
         domorum alia per allidadam novellam scito Qη   Item ... regulam] Adequatio
         domorum 12 alia per alidandam volvellam Mτ   habito] scito Kε; *add.* gradus Oβ
                ascendente] *twice* Pθ; ascendens Pγ; descendente Fε   et] et si Pγ; in Dδ Oϱ; *add.*
         in Eζ Pϱ   tribus] *om.* Vψ; 3 *some*   angulis] *blank* Eλ; angulos Eυ   angulis ...
         regulam] regulis Kα   pone] move (?) Xβ   regulam] novellam sive vovellam Oβ;
         add. illeg. Eλ   noviter] Mκ; *om.* Cε Rε Sη; nolvellam Wμ; novela Cγ; novelam Kδ;
         novellam Bβ Bδ Bε Cι Dη Eβ Eη Eμ Eσ Fβ Fγ Fε Fζ Kα Lβ Lγ Lε Lη Lμ Mδ Mη Mι Mμ
         Mπ Nα Nγ Nδ Nε Oζ Oξ Oϱ Oτ Oυ Oφ Pα Pβ Pδ Pθ Pμ Pν Pξ Pϱ Pτ Pφ Qβ Qγ Qη Qθ
         Qλ Sδ Tβ Tδ Vβ Vη Vψ Wα Wβ Xβ Xδ; novellam noviter Kε Kι; novellam seu vovellam
         noviter Oβ; novellarum Eα; novelle Oγ; novelli Sκ; novi Mo; sive novella Vμ Wζ;
         super(*interlin.*) noneliam novit' Qζ; super volvellem Pκ Pχ; vollellam Kθ Pσ Zα;
         volvellam Mυ Mφ Oι Rδ Vι; vovellam *corr. to* volvellam Fα; sive volvella Nζ; *add.*
         factum(?) Vξ; *add.* inventam Qδ   super] *interlin.* Mκ   rethe] *om.* Eσ; rete *some*;
         twice Pγ; *add.* astrolabii Oβ

2-3   Item ... et₂] *cut off* Vφ

[CHAPTER 38.] ON THE SAME, BUT DIFFERENT[1]

Likewise having obtained the ascendant and the other three angles, place the rule you set on the rete a short while ago

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[1] Some mss continue on from the previous capitulum without a break.

constitutam super gradum ascendentem, et gradus limbi inter eam et armillam vel
punctum meridianum divisi in tres partes equales sunt ascensiones trium domorum ab
ascendente in meridiem; unde si posueris eam super primam tertiam ab ascendente,

5

3   constitutam] *om.* Mμ Mυ Mφ Nζ Pκ Pχ Vι Vμ Wζ; sitam Oφ(*add. in marg.* al' constitutam)
        ascendentem ... gradus] *om.* Pφ; *marg.* Oφ   gradus] gradum Vξ   limbi]
      illeg. Nα; corr. from limbum Fβ; limi|limbi Oτ   inter] in Bθ Vπ   eam et] *om.* Mδ
      Nδ; eam volvellam et Zα; circulum Mφ; *add.* eius Qζ Qη   et₂] *add.* eius Kε Mτ
      armillam vel] *om.* Rε   vel] et Cε Mδ Mo Nδ Oϱ Pυ Qβ Qδ Vβ(*add. interlin.* vel)
      Xβ; sive Oβ; *add.* id est Eλ

4   punctum] puncta seu punctum Xβ   meridianum] mer; idiani Vψ; midium Pθ
        divisi] divisum Kε Nγ Vξ   in] *twice* Eζ   in tres] inter Mη   tres] 3 / 3ᵉˢ
      some   partes] *om.* Oϱ   equales] *om.* Bγ Cη Eκ Vξ Wι Wλ   sunt] *om.* Wμ
        ascensiones] *corr. in marg.* Oξ; *add. in zodiaco* Dδ; *add.* sive estensiones Fε
        trium] 3 / 3ᵐ *some; marg.* Nδ; terminis Oφ(*add. in marg.* al' trium) Pφ
        domorum] *om.* Pω; signorum Vφ   ab] *om.* Pγ Pφ Rδ; in Oφ

4-5   meridianum ... si] *illeg.* Nα

5   ascendente₁] scendente Eυ Nζ   in] ad Bδ Pξ; super Eδ   meridiem] *add. in marg.*
      Sunt ergo 20 partes inequales Tβ   unde] donec Dδ; dum Sκ; usi Fα   si] *om.* Nε
      Wλ   posueris] posuisses Pυ   eam] eadem novellam Pδ; ipsam regulam Eλ; *add.*
      novellam Kε Kι Qζ Qη Tβ; *add.* polvellam(*!*) Mτ; *add.* regulam Dδ; *add. interlin.* id est
      novellam Vβ; *add. interlin.* novellam Wζ; *add. in marg.* scilicet novellam Wα
        primam] *om.* Eη   tertiam] *om.* Mτ Qη; *blank* Kε; 3 / 3ᵐ / 3ᵃᵐ *some*; divisionem Eλ;
      quartam Lμ Pβ; nota 3ᵉ divisionis in margobro Dδ; tertiam ascendentem Qζ(*marg.*); *add.*
      ascendentem scilicet Pκ Pχ Wζ; *add.* q̄ Wβ; ; *add. in marg.* al' 4ᵃᵐ Oφ   ab] *om.* Fε Mι
      Mμ Nγ Nζ Rδ; ad Oτ   ab ascendente₂] *om.* Vφ   ascendente₂] scendente Cγ; *add.*
      huius divisionis Oβ; *add.* usque armillam Zα

on the ascendant degree, and the degrees on the rim between it and the armilla or southern point, divided into 3 [equal] parts, are the ascensions of the three houses from the ascension at noon; whence if you place it on the first third from the ascendant

habebis in zodiaco initium 12ᵉ domus; et super secundam tertiam, initium 11ᵉ domus.
Eodem modo de gradibus limbi inter eam in ascendente et punctum anguli terre

6   in zodiaco] *om.* Vψ; *add.* dictum Kα   initium₁] *om.* Bβ Oτ; principem Oγ
          initium₁ ... tertiam] *om.* Eζ   et] si Eη; et si Bβ Bε Dη Eλ Mκ(*interlin.*) Vσ Xδ; et si
posueris Nα Wλ; ň Mν   super] si Eσ   et ... domus ₂] *repeat* Pρ(11e) secunde); Si
super 22ᵃᵐ initium 11ᵉ domus. Si super 30ᵃᵐ initium 10ᵐ domus Eλ   12ᵉ] duodecim
some; XII Pρ; 2ᵉ Fε   12ᵉ ... initium₂] *marg.* Po   super] similiter Eκ Sκ(*add. in marg.*
si posueris super)   secundam] 2ᵐ / 2ᵃᵐ *some*; 12ᵃᵐ Pθ; 12ᵉ Bδ; 22 Eλ; *add.* et Mη Mτ
          secundam tertiam] tertiam partem divisionis Dδ; 3ᵃᵐ 2ᵃᵐ Nε   tertiam] *om.* Xβ;
3ᵃᵐ / 3ᵐ *some*; *corr. from* quartam Pβ; *add.* ab ascendente Rε; *add.* habebis Eσ Sκ(*marg.*)
          initium₂] *om.* Dη Mμ Mν Mφ Nζ Pκ Pχ Wζ   11ᵉ]² undecime *few*; nec Bθ Pγ Vπ;
2ᵉ Bβ Nγ Tδ Wλ; secunde Cγ Eκ Kα Oφ(*add. in marg.* al' 11) Pρ Pφ; secundo 12ᵉ Bδ; 5 Mτ;
XIᵉ Fγ   domus₂] *om.* Fγ Xδ; *illeg.* Wμ; *add.* habebis Kδ; *add.* habebis in zodiaco Dδ; *add.*
et habebis 12, 11, 10 domus et habebis ex opposito 6, 5, 4 Oβ; *add.* et super secundam
trium initium 10e domus Pω; *add.* et super tertiam initium xᵉ domus Eμ; *add.* et si
pones(ponas Qζ Vμ) in fine tertie est initium 10ᵐᵉ(dicte Qζ) domus scilicet super lineam
medii celi Mμ Nζ Pκ Pχ Qζ(*marg.; add.* eodem modo de gradibus lymbi) Vμ; *add.* Et si
~~pones in finem~~ (*add. in marg.* super 3ᵃᵐ) 3ᵃᵐ erit initium 10ᵉ domus (*add. in marg.* et tunc
pone volvellam) ~~et super lineam medie celi~~ Wζ; *add. in marg.* Hoc docet invenire aspectus
solum per gradus equinoxialis Tβ

7   Eodem] Quod Eζ   modo] *om.* Qζ Zα; *add.* facies Dδ   de] *om.* Zα   limbi] *om.*
Mτ; lymbi *few*; sibi Po; *add.* margoloro Dδ; *add.* qui sunt Oβ   inter eam in] erit Kα
          eam in] *om.* Mφ Sδ; ea in Fγ; gradus Oβ; *add. interlin.* id est novellam Vβ   eam
in ascendente] ascendentem Bβ Bδ Bε Cγ Cι Eβ Eη Eμ Eσ Fα Fβ Fε Fζ Kδ Kε Kθ Kι Lβ Lγ
Lε Lη Lμ Mδ Mμ Mπ Mτ Nα Nγ Nδ Nε Nζ Oγ Oζ Oι Oξ Oρ Oτ Oυ Oφ Pβ Pθ Pκ Pν Pρ
Pσ Pφ Pχ Pω Qβ Qγ Qζ Qη Qθ Qλ Rδ Tβ Tδ Vη Vι Vμ Vψ Wα Wζ Wλ Wμ Xβ Xδ Zα
          ascendente] ascendens Kα; *add. interlin.* quod est scilicet prima domus Vβ   in]
twice Eζ   et] in Fε   punctum] *om.* Eμ Nζ Wζζ; predictam Nγ; punctu *corr. in*
marg. to punctum Wα   anguli] in angulo Bγ Bθ Cη Eκ Eλ Eτ Eυ Mκ Pγ Vπ Vσ Wι;
angulo Nα; angulum Bδ Cε Eμ Mι Nγ Nζ Sκ Wζ   terre] tercie Nγ; *add.* id est in
medie noctis Vφ

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you will have the start of the 12th house in the zodiac, and on the second third, the start of the 11th house. In the same way you will work with the degrees on the rim between it [i.e., the point] of the ascension and the point of the angle of the earth [i.e., the midnight line],

facies, et habebis alias tres domos, scilicet, initium secunde et tertie domus. Nadir autem istarum sunt initia sex oppositarum domorum.

8   facies] *om.* Fγ Mλ; fac Vμ; facias Dδ Eμ Mτ Qη   et[1]] *add.* sic Fλ   habebis] etiam Cι; *add.* in zodiaco Vβ   alias] *om.* Eα Xβ; illas Bδ   alias ... et[2]] *illeg./faded* Pτ   tres] 3 *some*; 2 Qζ; duas Mμ Nζ Pκ Pχ Vμ Zα; duos Vη   tres ... domus] duas Tβ   domos] *om.* Pβ   scilicet] id est Pϱ; secundum Kα   scilicet ... domus] *om* Vη Wμ Zα   initium] *add.* prime et Pω   secunde] 2 / 2 [e] *some*; *add.* domus Dδ Lη   secunde et 3[e]] 3[e] et 2[e] *some*; 4[e], 5[e] et 6[e] Cγ; secunde 3 Wι; tertie Mτ Pφ   secunde ... domus] 1, 2, 3 Xδ   et] *om.* Eσ   et .. domus] dividendo in 3° partes et pone regulam super grad~ ut prius et habebis 1, 2, 3, 10, 11, 12 Oβ   tertie] 3[e] / 3 *some*; *marg.* Wα   domus] *om.* Mη Vμ Vψ; et 4[e] Dδ; et IIII[e] Eμ   nadir] gandayr Xδ; g'dair Wα; gmadaor Cι; gnad~ Rδ; gnadair Fβ Mη Pδ Pθ Qλ; gnadayr Cε Nε Sκ Vψ; gnadir Mπ; nadair Bθ Dη Eα Eβ Eδ Eζ Eμ Eυ Fα Lβ Lγ Lε Lη Mλ Mν Mυ Mφ Nδ Oζ Oι Oξ Oϱ Oτ Oυ Pα Pβ Pν Pξ Po Pϱ Pσ Pυ Qβ Qγ Sδ Sη Tδ Vβ Vι Vπ Wβ; nadair *corr. to* nadir Mκ; nadar Oγ; nadayr Bγ Cγ Cη Fζ Pγ Pτ Pω Qδ Wι Xβ; nadyr Kθ Mδ Oν Qθ Vξ Vσ Vφ Wλ; nardir Mι Nγ

9   autem] *om.* Eα Pξ Vφ; vero Eμ   istarum] *om.* Bδ Mμ Nζ Pκ Pχ Vμ Wζ; aliarum Pφ   initia] initium Mι Nγ; *add.* aliarum Bε Vμ   initia sex] opposita grad~ Eα   sex] 6 *some*; *add.* alterum Vβ   oppositarum] *om.* Kθ; aliarum Bδ Cγ Cε Cι Dη Eβ Eη Eσ Fβ Fε Fζ Kα Lβ Lγ Lε Lμ Mδ Mη Mμ Mπ Mυ Nγ Nδ Nε Nζ Oγ Oζ Oι Oξ Oϱ Oτ Oυ Oφ Pα Pβ Pθ Pκ Pν Pξ Pϱ Pσ Pφ Pχ Pω Qβ Qγ Qθ Qλ Rδ Sκ Tβ Tδ Vη Vι Vφ Vψ Wα Wζ Wμ Xβ Xδ Zα   domorum] *om.* Vφ; *add.* a[zum] {aliarum?}. Sequitur aliud Bβ; *add.* etc. Fε; *add.* Sequitur altera Qθ; *add.* 3 lines Zα   *ms* Oν *ends*;[3] *an extraneous chapter* [DE RE PERDITA INVENIENDA] *is found here in 1 ms: see Appendix.*[4]

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[3] Ms Oν does include Cap. 42-44 which appear earlier between Cap. 27 and 28. See the Introduction.

[4] This material is also sometimes found elsewhere: see Appendix.

and you will have another 3 houses, that is, the start of the second and third houses. Moreover the nadirs of these are the beginnings of the six opposite houses.

[Comment:

Again, using the previous example with the ascendant rising at Taurus 20°, rotate the rete so that Taurus 20° (the beginning of the first house) is on the (eastern) horizon. Examining the meridian line you will immediately see that the beginning of the fourth house will be at Cancer 28° and the beginning of the tenth house will be at Capricorn 28° (both on the meridian/mid-sky line). The beginning of the seventh house is the nadir of the ascendant, that is, Scorpio 20°.

Turning to the upper left arc and using the rule or alidade, determine the degree on the rim of the ascendant (Taurus 20°) which in this example would be 15° below the horizontal diameter. The total distance from there up to the midday line at the top (or south point) of the astrolabe (below the armilla) would be 15° + 90° = 105°; divide this into thirds (i.e., of 35°). Finally, placing the rule on the point on the rim 35° back from the midday line and reading the equivalent position on the ecliptic, you find the beginning of the eleventh house to be at Pisces 4°; and when the rule is set on the point of the rim 70° back from the midday line you find the beginning of the twelfth house to be Aries 12°

You do the same for the lower left arc (between the beginning of the first house, Taurus 20°, and the beginning of the fourth house on the north/midnight line) which is 75°; a third of this would be 25°. Using this measure along the rim (25° and 50° from the midnight line), you find the beginning of the third house to be Cancer 6° and the beginning of the second house to be Gemini 14°.

The opposite points, their nadirs, give you the beginnings of the other six houses.

This again is the Standard Method of casting the houses (Fixed Rete sub-method). Using the rim (the Tropic of Capricorn) and dividing the 4 "quarters" by 3, one is in fact plotting the unequal hours for the position of the ascendant in question, and hence the great circles through those points and the equatorial pole (the centre of the astrolabe) are the circles of right ascension, cutting off the appropriate segments of the ecliptic/zodiac.[5]]

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[5] North, *Horoscopes and History*, pp. 58-59; Kennedy, "Astrological Houses", pp. 538-540.

[CAPITULUM 39.] DE ASPECTIBUS PLANETARUM

Si autem aspectus duorum planetarum vel duorum graduum quorumlibet scire volueris, pone eandem regulam super ipsos, et vide gradus limbi intermedios, qui si

Cap. 39] *om.* Bζ Bη Bι Bκ Cδ Cζ₁ Cζ₂ Dγ Eο Eϱ Gα Lζ Lι Lλ Mα Mγ Oη Oσ Pζ Pι Qε Qμ Rα Sβ Sθ Sι Vα Vγ Vν Vϱ Vυ Vφ; *marg.* Mλ; *bottom marg.* Eμ(*fol.* 60ᵛ); Bβ *contains a parallel but different text*

1   De ... planetarum] *om.* Bγ Bδ Bε Cγ Cε Cζ Dδ Eα Eκ Eλ Eμ Eυ Kε Kι Mτ Nα Nζ Oβ Pγ Pκ
         Pξ Pσ Pχ Pφ Qη Sη Tβ Vη Vμ Vσ Wζ Wλ; *faded/illeg.* Eδ Eζ Fγ; Ad inveniendum aspectus
         duorum planetarum Qθ(*later hand*); Ad sciendum aspectus 2 planetarum vel duorum
         graduum Pτ; De aspectibus duorum planetarum et duorum graduum Wι; De aspectibus
         duorum planetarum vel duorum graduum inveniendis per astrolabium Mν; De
         aspectibus planetarum duorum vel graduum per alliddam Mλ; De aspectibus
         planetarum vel duorum graduum Vξ; De espectibus(*!*) 2 planetarum vel 2 graduum
         inveniendum Wβ; De inveniendum aspectam duorum planetarum Lμ Oφ(*add. in marg.*
         Capitulum 2 Planetarum graduum); De inveniendum aspectam planetarum Dη; *add. in
         marg.* 40 Vμ; *add. in marg.* 41 Mκ; *add. in marg.* 42 Oϱ(C. 42) Qζ(42us) Sδ(Cᵒ 42); *add. in
         marg.* Canon de aspectibus Wζ   De] Capitulum de Rδ   aspectibus] aspectu Mo
         Pο; axpectibus Rδ   planetarum] *add.* Capitulum Kδ Qβ Nδ; *add.* Rubrica Mo; *add.* vel
         graduum Kθ Mπ

2   autem] *om.* Bε Eη Eμ Fε Kι Lμ Oβ Qζ Qη   duorum₁] *om.* Dη Vμ; 2 / duarum *some*; 3
         Cε; 3ᵉˢ Sκ   vel duorum] *illeg.* Lμ   vel ... graduum] *om.* Kα   duorum₂] *om.* Bδ
         Bε Bθ Cγ Cε Cι Dη Eβ Eλ Eσ Eυ Fα Fβ Fε Fζ Kδ Kε Kι Lβ Lγ Lε Lη Mδ Mη Mι Mκ Mμ
         Mo Mπ Mτ Mυ Mφ Nα Nγ Nδ Nε Nζ Oγ Oζ Oι Oξ Oϱ Oτ Oυ Oφ Pα Pδ Pθ Pκ Pν Pξ Pϱ
         Pσ Pυ Pφ Pχ Pω Qβ Qγ Qδ Qζ Qη Qθ Qλ Rε Sδ Sη Sκ Tβ Tδ Vβ Vη Vι Vπ Vσ Vψ Wα Wζ
         Wμ Xβ Xδ Zα; *illeg.* Bγ ; 2 *some*; 3 Pγ; eorum Eμ   quorumlibet] *om.* Bδ Oβ; vel
         quorumlibet Wα

3   volueris] desi[de]ras Oγ; *add.* per astrolabium Oβ   pone] *om.* Cγ; positione Kε; *add.*
         illeg. Qλ; *add.* ea Lβ   eandem] *om.* Bε Eμ Fε Oβ; eam Eκ Pγ   eandem ... ipsos]
         regulam super rethe movitur constitutam super loca ipsorum Eλ   regulam] *add.* id
         est lineam novill~(?) inventam Dδ; *add.* id est volvellam Rδ; *add.* novellam Eμ Nα Oβ Sη;
         add. noviter super rete constitutum Rε; *add.* scilicet volvellam Kδ Zα   super] *om.* Qζ
             ipsos] eos Xδ; gradus in quibus sunt planete Kι Mτ Qζ Qη; ipsum Pσ; loca ipsorum
         Rε; rethem soltutam(?) Xβ   vide] imige Pϱ   limbi] *add.* ea(?) Eμ; *add.* medius(?)
         Wα   intermedios] inter eos medios Xδ   qui] et Pξ   si] *om.* Kα Mμ Mτ Mυ;
         et Oφ; scilicet Oβ; sic Nε

[CHAPTER 39.] ON THE ASPECTS OF PLANETS

      If, however, you wish to know the aspects[1] of two planets or of any two degrees [i.e., the relative positions of any two celestial objects], place the same rule on them, and see the intervening degrees of the rim, which, if

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[1] "Aspect" is an astrological term derived from "aspicio", to regard, that is, how any two celestial objects "regard" each other, or how they are related and influence each other. Technically it is the angular distance between two planets. The principle aspects are sextile, quartile (or square), and trine, as discussed in this capitulum, along with opposition and conjunction (although some authors do not count conjunction as an aspect).

fuerint 60, est aspectus sextilis; si 90, quartilis; si 120, trinus; si 180, oppositi; si nihil

5　　fuerit, coniuncti. Si autem citra hos terminos 5 minus fuerit, erit applicatio ad aspectum;

4　　　　fuerint 60] *marg.* Wα　　　60] 6 Eδ Mτ; 6° Cε; sex *corr. in marg. to* 60 Xδ　　　est] erit Cγ
　　　　Cε Dδ Dη Eη Eσ Fα Kδ Kε Lγ Lε Lη Mδ Mι Mπ Mτ Nγ Nδ Nε Oγ Oζ Oξ Oϱ Pβ Pθ Pξ Pυ
　　　　Pχ Pω Qβ Qγ Qλ Rδ Rε Sδ Sκ Tδ Vβ Wζ Zα; *corr. to* erit Pκ　　　est ... si₃] *om.* Oβ
　　　　　　sextilis] 6ˡⁱˢ *some*; †† Kα; *add.* hoc est per sextam partem circuli qui est suo/duo pg~
　　　　Zα　　　si₁ ... quartilis] *marg.* Sκ(*later hand*)　　　90] 90°; 9° Cε; *add.* erit Eσ; *add.* erit
　　　　aspectus Kδ Kε Kι Mτ Qζ Qη Rδ Zα　　　quartilis] 4ª Eυ; 4ᵗᵘˢ Kα Kδ Nδ Tβ; 4ᵘˢ Bθ Dη Eα
　　　　Eδ Mκ Nζ Qγ; quadrangulis Fε; quartus Bβ Cι Pκ Pϱ Pχ Qη Rε Vψ Wζ; *add.* distant per 3
　　　　pg~ qui facerunt 4tus parte zodiaci Zα　　　si₂] *om.* Oϱ; scilicet Fε Kδ; *add.* vero Kθ
　　　　　　120] *interlin.* Fε; 12 Mτ Nα; 100 viginti Vη; 1²0 Mυ; 130 Cγ Mη; *add.* erit Mτ Qη; *add.*
　　　　gradus erit Kε Qζ　　　120 ... si₃] *illeg.* Eμ　　　trinus] *illeg.* (= triangulis?) Fε; 3ᵘˢ Cη Eα
　　　　Mτ Nζ Pτ; tertius Eκ Mι Nγ Pϱ Pφ Vψ Wμ; *add.* vel 3ᵘˢ Kα; *add.* aspectus Qη　　　trinus
　　　　... oppositi] *blank* Xδ　　　si₃] *om.* Mυ; *add.* vero Vμ　　　180] 18 erit Mτ; 100 Mδ Pγ; 140
　　　　Oβ; *add.* 2ᵘˢ vel Vμ　　　oppositi] *illeg.* Kα; appositis Pγ; oppōnis(= oppositionis?) Bγ Cη
　　　　Dδ Eζ Kθ Mλ Mν Pτ Wβ Wι; oppōis(= oppositis?) Eκ; oppositi *corr. to* oppositus Fβ;
　　　　oppositionis Bβ Qδ; oppositis Pο; oppositus Bε Bθ Dη Eα Eδ Eλ Eσ Eτ Fγ Kδ Kε Kθ Lμ
　　　　Mκ Mτ Oϱ Oφ Pξ Pσ Qη Qθ Rδ Rε Vμ Vξ Vπ Vσ Wμ Xβ; oppositus *corr. to* oppositi Pϱ;
　　　　add. quare pars(?) distat per medium circulum que est 180 gradus Zα　　　si₄] scilicet
　　　　Eμ; *add.* autem Vμ; *add.* vero Oβ　　　si nihil] simul Cγ Cε　　　nihil] 0 Wλ; vel Pθ

4-5　　　si₄ ... fuerit₁] sicud(*!*) sunt Bδ; vel si Mτ

5　　　　fuerit₁] est sunt Dδ; sit sunt Eζ; sint sunt Pο; sint Nα; sint fuerit Eδ; sunt Bθ Cγ Cε Fα Fβ
　　　　Kδ Kι Lβ Lγ Lη Mη Mι Mν Mπ Mφ Nγ Nδ Oζ Oϱ Pξ Pϱ Pφ Qδ Qζ Qλ Sη Sκ Tβ Vπ Vσ
　　　　Vψ; tunc sunt Wβ　　　coniuncti] *add.* 90 Mτ　　　Si autem] et Eμ; Si vero Vμ
　　　　　　citra] infra Fε Mι Nγ; scita Cε　　　citra ... terminos] *om.* Fζ Oγ Oτ Pυ Qλ Wμ Xδ;
　　　　citra terminos Pα(*interlin.*); cum Pω; tt *corr. in marg. to* cita terminos Wα　　　citra ... 5]
　　　　circa 5 citra terminos Oφ(*add. in marg.* al' si autem citra terminos 5 minus fuerint) Pφ
　　　　　　hos] *om.* Bδ Cγ Cε Cι Dη Eβ Eη Eσ Fβ Kδ Lγ Lε Lμ Mι Mμ Mπ Mυ Mφ Nγ Nδ Nε
　　　　Nζ Oζ Oι Oξ Oϱ Oφ Pβ Pδ Pθ Pκ Pξ Pϱ Pσ Pχ Qβ Qγ Qθ Rα Sδ Tβ Vη Vι Vμ Vψ Wζ Xβ
　　　　Zα; hec *some*; istos Eλ Rε　　　hos terminos] *om.* Kα Lβ Oυ　　　terminos] *om.* Fε; *illeg.*
　　　　Qζ; trinos *corr. in marg. to* terminos Qδ; *add.* aspectuum Mμ Nζ Pκ Pχ Vμ Wζ　　　5] *om.*
　　　　Kι Kθ Mτ Mφ Oφ Qη Tδ; 5ᵘˢ / 5�qᵘᵉ / quinque *some*; quintus Vπ; 55 Vξ; per 5 gradus vel Fγ;
　　　　marg. 5 si tunc hoc levior planeta sit sinister agraviori si dexter econverso Kε; *add.* et si
　　　　cum hoc levior planeta sit sinister agraviori si dexter econverso Wι; *add.* gradibus Mμ Nζ
　　　　Pκ Pχ Vμ Wζ; *add.* gradus Wλ　　　5 minus] *om.* Eμ Oβ; aspectus Qζ(*interlin.*)
　　　　　　minus] *om.* Fε; unius Cι; *blank* Mι Nγ　　　fuerit₂] *om.* Eη; fuerint Eα Fγ Kε Nα Qβ
　　　　Qθ Sδ Vξ; fuerint *corr. from* fuerit Kι; fuerunt Eα; sunt Wζ; *add.* citra terminos Lβ; *add. in*
　　　　marg. al' autem citra terminos 5 minus fuerint Oφ　　　erit] *om.* Wι　　　applicatio] *add.*
　　　　ei Mτ　　　ad] de Vη　　　ad aspectum] aspectuum si [*illeg.*] predicti Mμ
　　　　　　aspectum] *add.* si tardior sequitur Kε Kι Mτ Qζ Qη; *add.* si velocior procedat Vμ;
　　　　add. scilicet [*illeg.*] si velocior procedat Pκ Pχ Wζ

they are 60, the aspect is sextile;[2] if 90, quartile;[3] if 120, trine;[4] if 180, opposites; if there is nothing, conjunction. If, however, it is 5 [degrees] less than these limits, there will be an application of the aspect [i.e., of its influence];

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[2] One sixth of 360º.

[3] One quarter of 360º. Today this is generally called the "square".

[4] One third of 360º.

si plus, separatio ab eodem. Secundum quosdam idem aspectus habentur ex gradibus equalibus. Secundum vero Ptholomeum fit aliter scilicet secundum gradus ascencionum quemadmodum equatio domorum sit et verius.

6   si] *om.* Nγ; si velociter precedit si Nζ; *add.* vero Rε   si ... aspectus] *om.* Wι   plus]
           add. erit Fγ Mμ Mυ Nζ Vι Vμ Wζ Zα; *add.* est Pκ Pχ   ab eodem] a hoc intellige Eμ;
           ab eo Mμ; *add.* scilicet relatione [*illeg.*] Zα   Secundum] Idem aspectus secundum Pφ;
           Sed Fζ   Secundum quosdam] et Mμ Nζ; scilicet secundum(*?*) [*illg.*] et Pκ Pχ Wζ
              quosdam] quodam Nδ; quos a in hi(*?*) Rε; *add.* autem hii Dδ; *add.* et hii Oβ
              idem] *om.* Pτ Xβ Vη; *illeg.* Qξ; aut Qη; autem Kε Mτ; eidem Zα; hii idem Bε Bθ Eυ
           Lμ Mγ Mι Mκ Nγ Qθ Vπ Vσ; idem hiis Cε; hii Oγ; hidem Rδ; hiidem Eβ Eη Eκ Fα Fβ Fε
           Fζ Kα Lβ Lγ Lη Mη Mπ Nδ Nε Oζ Oι Oϱ Oτ Oφ Pα Pγ Pθ Pν Qβ Qγ Qλ Sδ Vβ; hiis(*?*)
           Eσ; hisdem Lε Tδ; hūius Eλ; secundum alios iidem Eμ   idem aspectus] dr [=
           dicitur?] quod vero Wλ   aspectus] *om.* Vσ; aspunctum Eα   ex] 90 Wλ; a Nζ; de
           Xβ   ex gradibus] secundum gradus Eμ   gradibus] *add. interlin.* zodiachi Bγ

6-28   Secundum ... supra] Et nota quod aspectus post se est dexter aut se sinister Mλ

7   equalibus] zodiaci Mμ Nζ Pκ Pχ Vμ Wζ; *add.* equinocitalis Dη; *add.* in zodiaco Zα; *add.*
           zodiaci Oγ; *add. interlin.* id est zodiaci Tβ   Secundum₁ ... aliter] Si autem numerus
           radiationum Oβ   vero] *om.* Bε Cη Dη Eκ Fβ Fγ Lη Nε Pγ Vξ Wι; *interlin.* Bγ
              Ptholomeum] *illeg.* Pτ; Phtolᵐ Eσ; Ptho Nα; Pthol' Lγ; Ptholo'm Eδ Qθ;
           Ptholomeum Bθ Dη Eγ Eλ Eυ Fα Kα Kδ Lβ Lε Mδ Mη Mκ Mμ Mυ Nδ Nε Oι Oτ Oυ Oφ
           Pα Pγ Pμ Pν Pϱ Pυ Pω Qβ Qδ Qλ Rδ Rε Sδ Sη Sκ Tβ Tδ Vβ Vη Vμ Vπ Vσ Wα Wμ Xβ Zα;
           Pthoᵐ Eβ Eζ Fζ Kθ Lη Pθ Po Vι Wβ; Pthom Dδ Oζ; Pthoᵐ Fγ; Ptoloᵐ Eη Fε Kε Qγ Qζ;
           Ptolomeum Bβ Bδ Bε Kι Mν Mo Mφ Nζ Pξ Pφ Pχ Qη Vψ Wζ Wι; Ptoᵐ Wλ; pro/per
           Tholomeum Cε; Tholomeum Cγ Cι Eκ Eμ Fβ Mι Mπ Nγ Oξ Oϱ Pβ Pδ Pκ Pσ Vξ Xδ;
           Tholomeus Eα; Thoᵘᵐ Oγ; Tpolmeum Mτ; *add.* autem Bε   fit] *om.* Tβ; fiat Xβ; fuit Fε;
           sic Dη; sit Bθ(*?*) Fζ Sδ   aliter] *om.* Lε; aliud Fα; alius Kα; aspectus Fγ   aliter
           scilicet] *om.* Mτ   aliter ... secundum] per Pϱ   scilicet *om.* Bβ Bγ Bθ Cε Cη Dδ Eδ
           Eζ Eκ Eλ Eμ Eυ Fγ Kθ Kι Mμ Mν Mκ Mo Nε Oβ Pγ Po Pτ Pυ Qδ Qζ Qη Rε Vπ VσWβ Wι
           Wλ   gradus] gradum Cγ Nα

8   ascencionum] *add.* signorum Bδ Pξ   quemadmodum] *twice* Eβ; grad' et Mπ;
           quadatum (*?*) Cε; quem Eδ Mτ; quemad' Eζ; quem ad Pγ; *add.* est Oφ; *add.* in Pω
              equatio] *om.* Eδ; adequatio Cε Eδ Mτ Nα; est equale Wλ   sit] *om.* Lμ Mμ Qθ
           Vμ Wζ; erit Pκ Pχ; fit / sic *some*; *expunged* Oφ   sit et verius] *om.* Oβ; *illeg.* Eζ; et hoc
           est verius Fγ; et veneris Tβ; fit Pσ Vψ; fit aliter atque verius Bγ; fit atque u'us Eκ; fit et
           unius Cγ Eμ; fuit et verius Dη Fε; *corr. to illeg.* Eζ; sic atque numeris Cη; sit atque m'us
           Wι; sit atque verius Vξ; sit et aliter(*?*) verius Eλ; sit etiam al'r verius Rε; sit/sic et *blank* Xδ;
           add. et cetera Fε Pκ Pχ Vι

if more, a separation from the same [i.e., a lessening of the influence of the aspect]. According to some people, the aspects are likewise derived from equal degrees.[5] According to Ptolemy[6] it is done differently, that is, according to the degrees of ascension, just as the equation of the houses is, and [it is] more accurate.

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[5] There are a variety of ways of casting houses and defining rays, or radiations, or aspects. For methods of "equal degrees" (presumably along the ecliptic) see Casulleras and Hogendijk, pp. 63-65.

[6] Several methods for defining rays (or radiations or aspects) were ascribed to Ptolemy by medieval Islamic and Latin texts. The method here depends on dividing the ecliptic by using circles of right ascension which cross the ecliptic in order to define the points to which rays are sent; the angles for points are measured along the equator. Casulleras and Hogendijk (pp. 68-71) call this the "Single Hour Line Method," and name a variety of Arabic texts which include it. One of the most well-known texts is by al-Bīrūnī who ascribes it to Ptolemy, although it is not found in Ptolemy's writings.

For ascriptions to Ptolemy, see Casulleras and Hogendijk, pp. 87-88 and Josep Casulleras, "The Astrological Computations Attributed to Ptolemy and Hermes in Medieval Arabic Sources," in David Juste et al, ed., *Ptolemy's Science of the Stars in the Middle Ages* (Turnhout: Brepols, 2020), pp. 201-221.

Radiationum alia dextra alia sinistra. Pro sinistra quidem radiatione, gradum
10   planete super lineam meridianam pone, atque almuri signa; deinde ipsum almuri, motu
dextro, pro radiatione exagonali, 60 gradus procedat; pro tetragonali, 90; pro trigonali,

9   *before* Radiationum] *add.* CAPITULUM Lε Tδ; *add.* DE EISDEM ASPECTIBUS Pϱ; *add.* DE
          INVENIENDUM RADIATIONEM DEXTRAM VEL SINISTRAM Lμ Oφ; *add.* DE RADIATIONE
          PLANETARUM Dη Mδ Nδ(*add.* Rx) Vα; *add.* DE RADIATIONIBUS Mι Nγ Pω Zα; *add.* DE
          RADIATIONIBUS PLANETARUM Mυ Mφ Vι; *add.* Dicitur Bβ; *add. in marg.* 41 Pκ Vμ
              Radiationum] Dicitur Radiationum Bβ; *add.* autem Kε Kι Mτ Qζ Qη; *add.* etiam Fβ
              sinistra] a sinistra Bθ; sinixtra Fγ   alia] *add.* est Wβ   pro sinistra₂] *om.* Wι
          Xδ   sinistra₂] dextra Fε Mι Nγ   quidem] *om.* Zα; a’ Eζ; 9ᵗ Mτ   radiatione]
          corr. in marg. Qδ   gradum] g Bδ Eα; g~ Fε; gd~ Lμ; gradu Bε Cε Cι Dη Eβ Eη Fα Fβ
          Fζ Lβ Kα Kδ Lε Lγ Lη Mδ Mo Mπ Mυ Mφ Nδ Nε Nζ Oγ Oζ Oι Oξ Oϱ Oτ Oυ Oφ Pα Pβ
          Pδ Pθ Pκ Pμ Pν Pϱ Pσ Pφ Pχ Qβ Qδ Qλ Rδ Sδ Sη Sκ Tβ Tδ Vβ Vη Vι Vμ Vψ Wα Wζ Wμ
          Xβ Zα; gradus Bβ; gradus quidem Mι Nγ; graduum Mη

9-28   Radiatioum ... supra] *om.* Eμ

10   planete] *om.* Bθ Vπ   super] secundum Nγ   meridianam] meridionalem Cγ Fβ
          Lβ Lμ Mι Mτ Mφ Nγ Nα Nγ Oζ Oι Oτ Oυ Pθ Pμ Pν Pϱ Pσ Pτ Pυ Pω Qγ Qδ Rε Sη Vβ
          Wα   pone] posito Bδ Bε Cε Cι Dη Eα Eβ Eη Fα Fβ Fε Fζ Kα Kδ Lβ Lγ Lε Lη Lμ Mδ
          Mη Mι Mo Mπ Mυ Mφ Nγ Nγ Nε Nζ Oγ Oζ Oι Oξ Oϱ Oτ Oυ Oφ Pα Pβ Pδ Pθ Pκ Pμ Pν
          Pϱ Pσ Pυ Pφ Pχ Qβ Qδ Qλ Rδ Sδ Sη Sκ Tβ Tδ Vβ Vη Vι Vμ Vψ Wα Wζ Wμ Xβ Zα
              pone ... ipsum] *om.* Nδ; *illeg.* puncto Xδ   atque] *om* Cε Eδ Mo Nα Pυ Rδ Vβ Vξ
          Wβ; *interlin.* Eζ; et *some*; etor Po   atque ... ipsum] *om.* Bδ Bε Cι Dη Eα Eβ Eη Fα Fβ Fε
          Fζ Kα Kδ Lβ Lγ Lε Lη Lμ Mδ Mη Mι Mμ Mπ Mυ Mφ Nγ Nε Nζ Oζ Oι Oξ Oφ Oυ Pα Pβ
          Pδ Pθ Pκ Pμ Pν Pξ Pϱ Pσ Pφ Pχ Qβ Qγ Qθ Qλ Sδ Sκ Tβ Tδ Vι Vμ Vψ Wα Wμ Xβ Zα;
          marg. Oτ   atque ... almuri] *om.* Oϱ   signa] *om.* Vβ   signa ... almuri₂] *om.* Vη
          Wζ   ipsum] pone Mτ; *interlin.* Oγ   almuri₂] *add.* in Rδ; *add.* move Dδ Oβ
              motu] in toto Mτ; motus Eλ; promotu Cγ; *add. interlin.* id est an’u(?) die ad
          orientem Tβ

11   radiatione] indite Cγ; radice Cγ Dδ Eβ Eη Fα Fε Fζ Kα Kθ Lβ Lγ Lη Lμ Mδ Mι Nγ Oγ Oζ
          Oι Oτ Oυ Oφ Pα Pβ Pξ Pν Pϱ Pσ Pφ Qβ Qγ Qδ Qλ Sδ Wμ Xδ; radice *corr. to* radiatione
          Lε; tradictionem Nα   exagonali] exogonali Oφ(*add. in marg.* al’ exagonali); *add.* id est
          sextili Vψ; *add.* id est sixtili aspectu Zα; *add.* quidem Qδ   60] 6 Dδ Mo Pφ
              gradus] gradibus Eζ Kα Kε Mτ Qδ; gradu Cγ; graduum Vπ   procedat] *om.* Wα;
          interlin. Mμ; excedat Rε; precedant Pν; predatum Oφ(*add. in marg.* al’ procedat);
          protendet Wμ   pro₂] *om.* Nε   pro₂ ... 90] *om.* Mκ   tetragonali] detragonali
          Vπ; thetragonali Nζ; *corr. in marg.* Bβ(*later hand*)   90] 9 Nα; 24 Fβ(*interlin.*)   90 ...
          trigonali] *om.* Eκ Pϱ Vη   trigonali] t’gonali / tergonali *many*; t’golā Bε; t’goᵃli Pξ; t’goˡⁱ
          Bγ Eδ Eζ Fε Kε Kι Mν Pτ Wβ; t’goli *corr. in marg. to illeg.* Bβ; t’gōli Kθ; t’goˡⁱ Eσ; tigonali
          Rδ; tⁱgoli Fγ; trigoli Eα; triagonali Rε

11-12   pro₃ ... 120] pro t’bunali 120 Qζ(*marg.*)

Some[7] of the radiations [or rays or regards] [are] right, others left. For any left-hand radiation, set the degree of the planet on the midday line, and note [the position of] the indicator-muri; then the indicator-muri itself, moved to the right, should advance 60 degrees for hexagonal radiation; 90 for tetragonal; 120 for trigonal [or triangular];

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[7] In Gunther's edition this is treated as part of Capitulum 39 in the Latin (p. 228), but it is numbered as 40 in the English (p. 187). Several mss also indicate a new capitulum.

120; et notetur medii celi gradus, ipse enim est prime radiationis locus. Deinde gradum
planete super almucantharat orientale pone, atque iterum almuri signa, procedatque

12 120] 140 Mι Nγ; *add.* gradum Vπ   notetur] nocttum Pϱ; vocetur Oγ; *corr. in marg.* Eζ;
    corr. from votetur Fβ; *add. interlin.* post motum Tβ
     medii celi] ascendentis Mφ; ascendentis *del. and add. in marg. illeg.* Eη   gradus]
    om. Bε; grada Pφ   ipse] *illeg.* Pξ   ipse ... est] *om.; add. in marg.* ipse enim est
    prime radiationis locus Bε   enim] *om.* Eδ; *illeg.* Eα; autem Fβ   est] *om.* Cγ Cε Fγ
    Lη Nε Oζ Pϱ Vξ; *interlin.* Pτ   prime] primus Nα   prime radiationis] *om.* Mκ;
    corr. interlin. Eη   locus] gradus Kε Kι Mτ Qη Qθ; *om.* Lμ; *add. interlin.* al' gradus Oφ
     Deinde] distum Pϱ   gradum] gradus Bβ Nδ Vβ

12-14 gradum ... dextro] [*illeg.*] grad~ planete ad arcus et moveatur almuri Bε

12-15 medii ... notetur] *marg.* Lμ   Deinde .. est] *om. and add. illeg. in marg.* Eη

13 planete] *om.* Eζ; *blank* Cγ   planete ... orientale] *om.* Eδ   super] *add.* primum Pω
     super ... orientale] ad ascendens Bε   almucantharat] alimic' Cε Eσ; almi^at Wζ;
    almicanta^th Fγ; almicantarach Kδ; almicantarat Oϱ Zα; almicantarath Pω Rδ; almicanthar'
    Dη; almicantharath Bβ Tβ; almicantrat Kα; almicantrath Mτ Vμ; almicath Oγ; almicht^a
    Wλ; almic^th Eζ; almit' Kε Kι Nζ Oβ; almi^th Vη; almitr(?) Qζ; almi^tt Mμ; almuc' Cι Mπ Nε;
    almucant' Lμ; almucantarach Bδ Mκ Xβ; almucantarat Lβ Eκ Wα; almucantarath Eα Eλ
    Eυ Fζ Lη Oι Qγ Qδ Vβ; almucantart Fε; almucanth' Eβ Lη Oζ Pγ Pδ Pσ Pτ Qθ Vι Wμ;
    almucantharach Rε Wβ; almucantharat Fα Oτ Oυ Pυ Qλ Sκ; almucantharath Bγ Fβ Cζ Lε
    Mo Mυ Mφ Nδ Pα Pν Pϱ Qβ Sδ Tδ Vπ; almucanth't Wι; almucant^t Oξ; almucatarath Lγ
    Nα Pφ; almucatharath Pμ; almuch Kθ; almucha Xδ; almuchante^th Oφ; almu^rath Po Vξ;
    almuscantarath Pβ; almut' Dδ Mη Pθ Pκ Pχ; almutantarach Mν; almutanterach Mι Nγ;
    almutertantat Cγ; almuthantarath Vσ; almutra^ath(?) Pξ   orientale] *om.* Pκ Pχ Vξ;
    occidentale Mι Nγ; orientalem Rε   atque] itaque Mτ Mυ Mφ   atque ...
    procedatque] quod inter Nα; ad quod inter Qη   iterum] *om.* Cη Eκ Eτ Oβ Pγ Wι;
    interlin. Bγ   almuri ... procedatque] *om.* Qθ   signa] *om.* Xβ; *marg.* Kε; signum Pϱ;
    add. procedentia Eα   signa procedatque] *om.* Lμ   procedatque] procedat Cι Mη
    Vη; procedat atque Sδ Vσ

13-14 signa ... almuri] *om.* Nε; *crossed out* Oφ   signa ... motu] in toto Mτ   procedatque
    almuri] *om.* Kε

13-28 pone ... supra] *om., add. (later hand)o in marg.* Eζ *(mostly illeg.); bottom marg.* Po

and let the degree [of the ecliptic] of [or at] the middle of the sky be noted, for that is the place of the first radiation. Then set the degree of the planet on the eastern almucantar [i.e., the horizon] and again note [the position of] the indicator-muri, and let the indicator-muri advance

almuri motu dextro pro exagonali quidem 60, pro tetragonali 90, pro trigonali 120, et
15   notetur gradus ascendens, ipse enim radiationis secunde locus est. Accipe itaque
differentiam istarum duarum radiationum, et serva eam.

   Deinde gradum medii celi hora acceptionis operis super meridianum pone, et

14   almuri] *om.* Mν; *add.* ex Pδ   dextro] *interlin.* Vμ; dex | dextro Rδ   exagonali] g^li
          Bε   quidem] *om.* Bε; q^r Mτ   60] *om.* Mτ; sexaginta Bβ Vη Wζ; *add.* gradus Dη Eλ
          Rε   pro₂ ... 120] et cetera Kε Kι Qζ Qη; pro t'igonali 1·20, pro red'eagonali 90 Pγ
          tetragonali] thetragonali Nζ; tretiagonali Nγ; *corr. in marg. from* trigonali Fα;
          retrangonali *corr. to* detrangonali Sκ   90] 9 Mι Nγ   90 ... trigonali] *om.* Eλ Mν
             pro₃ ... 120] *om.* Bε; etc. Mτ   trigonali] t'agonali Rε; t'gn^li Eσ; t'gonali *many*; t'go^li
          Cε Eδ Nζ Po Pτ Sδ Wβ; t'goli Cγ Mμ; t'gōli Kθ; t^igoli Fγ; trigo^li Lη; trigoli Fε; trigōli Bγ
          Fα; trigona Bβ; tigonali Wι; exagonali Eα   120] 12 Pμ; 130 Cγ   et] ut Rε

15   notetur] *om.* Wι; note^ntur Fα; vocetur Cε Eσ   gradus] *add.* triangonis lineam Bε
             ascendens] *illeg.* Bε; ascendentis Bε Mδ Nα Oφ Pφ Sκ Xβ; ascensus Pυ Vβ(*add.*
          interlin. al' ascendentis); *add.* tunc Cε; *add.* et sub quot ga~ differ~ ag~ planete Xβ(?)
             enim] *om.* Eα Lε Oβ Tδ; *blank* Cγ; *add.* tue Bε   radiationis secunde] tue regionis
          Bε   secunde] 2 / 2^e *some*; 11 Mν   locus] *om.* Kι   est] *om.* Fγ; *add. in marg.*
          scilicet(?) 2^e radiationis Bε   Accipe] *illeg.* Oβ; acredes Cγ   itaque] *om.* Mτ; *illeg.*
          Fε; igitur Vψ; *corr. in marg. from* interum Wα; *add. note in bottom marg.* Oι(*fol. 138^r*):
                es   bra | pius   rus | gitarius ni | pricornus cer | o quarius | ces   go |
                Est   Ari   Li | Scor   Tau | Sa   Gemi | Ca   Can | Le   A | Pis   Vir |

15-28   radiationis ... supra] *52 convoluted and repetitive lines* Bβ(*other capitula are also corrupted*)

16   differentiam] *om.* Vπ   istarum] *om.* Mπ Oϱ Vμ; illarum Bδ Mκ Mτ; ipsarum Mμ Nζ
          Pκ Pχ Wζ   duarum] *om.* Kε Mτ Qζ Qη; *marg.* Kι; 2 *some*; et Kα   radiationum]
          add. differentiam Eυ   serva] conserva Vπ

17   Deinde] *om.* Eα   gradum] gradus Vξ; *add.* qui fuerit prius super lineam Dη Eβ Eσ
          Fα(*om.* prius) Fβ Fε Fζ Kε Kι Lβ Lγ Lε Lη Mι Lμ Mτ Nγ Nε Oζ Oι(*interlin.*) Oϱ Oυ(*marg.*)
          Oφ Pα(*marg.*) Pϱ Pσ Pφ Qβ Qγ Qζ Qη Qθ(*om.* prius) Sδ Tβ Tδ Vη Zα; *add.* qui fuerit
          super lineam prius super lineam Pμ   medii celi] *om.* Bθ Cλ Mκ   medii ... hora]
          om. Vσ   celi] *om.* Cε   acceptionis] inceptionis Cε Cγ Dη Eα Eβ Eη Eσ Fβ Fε Kα
          Kε Lβ Lγ Lε Lη Mδ Mι Mμ Mπ Mτ Mφ Nγ Nδ Nε Oγ Oζ Oι Oξ Oϱ Oυ Oφ Pα Pβ Pδ Pθ
          Pκ Pμ Pν Pξ Po Pϱ Pσ Pφ Pχ Pω Qγ Qζ Qη Qθ Qλ Rδ Sδ Sκ Tβ Tδ Vη Vι Vμ Vψ Wα Wζ
          Wμ Xβ; interceptionis Fζ; *add.* vel inceptionis Dδ   operis] *add.* scilicet horam qua
          volueris equare radiationem Dδ

by right-hand motion for hexagonal [radiation] 60 [degrees], for tetragonal 90, for trigonal [or triangular] 120, and the ascending degree should be noted, for that is the place of the second radiation. Therefore take the difference of these two radiations, and keep [i.e., remember] it.

Then at the hour of making the measurement place the degree of the mid-sky on the meridian, and

signetur almuri; procedatque motu dextro, donec planete gradus meridiano insideat, fiatque nota in almuri et capiatur numerorum duorum intersticium. Ducaturque in
20 differentiam radiationum; quodque inde producetur per medium arcus lucis sive diei ipsius planete dividatur, si super terram fuerit radiatio planete; si vero sub terra, per

18   almuri] *illeg*. Bε; alium Wι; alius Cη   procedatque] procedat Kε Qζ Xδ; *add*. ex Mo
        planete] *blank* Cγ; plene Po   planete ... insideat] *marg*. Oβ   gradus] gradu
        Eυ Mκ Vπ; *interlin*. Qζ; gradui Qη; *add*. in Wβ   meridiano] in meridiano Fε;
        meridionalis Mι Nγ; *add. interlin*. id est cadat super lineam meridianam Tβ   insideat]
        incidat Dη Rε Vη; incideat Pυ Vβ; inscidiat Mκ; videatur Mι Nγ

19   fiatque] facque Kε Kι Mτ   nota] *om*. Pφ; notam Mτ   et ... Ducaturque] *om*. Nδ
        capiatur] accipiatur Eβ Eδ Fα Lη Mδ Nζ Oφ Po Pφ Qβ Sδ Tβ Vβ Vη; capiantur Pϱ
        Qδ; capiat Qη; *add*. etiam Mμ Pκ Pχ Qζ Vμ; *add*. 2 notarum vel Kθ   numerorum] *om*.
        Mκ Mπ Pσ Vσ; illorum Pτ; minor Cγ; notarum Eκ Eυ Fγ Pκ Pχ Vμ; minorum Pϱ;
        numerorum *corr. to* notarum Qζ; numerus Fε   numerorum ... differentiam] *om*. Oφ
        duorum] *om*. Kα Mτ Nγ Pκ Pχ Qη; 2 / 2ᵒʳᵘᵐ *some*; duo Pϱ; eorum Nζ; minorum
        Kι(*add. in marg*. al' terciorum); secundorum Vξ; 3ᵐ scilicet 2ᵒʳᵘᵐ Kε   intersticium] *om*.
        Pσ; *blank* Bδ; intracticium Fζ   in] *om*. Nα Pυ

19-20   ducaturque ... radiationum] *om.* Lβ

19-28   fiatque ... supra] *om.* Oβ

20   differentiam] diem Vπ; *add*. et minorem qua est differentiam ascen~ inspera 90
        intersticium ducaturque in differentiam Oφ   radiationum] radiationis Kε Qζ Qη
        quodque] quicquod Bθ Rε Vπ Vσ; quidque Mκ; quod Cι Eα Pδ; quodcumque Dδ;
        quodemque Eδ   inde] autem Wλ   per] in Pφ   medium arcus] arcu Bγ(*add.
        interlin*. medium); arcum Bθ Cη Dδ Eδ Eκ Eυ Mκ Mμ Mν Pγ Po Pτ Vμ Vξ Vπ Vσ Wι Wλ;
        arcus Eλ; medium arcum Cε Cι Fε Kα Mη Mι Mo Mπ Nα Nγ Nζ Pδ Pκ Pυ Pχ Pω Qβ Qδ
        Sη Sκ Vβ Vψ Wζ; modum arcus Kδ; motum arcus Kε Kι Qζ   arcus] archum Xδ;
        archus Xβ   lucis] locis Nα   lucis sive] *om*. Bδ Pξ   sive] vel Dη   diei]
        di|diei Mκ

21   ipsius planete₁] *om*. Kδ Rδ   planete₁] *blank* Cγ; *twice* Bδ; plene Po   dividatur]
        accipiatur et dividatur Mδ Nδ; decidatur Kδ   si₁] scilicet Mo   fuerit] fuit Mι Oυ
        radiatio] per radiationem Fγ   planete₂] *om*. Nγ Xδ   vero] *om*. Wμ; autem
        Bε; eodem Vξ   terra] terram *few*; *add*. fuerit Xδ   per] *om*. Mτ; *add. interlin*.
        medium Qζ; *add*. vicᵐ Kα

21-22   si₂ ... eius] *om*. Eλ   per medium] penieᵐ Lβ

the indicator-muri is marked [i.e., noted]; and the planet should advance with a move to the right until its degree settles on the meridian, and let a note of the indicator-muri be made and the distance between the two numbers [for the indicator-muri] be perceived. And let [this distance] be multiplied by the difference of the radiations; and what will be then produced from there should be divided by half of the arc of the light or of the day of that planet if the radiation of the planet is above the earth; by

medium arcus noctis eius; et quod ex divisione exierit, erit radiationis equatio.

Que equatio minuetur a radiatione maiori, si fuerit planeta inter 10^m et 7^m aut inter 4^m et primum; et si fuerit inter 10^m et primum aut inter 4^m et 7^m addetur equatio

22   medium] *rep.* arcum lucis ... medium (*ll.* 20-22) Pω   medium arcus] arcum Bγ Bθ Cη Cι Dδ Eδ Eκ Eυ Fγ Kε Kθ Kι Lβ Mη Mκ Mν Mo Mτ Nα Nε Pγ Po Pτ Pυ Qδ Qζ(*add. interlin.* medium) Qη Rε Sη Vμ Vξ Vπ Vσ Wβ Wι Wλ; medium arcum Cε Eβ Eη Eσ Fα Fβ Fε Fζ Kα Kδ Lγ Lε Mδ Mι Mπ Mυ Nγ Nδ Nζ Oγ Oι Oξ Oτ Pα Pδ Pθ Pκ Pν Pξ Pφ Pχ Pω Qγ Qλ Rδ Sκ Tδ Vβ Vψ Wζ Wμ   arcus] archum Xδ; archus Xβ   eius] *om.* Fε Nδ; ipsius Bδ; *add.* dividatur Oρ   quod] *om.* Kα   ex] *om.* Dδ Mτ; de Eκ Fγ Pγ Bξ; in Nε; *add.* eius Nα   divisione] *add.* eius Nδ Vξ   exierit] exigerit Mμ Vη; exigerit *corr. to* exierit Wι; exvient Bθ; pervenerit Bε Eη   erit] *om.* Bδ Pμ Pν Vη; est Kα Wβ   radiationis] *om.* Fβ; radiationum Rε   equatio] adequatio Kα; equale Wλ; *add.* que equatio radiationis Bδ; *add.* radiationis Kδ Mη; *add.* que minues de secunde radiationis loco. Si fuerit planeta inter ascendens et 10^m aut 7^m et 4^m. Si vero inter 10^m et 7^m fuerit aut 4^m et ascendens eam prime radiationi super addes et quod exit erit radiationis locus equatio. Eκ

23   Que ... maiori] Equatio que minus de se radiationis loco Eκ   Que equatio] *om.* Fβ; Que est equatio Nε Vσ   equatio] *om.* Dδ; *blank* Cγ   minuetur] minue Pφ   a] de Eα   radiatione] radice Nα   maiori] niatonis Cγ; *add.* scilicet circuli per regione Bε Eη(*interlin.*)   si] sive Pω   planeta] *om.* Mμ Nζ Pκ Pχ; *blank* Cγ; *marg.* Kα; *add.* si fuerit Pθ   inter] *add.* domum Xβ   10^m] 10 / 10^{am} *some*; x^m Fγ; 20 Eυ   10^m et] *om.* Wζ   10^m et 7^m] decimum et septimum Vψ; septimam et decimam Mι Nγ; 17^m Pκ Pχ   et] aut Qθ Qλ; *add.* primum aut 4 et Kα   et 7^m] ex^m Nα   7^m] 7 / 7^{am} *some*; *illeg.* Mμ; primam Tβ Vη; primum Pθ; primum domum Zα   aut] *om.* Eσ

23-24   7^m ... et$_3$] *om.* Pξ   aut ... 7^m] *om.* Oρ

24   inter$_1$] *om.* Kα Pκ Pχ Wζ; infra Kε Kι   4^{m1}] 4 / 4^{am} / quartum *some*; 10^m Cγ; 14 Kι(*add. in marg.* al' 4) Qη   4^{m1} ... aut] *om.* Qθ   et$_1$ ... 7^m] *om.* Nε   et$_1$ primum] *om.* Mμ   primum$_1$] 1 *some*; prima *few*; 7^{am} Tβ Vη; septem Zα; *add.* domus Pκ Pχ   et$_2$] aut Pρ   et$_2$ si fuerit] *om.* Eα   et$_2$ ... primum$_2$] *om.* Eα   et$_2$ ... 7^m] *om.* Bδ Cη Fγ Kε Kι Pξ Qζ Qη Wλ; *marg.* Bγ   si] *add.* vero Bγ   fuerit] *add. interlin.* scilicet planeta Vβ   10^m] decimum *some*; x Nα; 4^m Eα   et$_3$] aut Pγ   primum$_2$] 1 *few*; 7^{am} Tβ Vη; septem Zα; primam domum Rε; *add. interlin.* id est ascendens Fβ   aut] atque Xβ   aut ... 7^m] *om.* Eδ Wβ   inter$_3$] *om.* Kα   et$_4$ 7^m] *om.* Pγ   4$^m{}_2$] quartum *some*; 10^m Cγ   7^m] septimum *some*; primam Tβ Vη; primum Eκ Dδ Mν Po Vξ Zα; *corr. from* primum Pβ   addetur] *om.* Mκ Vσ; adde Pρ; addotetur Lβ; *add.* ad Mυ Nε Vι   equatio] econverso Tβ; equale Wλ

24-25   et$_3$ ... radiationem] *om.* Pκ Pχ   4^{m2} ... additionem] *marg.* Wα

half of the arc of its night if indeed [it is] below the earth; and what results from the division is the equation of the radiation.

This equation will be deducted from the greater radiation if the planet is between the tenth and the seventh [houses], or between the fourth and the first [houses]; and if it is between the tenth and the first [houses] or between the fourth and the seventh [houses], the equation will be added

25   super radiationem minorem. Sicque post additionem vel subtractionem habebis radiationem quesitam.

Pro dextra autem radiatione invenienda erit processus almuri motu sinistro promovendus; cetera ut supra.

25   radiationem] additionem Pφ; *add.* vel subtractionem Eα   minorem] horam Kα; interiorem Bδ   minorem ... subtractionem] que sitam Kδ   Sicque] sic Eυ; sic quia Sκ; sicut Mη; sicutque Vψ   Sicque ... quesitam] *om.* Lμ Qθ   post] *om.* Mτ Wλ; per Qζ Qη   vel] *om.* Bγ Cη Wι; et Cε Eδ Eυ Kε Kι Mη Mκ Mμ Nε Nζ Po Qδ Qζ Sη Vξ Vπ Vσ Wβ Zα; *add.* per Mτ Pξ   vel subtractionem] *om.* Qη; vel diminutionem Vμ

25-26 Sicque ... quesita] *om.* Pσ   vel ... radiationem] *om.* Xβ

26   radiationem quesitam] *illeg.* Mη   quesitam] que Cγ

26-27 quesitam ... radiatione] *om.* Fζ

27   dextra] sinistra Fε Mι Nγ Rε   utem] *om.* Zα; *rep.* Pξ; 1.1ᵃ que recipitur contra successioni signorum Tβ   invenienda] habenda Tβ Vη Zα; inventa Vσ; querenda Mτ   erit] est Kα   processus] *twice* Vψ; motus Mι Nγ   sinstro] *add. illeg.* Zα

28   promovendus] *om.* Kι Vμ; proficienda Wλ; promovenda Qη; promovendo Cγ   promovendus ... supra] alia ut prius Bε; et faciendum est ut supra Dη   cetera] *om.* Lμ Kι Mτ Qη Qθ Vμ; et cetera Vη; fac Nζ Pκ Pχ Wζ   cetera ut supra] *om.* Fγ Mμ   ut] autem Zα   supra] 8° Wλ; *add.* dictum est Pκ Pχ; *add.* etc. Rδ; *add.* et siga²/figa² istius imponitur Mπ; *add.* precedendo Vμ; *add. 7.5 lines* Zα

to the lesser radiation. And thus after the addition or subtraction, you will have the desired radiation.

However, for finding the right-hand radiation the indicator-muri will have to be advanced by moving it to the left; the rest is as above.

[Comment:

In astrology there are five "aspects" which relate planets (and the sun and moon) to each other via their respective places around a celestial circle.[8] The five are (1) conjunction, (2) sextile, (3) quartile, (4) trine, and (5) opposition. Conjunction and opposition are obvious; for sextile (sixths) the planets are multiples of 60° from each other; for quartile (or square) the planets are multiples of 90° from each other; and for trine (or trigonali or triangular) the planets are multiples of 120° from each other.

Thus if two celestial objects are being related, one notes their positions vis-à-vis a celestial circle in order to judge which aspect defines their relationship (e.g., 60° for sextile, 90° for quartile, 120° for trine, 180° for opposition). Of course the relationship will not fit precisely to these measurements; if the angular distance is within 5° of an aspect, the aspect is strong; if it is more than 5° off, the aspect is weakened, and the astrological interpretation will reflect this.

Plotting these aspects, and relating these to the houses, involves locating the "corners" of the aspects within the circumscribing circle. This is done by means of the concept of "radiation" or rays or lines from the planet to another planet, either to one which rises ahead (right-hand) or will rise later or follow (left-hand). In right-hand relationships the leading planet dominates the one following. For the planet following, the leading planet is in a left-hand relationship and again the following planet will be dominated by the leading planet.

Plotting the radiations (or rays or aspects) of a planet is not straightforward. This capitulum outlines one way of plotting such a radiation by means of calculating an iteration between a radiation based on right ascension and a radiation based on oblique ascension.[9]

For the first radiation (right ascension), find the longitude of the planet on the ecliptic (sometimes this involves a calculation based on the planet's right ascension), and place that ecliptic position on the meridian. As an example we will assume that our planet has an ecliptic longitude of 18° Aries (or simply longitude 18°);[10] thus the ecliptic point 18° Aries is placed on the

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[8] There are a number of different ways of calculating aspects, relating them to the equatorial circle or the ecliptic or other great circles, using right ascension, declination, longitude, latitude and even oblique ascension. These are all covered in Casulleras and Hogendijk, pp. 62-80. Note that for any astrologer, or any text, the method for casting the rays need not conform to the method of casting the houses.

[9] As noted above, Casulleras and Hogendijk (pp. 68-71) call this the "Single Hour Line Method,"

[10] Normally one would just use celestial/ecliptic longitude, from 0° to 360°, but here I will also use the degree of the zodiac sign since that is generally how the ecliptic on an astrolabe rete is graduated. For this example I am also placing the ascendant at 0° Aquarius.

meridian.[11] Note the position of the indicator-muri (the marker on the rim of the rete) vis-à-vis the edge of the astrolabe itself, and then rotate the rete by the appropriate number of degrees (60 for sextile, 90 for quartile, etc. – we will choose sextile in our example) to the right (clock-wise). The point on the ecliptic which then sits on the meridian (18º Gemini, i.e., longitude 78º) will define the first radiation.

For the second radiation (oblique ascension) place the same ecliptic position of the planet (18º Aries) on the eastern horizon (here called the "almucantar", that is, the first – or zero – almucantar) and again note the position of the indicator-muri on the rim of the astrolabe. Then rotate the rete as before (to the right by 60º in our example) and the point on the ecliptic which is on the eastern horizon (the new ascendant: 3º Cancer, i.e., longitude 93º) will define the second radiation.

Next the equation of the radiation needs to be calculated in order to interpolate a final position of the radiation between the above two points. This calculation is based on three values. The first is the difference between the two radiations found above, that is, in our example, 17 degrees.

The second value is the equatorial distance the planet from the meridian. Set the ascendant for that moment (0º Aquarius) on the horizon, which will place mid-sky on the meridian, and note the position of the indicator-muri on the rim of the astrolabe. Then rotate the rete until the position of Mars (18º Aries) is on the meridian and again note the position of the indicator-muri. The difference will be the equatorial distance of the planet from the meridian; in our example it will be 36 degrees.

The third value is half of the arc of the day or the night (depending whether Mars is in the day or night sky), and that is the equatorial distance between the position of the ascendant (0º Aquarius) on the eastern horizon and the meridian; in our example, reading off the rim, this is 88 degrees.

The formula for the equation of the radiation is the first value (the difference between the two radiations) multiplied by the second value (the distance of the planet from the meridian) divided by the third value (half the arc of the day or night): (17 x 36)/88 = 6.95 or 7 degrees.

This result for the iteration is then subtracted from the greater radiation (our second radiation) if the planet is in Houses 1-3 or 7-9, or added to the lesser radiation (our first) if the planet is in Houses 4-6 or 10-12. (The limits given in the text are the beginnings of houses and therefore the ends of the previous ones.) Since in our example Mars (18º Aries) is in House 3 (based on the ascendant at 0º Aquarius), we subtract the equation from the second radiation (93º) to give a final longitude of 86º or 26º Gemini.

If one is trying to find a right-hand radiation, the rotation of the rete would be to the left (counter-clockwise); otherwise the process is the same.[12]]

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[11] For this example I am using an astrolabe plate engraved for a latitude of 42º north.

[12] An outline of this method, as in al-Bīrūnī, can be found in E. S. Kennedy and Haiganoush Krikorian-Preisler, "The Astrological Doctrine of Projecting the Rays," *Al-Abhath*, 25 (1972), 3-15; reprinted in Kennedy, *Astronomy and Astrology*, pp. 372-384. A minor correction can be found in Jan P. Hogendijk, "The Mathematical Structure of Two Islamic Tables for 'Casting the Rays'," *Centaurus*, 32 (1989), 171-202 at note 20 p. 199.

I wish to thank Josep Casulleras (Barcelona) for helping me work through this capitulum.

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[CAPITULUM 40.] SCIENTIA ANNI MUNDANI VEL NATALIS

Cum volueris anni natalis vel mundani revolutionem scire, gradum

Cap. 40] *om.* Lι; *two versions* Cζ₁ Cζ₂

1   Scientia ... natalis] *om.* Bγ Bδ Bε Bζ Bκ Cγ Cδ Cε Dδ Eα Eγ Eλ Eκ Eo Eυ Gα Kε Kι Lζ Mα
         Mκ Mμ Mτ Nα Nζ Oβ Pγ Pζ Pι Pκ Pξ Pσ Pφ Pχ Qε Qη Sη Sθ Sι Tβ Vα Vη Vμ Vν Vσ Vυ
         Wγ Wζ; *faded/illeg.* Eδ Eζ Eϱ Fγ; Ad habendam revolutionem annorum Dη; Ad sciendum
         anni natalis vel mundani revolutionem Fβ; Ad sciendum revolutionem anni natalis vel
         mundani Lμ; De anni mundani vel natalis revolutione Vψ; De anni natalis vel
         mundani(*add.* in Mυ) revolutione Mν Mυ Vι Wβ Wι; De anno naturali vel mundano Bι;
         De anno natali Mπ; De gradu ascendentis revolutionis Mλ; De revoluptione(*!*) annorum
         Vγ; De revolutione anni mundani Mγ Vξ; De revolutione anni mundani vel natalis Rε;
         De revolutione anni natalis Bη Cζ₁ Cζ₂ Eμ(*marg.*) Pτ Oη Pζ(*marg., later hand*) Vβ(*add.*
         mund[an]i); De revolutione annorum Lλ; Modus inqueriendi anni mundani vel natalis
         Pϱ; Quot hore equales sint inter annum preteritum et revolutum Kα(*add.* Titulus
         inferioris can[onis]); Revolutio~ anni natalis Qθ(*marg., later hand*); Scientia anni natalis
         Pν; Scientia(C. 38. Scientia) revolutionis anni mundani vel natalis Dγ Kθ Po Qμ Rα
         Sβ(*marg., later hand*); Si gradus revolutionis quolibet anno vis scire Bβ[1]; Scientia
         revolutionis natalis sive mundani Vϱ; *add. in marg.* De revolutione anni natalis Oφ; *add. in
         marg.* 32 Bη; *add. in marg.* C. 33 Bι; *add. in marg.* 42 Mκ Pκ Vμ; *add. in marg.* C. 43 Oϱ; *add.
         in marg.* 44ᵘˢ Qζ   Scientia] *illeg.* Wα; De scientia Kδ Oϱ Rδ; *add.* inveniendis Mo
               vel] *om.* Cγ   natalis] nathalis Eβ Fζ Lβ Lγ Lε Mη Oγ Oζ Oι Oτ Oυ Pζ Pθ Pμ Po
         Pω Qγ Qζ Qλ Sδ Wι Xβ Xδ; naturalis Eσ; *add.* est hoc. Rx Nδ; *add.* etc. Rδ; *add.* Rubrica Oξ
         Vπ

2   Cum] Et si Oφ Pφ; *add.* autem Bκ Wγ   volueris ... scire] querere revolutionem Dη
               anni] *om.* Mγ; annal' Eβ; annalis Eγ; *add.* natalitii sive(?) Oβ   anni natalis]
         autem *blank* Cγ   natalis] *blank* Cγ; naialitis Kε Mτ; nalis Nη; natahcis Qζ; natahcii
         Qη; natalitia Nζ; natalitii Mμ Pκ Pχ Vμ Wζ; nathali Mη; nathalis Eβ Eσ Fβ Fζ Lγ Lε Lη
         Oγ Oζ Oι Oξ Oτ Oυ Pα Pω Qβ Qγ Qλ Sδ Sκ Tδ Wμ Xβ Xδ; naturalis Dγ; *add.* alicuius Mγ
         Mλ Rε Vν; *add. illeg.* Lη   vel] *add. in marg.* Eζ   mundani] aliquam Oη; meridiani
         Bγ Bε Cη Dη Eα Eλ   revolutionem] *om.* Pσ   scire] *om.* Mμ; *rep.* Qζ; querere Bδ
         Bε Cε Cι Eη Eσ Fα Fβ Fε Fζ Kα Kδ Lβ Lγ Lε Lη Lμ Mδ Mη Mι Mπ Mφ Nγ Nδ Nε Oγ Oζ
         Oι Oτ Oυ Pα Pβ Pδ Pθ Pμ Pν Pξ Pϱ Pσ Pω Qβ Qγ Qθ Qλ Rδ Sδ Sκ(*rep.*) Tβ Vη Vι Wα Wμ
         Xβ Xδ Zα   gradum] gradus Bι Gα Mo Pω Vβ Vν Xβ; graduum Eγ Nδ

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[1] The text of Cap. 40 in ms Bβ is seriously corrupted and has not been collated.

[CHAPTER 40.] KNOWLEDGE OF THE EARTH'S YEAR OR THE NATAL [YEAR][2]

　　　　When you wish to know the revolution of the natal or earth's year,[3] place the degree

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[2] In Gunther's edition this is Capitulum 40 in the Latin (p. 229), but it is numbered as 41 in the English (p. 188).

[3] Actually this deals with the sidereal year, but is used when casting horoscopes based on earlier births.

ascendentis transacti anni pone super orizontem in oriente, et locum almuri in margine
signa. Post hec almuri ab eodem loco in 93 gradu move, et gradus qui ceciderit super

3   ascendentis] *om.* Kα; ascendentem Nα; *add.* signi Gα   transacti] *om.* Vϱ;
         pertransacti(*?*) Oσ   anni] *om.* Mπ Pσ Pτ Xδ; *rep.* Nα   pone] *om.* Eδ Mυ Pϱ;
         interlin. Eα   pone ... oriente] super orizontem Eζ(*add. in marg.* pone in oriente)
                 super] in Mτ; supra *some*   orizontem] *add.* in orizonte Qδ   in oriente] *om.*
         Bθ Vη Vπ Wβ; orientali Fγ Vα; *add.* pone Mo   locum] *om.* Mκ Vπ Vσ; latum Lβ
                 margine] limbo Fγ

3-4   in₂ ... almuri] *om.* Kα Vα Vη   margine ... ab] *om.* Eo

4   signa] conscidera Cγ; considera Eγ Wγ; serva Mγ Mλ Vv; serva Bζ; signabis Pϱ   Post
         hec] *om.* Vξ; Post Mη; Postea Bζ; Post hoc Dη Mυ Pv Rδ; *add.* move Bκ Lζ   Post ...
         move] *om.* Pφ   almuri] locum almuri Qμ   ab] *om.* Mγ; *marg.* Nδ; de Eη; in Bζ
         Mμ Pκ Pχ   eadem] *add.* est Pγ   loco] *om.* Mλ; *add.* 90 Nζ   in] *om.* Bε Bκ Kε
         Lζ Lη Mμ Pϱ Oζ Qη Vμ; *interlin.* Oφ; cum Eϱ   in 93] *illeg.* Wζ; que Mτ; *corr. in marg.*
         from in 9ⁱⁱ Wβ   in 93 gradu] *interlin.* Qζ   93] *blank* Xδ; 93° *few*; 93ᵐ Nγ Nδ Qβ Sδ;
         93ᵇᵘˢ Nζ; nonagesimo tertio Mα; 9ᴵᴵᴵ Sβ; 3 Eo; Qε; 90.93 Pτ; 33 Sι; 63 Gα; LXIII Sθ; LXIII *corr.*
         to 93; 87 Dδ Eϱ Fγ Oβ Pξ Rε Tβ Xβ; 92 Fζ; *add. in marg.* aliter 87 Mη(*later hand*); *add. in*
         marg. et soᵘ(*?*) quod in exemplaribus que vide per istius erant 87, secundum quod in
         hic(*?*) videtur et 80 videatur in aliis Qμ   93 gradu] 87 gʳ et 19 puncta Zα; 87 gradus
         et 19 minuta Vη; 90 minus gradibus tribus Pκ Pχ   gradu] *om.* Kε Kι Mι Nγ Pυ Qη
         Vσ; gradibus Bζ Eλ Gα Kθ Mγ Mλ Mμ Nζ Pι Pκ Pv Pχ Qζ Sι Vμ Vv Wζ Wι; gradum Eσ
         Tβ; gradus Bι Dη Nε Pξ Vϱ Vξ Wλ; graduum Nδ; *add.* equinoctialis Rε   gradu move
         et] *om.* Sη   gradu ... qui] *illeg.* Nα   move] *om.* Pυ; *marg.* Pι; pone Bζ Bη Bθ Bι Bκ
         Cγ Cδ Cζ₁ Dγ Dδ Eα Eγ Eδ Eζ Eλ Eo Eϱ Eυ Fε Kε Kθ Kι Lζ Lλ Mα Mγ Mλ Mμ Mv Mo
         Mτ Nζ Oβ Oη Oϱ Oσ Oφ Pζ Pκ Po Pτ Pχ Qδ Qε Qζ Rα Sβ Sθ Sι Vμ Vv Vπ Vϱ Vσ Vυ Vφ
         Wβ Wγ Wζ Wλ; *add.* circumeundo(*?*) cum eodem almuri 20 Oβ   et gradus] *om.* Mγ;
         et 8 gra Pγ; et pone gradus Pι; gradum Vπ; *add.* zodiaci Zα   cediderit super]
         supracediterit Cε   super] supra *some*

4-5   qui ... gradus] *om.* Fβ

4-6   move ... gradus] *om.* Vη

of the ascendant of the previous year[4] on the horizon in the east, and mark the place of the indicator-muri on the rim. After this move the indicator-muri from this same place to degree 93[5] [that is, 93 degrees around the rim], and the degree [of the ecliptic] which falls on

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[4] We are dealing with a period of one year, beginning on any day (probably a birthday). The calculation starts with the ascendant on that day, and ends with the ascendant one sidereal year later.

[5] See the comment at the end of this capitulum concerning the various values of this parameter.

5   orizontem est gradus ascendentis eiusdem anni. Si autem plures fuerint anni, pro
         unoquoque anno deduces almuri 93 gradus, et gradus existens in orizonte in parte

5   orizontem] *add.* orientalem Oβ; *add.* pro Bζ; *add. interlin.* id est in orientali parte Oφ
         est] erit Cγ Cε Dη Lλ Mα Mτ Nζ Pζ Pκ Pχ Qε Rε Sθ Vγ Wζ; et Qη   gradus] *om.*
         Pσ Qθ   ascendentis] *om.* Pν Vγ; ascendens Vμ; *add.* quesiti Tβ; *add. interlin.* est
         ascendens Fβ   eiusdem] *illeg.* Nα; eius Bδ Bε Cι Eη Eσ Fα Fβ Fε Fζ Kα Lβ Lγ Lη Lμ
         Mγ Mδ Mη Mπ Mυ Nδ Nε Oγ Oζ Oτ Pα Pβ Pγ Pθ Pμ Pν Pξ Pϱ Pω Qβ Qγ Qθ Rδ Sκ Tδ
         Vι Vψ Wα Wμ Xβ; eius illius Xδ; illius Dη; ipsius Pζ; sequentis Rε   eiusdem ...
         fuerint] eius autem Kδ   anni₁] *om.* Kε Kι Mμ Pκ Pσ Pχ Qζ Qη Sδ Wι; *interlin.* Wζζ
         Si ... anni₂] *marg.* Mκ Po   autem] *om.* Xδ   plures] planetes Cγ   fuerint]
         erunt Mι Nγ; sunt Rδ   anni₂] *om.* Bκ Lζ Tβ   pro] *om.* Bζ; qui in Mγ; vel Mν

5-6   ascendentis ... unoquoque] *om.* Kα

5-7   eiusdem ... ascendens] *om.* Mτ
         Si ... anni] *om.* Pζ

6   unaquoque] quocumque Rδ; quolibet Bι Vϱ; uno Dδ; uno quolibet Nζ   anno] *om.* Bζ
         Eλ Eo Lλ Mλ Vγ Vν; anni Vψ; annum Kα; *add.* quoque anno Qβ   deduces] *om.* Mν;
         illeg. Oβ; *corr. from* reduces Mκ; deces *corr. to* deduces Cδ; deduc Nζ; duces Cγ Eγ Qη;
         reduces Bγ Bδ Bε Bζ Bθ Bι Cη Cι Dγ Eβ Eη Eσ Eυ Fα Fβ Kα Kδ Kθ Lβ Lγ Lε Lη Lμ Mδ
         Mη Mι Mo Mπ Mυ Mφ Nα Nγ Nε Oγ Oι Oσ Oτ Oυ Pα Pγ Pδ Pθ Pμ Pξ Pν Po Pϱ Pσ Pυ
         Pτ Pω Qβ Qγ Qδ Qθ Qλ Qμ Rδ Sδ Sη Sκ Tβ Vι Vπ Vϱ Vσ Vψ Wβ Wι Wλ Wμ Xβ Xδ Zα
         almuri] cum Eϱ; *add.* etiam Lβ; *add.* in Eβ Eη Fα Kα Lη Mδ Mι Nα Nγ Nδ Oζ Oτ Oυ
         Pϱ Pσ Pω Qβ Qγ Qθ Sη Sκ(*interlin.*) Wμ; *add.* per Rε Vμ   93] 93ᵇᵘˢ *few*; 87 Dδ Eϱ Fγ
         Oβ Rε Xβ; 63 Gα Rα Vφ; LXIII Sβ Sθ; LXIII *corr. to* 93 Qε; in 93 Oφ; 03 Lβ; *add.* in marg. *(later
         hand)* aliter 87 Mη   93 gradus] *om.* Dγ Mμ Mo Qζ Pκ Pυ Pχ Vυ; *marg.* Wζ; 93ᵐ
         gradum Nγ; ad tot gradus scilicet 87 Nζ; in 87 gradus et 19 minuta Zα; in 87 gradum 19
         minutie 6 secunde Tβ   gradus₁] *om.* Dδ Eα Eo Mν Po; *blank* Sη; gradibus Kθ;
         gradibus circumeundo cum(in Pι) eodem almuri Lλ Mα Pι Qε Qζ Qη Rα Sβ Sθ Vβ;
         gradibus occurendo cum eodem almuri Cδ Cζ₁ Cζ₂ Oη Oσ Vα; gradibus occurendo
         in(cum Oϱ) eodem almuri Eλ Oϱ Vν Vσ; *add.* accipiendo in eodem almuri Sι; *add.*
         circumeundo cum eodem almuri Eϱ Gα Vφ; *add.* in occurendo cum eodem almuri Bκ Lζ
         Oι(*marg.*); *add.* occurendo cum eodem almuri Qμ; *add.* occurendo in eodem Mλ; *add.*
         occurendo in eodem almuri Bζ Bι Dδ Eλ Eo Eυ Mγ Mκ Pφ Vπ Vϱ; *add.* occurendo in
         eodem almuri set semper Fγ; *add.* occurendo in eodem almuri 93 gradus occurendo in
         eodem almuri Bθ   et] tunc Oσ   et gradus₂] *om.* Fζ Vγ Wι; *interlin.* Eζ; *add.*
         occurrendo cum eodem almuri Rε; *add.* zodiaci Zα   existens] *om.* Oη; ascendens Rδ;
         add. post notum almuri Fγ   in₁] *add.* eodem Eo   in orizonte] *om.* Bη Cζ₁ Cζ₂ Mγ
         Sι; in oriente Wγ   in₁ ... parte] *illeg.* Nα   in₂] *om.* Pγ; ex Bζ Bθ Eλ Eo Eυ Mγ Mκ
         Mλ Pφ Rε Vν Vπ Vσ   in parte] *om.* Fε

the horizon is the degree of the ascendant [at the end] of the same year. If, however, there are many[6] years, you will turn the indicator-muri 93 degrees for each year, and the degree [of the ecliptic] lying on the horizon in the

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[6] Gunther accepted *planetes* (from his base ms) – which makes no sense. All other mss have *plures,* either in full or abbreviated.

orientali erit ascendens ipsius anni.

7 orientali] orientalis Bθ; orientis Mγ Vσ; *corr. from* occidentali Cδ erit] est Kα Pκ Pϱ
Pχ Wβ Wζ; *et fit* Sη; *add*. gradus Eγ Fγ Vγ Wγ ascendens] ascensus Fβ; gradus Mδ
Nδ; gradus ascendentis Cγ ipsius] *om*. Eo Eσ Mγ Mλ Vν; illius Bδ Bζ Cε Cι Dη Eα
Eβ Eη Fα Fβ Fε Fζ Kα Lβ Lγ Lε Lη Mδ Mι Mo Mπ Mυ Mφ Nγ Nδ Nε Oγ Oι Oξ Oτ Oυ
Pα Pβ Pγ Pδ Pθ Pμ Pν Pξ Pϱ Pσ Pτ Pυ Pω Qβ Qγ Qλ Rε Rδ Sδ Sη Sκ Tβ Tδ Vψ Wα Wβ
Wμ Xβ Xδ Zα; istius Eυ Nζ Oζ Vη; *add. interlin*. illius Vβ anni] *om*. Bη Cζ$_1$ Cζ$_2$ Kα
Oη; *add*. etc. Rδ Vη; *ms* Bβ *ends*

east will be the ascendant for this [final] year.

[Comment:

Preliminary
The modern measure of the sidereal (and tropical) year is 365 and just over (or under) a quarter of a day, while the medieval estimates (Arabic and Latin) describe it as 365 and just over a quarter of a day (implying the use of the sidereal year).

Modern sidereal year: 365d + 6h 09m
Modern tropical year: 365d + 5h 49m
Pseudo- Māshā'allāh: 365d + 6h 12m (calculated from his parameter)

The extra (approximate) 6 hours translated into the number of degrees through which the sun will move in its daily circle would be:

Modern sidereal year: 92;15 degrees
Modern tropical year: 87;45 degrees
Pseudo- Māshā'allāh: 93 degrees (as given in the text)[7]

The medieval figures are remarkably close to the modern figures, given the difficulty of making accurate measurements, even though the calculations are based on long time spans. Some texts give slightly different parameters (e.g., al-Khwārizmī and ibn al-Samḥ: 93;2 degrees; al-Zarqālī and Ibn Bāṣo: 93;24 degrees)[8] but it would be difficult to differentiate among them (e.g., 2 minutes of arc) on an astrolabe normally graduated at 2 degrees of arc.

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[7]   In the 1512 printed edition of the Pseudo- Māshā'allāh text *(Margarita Philosophica nove*, ed. Reisch), the parameter has been changed to 87;19 degrees. This figure survived through all the sixteenth-century editions and was carried over into the 1599 and 1600 Italian translations. Julio Samsó notes that whereas the 93 degrees in the original text implies the use of the sidereal year, this later figure implies the use of the tropical year (personal communication). Note that the apparatus criticus for lines 4 and 6 records the use of the tropical year figure in some manuscripts of the fourteenth and fifteenth centuries.
Others also use 93 as this parameter, e.g., Ibn al-Ṣaffār. See Abū ʿAlī al-Ḥousayn Ibn Bāṣo, *Risālat al-Ṣafīḥa al Ŷāmiʿa li-Ŷamīʿ al-ʿUrūḍ (Tratado sobre la Lámina General para Todas las Latitudes),* ed. Emilia Calvo Labarta (Madrid Consejo Superior de Investigaciones Científicas, Instituto de Cooperación con el Mundo Árabe, 1993), p. 87 n. 31.

[8]   Al-Khwārizmī: Julio Samsó, *On Both Sides*, pp. 345 and 711-12.
Mercè Viladrich i Grau, ed., *El "Kitāb al-ʿAmal bi-l-Asṭurlāb" (Llibre de l'Ús de l'Astrolabi) d'Ibn al-Samḥ* (Barcelona: Institut d'Estudis Catalans, 1986), pp. 67-68, 147. References to other texts and their parameters are in the footnotes.
Roser Puig Aguilar, ed., *Los Tratados de Construcción y Uso de la Azafea de Azarquiel* (Madrid: Instituto Hispano-Árabe de Cultura, 1987), pp. 31 and 80.
G. J. Toomer, "The Solar Theory of Az-Zarqāl. A History of Errors," *Centaurus* 14 (1969), 319.
Ibn Bāṣo, ed. Calvo Labarta, pp. 86-87, 190-192, 156-160 (Arabic). Also contains references to other texts and their parameters in the footnotes.

Capitulum 40

The purpose of this capitulum is to deal with the problem of properly calculating the ascendant over one or more years. Since the sun takes approximately 365 and a quarter days to make its way around the ecliptic, its position at the beginning of the following year will be a quarter day later than its previous beginning point. In this quarter day the sun will have moved an extra 93 degrees along its path of daily motion.

One must multiply this parameter (93) by the number of years which have passed; if the product exceeds 360 (or a multiple of 360) this 360 (or its multiple) would be subtracted from the product leaving a number less than 360.

To proceed, first set the previous ascendant on the eastern horizon; then rotate the pointer-muri 93 degrees (or the product produced above for multiple years) counter-clockwise around the rim. The point on the ecliptic which intersects with the eastern horizon will be the ascendant of the following year. (For example, if the ascendant in the first year was 0° Aries, and this is set on the eastern horizon, after the rete is rotated 93° for one year, or 186° for two, it will show that the ascendant of the following year will be 9° Sagittarius, or 26° Virgo for two years.)

If the original ascendant point (on the ecliptic) is then over the unequal hour-lines, the time of the beginning of the new sidereal year will be in the day; if it is over the almucantars, that point in time will be at night. Using the unequal hour-lines or the almucantars the exact time of the beginning of the new year can be found. (In our example, 0° Aries is 8 [unequal] minutes past the fifth unequal hour line.)

For multiple years, the pointer-almuri is moved 93 degrees for each year. The final position of the almuri (after 4 or more years) will automatically eliminate complete revolutions and again the exact time of the beginning of the final year can be found.]

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[CAPITULUM 41.] QUOT HORE EQUALES SUNT INTER ANNUM PRETERITUM ET REVOLUTUM

Si autem volueris scire quot hore equales sint inter annum preteritum et annum

Cap. 41] *om.* Lι; *two versions* Cζ₁ Cζ₂

1   Quot ... revolutum] *om.* Bγ Bδ Bε Bζ Bκ Cγ Cδ Cε Dδ Dη Eα Eγ Eκ Eλ Eo Eσ Eυ Fε Gα Kε
        Kι Lζ Lλ Mα Mκ Mμ Mπ Mτ Nα Nζ Oβ Oσ Pβ Pγ Pζ Pι Pκ Pξ Pσ Pφ Pχ Qβ Qε Qη Sη Sθ
        Sι Tβ Vα Vγ Vη Vι Vμ Vν Vσ Vυ Vφ Wβ Wγ Wζ Wλ Zα; *faded/illeg.* Cη Eδ Eζ Eϱ Fγ; Ad
        habendum horas equales inter annum revolutionis et annum preteritum Mλ; Ad
        inveniendum quot hore sint inter annum preteritum Qθ; De horis equalibus inter annos
        preteritum et revolutum Pτ; De horis inter annum revolutionis et annum preteritum Kθ;
        De horis inter annum revolutionis preteritum et presentem Bι(*add. in marg.* C. 34) Po; De
        horis inter duos annos Mγ Vξ; De scientia anni mundi vel natalis Kα (*add.* Titulus
        superioris canonis); Quot horis sint inter annos Cζ₁ Cζ₂ Oη(sunt); Quot horis sint inter
        annos preteritos Bη(*add. in marg.* 33); Scientia differentie horarum equalium anni perteriti
        ab anno revoluto Vϱ; Scientia differentie horarum inter quoslibet annos revolutionum et
        preteritos Dγ; Scientia(C. 39 Scientia Sβ) differentie horarum inter annos
        revolutum(revolutenum Sβ) preteritos Rα Sβ(*marg. later hand*); Summa distant~ horarum
        inter quoslibet annos Oφ(*line partly damaged*); *add. in marg.* 43 Mκ Pκ Vμ; *add. in marg.* C.
        44 Oϱ;; *add. in marg.* 45 Qζ(45ᵘˢ) Sδ(*later hand*)   Quot] Ad sciendum quot Kδ Lμ Rδ;
        De gnomonis. Quot Oγ; Quod Mν   equales] *om.* Mι Nγ Vπ   sunt] sint Lγ Mη
        Mι Mo Mυ Nγ Oυ Pδ Pθ Pμ Pν Pϱ Oυ Qβ Qλ Sκ Vπ Vψ Wα Wμ   inter] *om.* Sδ
            et] *add.* annum Oϱ; *add.* annum etiam Mδ Nδ   revolutum] revolutionis Kδ Wι;
        add. anni Mν; *add.* Capitulum Nδ; *add.* etc. Rδ; *add.* Rubrica Vπ

2   Si] Cum Kε Kι Mμ Mτ Nζ Pκ Pχ Wζ; Item Dγ   autem] *om.* Bζ Bθ Cε Eλ Eo Eσ Eυ Fβ
        Fγ Mκ Mλ Oφ Pφ Vμ Vν Vπ Vσ Wβ   scire] *om.* Kε Pι; *illeg.* Nα   quot] *interlin.*
        Xβ; quod Kε Mμ Qζ Qθ Rα Sκ Vξ   hore] *add.* quod (?) Kθ   hore equales sint]
        om. Qβ   equales] *om.* Oϱ; *marg.* Cζ₁; *add.* in anno Eδ   sint] *illeg.* Lμ; fuerint Bδ
        Oφ Pφ; sunt Oη Pζ   inter] in Mτ Oη; *add.* primam Vξ   annum₁] *interlin.* Vβ
            annum₁ ... et] *om.* Dη   preteritum] *illeg.* Nα; *marg.* Xβ; predictum Bκ Lζ Mν
            et] secundum Zα; seu Vη   annum₂] *om.* Eβ Eλ Fγ Fε Lη Mι Nγ Oζ Pϱ Pφ Qγ
        Vσ

[CHAPTER 41.] HOW MANY EQUAL HOURS ARE BETWEEN THE PAST YEAR AND THE REVOLVED [YEAR][1]

If, however, you wish to know how many equal hours are between the past year and the revolved year [that is, the number of equal hours in the number of unequal hours found in Cap. 40],

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[1] In Gunther's edition this is Capitulum 41 in the Latin (p. 229), but it is numbered as 42 in the English (p. 189).

revolutum, gradum perambulationis almuri divide per 15, et numerus qui exierit ex divisione est numerus equalium horarum inter utrumque annum exientium.

3   revolutum] *add*. sunt Tβ; *add*. 87 equinoctialis Rε   gradum] gradus Cζ$_1$ Cζ$_2$ Eυ Fζ Gα
         Mη Nζ Oη Pκ Pχ Qλ Sκ Tβ(*add. interlin* id est 87) Vα Vβ Vη Vν Vσ Vψ Wγ Wζ
             gradum perambulationis] gradumque ambulationis Wι; gradus perambulatores Mα
         Nε Pφ; gradus perambulationis Rε; per gradum ambulationis Fγ; gradus revolutionis Bδ
         Bε Dη Eβ Eη Eσ Fα Fβ Fε Kα Kδ Lβ Lγ Lε Lη Lμ Mδ Mι Mπ Mυ Mφ Nγ Nδ Oγ Oζ Oι Oξ
         Oϱ Oτ Oυ Pα Pβ Pθ Pμ Pν Pξ Pϱ Pσ Pω Qβ Qγ Qθ Rδ Sδ Tδ Vι Wα(*add. interlin*.
         perambulationis) Wμ Xδ; *add*. scilicet da Nζ   almuri] *om*. Bζ Eo Mλ Sβ Vν Xδ
         per] *om*. Sθ; *add. and del*. 5 Wα   15] XV Qε; 3 Wγ; quinque Oη   numerus] *om*. Eζ
         Wγ   exierit] excreverit Pκ Pχ; exigerit Vη; exit Bδ Nζ   ex] *om*. Eγ; a Cγ Wγ; de
         Bι Fε Nζ Vμ Vϱ; in Wμ

3-4   qui ... numerus] *marg*. Oυ

4   divisione] additione Eγ; *add*. eius Bκ Lζ   est] erit Bζ Bη Bθ Cγ Cζ$_1$ Cζ$_2$ Dη Eγ Mα Mγ
         Oη Oφ Pζ Pφ Qε Sβ Sθ Sι Vγ Vν Vξ Vπ Vσ Wγ   numerus] *illeg*. Nα   horarum]
         add. equalium Pξ Pυ   inter] in Eδ Mν Oη; *add*. initium Oβ   utrumque annum]
         utrorum anni Kε Lμ Nζ   annum] *om*. Cδ   exientium] *om*. Kα; existencium Bι Mλ
         Pζ Pκ Pφ Pχ Rε Vν; *add*. annum Bθ; *add*. etc. Rβ; *add*. et id quod remanet multiplica per 4ᵃ
         et erunt *illeg*. hore *illeg*. Xβ; *add*. Si queris de annis futuris revolve almuri a parte
         occidente (*add. interlin*. versus occidentem). Si vero queris de annis preteritis volve almuri
         a parte oriente (*add. interlin*. versus orientem). Tβ; add. Si queris de annis futuris revolve
         almuri a parte occidente versus occidentem. Si vero queris de annis preteritis volve
         almuri ab orizentem orientali versus occidentem a parte orientem Zα; *add. and del*.
         Explicit de utilitate astrolabii. Nam de gnomonis officio quod inferius sequitur Mπ; *an
         extraneous chapter* [DE RE PERDITA INVENIENDA] *is found here in 7 mss: see Appendix*.[2]

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[2] This material is also sometimes found elsewhere: see Appendix.

divide the degree of the course of the indicator-muri by 15, and the number which results from the division is the number of equal hours produced between the two years.

[Comment:
        This is essentially a repeat of Cap. 9, on converting unequal hours into equal hours. The span of unequal hours (as found in Cap. 40) is transferred to the rim of the astrolabe and the number of degrees in that arc is divided by 15 to produce the number of equal hours.]

[CAPITULUM 42.] DE GNOMONIS OFFICIO; ET PRIMO DE UMBRA ALTITUDINIS[1]

1   De ... umbra] *om.* Bγ Bδ Bζ Bκ Cγ Cδ Cε Dδ Eα Eγ Eκ Eλ Eo Eυ Gα Kε Kι Mα Mκ Mμ Mπ
         Mτ Nα Nζ Oβ Oν Oσ Pγ Pι Pκ Pξ Pσ Pφ Pχ Qε Qη Sθ Sι Sλ Tβ Vα Vη Vμ Vν Vσ Vυ Vφ
         Wγ Wζ Wλ; *faded/illeg.* Eδ Eζ Fγ Lλ Vϱ Wα; *ms* Lι *begins again;* Ad inveniendum quot sint
         puncta gnomonis umbre extense in umbra versa et econverso Lμ Qθ (*later hand*);
         Capitulum de officio gnomonis Bε; De dorso astrolabii Zα; De gnomone astrolabii et usu
         eius Bι(*add. in marg.* C. 1ᵃ (*!*)); De gnomonis officio ap²o delibra alt[e]ris Kθ(?); De
         gnomonis officio sive et quadrante in astrolabio Sη; De officiostale altimetre posite in
         dorso astrolabii Dη; De operatione quadrandis astrolabii Pζ(*marg., later hand*); De
         operationibus geoⁿˢ et primo de lateribus quadrantis Oφ(*add. in marg.* De noticia
         punctorum gnomonis umbrarum dorsi astrolabii in quadrante); De opere quadrantis
         astrolabii. De utilitatibus geometricis. Et primo de inventione umbre per altitudinem Vβ;
         De opere quadrantis in astrolabio Vγ; De scientia astrolabii scilicet quadrantis in dorso
         astrolabii Vξ; De scientia quadrantis in astrolabio Pτ; De scientia quadrantis in dorso
         astrolabii Mγ; De suornoris(*!*) officio et primo de utilitatibus altitudinis Nγ; De umbra
         per altitudine solis invenienda Bη(*add. in marg.* 23) Cζ Oη; De utilitatibus geometritis et
         primo de inventione punctorum umbre per altitudinem Mν Mυ(*add.* vel de gnomonis
         officio et primo de umbra altitudinis) Wβ Vι(*add.* vel de gnomonis officio et primo de
         umbra altitudinis); De (C. 26. De Sβ) utilitatibus gnomonis Rα Sβ(*marg., later hand*); De
         utilitatibus gnomonis et primo de lateribus quadrantis Rε; De utilitatiubs geometritis et
         primo de rectificatione punctorum umbre Wι] Inventio distancie regionum inter se Po
         Qμ; Sequentur de utibus gnomonis et cetera Dγ; Secunda pars usus astrolabii. De
         mensurationibus et puncto de quadrante Mλ; Versus quadrantis astrolabii Lζ(*later hand*);
         add. in marg. 44 Mκ Pκ Vμ; *add. in marg.* C. 45 Oϱ; *add. in marg.* 46 Qζ(46ᵘˢ) Sδ; *add. in marg.*
         Oφ:[2] Istud capitulum caim immediate sequenti in aliquis tractatibus *De usu astrolabii*
         solent(*!*) poni quia pertinent geometre immediate ante illud capitulum [i.e., 45] quod
         incipit "Cum altitudinem rei elevate etc." et hic per ordine debet sequi illud capitulum
         [28] "Si autem ascensiones signorum etc." INVENTIO UMBRE CUIUSLIBET PER ALTITUDINE
              De₁] *add.* sexto Qδ   officio] *om.* Vψ   gnomonis] generationis Mη; gomonis
         Pβ; suornoris (?) Mι Nγ   primo] *marg.* Pυ; postea Tδ   de₂ umbre] inventio Xβ
              de₂ ... altitudinis] habenda Pμ   altitudinis] *om.* Oϱ; habenda Bθ; solis Pδ
         Pυ(*add. in marg.* habenda); solis habenda Rubrica Vπ; *add.* Capitulum Nδ Qβ

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[1] In Gunther's edition this is Capitulum 42 in the Latin (p. 229), but it is numbered as 43 in the
English (p. 189).

[2] The order of the capitula in ms Oφ is irregular. See Introduction.

[CHAPTER 42.] ON THE PURPOSE OF A GNOMON; AND FIRST, OF THE SHADOW OF AN ALTITUDE

Quadrantis in astrolabio constituti sunt duo latera singula in 12 partes equales divisa, que vocantur puncta umbre. Sed notandum est quod latus inferius vocatur umbra extensa,[3] et aliud latus umbra versa, quia unum representat puncta umbre
5   extense, et aliud verse.

2   Quadrantis] *add.* autem Bθ Eo Eυ Mγ Mκ Mλ Oφ Pφ Vν Vπ Vσ   constituti] *marg.* Pν; *twice* Dγ; constituta Mγ   sunt] *om.* Kθ Pμ   duo] *om.* Mπ Zα; 2 / 2° *some*; et Mμ Mτ Nγ Vξ   latera] *add.* equalia Sη   latera ... 12] *om.* Pν Xδ   singula] *om.* Cη Eκ Kα Pγ Wι; *interlin.* Bγ Pϱ; *illeg.* Oβ; equalia Nα   in] *om.* Oη; *interlin.* Oφ   in 12] *illeg.* Nα   12] duodecim Mα Pκ Pφ; XII Pζ Pν Qε Sβ Sθ Sλ; 13 Pγ   equales] *om.* Nζ Pβ Pι Vμ Vν Vξ; equas Vγ; *add. interlin.* al' equans Vβ

3   divisa] distincta Oφ Pφ; divisas Lλ; *add. interlin.* al' distincta Vβ   que] *marg.* Eζ; et Kα Wβ   vocantur] *twice* Eζ; vocantes *corr. to* vocantur Nε   puncta] *om.* Eσ; partes *corr. in marg. to* puncta Xδ; presta Nγ; *add.* vel digiti Pι   umbre] *om.* Bε Eη; ambre Mγ   Sed] Et Lμ   Sed ... umbra] *om.* Bζ   notandum] *rep.* Qη; nota Cγ Cδ Eγ Mμ Wγ; *corr. to* nota Bη   est] *om.* Bγ Bδ Bε Bθ Cγ Cε Cζ Cη Dη Eβ Eκ Eσ Fγ Gα Kα Kε Kι Lι Nζ Oβ Oη Pγ Pι Pκ Pξ Pχ Qζ Sλ Vμ Vπ Wι Xβ Xδ Wγ Wζ; *interlin.* Fζ; *illeg.* Nα   quod] *add. interlin.* affixum linee medie noctis Bγ   latus] *om.* Oη   inferius] in quo fueris Mτ   vocatur] *om.* Eσ

3-4   Sed ... umbra₁] *om.* Bζ   vocatur ... et] *marg.* Qε

4   umbra₁] *om.* Eσ Qε Sι   extensa] recta Nα; *add.* sive recta Pι Wγ; *add.* vel recta Eγ Oγ Rε; *add. interlin.* id est recta Tβ   extensa ... umbra₂] *om.* Dη; *interlin.* Kε   et ... latus] ab Mτ   et ... versa] *om.* Vφ   aliud] aliud c'clus/t'tlus Pν; alium Lλ; superius Qε   latus] *om.* Kα Kε Qζ; *add.* vocatur Eγ Qε Xδ Wγ; *add. interlin.* affixum linee occidentali Bγ   versa] *add.* vocatur Vη   quia] et Mπ Vη; quare Fγ; et quod Tβ; quod Kα; *corr. from* que Wι   unum] *om.* Zα; *marg.* Qδ; unus Rδ; *corr. from* unu Wι   representat] presentat Lλ; r[epres]entat Kα   puncta] *interlin.* Qζ; position~(?) Pκ Pχ; presta Nγ; punctum Mγ   umbre] *om.* Nζ; *interlin.* Pκ

4-5   latus ... aliud] puncta Rε   latus ... verse] extense vel econverso Bη   quia ... verse] *om.* Lι Nα Pν Sη   puncta ... aliud] *marg.* Mκ

5   aliud] adad(?) Vυ; *add.* puncta Bζ Mλ; *add.* puncta umbre Gα Mκ Vπ Vσ; *add.* pumtum Mγ; *add.* umbre Eα Eκ Eυ Kε Kι Mν Mτ Oφ(*interlin.*) Qζ   aliud verse] adverse Sι   verse] *add.* punctis per altitudinem Mλ; *add.* vel econverso Oη

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[3] Sometimes called the *umbra recta*. See *Compositio*, Cap. 2 figura.

There are two sides of a quadrant drawn on an astrolabe, each divided into 12 equal parts which are called shadow points. But it should be noted that the lower side is called the "extended shadow," and the other side the "reversed shadow" because one shows the points of an extended shadow and the other of a reversed [shadow].

Cum ergo per hoc opus volueris scire quot punctorum gnomonis sunt umbra extensa vel versa, considera altitudinem solis; si fuerint 45 graduum est unaqueque

6 *before* Cum] QUOT PUNCTORUM SIT UMBRA GNOMONIS Mγ Cum] *add.* h' Pζ Cum ergo] *om.* Sι ergo] *om.* Kε Mτ Qζ; autem Eλ; igitur Bε Mι Mκ Mμ Nγ Nζ Pκκ Pχ Vμ Vσ Wζ ergo ... opus] *om.* Cγ; hoc Kι per] *interlin.* Sκ; propter Gα per hoc opus] *om.* Eγ Wγ hoc] *om.* Nε Qη opus] *om.* Kε Qζ Vυ volueris] *om.* Eϱ; desideras Pι quot] quo Lβ quod Kα Mν Qη Vη unctorum] *illeg.* Pθ; presta Mι Nγ Sκ; puncta Bδ Bε Dδ Dη Eα Eβ Eη Eλ Eσ Fα Fβ Fε Fζ Gα Kα Kδ Kε Kι Lβ Lγ Lε Lη Lι Lμ Mδ Mπ Mτ Mυ Mφ Nα Nδ Nζ Oγ Oζ Oι Oξ Oτ Oυ Oφ Pα Pβ Pδ Pμ Pν Pξ Pϱ Pσ Pω Qβ Qγ Qζ Qθ Qλ Rδ Rε Sδ Sη Tβ Tδ Vη Vι Vμ Vψ Wα Wβ Wζ Wμ Xβ Xδ Zα
   gnomonis] *om.* Cγ Cδ Eγ Wγ; gnoininis Cζ; gnomornis Eη; gnonimis Nγ; motus Qγ; *add.* in Qζ sunt] *illeg.* Fζ Gα Ov Pι Pτ Wα; fit Bγ Cη Pγ Sλ; sint Bζ Bθ Dγ Eδ Eϱ Kθ Mα Mν Mo Nζ Oϱ Pζ Pκ Po Qθ Qμ Vπ Vφ Wγ Wζ; sint *corr. to* sit Mκ; sit Bη Bι Bκ Cγ Cδ Cζ Eγ Eζ Eη Eκ Eμ Eo Eτ Fγ Lζ Lλ Oη Oσ Qε Sβ Sθ Vα Vβ(*add. interlin.* al' sunt) Vγ Vξ Vϱ Vσ Vυ Wι Wλ; *add. interlin.* al' in Oφ umbra] in umbra Kε Kι Mτ Pι Pκ Pχ Qζ Wζ

6-7 umbra ... versa] *om.* Sλ; umbra extensa et similia e converso Sθ; umbra extensa in versa Sκ; umbra extensa umbra versa et e converso Sη; umbra versa vel extensa Eδ Eτ Fγ Pγ Vξ Wβ; umbre extense et umbre verse e converso Mι Nγ; umbre extense et verse Sι; umbre extense in umbra et versa e converso Fζ Qλ Xδ; umbre extense in(*add.* scilicet vel Kα; vel Pω) umbra versa(*add.* vel Vψ) e converso Bδ Bε Dη Eβ Eη Eσ Fα Fβ Fε Kα Lβ Lγ Lε Lη Lι Lμ Mδ Mπ Mυ Mφ Nα Nδ Oγ Oζ Oι Oξ Oτ Oυ Pα Pβ Pι Pμ Pν Pξ Pϱ Pσ Pω Qβ Qγ Qδ(e converso *marg.*) Qθ Sδ Tβ Tδ Vη Vι Vψ Wα Wμ Xβ Zα; umbre extense in versa e converso Eα Kδ Pδ Cι Pθ Qδ(vel e converso *marg.*) Rδ; umbre extense in versa vel verse in extensa Kθ; umbre extense vel verse Dδ Eλ Mκ Nζ Rε Wζ; umbre recte in umbr~ [*illeg.*] et econverso umbre extense et umbra versa et econverso Oι

7 vel] aut Mμ versa] *add.* alicuius gnomonis Cδ altitudinem] latitudinem *corr. in marg.* Wα solis] *om.* Qλ Sι; *add.* que Rε solis si fuerint] *om.* Qθ si] cum Bδ Bε Cι Dη Eα Eη Fα Fε Fζ Kα Lβ Lγ Lε Lη Lι Lμ Mδ Mη Mι Mυ Mφ Nα Nγ Nδ Nε Oγ Oζ Oξ Oτ Pβ Pθ Pμ Pν Pϱ Pω Rδ Qβ Qλ Sδ Sκ Tβ Vη Bψ Wα Wμ Xβ Xδ Zα; non Mo si fuerint] *illeg.* Cε fuerint] *om.* Oγ; fuerit Lβ Mγ Mτ Nζ Oη Pζ Pφ Rδ Wι; *add.* 9(?) Mμ
   45] *illeg.* Nα; XLV Qε; 4v Sβ; 4 *add. in marg.* 5 Vφ; quadraginta quinque Mα; 14 *corr. in marg. to* 45 Kα; 15 Eλ; XV Sθ; 15 *corr. in marg. to* alius 45 Lλ 45 ... est] si gradus tunc erit ccϱ Kθ graduum] *om.* Fγ; gradibus Tβ; gradus Vϱ; tunc Pξ; *add.* perpendiculorum Xβ; *add.* tunc Qζ Qη Sη; *add.* tunc enim Lι Pω Vμ est] erit Cγ Eγ Lλ Mα Pζ Qε Sβ Sθ Vφ; et Cε Mν Mo Pυ Wβ Wλ; tunc Nα; tunc enim Cι Dη Eα Nγ Qδ; tunc enim est Bδ Bε Eβ Eη Eσ Fα Fβ Fε Fζ Kα Kδ Lβ Lγ Lε Lη Lμ Mδ Mι Mπ Mυ Mφ Nγ Nδ Nζ Oγ Oζ Oι Oξ Oτ Oυ Pα Pβ Pδ Pθ Pμ Pϱ Pσ Qβ Qγ Qθ Qλ Qδ Rδ Sκ Tβ Tδ Vη Vι Vψ Wα Wμ Xβ Zα; tunc est Kε Mτ Pκ Pχ Rε Sι Wζ; *add.* uno vero est Xδ
   unaqueque] *illeg.* Bη; interque Cγ Eγ; unaque Mτ Oη; *add.* cum eam Pν

Therefore, when through this operation you wish to know how many of the points of the gnomon are [in] the extended shadow or the reverse [shadow] consider the altitude of the sun. If it is 45 degrees, each

earum 12 punctorum equalis, scilicet, suo gnomoni. Si autem fuerit maior altitudo solis,

8   earum] *om.* Eλ; harum Eσ; illarum Lλ Pζ Qε Sθ; rerum Wμ; umbra Pι; *add.* est Eα Mμ;
           add. umbrarum Tβ; *add. interlin.* illarum Vβ   12] duodecim Mα Mμ Pφ; xii Qε Pζ Pϱ
           Sβ Sθ Wψ; 13 Sι; duorum Eo   punctorum] poitionum(*!*) Mι Nγ; *add.* scilicet est Rε
                equalis] {Bδ Bε Bη Bθ Bι Bκ Cδ Cε Cζ Cι Dγ Dδ Eα Eβ Eδ Eζ(*corr. from* 8) Eη Eμ Eϱ
           Eσ Eτ Eυ Fα Fβ Fε Fζ Gα Kα Kδ Kε Kθ Kι Lβ Lγ Lε Lζ Lη Lλ Lμ Mα Mγ Mδ Mη Mι Mκ
           Mλ Mν Mo Mπ Mτ Mυ Mφ Nα Nγ Nδ Nε Nζ Oβ Oγ Oζ Oη Oι Oξ Oσ Oτ Oυ Oφ Pα Pβ
           Pδ Pζ Pθ Pι Pμ Pν Pξ Po Pϱ Pτ Pυ Pφ Qγ Qδ Qε Qζ Qη Qθ Qλ Qμ Rα Rε Sβ Sδ Sη Sθ Sκ
           Sλ Tβ Tδ Vα Vβ Vγ Vι Vν Vξ Vπ Vϱ Vυ Vψ Vφ Wα Wβ Wμ Xβ Xδ Zα}; *om.* Eo; equales
           Bζ Sι Wλ; equalium Bγ Cγ Cη Eγ Eκ Pγ Wγ Wι; est equalis Dη; scilicet enim est equalis
           Eλ   scilicet] *om.* Bδ Bε Bκ Cι Dη Eβ Eη Eλ Eo Eϱ Eσ Fα Fβ Fε Fζ Kα Kδ Kε Kι Lβ Lγ
           Lε Lζ Lη Lι Lμ Mγ Mδ Mη Mι Mλ Mμ Mτ Mυ Mφ Nγ Nδ Nε Nζ Oγ Oζ Oι Oξ Oϱ Oτ Oυ
           Oφ Pα Pβ Pδ Pθ Pι Pκ Pμ Pν Pξ Pϱ Pχ Qγ Qδ Qζ Qη Qθ Qλ Rδ Rε Sδ Sκ Tβ Tδ Vη Vι Vμ
           Vν Vψ Vφ Wα Wζ Wμ Xβ Xδ Zα   suo] *om.* Kθ Wλ; *interlin.* Pι; duo Vα   suo
           gnomoni] mognomoni Nε   gnomoni] gnomini Cζ; gnomonis Mo; gomoni Mπ Pβ;
           nomini Sι; *add.* id est equalis umbre sue q'libet enim res tunc cum umbra sua est in figura
           gnomonis Mι Nγ; *add.* id est tantum est umbra quantum est corporis altitudo Cγ
                autem] enim Vη; vero Sβ   fuerit] *om.* Oη; *illeg.* Nα; fuit Pθ   maior] *illeg.*
           Gα; magis Mδ; maiori Oϱ; minor Mγ Oγ   altitudo] latitudo Fε; longitudo Bε; *add.*
           interlin. scilicet 45 gradibus Vβ   solis] *om.* Kα Vυ Wμ; *add.* 45 grad~ Oβ Qη; *add.* 45
           graduum tunc Bθ Eυ Vπ; *add.* maior Bδ; *add.* maior fuerit Lμ Vι; *add.* quam 45 graduum
           Wγ; *add.* 45 gradibus tunc Pι Vσ; *add* 45 gradibus(*marg.*) tunc Mκ; *add.* minor erit umbra
           suo gnomoni Qδ Vυ; *add.* tunc Eλ

of them of 12 points is equal, that is, by its gnomon. If, however, the altitude of the sun is larger

tanget regula latus umbre extense super aliquid punctum. Igitur puncta que sunt a tactu

10   regule in diametrum sunt umbre extense; et si diviseris per ea 144, invenies puncta

9   tanget] tange Sλ; tanges Qε; tangit Nγ   regula] *om.* Tβ Vη Zα; *marg.* Xβ; illud Kα Nζ;
        regulam Bδ; rigula Nγ; *add.* in Cγ Sλ   latus] *om.* Pκ Pχ Sι; in latere Cδ Cζ Eγ Lε Mα
        Pζ Qε Sβ Sθ Vγ Wγ; ⁱⁿ latere Vβ; *add.* solis Nζ; *add. interlin.* al' in latere Oφ   extense]
        recte Nα; *add. interlin.* id est recte Vβ   extense ... punctum] expanse finem illius
        punctorum Qε; finem punctorum Pκ Pχ   super] sit Bζ; *add. in marg.* al' pars finem
        illius punctorum Oι   super ... punctum] *om.* Cζ Oη Oν Pγ Vϱ Wι; *interlin.* Kε; fine
        g[radu]s punctorum Pι; finem illius(*om.* Mμ) punctorum Bη Bκ Cδ Dγ Eγ Gα Lζ Lλ Mα
        Mμ Oϱ Pζ Rα Sβ Sθ Vα Vγ Vυ Vφ Wγ; finem illius (*expunged*) Bι; finem illius puncti
        Bγ(*marg.*) Cε Eα Eδ Mη Mν Nε Oφ(*add. in marg.* al' super aliquem punctum illius vel
        finem illius) Po Pυ Pφ Qμ Vβ(*add. interlin.* al' -torum) Wβ; finem illius puncti [*illeg.*]
        gradus Kθ; finem punctorum Cγ Nζ Vμ; quantum illius punctorum computa Dδ; super
        ille puncto illius Sι   super ... puncta] et numerus punctorum Wζ   aliquid] *om.*
        Vα; *illeg.* Wα; aliquam Bθ; aliquem Fγ Mλ Pϱ Rε Vπ; aliquic Mγ; aliquod Fα Fζ Lε Lη Lι
        Mδ Mτ Nγ Oξ Sκ; ille Sι; illud *corr. in marg. to* aliquid Qδ; quot Eσ   punctum]
        punctorum illius Vα Wλ; punctorum ipsius Eϱ Fγ; spacium Lι Oξ; *add.* illius Eλ Eo
        Kε(*interlin.*) Kι Mκ Oβ Pτ Pω Qζ Qη Rε Vν Vπ Vσ; *add.* istius Mτ   Igitur] *om.* Bκ;
        ergo Bθ Kα Nα Pφ Qδ Tβ Tδ Vπ; si Pω; *add.* numerus punctorum Qη   Igitur puncta]
        om. Gα Mμ Nζ Pι Pκ Pχ Vμ Vφ; et numerus punctorum Kι Mτ   Igitur ... sunt₁]
        Numerus punctus que fuerit Qζ   Igitur ... tactu] Ergo numerus punctorum qui sunt
        in contactu Kε   puncta] Deinde Bθ; Punctorum Rα; Umbre puncta Xβ   que]
        quot Mφ   sunt] stbi²(?) Vη   a tactu] *corr. from* actu Wι; in contactu Qζ
                tactu] contactu Cζ Oη Qη

9-10   extense ... umbre] *om.* Eκ Sλ Vξ; *1.7 lines expunged* Eζ   Igitur ... extense] *om.* Cη; *marg.*
        Bγ

9-11   latus ... puncta] *om.* Eυ

10   regule] *om.* Bζ; rigule Nγ   in] ad Pκ Pχ; et Mμ Nζ Vμ   in diametrum] *om.* Pθ
        Rδ; in diametro Vψ   sunt] finit *corr. in marg. to* sunt puncta Qδ; *add.* puncta Bκ Lζ Mι
        Mκ Nγ Nν Pι Qμ Rδ Vγ Vη Vπ Vσ Zα   extense] recte Fγ; *add.* recte Mι Nγ; *add.*
        super aliquid punctorum Wλ   et] *add.* quam Qζ   et si] sed Sθ   et ... ea] per
        quam si divisorum Mτ   si] *om.* Pι   diviseris] *add.* postea Nα   per ea] ea Eϱ;
        ea per Bζ Eλ Eo Fγ Kα Mγ Vν Wι Wλ Zα; per quam Kι   per ea 144] ea per 144 *corr.*
        to ^{per} ea 144 Pτ   ea] *om.* Eγ; eum Pι; illa puncta Mμ Nζ Vμ; ista puncta Pκ Pχ Wζ;
        quod Kε   ea 144] *blank* Lλ Vγ; equos Eα; ita puncta Qξ; ; *add.* id est per puncta
        umbre extense Cγ   144] 144^{or} Vβ; C4IIII Sβ; 14 Vσ; 244 Nα; CXIIII Qε   invenies]
        twice Fε; habebis Lι Nα Sη; et habebis Vη; *add.* per ea Bη Cζ Oη

10-11   in ... verse] puncta umbre verse ad 12 et sic se habebit altitudo rei ad spacium extensum
        infra Kδ   extense ... umbre] *om.* Eσ

the rule will touch [on] the side of the extended shadow on some point. Therefore the points which are touched by the rule along the diameter are on the "extended shadow"; and if you divide 144 by them, you will find the points

umbre verse. Si vero solis altitudo fuerit minor 45 gradibus, tactus regule in umbra
versa ostendet eius puncta; per que divide 144, et habebis puncta umbre extense. Nam
si puncta umbre verse multiplicaveris in puncta illius umbre extense, provenient ex

11   umbre] *om.* Cγ Cη Eγ Eκ Pγ; *marg.* Wι; *interlin.* Bγ   verse] *add. interlin.* umbre Bγ;
      add. in marg. et compara(opera Pθ) illa puncta umbre verse ad 12 et sic se habebis altitudo
      rei ad spatium extensum in terra Pθ Qδ Rδ; *add. 8-line gloss* Oι(*fol. 138ᵛ bottom marg.*)
           verse ... umbra] *om.* Wβ   vero] *om.* Vν; autem Eλ Eo Mγ Mλ Mμ Nζ Pκ Pχ Qη
      Rε Vμ Wζ   solis] *om.* Mλ Rε Vν   altitudo] *om.* Bζ; latitudo Qη   fuerit] *om.*
      Lη Oζ; *add.* umbre Sθ   minor] *om.* Pσ; *illeg.* Gα; *corr. in marg. from* maior fuerit tanget
      regula latus umbre Cι; *add. interlin.* quam Sλ   45] 4ᵛ Sβ; 4 et Vφ; 15 Eλ; xv Sθ; xv
      corr. to XLV Qε   gradibus] *om.* Eϙ Nα; gᵃ/ᵈ Bδ Bε Bι Dγ Dδ Eα Eδ Eζ Eλ Eκ Eτ Kδ Kθ
      Mν Mτ Oβ Po Pξ Qγ Qδ Qη Qμ Rα Vξ Vϙ Vφ Vψ; gradus Cγ Eη Mι Nγ; graduum Bγ Cη
      Eγ Gα Kα Kε Kι Nζ Pγ Pτ Pφ Qζ Sλ Wι Wλ Wγ; *add.* est umbra maior Vυ; *add.* tunc Kδ
      Rδ   tactus] *om.* Rε; contactus Qζ; tactu Qε   regule] regula Rε; rigule Nγ; regulo
      Eτ   in] *om.* Dγ Vγ

11-12   umbre ... puncta₁] *om.* Fβ   Si ... extense] *om.* Sη

12   versa] *add.* extensa Vι   ostendet] *om.* Eσ; accendet Sι; ascendet Kδ; *add.* tibi Bζ
           eius] *om.* Gα; eorum Qη; ipsius Nζ; tibi Bι   eius puncta] ei Pγ   puncta₁]
      add. per umbram versam Cγ; *add. in marg.* computando a tactu regule usque ad
      dyametrum occidentalem Bγ   per ... puncta₂] *om.* Mη Oϙ Vη Vυ   per ... extense]
      corr. in line and add. in marg. Eζ   144] *om.* Nα; CXIIII Qε Sθ; C4IIII Sβ; 19 *corr. to* 144 Qη
           et ... extense] *om.* Eζ   puncta₂] *om.* Eυ; *add.* etiam Fβ   umbre] *add.* illius Bθ
      extense] *add.* Et compara(opera Pθ) ista puncta umbre extense ad 12 et sic se habebit
      extensio rei in terra ad(*om.* Rδ) altitudinem Kδ Pθ Rδ; *add.* et sunt puncta umbre extense
      32 puncta umbre verse sunt 6 ad [*illeg.*] altitudine per quam adid~ 144 exibunt 24 Oν; *add.*
      in marg. et compara ista [*cut off*] | umbre extense | 2ʳ(?) sic habebit [exten]|sio rei [*cut off*]
      | altitudinem Qδ   nam] *add. in marg.* al' nam si puncta cuiuslibet gnomonis umbre et
      cetera Oφ; Non si puncta umbra extense. Nam Wβ

12-13   nam ... extense] *om.* Pξ; et Mι Nγ

13   si] *add.* cuiuslibet gnomonis Cγ Eγ Fε Lλ Mα Oβ Oι(*marg.*) Oϙ Pζ Qε Sβ Sθ Vβ Vγ Wγ;
      add. quoque gnomonis Sλ   puncta₁ ... in] *om.* Eυ   umbre₁] *om.* Wι; *twice* Lη; illius
      Eυ   verse] *om.* Eλ Nδ Qγ; *interlin.* Wα   verse ... umbre₂] *om.* Eμ
           multiplicaveris] multiplicabis Rε   in] per Dη Eα Rε Wζ   puncta₂] *add.*
      umbre Lμ Qθ   illius] *om.* Bγ Cη Nα Pυ Sη; cuius Oϙ; istius Qη   umbre₂] *add.*
      illius Bζ Eυ   extense] verse Vη   provenient] pervenient Oφ(*add. interlin.* al' pro)
      Qδ Sι; provenerit Eα; proveniet Dη Nγ; *add.* se Fζ   ex] *om.* Nε

13-14   ex multiplicatione₁] *om.* Eϙ; ex multiplicare Pι

on the reversed shadow [scale]. If however the altitude of the sun be less than 45 degrees, the touch of the rule in the reversed shadow [scale] will show its points; divide 144 by these and you will have the points of the extended shadow. For if you have multiplied the points of the reversed shadow by the points of the extended shadow, 144 will proceed from

multiplicatione 144, que proveniunt etiam ex multiplicatione 12 in semet ipsis, que sunt
15   partes gnomonis unius.

     Sciendum est etiam quod si in acceptione umbre per altitudinem ceciderit regula

14   144] CXᴸIII. Cent' vero XLIIII Qε; C4IIII. C vero 4IIII Sβ; CC4 Fβ; *add.* centum 44 Vγ; *add.*
    centum vero 44 Lλ; *add.* centum vero quadragintaquatuor Mα; *add.* centum vero
    quadraginta IIIIᵒʳ Pζ; *add.* centum XLIIII Sθ   144 ... multiplicatione₂] *om.* Cγ Dη Eγ Nζ
    Oν Pϙ Pτ Vφ Wβ Wγ   que₁] *om.* Lλ Mα Pζ Qε Sβ Sθ; vero Vγ; *add.* cum Oϙ; *add.*
    etiam Mκ; *add. in marg.* scilicet 144 Oφ; *add. interlin.* scilicet 144ᵒʳ Vβ   que₁ ... 12] *om.*
    Cε   proveniunt] pervenient Pν; perveniunt Sι; provenit Oβ; veniunt Oη   etiam]
    om. Bε Bη Eδ Eϙ Fε Lλ Mα Mμ Oϙ Oσ Pκ Pχ Qε Sθ Vγ Vψ Wα Wζ; *marg.* Oξ; et Mν Nε
    Vι   ex₂] *interlin.* Sκ   multiplicatione₂] *interlin.* Kε   12] *om.* Kα Lζ; duodecim
    Mα; XII Qε Sβ Sθ   semet] se Bζ Mν Sβ Tβ Wβ Zα; se cum Pφ   semet ipsis] se Pχ;
    se ipsam(?) Bε Pι; se ipsis(?) Mτ Vη; *add.* 144 Nζ   ipsis] ipsa Rε   que₂] *om.* Lλ;
    interlin. Lζ; *add. interlin.* 12 Bγ Lζ   sunt] super Pγ

14-15   12 ... unius] *om.* Sι

15   gnomonis] gnominis Cζ; gomonis Pβ Mπ   gnomonis unius] unius cuiusque
    gnomonis Bκ Lζ(*add. interlin.* al' ipsius etiam) Oν   unius] *om.* Bδ Bε Bζ Cε Cι Dη Eβ
    Eδ Eη Eo Eσ Fβ Fε Fζ Kα Kδ Kι Lβ Lγ Lε Lι Lμ Mδ Mη Mι Mπ Mυ Mφ Nγ Nδ Nε Oζ Oξ
    Oτ Oυ Pδ Pα Pβ Pθ Pμ Pν Pξ Pϙ Pσ Pω Qβ Qγ Rδ Sδ Sκ Tβ Tδ Vη Vψ Wμ Xβ Xδ Zα;
    marg. Oι; illius Dδ Mμ Mτ Qζ Vμ; ipsius Nζ Pκ Pχ; istius Kε Qη; *add.* 144 Eγ Wγ

16   *before* Sciendum] *add.* DE EIUS DENOMINATIONE Bθ Mη Vπ(*add.* Rubrica); *add.* DE PARTE
    PUNCTI HABENDA SECUNDUM PROPORTIONEM PER ALMURI Mλ; *add.* QUALITER EQUALITUR
    PUNCTA Bη(*add. in marg.* 24) Cζ; *add.* UT SCIAS DENOMINARE PUNCTA A TOTO Mγ; *add. in*
    marg. INVENTIO PARTIS PUNCTI UMBRE PER; PROPORTIONEM Oφ   Sciendum] *corr. in*
    marg. from Secundum Oξ   Sciendum est] *del.* Mκ   Sciendum ... etiam] *om.* Vσ
        est] *om.* Cζ Nα Oη Pυ Rε Sβ Sη Sλ Wβ; *interlin.* Oι   est etiam] *om.* Bδ Bε Bζ Cε
    Cι Eβ Eη Eλ Eσ Fα Fβ Kα Kδ Kε Kι Lβ Lγ Lε Lη Lι Lμ Mγ Mδ Mη Mι Mλ Mμ Mo Mπ Mτ
    Mφ Nγ Nδ Nε Nζ Oγ Oζ Oξ Oτ Oυ Oφ Pα Pβ Pδ Pθ Pμ Pν Pξ Pϙ Pφ Pχ Pω Qβ Qγ Qζ
    Qη Qθ Qλ Rδ Sδ Sι Sκ Tβ Tδ Vη Vμ Vν Vπ Wα Wζ Wμ Xβ Xδ Zα; quod Wψ; tunc est Pβ
        est ... quod] *om.* Pκ   etiam] *om.* Mκ Wγ   est ... si] quod in Dη   etiam]
    om. Bη Bθ Eγ Oι; autem Vξ   si] *om.* Sι; *interlin.* Oγ Pκ   in] *om.* Fε   in
    acceptione] incaptione Oφ(*add. interlin.* al' acceptione)   umbre] *om.* Bζ Eo; *add.* qui
    est Pι   per altitudinem] *om.* Eλ Mτ; per latitudinem Pδ; verse Rε; *add.* si Dη; *add.* solis
    Mκ(*marg.*) Oβ Pι Tβ Vη   cecederit] recederit Pγ; *add.* in Mo Nα Pυ Qβ Wλ
        regula] *om.* Rδ; *expanded in marg.* Xβ; regulam Wι; rigula Nγ

16-17   in ... alicuius] ex parte altitudinis Oφ

the multiplication, which also proceeds from the multiplication of 12 by itself, which are the parts of one gnomon.

One should also know that if in taking a shadow for the altitude the rule shall have fallen

in parte alicuius puncti, et volueris eam denominare a toto, move regulam ab initio
illius puncti in partem ipsam, et vide quot gradus moveatur regula, qui erunt gradus

17   in] ex Pφ   parte] partem umbre Mτ; *add.* altitudinis Fγ Pτ Wλ   alicuius]
        altitudinis Eo Mγ Mλ Pφ Sι Vν   alicuius puncti] *twice* Eϱ   puncti] *add.* id est
        inter duo puncta Cγ Eγ; *add.* inter duo puncta Wγ; *add. in marg.* al' in parte alicuius
        puncti Oφ   eam] *om.* Cγ Dδ Eγ Lμ Qθ Vϱ Wγ; ea Kα Nγ; eandem Bθ Oι Pγ Vπ; *add.*
        partem Bζ   eam ... toto] scire a tacto ei denominati Vγ   denominare] nominare
        Kε Mμ Nζ Pκ Pχ Qζ Vμ Wζ; notare Mτ; *add.* id est que sit pars illius puncti Cγ Eγ Wγ
              toto] tot Nζ; *add.* puncto 12 in semet ipsius que sunt partes unius nomonis Sι(= ll.
        14-15); *add.* scilicet scire quota pars puncti fuerit Qμ   regulam] rigulam Nγ; *corr. in
        marg. from* umbram Xβ   ab] sub Oγ   initio] *om.* Fγ

17-18   et ... puncti] *om.* Bδ

18   illius] alicuius Mμ Pκ Pχ Qη; alius Eo; eiusdem Cγ Eγ; ipsius Bη Eκ Fγ Oφ Pγ Pφ Sι Wι;
        istius Kι Lι Nζ Pι   puncti] *om.* Qε; *add.* ubi prius ceciderit Fγ   partem] finem Fε
              ipsam] *om.* Mν Mτ; illam Bζ Cζ Fε Oη; ipsius Kε Kι; *add.* in quo ceciderit Vμ; *add.*
        ubi prius ceciderit Bθ Eλ Oν Oφ(*interlin.*) Pτ Tβ Vη Vν Vπ Wλ; *add.* ubi prius ceciderit in
        parte [*illeg.*] altitudinem Zα; *add.* ubi prius cecidit Eo Eυ Mγ Mκ Mλ Rε Vσ; *add.* ut prius
        Bζ   vide] videverit Fε   quot] per quod Vη; per quot Pι Tβ Vμ; quod Eσ Kε Mμ
        Mπ Sκ Wι Wλ   gradus₁] gradibus Bγ Cδ Eλ Fγ Lζ Lλ Mα Mτ Oη Oϱ Pκ Pχ Qμ Rε Sβ
        Sθ Sλ Vα Vβ(*add. interlin.* al' gradus moveantur) Vγ Vξ Vυ Wζ   moveatur] movebit
        Pω; moveantur Eα Mo Nα Sη Sι Vπ Vϱ; movetur Dη Mπ Mφ Nδ Sδ Tβ; movevit Vψ;
        mo^vetur Pϱ noveantur Mν; *corr. from* moveantur Bι   regula] *om.* Bζ Bη Bθ Bι Cδ Cζ Dδ
        Eα Eδ Eo Eϱ Eυ Kθ Lλ Mα Mγ Mκ Mμ Mμ Mo Nα Oη Oϱ Pι Pκ Po Pτ Pυ Pφ Pχ Qδ Qε
        Qμ Rα Rε Sδ Sι Sλ Vα Vβ Vγ Vμ Vν Vϱ Vσ Vυ Vφ Wζ; in margine Nζ; *marg.* Eζ Oσ;
        interlin. Oφ; *corr. interlin. from* umbra Xβ   qui] *add.* gradus Bδ Dη Eβ Eη Fα Fβ Fζ Lβ
        Lγ Lε Lη Lι Lμ Mδ Nδ Oγ Oζ Oι Oξ Oτ Oυ Pα Pβ Pμ Pν Pξ Pϱ Pσ Pω Qβ Qθ Qλ Tβ Tδ
        Xδ   erunt] *marg.* Wα; erat Mγ; erit Pζ Sθ Sι Vν   gradus₂] *add.* huius(?) puncti Kα

18-19   puncti ... illius₁] *om.* Oβ   in ... partis₂] *om.* Cγ Eγ Eκ Nγ; ad Wγ   quot ... vide]
        om. Qη   qui ... partis₁] *om.* Mλ

18-20   regula ... regula] *om.* Gα

on the part of any point [i.e., between two marked points] and you wish to denominate it from the whole, move the rule from the beginning of that point unto its part, and observe how many degrees the rule is moved, which will be the degrees

ipsius partis. Deinde move regulam ab initio illius partis in finem illius, et vide iterum

20 quot gradus moveatur regula, qui erunt gradus totius puncti. Quanta ergo proportione
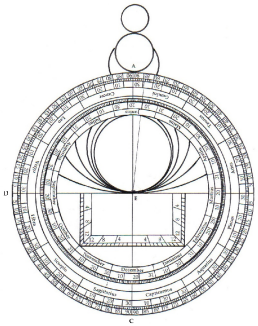
19   ipsius] illius Bγ Cη Dη Fγ Oγ Sλ Vπ   partis₁] *om.* Pκ Pχ; partes Cδ(*add. interlin* vel
        partis); *add.* puncti Mτ   Deinde] De Qλ; *add.* etiam Cδ Eo Mλ Oι(*interlin.*) Oν Oσ Qε
        Sβ Vα Vυ   Deinde ... partis₂] *marg.* Mκ(*add.* usque)   Deinde ... illius₂] *om.* Bζ
                move] etiam Oϱ; *add.* etiam Bκ Cζ Lζ Lλ Mα Oφ Pζ Pφ Sθ Sλ Vβ Vγ   move
        regulam] mota Mλ   regulam] *om.* Eo   initio] *om.* Bθ Vπ; *add.* regule Nα Sη
                illius₁] *om.* Fγ Mμ Pκ Pχ Wζ; *excised* Vγ; eiusdem Lλ Mα Pζ Qε Rε Sβ Sθ; ipsius Bη
        Bθ Bκ Eυ Kδ Lζ Mπ Oν Rδ Vπ Vσ; istius Kι; *add. interlin.* al' eiusdem puncti Vβ
                partis₂] *om* Eζ Nζ; *corr. to* puncti Bγ; puncti Bδ Dδ Fβ Fζ Kι Lλ Lμ Mα Mδ Mυ Mφ
        Oζ Pζ Pι Qε Qλ Sβ Sκ Vγ Vμ Vσ Wμ Zα; *add.* eiusdem Vγ; *add. interlin* al' puncti Oφ
                partis₂ in] puncti ad Dη; puncti in Xδ   partis₂ ... illius₂] *om.* Pγ   in] *interlin.*
        Oξ; ad Bε Eη Mγ Rα; et Fζ Oυ(*add. in marg.* al' in); et ad Pϱ; usque ad Pω; usque in Eλ Fγ
        Vσ   finem] fine Sλ   illius₂] *om.* Eo; *excised* Vγ; eius Bη Mυ Tβ Wμ; eiusdem Pι;
        ipsius Eλ Nζ Vμ Vξ; istius Kε Kι Pκ Pχ; *add.* partis Wβ; *add.* puncti Bγ(*interlin.*) Pξ
                et vide] *om.* Cε; et m̄ Bζ; *add. in* mageolabio Mι Nγ   vide interim] videris Kα;
        iūitorum(?) SI   iterum] *om.* Wμ; *illeg.* Pγ Tδ; rēm Po; *add.* per Mκ(*interlin.*) Vσ Zα

19-20   partis₂ ... totius] *om.* Mτ   ipsius ... gradus₂] *om.* Fε   in ... erunt] ad Eδ   et ...
        regula] *om.* Mλ; *moved to before* "Deinde ... illius" Eo Mγ

19-21   in ... partis] *om.* Eδ

20   ot] *illeg.* Vϱ; per quod Vη; per quot Pι Tβ; quo Mι Nγ; quod Bε Eσ Kα Kε Mμ Qη Sκ Wι
        Wλ; quotquot Eα Pφ   gradus₁] gradibus Bκ Cγ Cδ Cζ Eγ Lζ Lλ Mα Oι Oϱ Pζ Pκ Pχ
        Pω Qε Sβ Sθ Sλ Vα Vβ(*add. interlin.* al'gradus moveantur) Vγ Vυ Wγ Wζ   moveatur]
        moveantur Bι Dγ Eα Mo Nα Qμ Sη Vπ; moveat Mη; movetur Dη Vψ; *add.* interum Lμ
        Pσ; *add.* ipsam Bζ; *add.* 2 Vξ   regula] *om.* Bη Bθ Bι Bκ Cγ Cδ Cζ Dγ Dδ Eγ Eζ Eϱ Eυ
        Kε Kι Lζ Mα Mκ Mμ Mν Nα Nζ Oβ Oη Oϱ Oσ Pκ Pτ Pυ Pφ Pχ Qε Qζ Qη Rα Rε Sβ Sη
        Sθ Sι Sλ Vα Vγ Vμ Vπ Vσ Vυ Vφ Wζ Wλ; *interlin.* Oφ Qθ; *expanded in marg.* Xβ; rigula
        Nγ   qui] et Sθ; que Tβ Vη; *add.* gradus Lγ Wμ; *add.* vero Sι   erunt] erat Mγ Po;
        erit Pζ Qδ Qμ   gradus₂] *om.* Tβ Vη Vψ; *add.* ipsius Pν   totius] illius Bκ; ipsius
        Wμ   puncti] *om.* Eκ Pγ Vφ; *interlin.* Bγ   Quanta] *om.* Wμ; In quanta Cγ Eγ Fγ
        Oβ Pι Qδ; Quocumque Sλ; tanta Dδ   ergo] *om.* Vφ; et Oβ; gradui Bζ Bη Bι; igitur
        many; vero Eλ Eυ Vσ

20-21   puncti ... totius] *om.* Cη Nε Wι   Quanta ... totius] *marg.* Mκ

of that part. Then move the rule from the beginning of its part to the end of it, and see again how many degrees the rule is moved, which will be the degrees of all the points. As much therefore as the degrees of the part have in proportion
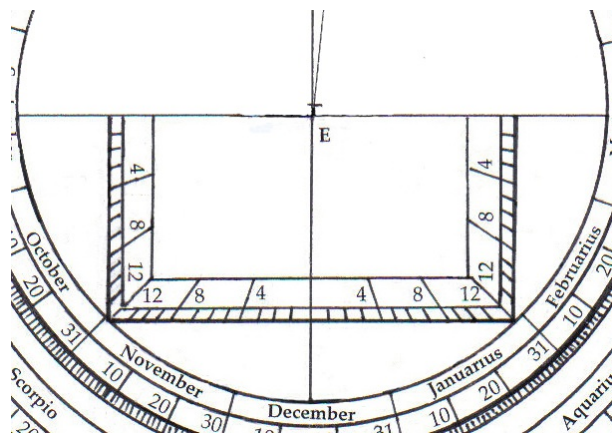
se habent gradus partis ad gradus totius, tanta proportione se habet pars puncti ad totum punctum.

21   habent] habeant Mν; habebunt Cγ Eγ; hūt Kδ   habent ... se] *om.* Mγ Qε Vν Vπ Vφ
          gradus₁] *om.* Oγ   gradus₁ partis] pars graduum Rε   gradus₁ ... pars] *om.* Lι
          partis] puncti Oβ; totius Qβ   partis ... totius] totius puncti ad gradus partis
          puncti(punctorum Oν) Eκ Oν   partis ad gradus] *om.* Pω   ad₁] et Vη   ad₁
          gradus] *om.* Bκ Lζ; *marg.* Wα   totius] damus(?) Vξ; partus Qβ; *add. and expunged*
          totius Oτ; *add.* eadem se habet pars ad totum punctum Bγ; *add.* in Cγ; *add.* puncti Mλ Rε
          tanta] in tanta Fγ Oβ Pι Qδ Rε Vυ; quanta grad~ Bη; Quanta vero Bθ; *add.* ergo Pφ
          tanta ... habet] sic Mλ   proportione] *om.* Wγ   se habet] *om.* Eσ   habet]
          corr. from habeat Mν   pars] *om.* Pγ   ad₂] *add.* gradum Oβ

21-22   tanta ... punctum] *marked* va⏐cat Bγ   ad ... punctum] *om.* Vη

22   totum] *om.* Kθ   punctum] *om.* Pδ; *add.* etc. / et cetera Fε Mλ Rδ

to the degrees of the whole, so much does the part of the point have in proportion to the whole point.

Compositio, Figura 2

Compositio, Figura 2, detail

[Comment:

The shadow square on the back of the astrolabe (see diagram detail) is taken from the more simple astronomical instrument, the quadrant. If a gnomon (something which casts a shadow) is being examined, its shadow is proportional to the shadow cast by a vertical stylus on the "umbra extensa" scale beginning at the base of the stylus. The "umbra extensa" (which is also known in the middle ages as the "umbra recta" or "direct shadow", and is called this in the *Compositio*, Cap. 3 and Figura 2) can extend infinitely as the sun is closer and closer to the horizon, but practically it is used only for shadows when the sun is 45° or more above the horizon and for this the scale is generally divided into 12 parts.

Associated with the "umbra extensa/recta" is the "umbra versa" or "reversed (or vertical) shadow". In this case the stylus extends horizontally at the top of the scale and extends down to

the horizontal plane. Like the direct shadow, the reverse shadow could extend infinitely (or down to the horizontal plane and along that plane under the stylus) but again, practically, it is used only for shadows when the sun is less than 45° above the horizon, and for this the scale is also divided into 12 parts, equal to the parts of the direct-shadow scale.

The 12 points along each scale are known as "punctaδ umbre" or "shadow points".

The mechanics of measurement involve the rotation of the alidade or rule so that the rays of the sun run along its edge (or through both pin-holes) and then seeing which point on the scales the edge of the alidade touches.

To know the number of points on the scales cast by the gnomon, if the sun is at 45° the shadow (marked by the edge of the alidade) will be at the 12-point mark on both scales, where they meet.

When the sun is higher than 45°, the edge of the alidade will be somewhere on the direct-shadow scale. It would also be somewhere along a lengthened reversed-shadow scale beyond/below the 12-point mark. To find this latter point, divide 144 by the number of direct-shadow points and the result will be the number of reversed-shadow points.

Likewise, when the sun is lower than 45°, the edge of the alidade will be somewhere on the reverse-shadow scale and it would also be somewhere along a lengthened direct shadow scale beyond the 12-point mark. To find this latter point, divide 144 by the number of reversed-shadow points and the result will be the number of direct-shadow points.

If a shadow were measured at the same time on both scales (i.e., on the direct-shadow scale and the extended reversed-shadow scale, or on the reversed-shadow scale and the extended direct-shadow scale) the product of these two measures would be 144, as it would if the shadow were at the corner (and the sun at 45°) where the 12 on one scale is multiplied by the 12 on the other.

If the shadow falls on a place between points, find (along the rim) the degrees of that place, and of the shadow-points before and after it, and the proportions obtained by comparing the degrees will also be the proportion of that place between the two shadow-points.]

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[CAPITULUM 43.] AD INVENIENDUM ALTITUDINEM REI PER PUNCTA UMBRE

Ut autem per umbram invenias altitudinem, pone regulam super puncta umbre

Cap. 43] *om.* Rα; *two versions* Cζ₁ Cζ₂

1   Ad ... umbre] *om.* Bγ Bδ Bε Bζ Bκ Cγ Cδ Cε Dδ Eα Eγ Eκ Eλ Eo Eυ Fε Gα Kε Kι Lζ Lι Mα Mκ Mμ Mτ Nα Nζ Oβ Oν Oσ Pγ Pι Pκ Pξ Pσ Pφ Pχ Qε Qη Sθ Sι Sλ Tβ Vα Vη Vμ Vν Vσ Vυ Vφ Wγ Wζ; *faded/illeg.* Eδ Eζ Eϱ Fγ; *interlin.* Pθ; *later hand* Qθ; Ad inveniendum altitudinem per umbram Bθ Lμ Mη Wμ; Ad inveniendum altitudinem umbre vel inventio altitudinis punctorum umbrarum Mυ Vι; Ad inveniendum per umbram Mπ; Ad inveniendum solis altitudinem per umbram Bη(*add. in marg.* 25); De altitudine (*add. interlin.* scilicet solis) invenienda per umbram Mλ; De altitudine inveniendis Sη; De(23. De Lλ) altitudine scienda per umbram Lλ Pζ(*marg., later hand*) Vβ Vγ; De altitudine solis per stalam(*?*) altimetid(*?*) invenienda Zα; De invenienda(inveniendi Oη) solis altitudinem per umbram Cζ₁ Cζ₂ Oη; De invenienda umbra per altitudinem solis oīhō(= omni hora?) Bι(*add. in marg.* C. 2[*cut off*]); De inventione altitudinis per umbram Dη; Inventio altitudinis alicuius per umbram Oφ; Inventio altitudinis cuiusque rei per umbram Rε; Inventio altitudinis(*add.* rei Qβ) per puncta umbre Mν Qβ(*add.* Rubrica) Wβ Wι; Inventio altitudinis (*add.* rei Mo) per umbram Fβ Mγ Mo Pτ Sβ (*marg. later hand, add.* C. 27) Vξ; Inventio altitudinis rerum per puncta umbre recte vel verse Mν; Inventio altitudinis rerum per puncta umbre. Capitulum Cη; Invencio altitudinis solis(*interlin.* Lζ) per umbram eius(*om.* Lζ) Kθ Lζ(*marg., later hand*) Po Qμ; Inventio umbra per altitudinem in omnes horas(?) Vϱ; *add. in marg.* 5.5-line gloss Bγ; *add. in marg.* 45 Mκ Pκ; *add. in marg.* 46 Oϱ(C. 46) Vμ; *add. in marg.* 47 Qζ(47ᵘˢ) Sδ(*later hand*)   Ad inveniendum] Inventio Xβ   inveniendum] invenienda Pϱ   altitudinem] *add.* alicuius Kδ   rei] *om.* Cι Eη Oξ Rα Pδ Pθ Qθ Qλ Sκ Vψ; alicuius Rδ; solis Lε Tδ   rei ... umbre] *om.* Mφ   per] in Oξ   puncta] *om.* Mδ Nδ   umbre] *add.* etc. Rδ

2   Ut] Et Dγ Dδ Mν; S[*illeg.*] Pξ   autem] *om.* Dη Nα Sη Sι   per] *interlin.* Pκ   umbram] *add.* cuius Xβ; *add.* cuiusque rei Bζ Bθ Eλ Eo Eυ Mγ Mκ Mλ Qμ(*interlin.*) Vν Vπ Vσ; *add.* cuiusque rei gˆmonicam(?) fine illa fuerit versa sive recta Rε; *add. interlin.* datam Bγ   invenias] *twice* Mφ; invenies Dγ Nα Nζ Oη; invenire possis Eδ; scire desideras Xβ   altitudinem] *illeg.* Pι; altitudines Eϱ Vφ; *add.* cuiuslibet rei Fγ Gα Wλ; *add.* eius Rε; *add.* solis Cδ(*interlin.*) Cζ₁ Cζ₂ Eδ Kθ Oη Tβ Vη Vι Vσ Xβ Zα; *add.* solis scilicet Mυ Mφ; *add. interlin.* rei vel solis Bγ; *add. interlin.* solis Qμ   pone regulam] *blank* Cγ   regulam] rigulam Nγ   super] supra *many*   puncta] punctum Sκ

[CHAPTER 43.] TO FIND THE ALTITUDE OF A THING BY POINTS OF THE SHADOW[1]

In order then for one to find a height through [its] shadow, place the rule on the points of the extended shadow

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[1] In Gunther's edition this is Capitulum 43 in the Latin (p. 230), but it is numbered as 44 in the English (p. 190).

extense, si fuerint pauciora 12, et tactus eius in quarta altitudinis ostendet altitudinem.
Si autem fuerint plura 12, divide per ea 144, et invenies puncta umbre verse; super que
5   pone regulam, et tactus eius in quarta altitudinis ostendet tibi altitudinem. Si fuerit

3   extense] *om*. Nε   si] quod si Rε   fuerint] *add*. puncta Bθ Vπ   pauciora] *om*.
         Bι Eδ Rα Mo Po Vϱ Vφ Wβ; *marg*. Eζ; minus Dδ; pauciores Mι Nγ Qη; *add*. quam Kα
             pauciora 12] minus quam 12 ut si regula cadit super 9 punctum vel 10 Kε Mτ Qζ
             12] *om*. Pι Pσ; duodecim Mα; XII Pϱ Qε Sβ Sθ; 15 Eo; *add*. punctorum Rε; *add*. ut si
         regula tacit super 9ᵐ gradum vel 10ᵐ Gα; *add*. ut si regula cadet super 9 punctum vel 10
         Qη   tactus] est tactus Rε; motus Nα   eius] *add*. regule Qμ   quarta] 4 / 4ᵃ
         some; IIII Qε; quatuor Tδ; qua regula Dδ   altitudinis] altitudine Pφ Vη Vμ;
         altitudinum Mι Nγ   ostendet] erit rei Wλ; *add*. tibi Bε Eη Eκ Fε Pκ Pχ; *add*. tibi rei Fγ
             ostendet altitudinem] *om*. Fζ; que altitudo per alidadam ostenditur Rε
             altitudinem] altitudines Cι Eβ Eσ Fβ Mι Mφ Nγ Pδ Pθ; *add*. etc. Bε Bκ Eη Kδ Lγ Lε
         Mδ Mη Mπ Nδ Nε Pα Pβ Pμ Pν Pξ Qβ Qλ Rδ Sδ Sκ Vψ Wα Xβ; *add*. solis Bγ(*interlin*.) Bκ
         Cγ Cζ₁ Cζ₂ Lζ Mυ Mφ Oη Oν Pγ Vι Wγ; *add*. 5.5 lines Xβ

3-4   pauciora ... fuerint] *om*. Eγ   et ... 12] *om*. Eϱ   eius ... 12] fuerit 12 [*illeg*.] umbra
         extensa Oβ

4   Si autem] *twice* Cε   Si ... 12] Si autem fuerint XII *expunged* Pϱ   autem] *om*. Mπ Mτ
         Nδ Oϱ; vero Oγ   fuerint] fuerit Wι   plura] *om*. Lβ Nε Pβ Pν Vϱ Wμ Xδ; planete
         Mη; puncta Lμ Qε; *add*. quam Mτ; *add*. *interlin*. puncta Oφ   plura 12] *marg*. Wα; plani
         Vφ; plura quam 12 Nζ   12] *om*. Bδ Dδ Dη Eσ Fβ Fε Lγ Lε Mι Mυ Mφ Nγ Pξ Pω Tδ
         Xβ; duodecim Mα Zα; XII Pζ Qε Sβ Sθ; *add*. de umbra extensa Kε Mτ Qζ Qη; *add*. *in marg*.
         puncta data qᵃ 12ᵃ Bγ   per] *interlin*. Nδ   per ea] ea per Dδ Wβ; puncta per Mτ
             ea] *om*. Sι; ei Mδ   144] 144ᵒʳ Vβ; C4IIII Sβ; CXIIII Sθ   invenies] *add*. per Bζ
             umbre] *om*. Bζ Eλ Eo Mγ   verse] *om*. Bε

4-5   Si ... altitudinem] *om*. Eη Vγ; *marg*. Bε Kε(altitudinem e converso); quare Vμ   Si ...
         regulam] vel sit Oν   puncta ... tibi] *om*. Bι Dγ Dδ Eδ Eζ Eϱ Fγ Mμ Mo Pι Pκ Po Pυ Pχ
         Rα Vϱ Vφ Wζ   que pone] quam pones Cγ Eγ

5   pone] ponas Bη Eλ; pones Cδ Cζ₁ Cζ₂ Eυ Lζ Mα Mκ Oη Oν Oϱ Pζ Sβ Sθ Sλ Vα Vβ Vπ Vσ
         Vυ   regulam] *blank* Cγ; rigulam Nγ   tactus ... tibi] invenies Bζ Bη Bθ Bκ Cδ Cζ₁
         Cζ₂ Eγ Eλ Eo Eυ Lζ Lλ Mα Mγ Mκ Mλ Oβ Oη Oν Oϱ Oσ Oφ Pζ Pτ Pφ Qε Qμ Rε Sβ Sθ
         Sι Sλ Vα Vβ Vν Vπ Vσ Vυ Wγ   eius] *om*. Lγ; *add*. est Dη   quarta] 4ᵃ *some*; *add*. in
         Kδ   altitudinis] altitudine Mη; altitudine secunde Vη   tibi] *om*. Kα Nζ Pϱ Sη; et
         Mι Nγ; sibi Wα   altitudinem] *add*. et cetera Cι Eβ Eσ Fζ Lγ Lε Lι Lζ Mη Mι Nγ Nδ
         Nε Oζ Oξ Oτ Pα Pβ Pθ Pξ Qβ Qγ Qλ Sδ Sκ Vψ Wμ Xδ; *add*. (et) e converso Kε Kι Mτ Qζ
         Qη; *add*. solis Bγ(*interlin*.) Cγ Cζ₁ Cζ₂ Oη Wγ   Si] *om*. Qδ; *add*. autem Bθ Mκ Po Vπ
         Vσ   fuerit] *om*. Kε Oϱ Qδ; est Kι; fuerint Oη; *add*. in Mυ Vϱ

5-6   Si ... 45] *om*. Mτ

if they are less than 12, and its tip [i.e., of the rule] in the quarter of altitude will show its altitude. If however they are more than 12, divide 144 by them and you will find the points of the reverse shadow; place the rule on this [i.e., on the last point], and its tip [i.e., of the rule] in the quarter of the altitude will show you the altitude. If the shadow

umbra 12 punctorum, est altitudo 45. Si vero cum predictis habueris fractiones, vide
quid debeatur sibi de gradibus, ut supra demonstratum est.

6   umbra] *om.* Cζ₁ Cζ₂ Lμ Nα Oη; altitudo Oγ   12] XII Nα Pϱ Sβ Sθ; *add.* 2 Vπ
           punctorum] *add.* tunc Bη Fε   est] eius Mμ; erit Cγ Cζ₁ Cζ₂ Dη Lλ Mα Oη Pζ Qε
           Sβ Sθ Vγ Vμ Wγ; et Qδ   altitudo] umbra Mα; *add.* solis Wγ   45] 4v gradus Sβ;
           15 gradum Eλ; XV gradus Qε; 15 graduum Sλ; XV graduum Sθ; *add.* gd Vξ; *add.* gradibus
           Vα; *add.* gradum Eo Oφ Pφ; *add.* gradus Cγ Cζ₁ Cζ₂ Eγ Fγ Vγ; *add.* graduum Bζ Bκ Cδ Dη
           Eυ Kα Kε Kι Lζ Lλ Mα Mγ Mκ Mλ Nζ Oβ Oη Oι(*marg.*) Oϱ Pζ Pι Pτ Qζ Rε Sι Tβ Vβ Vη
           Vι Vμ Vν Vπ Wγ Zα   Si] *add.* fuerit Wλ   vero] autem Wγ; *add.* in margine Nζ
           predictis] punctis Bδ Bζ Bι Bκ Cδ Dγ Dη Eγ Eη Eϱ Eυ Fγ Kδ Lε Lζ Mα Mγ Mδ Mη
           Mι Mλ Mo Mφ Nγ Nε Nζ Oβ Oγ Oϱ Oσ Pδ Pζ Pι Pκ Pν Pτ Pφ Pχ Qβ Qγ Qε Qθ Qλ Rα
           Sδ Sθ Sκ Sλ Tβ Vα Vγ Vη Vι Vμ Vν Vξ Vπ Vσ Wγ Wζ Wλ; punctis horas Mτ; punctu Oη;
           add. horum et Kε Kι Qζ; *add. in marg.* punctis Wι   habueris] *repeated in marg.* Xβ;
           habuerim Fβ   fractiones] fractionem Mγ Mκ Qε; *add.* aliquas Cδ; *add.* fac cumillis
           sicut dictum est Fγ; *add.* scire volueris Nγ   vide] *add.* in magrolabio Mι Nγ

7   quid] quantum Mτ; qui Mν; quod Cγ Sθ; quot Kε Pκ Pχ; Qζ Wγ; *add.* ei Bθ; *add. interlin.*
           al' quantam Oφ   debeatur] *corr. from* debeatis Mπ   sibi] *om.* Cγ Eγ Vμ Vν Vπ
           Wγ; ea Eo; ei Bζ Eλ Eυ Mγ Mκ Mλ Oφ Rε Vσ   gradibus] *om.* Wι; fractionibus Vξ;
           gradu Dγ Qμ(*add.* in dorso astrolabii) Rα; *add.* in margine Nζ   ut ... est] *om.* Oγ; ut
           demonstratum est superius Cζ₁ Cζ₂; ut dictum est Cγ Eγ Kα Wγ; ut supra dictum est Bζ
           Mτ   demonstratum] determinatum Eσ Fα Fβ Fε Fζ Lβ Lε Lη Mφ(?) Nε Oζ Pθ Sδ Sκ;
           dictum Eo Kε Kι Mι Mo Nγ Nδ Oξ Pβ Pκ Pμ Pν Pϱ Pσ Pχ Pω Qβ Rε Tβ Vγ Vη Vι Vν Vψ
           Wα Wβ Wμ Xβ Zα; monstratum Sβ Wλ; *add. interlin.* al' dictum Oφ   est] *om.* Dδ; *add.*
           etc. Mτ; *add.* ideo etc. Nε; *add.* in canone precedenti proximo Vμ; *add.* Explicit tractatus de
           pratica astrolabii Dη; *add. extraneous chapter inc.* "Poneque ad altitudinem 45 graduum..."
           Lζ(*fol.* 40^{rb-va}); *ms* Dη *ends*

is 12 points, its altitude is 45 [degrees]. If indeed you have fractions from the aforementioned, see what is owed to it [i.e., what they have] in degrees, as has been shown above [in the previous capitulum].

[Comment:

When a shadow is set on the shadow scales (perhaps after measuring the physical shadow of some object and comparing it to its height), place the rule on the appropriate point of the extended-shadow scale, and the tip of the rule on the rim will mark the degrees of altitude.

If the extended shadow is more than 12 points, divide 144 by the number of points of the extended shadow to find its position on the reversed-shadow scale; then placing the rule on this position will allow the altitude to be read at the rim shown by the tip of the rule.

If the extended shadow is 12 points long, the altitude is 45°.

If the length of the extended shadow falls between two points on the extended-shadow scale, work proportionately as in the previous chapter.

For example, if an object is 2 metres high and it casts a shadow of 1 metre, the ratio is 2:1 and the position on the extended-shadow scale will be six. Placing the edge of the rule on 6 will point to an altitude of $\simeq 62°$.

If an object is 2 metres high and it casts a shadow of 3 metres, the ratio is 2:3 and the extended-shadow scale position would be 18. Divide 144 by 18; the result is 8. Placing the edge of the rule on 8 on the reversed-shadow scale will point to an altitude of $\simeq 33°$.]

[CAPITULUM 44.] INVENTIO UMBRE MERIDIEI PER ALTITUDINEM

Cum volueris medie diei umbram scire, altitudinem solis in medio eiusdem diei

Cap. 44] *two versions* Cζ₁ Cζ₂; *om.* Mτ Qζ

1   Invencio ... altitudinem] *om.* Bγ Bδ Bε Bζ Bκ Cγ Cδ Cε Dδ Eα Eκ Eλ Eo Eυ Gα Kε Kι Lζ Lι Mα Mκ Mμ Mπ Nα Nζ Oβ Oν Oσ Pγ Pι Pκ ξ Pσ Pφ Pχ Qε Qη Qθ Sθ Sι Sλ Tβ Vα Vη Vμ Vν Vξ Vσ Vυ Vφ Wγ Wζ Wλ Zα; *faded/illeg.* Eδ Eζ Eϱ Fγ Wα; *marg., later hand* Sβ; Ad habendum umbram in meridie quolibet Mλ; Ad inveniendum umbra medie diei Lμ; Ad inveniendum umbram meridanam per altitudinem solis Oφ; Ad sciendum umbram in medie diei Fβ; Altitudo in medio die Wι; De umbra medie diei per altitudinem solis Po Qμ Rε; De umbra meridiana Kθ(*add*. solis) Vγ; De umbra meridiana per altitudinem solis invenire Vβ(*add. in marg*. Inventio umbre meridiei per altitudinem solis); De(24 De Lλ) umbra meridiei Bη(*add. in marg*. 26) Cζ₁ Cζ₂ Lλ Oη Pζ(*marg., later hand*); De umbra meridiei invenienda Sη; Inventio hore meridiane Mγ; Inventio punctorum umbre altitudinis Mν Wβ(*add*. meridiei); Inventio punctorum umbre altitudinis medie [*illeg*.] vel inventio umbre medie diei per altitudinem solis Mυ Vι; Inventio umbre cuiuslibet medii diei Bι(*add. in marg*. C. 3(!)) Vϱ; Inventio umbre medie diei Pτ; C. 27. Inventio umbre per altitudinem Sβ(*marg. later hand*); *add. in marg*. 27 Sβ(*later hand*); *add. in marg*. 46 Mκ; *add. in marg*. 47 Oϱ(C. 47) Vμ; *add. in marg*. 48 Sδ(*later hand*)   Inventio] De inventione Oι   meridiei] *om.* Dγ Rα Sβ; die Mι Nγ; medie diei Mφ; rei Lη Oζ   altitudinem] *add*. solis Eσ Mφ Qγ Qδ; *add*. Rubrica Qδ Vπ

2   *before* Cum] *add*. Cum autem ascensiones signorum in circulo directo scire desideras Kι[1]   Cum] Si Bε Eη; Si autem Mμ Nζ Pκ Pχ Vμ Vζ; *add*. autem Eϱ Kε Kι Oβ Qη Vθ; *add*. vero Bκ Fε   volueris] *om.* Pι; voluerisque Eλ; *add*. quoque Bθ Eo Lζ Oν Eυ Mγ Mκ Mλ Oσ Sι Vν Vπ Vσ   medie] in medio cuiuslibet Lλ Mα Pζ Qε Sβ Sθ Vβ Vγ Wγ(cuiusque); in medio Oη; in medio quoque Sλ; medie quoque Oϱ; medii Mλ; *add*. quoque Oφ Vα; *add. interlin*. al' in medio cuiuslibet diei Oφ   diei₁] *om.* Kι; *add*. quoque Bζ Cδ   scire] *om.* Bδ Bζ Bι Eβ Eδ Eκ Eo Eϱ Fα Fζ Kα Kθ Lβ Lγ Lη Lμ Mγ Mδ Mη Mλ Mo Mζ Nδ Nε Oξ Oσ Oτ Pα Pβ Pγ Pθ Pμ Pν Pξ Po Pϱ Pυ Pφ Qβ Qγ Qδ Qθ Qλ Rα Sδ Sη Sι Sκ Tδ Vν Vξ Vϱ Vφ Vψ Wβ Wμ Xβ; *interlin*. Pϱ Rε; invenire Bη Cγ Cζ₁ Cζ₂ Dγ Eγ Fε Lλ Mα Mν Mυ Mφ Oη Oι(*interlin*.) Oϱ Oφ Pζ Qε Sβ Sθ Vα Vβ Vγ Vι Wγ; investigare Pδ Tβ Vη Zα; per Cι Eα; *add. interlin*. per Vφ   altitudinem] altitudinis Kα   solis] *om.* Sβ   in] *om.* Eα   in medio] *om.* Mα   in ... eiusdem] *twice* Oη   eiusdem] *om.* Cζ₁ Cζ₂ Sι Vξ; *illeg*. Eγ(*add*. cuiuslibet); *cut off* Eκ; cuiuslibet Cγ; eius Bε Kα; illius Xδ; *add. interlin*. per II capitulum Bι   diei₂] *om.* Eζ Kδ Kε; *add*. altitudinem Vφ

CHAPTER 44.] FINDING A SHADOW AT NOON BY THE ALTITUDE[2]

When you want to know [the length of] a shadow at midday, seek the altitude of the sun in the middle of the same day

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[2] In Gunther's edition this is Capitulum 44 in the Latin (p. 230), but it is numbered as 45 in the English (p. 190).

querere, et per eam invenies umbram, sicut supra dictum est.[3]

3   querere] *om.* Fζ; considera Vξ; *add.* per 12 canonem[4] Bζ Rα(*interlin., later hand*)   et …
         invenies] *rep.* Zα   eam] ea *some*; eandem Xβ; regulam et eam Bζ   invenies]
         invenias Lλ Qε   umbram] *om.* Vξ; *twice* Xδ; umbras Vμ   umbram … est] *om.* Bε;
         noi^em (?) Eη   sicut] sic Eα; ut Bι Cη Eκ Kε Kι Lη Mμ Nζ Pκ Pχ Qη Rα Vη Vξ Vϱ Wζ
         Zα; *add.* iam Kδ Rδ; *add.* quod Rε Vμ   sicut … est] *illeg.* Oν; per secundum dictam
         regularm Vσ; secundum predictam est Wλ; secundum predictam priam Eλ; secundum
         predictam regulam Bζ Bη Bκ Cζ₁ Cζ₂ Eo Lζ Mγ Mλ Oη Oϱ Oφ Pφ Vβ(*add. interlin.* sicut
         supradictum est); secundum prius dictum est Kα; secundum prius dictam regulam Sι;
         secundum supra dictum est Cε Vγ; secundum supradictam regulam Cγ Eγ Eμ Lλ Mα Oσ
         Pζ Qε Sβ Sθ Vα Vυ; sicut dictum est Pι; ut etc.(*?*) Oβ; ut supra dictum regula Cδ Wγ;
         vel(*add.* etiam Vν) per predictam regulam Bθ Eυ Mκ Vν Vπ; *add.* secundum illum
         regulam Sλ; *add. interlin.* per predictam regulam Qμ   est] *cut off* Eκ; *add.* etc. Rδ Vη

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[3] The reference to "predictum/prius dictum/supradictum regulam" would be to Capitulum 12
above (q.v.),

[4] The reference is to Capitulum 12 above (q.v.)

and by it you will find the shadow, as stated above.

[Comment:

To find the shadow of the noon-day sun, that is the proportion of length of a noon-day shadow of a gnomon to its height, measure the altitude of the sun at noon using the alidade and instead of reading that altitude along the rim (in degrees above the horizontal), measure it on the shadow scales (extended or reversed), and this will give you the appropriate proportion.]

[CAPITULUM 45.] INVENTIO ALTITUDINIS REI ACCESSIBILIS

Cum elevate rei altitudinem volueris scire, regulam super 45 gradum in quarta

Cap. 45] *two versions* Cζ₁ Cζ₂

1   Invencio ... apponenda] *om.* Bγ Bδ Bε Bζ Bκ Cγ Cδ Cε Dδ Eα Eγ Eκ Eλ Eυ Gα Kε Kι Lζ Lι Mα Mκ Mμ Mπ Nζ Oβ Pκ Pξ Pφ Pχ Qε Qη Sθ Sι Tβ Vα Vη Vμ Vν Vσ Vυ Vφ Wγ Wζ Wλ; *faded/illeg.* Eδ Eo Eϱ Fγ Wα; Ad inveniendum altitudinem rei elevate Lμ Qθ(*later hand*); Ad inveniendum altitudinem rerum Pτ; Ad sciendum umbram rei elevate Fβ; De altitudine accessibilis Kθ; De altitudine cuiuslibet rei accessibilis metienda Vβ(*add. in marg.* Inventio altitudinis cuiuslibet rei accessibilis); De altitudine cuiuslibet rei invenienda Vγ; De altitudine cuiuslibet rei metiende Pζ(*marg., later hand*) ; De altitudine mensurada Cζ₁ Cζ₂ ; De altitudine mensurada et(*om.* Oη) profunditione Bη(*add. in marg.* 35) Oη; De altitudine rei accessibilis Mν Mυ Vι Wβ Wι(altitudinis); De altitudine rei elevate Rε; De altitudine rei elevate accipienda Oφ(*add. in marg.* De noticia altitudinis rei elevate); De altitudine rei elevate invenienda Sη; De altitudine rei elevate per astrolabium. Rubrica Qδ; De(C. 41. De Sβ) invenienda rerum accessibilium altitudine Dγ Rα Sβ(*marg. later hand*); De inventione altitudinis rei accessibilis Eσ Nγ; De mensuratione altitudinis super 45 gradum Mλ; De mensurationibus Zα; De quantitate altitudinis rei elevate Bι; Inventio altitudinis alicuius rei accessibilis Eζ Kδ; Inventio altitudinis rei elevate Mγ Vξ; Inventio rei accessibilis Xδ; Inventio umbre meridiei per altitudinem[1] Mδ Nδ; Modus mensuratione altitudinis rei accessibilis Vϱ; Sequitur de mensura altitudinum etc. Mτ; *add. in marg.* 46 Pϱ; *add. in marg.* 47 Mκ; *add. in marg.* 48 Oϱ(C. 48) Qζ(48ᵘˢ) Vμ; *add. in marg.* 49 Sδ(*later hand*)   Invencio] *add.* alicuius Qμ   rei] *add.* alicuius Rδ   accessibilis] *add.* per regulam Mo; *add.* etc. Rδ; *add.* Rubrica Vπ; *add.* sequitur apponenda Cη; *add.* sic poterit haberi Qβ

2   Cum] Cumque Bη; Si Bθ Eυ Mκ Vα Vπ; *add.* autem Bκ; *add.* cuiuslibet Lλ Mα Pζ Qε Sβ Sθ Vβ Vγ Wγ; *add.* in plano Pι; *add.* quoque Cζ₁ Cζ₂ Oη   elevate] *illeg.* Vα; uniuscuius Oσ; uniuscuiusque Vυ   elevate rei altitudinem] cuiuslibet rei elevationis Cγ   rei] *twice* Qβ; alicuius rei Fε; *add.* cuiuscumque Cδ (*interlin.*); *add.* cuiusvis Bκ Lζ   volueris] desideras Cδ   scire] *interlin.* Eo; invenire Rδ   regulam] *om.* Eλ; regula Bζ Bη Bι Bκ Cγ Cδ Cζ₁ Cζ₂ Dδ Eδ Eζ Eυ Gα Lζ Lλ Mα Mγ Mκ Mλ Mμ Nζ Oϱ Pζ Rε Sβ Sη Sθ Sι Vα Vβ Vγ Vμ Vν Vπ Vϱ Vσ Vυ Vφ Wγ Wζ Wι; *add.* in dorso astrolabii Eδ Pι   super] *om.* Bθ   super 45 gradum] *om.* Cγ Eγ Wγ   45] 5 Mγ; 15 Eλ Eo Mτ; XV Qε   gradum] *om* Lγ Mγ Vϱ; gradibus Pι; gradu Pφ; gradus Mη Mλ Mo Nγ Nδ Nε Pκ Pχ Sκ Vμ Vν Vξ Vσ Wζ   in] et Fζ; *add.* gradu Oγ   quarta] 4ᵃ *some*; IIIIᵃ Qε; 4v Sβ; 4ᵗᵃᵐ Mτ

2-3   in ... altitudinis] *marg.* Sβ   quarta ... diu] *illeg.* Nα

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[1] A repeat of the title of Capitulum 44.

[CHAPTER 45.] FINDING THE HEIGHT OF AN ACCESSIBLE OBJECT[2]

When you wish to know the height of a raised object, set the rule on the 45th degree in the quarter

altitudinis pone, et tam diu ante vel retro te move, donec per utriusque tabule foramen rei elevate videas summitatem. Tunc quanta est longitudo a loco in quo fueris in

3 pone] posita Bζ Bη Bι Bκ Cγ Cδ Cζ₁ Cζ₂ Dδ Eα Eδ Eζ Eλ Eυ Gα Lζ Lλ Mα Mγ Mκ Mλ Mμ Nζ Oϱ Pζ Pι Pκ Po Pφ Pχ Rε Sβ Sη Sθ Sι Vα Vβ Vγ Vμ Vν Vπ Vσ Vυ Vφ Wγ Wλ; positam Mo Pυ; positam regulam Wζ; *add.* et eadem sta[t]ute fixa Pι   tam diu] *rep.* Vυ; diu Vγ; eam Qη; postea tam diu Wβ; tam Cη Bγ; *add.* retro Bθ Vπ   vel] et Bζ Eλ Mγ Mλ Oφ(*add. in marg.* al′ vel) Wβ   te] *om.* Bκ Cη Eγ Kθ Oη Rα Sθ Vγ Wβ Xδ; it *corr. to* te Qμ   te move] move *corr. to* ᵣₑmove Pτ; remove Bγ(*add. interlin.* te) Bι Cγ Cδ Dγ Dδ Eδ Eκ Eϱ Fα Fε Kα Kε(*add.* ad rem) Kι(*add.* ad rem) Lζ Mι Mν Mo Mτ Nγ Nε Oβ Oϱ Oσ Oφ(*add. in marg.* al′ te move) Pγ Po Pυ Pφ Qη(*add.* ad rem) Rα Sβ Sη Sι Tβ Vα Vξ Vϱ Wγ(*add.* te) Wι; removeas Bη; removeat Eδ; revolve Pφ   move] et de vel rererde/retede sic/sit quod si regula moveat super 45 Gα; moveas Cζ₁ Cζ₂ Eμ Oη Vη Zα; remove Bζ Bθ Eo Eυ Mγ Mλ Oγ Pι Rε Vπ Vφ(*add. interlin.* te move) Wλ; remove *corr. to* move Mκ; *add.* ad Oβ; *add.* ad rem Qζ; *add. interlin.* al′ te volve Vβ   move ... tabula] *illeg.* Nα   per] *interlin.* Eϱ; ipse(?) Xδ   utriusque] utrumque Vγ Vπ; *add. interlin.* id est re Oφ   tabule] *om.* Eκ Eσ; tabelle Cγ Cδ Cζ₁ Cζ₂ Dγ Eϱ Lλ Mγ Mo Oβ Pζ Pκ Pυ Pχ Oϱ Oσ Qδ Qε Qμ Rα Sβ Sθ Vα Vβ Vγ Vν Vυ Wγ; *add.* per Oη; tabulle Dδ

3-4 foramen ... elevate] perforate Bζ

4 rei] *om.* Pυ   elevate] *om.* Eυ   videas] *illeg.* Nα; vide Zα; vides Bζ   summitatem] semitatem Sκ; *add.* rei elongate Oβ   Tunc] Ut Vη   quanta] quarta Cε   est] *illeg.* Mα; erit Lλ Pζ Sβ Wγ; *add. interlin.* al′ erit Oφ   est longitudo] ellongatio Mγ; elongatio Mλ Vν; *add.* in loco in quo fueris Bζ; *add. interlin.* al′ elongatio Oφ   a] in Pκ pχ Vη Vμ   a loco in] *illeg.* Nα; in Wγ   loco] loquo Mι   in²] ad Lι; usque ad Vσ   quo] *illeg.* Gα³   fueris] fuerit Oϱ   in₂] *om.* Eη; *interlin.* Bε; a Mτ; ad Oϱ; usque ad Bζ Bθ Eλ Eo Mγ Mκ Mλ Pι Rε Vν Vπ Wγ; inter Pζ(*add. interlin.* te et); usque in Wλ; *add. interlin.* usque ad Qμ

4-5 tunc ... rei] qua mensuras Eυ   in₂ ... rei] *om.* Vμ

4-16 in₂ ... longitudine] *40 lines of different text* Xβ(*fol. 115rb-va*)

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³ Ms Gα skips back from fol. 147ᵛ to fol. 143ʳ.

of the altitude and move yourself forward or back for such time until you can see the top of the high object through the holes in both sights. Then as much as is the distance from the place in which you are to

5   radicem rei, cum additione stature tue a visu in terram, tanta est procul dubio altitudo
         rei.
                 Si autem eius altitudinem, ita ut non removearis a loco uno, volueris invenire,
         regulam tam diu subleva vel depone quod per utriusque foramen videas rei cacumen.

5   radicem] radice Fε Pφ Mτ Vγ; *add*. talis Nζ; *add. illeg*. Zα   rei] in qua mensuras Eo;
         quam mensuras Fγ Vσ Wλ; *add*. elevate Eσ Pι; *add*. mensurando Eλ; *add*. quam mensuras
         Bζ Bθ Mγ Mκ Mλ Oφ(*interlin*.) Pτ Rε Vν Vπ; *add*. quia mensuras Bθ   additione]
         addito Pκ Pχ; adiecione Mλ; adiectione Rα Vβ Vφ   stature] *add*. scilicet Oβ   tue]
         om. Cε Eα Pβ Sι; *interlin* Oφ; tunc *corr. to* tue Rα; tunc Bι   a] *om*. Vσ; ad Fε   a ...
         terram] *om*. Rε   visu] *add*. scilicet ortus(?) Zα   in] *om*. Eδ Po; ad Vξ Wβ; intra
         Kα; usque ad Bγ Cη Fγ Kθ Mν Pγ Wι; *add. interlin*. id est usque Vβ   in terram] *marg*.
         Rα   terram] terra *some*; elevate Xδ   tanta] *om*. Qη Xδ   tanta est] et Kα
                 est] *om*. Oι Vϱ; erit Cγ Mφ Qε Vγ; *add*. altitudo Eυ   procul dubio] *om*. Nζ
                 dubio] *illeg*. Nα   altitudo] *om*. Bδ Sη

6   rei] *om*. Mγ; *add*. elevate Pι; *add*. illius Wγ; *add*. quesita Cδ

7   *before* Si] *add*. AD HABENDAM ALTITUDINEM REI ELEVATE SUBTILIUS MODO Vξ; *add*. AD IDEM
         ARTIFICIO SUBTILARI Eϱ Mγ; *add*. DE EODEM SCIENDO SINE ALIQUA REMOTIONE Bθ Mη(*marg*.)
         Pδ Vπ; *add*. DE EODEM STANDO UBI HABET Mλ; *add. in marg*. DE ALTITUDINE REI NON
         MOVENDO TE Oφ; *add. in marg*. SECUNDUS MODUS Bι; *add. in marg*. 47 Pκ; *add. in marg*. 49
         Qζ(49us) Vμ   Si] [?]i si Vπ   autem] *om*. Eυ Mκ Mτ Nα Vπ Vσ   eius] *om*. Eσ
         Mι Nα Nγ Pγ; alicuius rei Cδ; eis Bδ; eiusdem Rε Wλ; eiusdem rei Eλ; rei Bε Cε Cι Eη Fα
         Fβ Kδ Lβ Lγ Lε Lι Mδ Mη Mπ Mτ Mυ Mφ Nδ Nε Oγ Oζ Oι Oξ Oϱ Oτ Oυ Pα Pβ Pθ Pν
         Pξ Pϱ Pσ Qβ Qγ Qθ Qλ Rδ Sδ Sκ Tβ Tδ Vη Vι Vψ Wμ Xδ   altitudinem] *add*. rei Kα;
         add. volueris Eη   ita ut] ita Vϱ; itaque Nα Pι; ut Eλ Kθ Pκ Pχ Wζ Zα   ut]
         interlin. Mκ   removearis] *illeg*. Nα; amovearis Lι; movearis Bζ Bη Bκ Cζ₁ Cζ₂ Cι Eγ
         Eκ Eλ Eo Eϱ Eυ Fγ Fε Kδ Kε Kι Lλ Mι Mκ Mλ Mμ Mπ Mτ Nγ Nζ Oβ Oγ Oη Pκ Pχ Qζ
         Qη Qθ Rδ Rε Sθ Sδ Tβ Vγ Vη Vμ Vϱ Vσ Wζ Wμ; movearit Mγ   a] de Lλ Mμ Nζ Oβ
         Pκ Pχ Qε Sθ Vμ Wζ   a loco] *om*. Eσ   uno] *om*. Bζ Bκ Eλ Lγ Mγ Mλ Mμ Pι Pκ Pχ
         Vμ Vν Wζ Zα; suo Cζ₂ Vη; tuo Cγ Eγ Fε Lμ Kε Kθ Kι Mι Mτ Nγ Oφ(*add. interlin*. al' uno)
         Pσ Pφ Qζ Qη Qθ Sκ Wγ; tuo uno Sι   volueris invenire] *om*. Bθ; *add*. sta in uno loco
         Pι   invenire] *om*. Vπ; scire Kδ; *add*. in Oη

8   regulam] rigulam Nγ   sublevea vel depone] subpone vel subleva Bζ   depone]
         deprime Bγ Bε Cγ Cδ Cη Eγ Eκ Fγ Kε Kθ Mμ Mν Nζ Oβ Pγ Pκ Pχ Qβ Qζ Qη Tβ Vμ Vξ
         Wγ Wζ Wι Zα; pone Fβ; *add. interlin*. al' deprime Oφ   quod] quousque Bζ Cζ₁ Cζ₂
         Eλ Eo Eυ Mγ Mκ Mλ Oη Pι Rε Vν Vπ Vσ; donec Kδ Mμ Nζ Pκ Pϱ Pχ Vμ Wζ   per]
         om. Bη Eσ; *interlin*. Mo   utriusque] blank Sκ(*add. in marg. later hand* utrumque); *blank* -
         que Pγ; utrum Bθ Vπ Wα; utrumque Bη Fε Kδ Kε Lε Lι Lλ Mκ Mλ Mπ Nγ Oγ Oι Oϱ Pβ
         Pμ Pν Pφ Pω Qβ Rδ Rε Sβ Tβ Vα Vγ Vι Vν Vσ Vυ Wγ; *add*. tabule Pι; *add. interlin*. al'
         utrumque Vβ   foramen] *om*. Wλ; foramina Cγ Pι; *add*. tabule/tabelle Mμ Nζ Oβ Pκ
         Pχ Vμ Wζ   videas] videi Zα; *add. erasure* Eζ   rei] *om*. Cη Dδ Eα Eδ Eκ Kθ Mν Po
         Wι; *interlin*. Bγ; eius Pϱ; *add. illeg, expunged* Eζ   cacumen] cachumen Cγ Wγ; cacutisa
         corr. in marg. to cacumen Oξ; cakumun Pξ; acumen Bζ; altitudinem Gα; mensurande
         summitatem Pι; statam Mλ; summitatem Eλ

the base of the object, with the addition of your height from you, [from your] eye to the ground, so much without a doubt is the height of the object.

If, however, you wish to find its height so that you are not removed [i.e., if you cannot move] from one place raise or lower the rule for so long that you see the top of the object through the holes of each [vane of the rule].

Tunc si regula ceciderit super puncta umbre extense, considera quanta proportione se
10   habeant 12 ad ista puncta; et tanta proportione se habebit altitudo rei ad longitudinem
inter te et ipsam, cum addita fuerit statura tua longitudini.

9   regula] illa Lγ; rigula Nγ; vero Kα   ceciderit] *add. erasure* Eζ   super] *rep* Qζ;
supra *some*   puncta] *interlin.* Sβ; *add.* regule Pι; *add.* [*illeg.*] recte Zα   extense] *add.*
recte Mι Nγ   quanta] in quanta Cγ Eγ Fγ Nζ Oφ Pι Pκ Pχ Rε Vμ Wζ
proportione] in proportione Xδ; portione Sθ   se] *om.* Nα

9-10   se habeant] *om.* Eγ   se ... se] *om.* Nα

10   habeant] habebit altitudo rei ad longitudinem Nα   habeant ... se] *om.* Eσ Pξ Pφ Pω
12] *om.* Mγ; XII Pζ Pϱ Qε Sβ Sθ; ad 12 Fε; *add.* ut sint dupla ad ea Cζ$_1$(*marg.*) Cζ$_2$
ista] ea Cγ Eγ Lλ Mα Qε Sβ Sθ Vγ Wγ; illa Oσ Oφ Pι Pκ Pχ Sι Vμ Vξ Vυ; ipsa Bζ
Eo Mγ Mλ; *corr. to* illa Bγ   puncta] *om.* Bζ Mγ Mλ Vν   et] *illeg.* Zα; 2 Dγ; in Tβ
Vη; quia Kε Kι Mμ Mτ Nζ Pι Pκ Pχ Qζ Qη Vγ Vμ; quod Wζ   tanta] *om.* Mι Nγ; in
tanta Cγ Eγ Eϱ Fγ Oβ Pι Pκ Pϱ Pχ; tunc in tanta Rε   se] *interlin.* Eζ   habebit]
add. illa Vμ   altitudo] longitudo Bζ Mι Nγ   rei] ita Nδ   ad] *om.* Bκ; illius Kδ
longitudinem] altitudinem Vη; logitudinis Kδ

11   inter] in Mτ   te] se Dγ Dδ Nα Nδ Oϱ Pγ Pκ Pχ; se te Vπ   et ... longitudini] et
cum ipsam addita tunc statura tui longitudini Oβ   ipsam] illam rem Mμ; ipsa Mν;
add. nam(?) in terra Qζ; *add.* rem Nζ; *add.* in terra Kε(*interlin.*) Mτ Qη; *add.* rem Pκ Pχ Vμ
cum] *om.* Mμ Pι Wβ; et Pκ Pχ   cum addita] *rep.* Dγ   cum ... longitudini]
addita tantum longitudine stature tue eidem longitudini Oη; addita tamen(tunc? Nζ)
longitudine stature tue Bζ Bθ Bι Eλ Eo Eυ Mγ Mλ Nζ Rε Vϱ Vν Vπ Vσ; addita tamen
longitudine stature tue cum longitudini Eμ; addita tamen longitudine stature tue eidem
longitudini id est punctus dupplicatione Cζ$_2$; addita tamen longitudine stature tue id est
punctus duplicationi eius de longitudini Cζ$_1$; addita tamen statura tua longitudini Mκ Oβ
Wζ; cum addita longitudine stature tue Bκ Lζ Pζ Pφ Vγ Vυ; cum addita longitudinem
stature tue Sι; cum fuerit addita longitudo stature tue Oφ; cum longitudine stature tue
addita altitudini invent(?) Dδ; et addito longitudine stature tue eidem longitudini Bη
addita] ad dicta Qδ; additione Cγ; te addita tamen Pκ Pχ   fuerit] *om.* Bγ Cγ Cδ
Cε Cη Cι Dγ Eα Eγ Eδ Eζ Eκ Eϱ Eτ Fγ Gα Kθ Lλ Mα Mη Mι Mμ Mν Mo Nγ Nε Oι Oϱ
Oσ Oτ Pδ Pι Pκ Po Pτ Pυ Pχ Qμ Rα Rδ Sβ Sθ Sκ Vα Vμ Vξ Vψ Wβ Wι Wλ; *add.* longitudo
Mτ   tua longitudini] tue a visu in terram Wγ   tua] *add.* illi(?) Lι; *add.* ipsi Vμ
longitudini] *om.* Cγ Eγ; longitudinem Mν Vξ; longitudinis Wλ; *add.* etc. Rδ

11-13   et ... te] *om.* Kδ

Then if the rule falls on the points of the extended shadow, consider in what proportion 12 has to these points; and the height of the object will have such a proportion to the distance between you and it, when your height has been added to the distance.

Si vero ceciderit super puncta umbre verse, quota pars erunt puncta de 12, tota pars erit altitudo rei illius longitudinis inter te et eius radicem, coniuncta longitudini statura tua. Unde notandum, quod si fuerit regula super diametrum quadrantis, est rei

12   vero] autem Cγ Eγ Wγ   puncta₁] *om.* Lζ   umbre versa] *illeg.* Eη   verse] *om.*
Mη Mo Nε; *add.* tunc Fε Pι Vμ   quota] quarta Mγ   erunt] *om.* Oϱ; erant Vν; erit
Sβ   erunt ... pars₂] *om.* Qλ   puncta₂] *om.* Bζ Tβ; *rep.* Oβ; *add.* super que cadit
regula Cγ Eγ; *add.* umbre Eo; *add. interlin.* ille Bγ   de] *om.* Lλ Mα Pζ Pθ Sβ Sθ Vγ; ad
Bζ Mγ Mλ   12] XII Cδ Qε Pζ Pϱ Sβ Sθ   tota] nota Vγ; quanta Pξ; tanta Cγ Cη Eγ
Fε Mμ Nα Nζ Pτ Qβ Sβ Vμ Vξ Wζ; tota vel tanta Mα; totas Kα; totius Nε; totta Bκ; *add.*
interlin. vel tanta Cδ

12-13   quota ... radicem] item in quota proportione 12 ad ea puncta, in tanta se habebit
longitudinem inter te et ipsum Wγ   erunt ... altitudo] *om.* Mτ

13   pars] *add.* erunt puncta de 12 tota pars Oτ   pars erit] parsa(?) Vψ   erit] erat Mλ;
est Bκ; et Lζ   altitudo] longitudo Bζ Pι   rei] *om.* Cι Eκ(*cut off?*) Mν Xδ; *del.* Lγ
     illius] illi Sθ; istius Kι Qη   longitudinis] *om.* Sκ; *illeg.* Kα; longitudine Pκ Pχ;
add. que est Bθ Eλ Mκ Vπ Vσ   inter ... longitudini] *om.* Fζ   te] *corr. from* se Bγ
Qθ; se Nα Oη Sι Wι   eius] *om.* Fε Wμ; eiusdem Eγ; ipsam rem vel ipsius rei Cζ₁ Cζ₂;
ipsam rem vel rei Bη; ipsius Pξ   eius radicem] ipsum rem vel ipsius rei radicem
longitudine tua Oη   radicem] *add. interlin.* ipsam Bγ   coniuncta] addita Pι;
adiuncta Bε; iuncta Fε; *add.* cum Eλ   longitudini] *twice* Eδ; altitudini Dδ;
conlongitudini Pβ; illi altitudini Rε; illi longitudini Vσ; latitudine Qη; longitudine Eo Mτ

13-14   coniuncta ... tua] coniuncta longitudine stature tue Mι Nγ Nζ; coniuncta tamen statura
tua illi longitudini Eυ Mκ Vπ; coniuncta tue longitudinis stature Vγ; cum additione
stature tue a visu in terra ad altitudinem Wγ; cum longitudine statura tue additione vel
statura tua coniuncta longitudini Bη; cum statura tua illi longitudini Bθ; longitudine tue
addita vel statura tua ad dicta longitudine Cζ₁ Cζ₂; que iuncta longitudini statura est tua
Pγ; vel statura tua addita longitudini Oη

14   statura] stature Pκ Pχ Wζ   statura ... longitudini] *om.* Cγ   tua] *om.* Mα Pζ Pι Qε
Sθ; tue Kι Pκ Pχ Wζ; *marg.* Sβ; *add.* illi longitudini Eλ   Unde ... quod] *illeg.* Lμ
     notandum] *om.* Qθ; nota Bζ Eλ; notandem Bθ; notans Bδ; notans erit Mα; *corr. in*
marg. Wα; *add.* est Bκ Eγ Eζ Eυ Lζ Lλ Oϱ Pζ Qε Sβ Sθ Vα Vβ(*interlin.*) Vπ Vσ; *add. and del.*
est Pϱ   notandum quod] *om.* Pσ   quod] *om.* Mμ Pκ Pχ Wζ   quod si fuert]
rep. Fγ   si] cum Nζ   fuerit] ceciderit Pι   regula] *om.* Vφ; rigula Nγ; vera Kα
     regula ... diametrum] *corr. from* diametrum regula super Fζ   super] sunt Cε
     quadrantis] *om.* Pκ Pχ Wζ; equantis Rα   est] erit Bη Eγ Lλ Mα Mμ Nζ Oη Pζ
Pκ Pχ Qε Rδ Sβ Sθ Vγ Wγ Wζ; *add. interlin.* erit Vβ   rei] *om.* Pδ Pκ Pχ Wγ; 21 Nα; ibi
Tβ Vη

14-15   Unde ... statura] *om.* Eκ Vμ

If, however, [the rule] fall on the points of the reversed shadow, in whichever proportion the points will be to 12, the height of the object will be to the total of this distance between you and its base, your height being added to the distance. From which it should be remarked that if the rule is upon the diameter [i.e., diagonal] of the quadrant,

15   altitudo equalis longitudini, sibi addita statura. Et si fuerit super umbram extensam, est
     altitudo maior longitudine; si vero est super versam, est minor longitudine.

15   longitudini] longitudine Vξ; longitudinis Pζ Wλ; sua Eλ; *add.* inter te et epsam Wγ; *add.*
     que est intra te et ipsam Mι Nγ; *add.* sue Bθ Mκ Rε Vπ Vσ   sibi] *om.* Cδ Kθ Oσ Vϱ
     Vυ; sed Mμ Wζ; sempter Pκ Pχ; si Bζ; similiter Qβ; *add. in marg.* id est spacio intercepti
     Oι   sibi ... statura] addita longitudini staturam tuam Wγ; longitudine stature tue sibi
     addita Cζ₁ Cζ₂ Oη; sue id est spatio intercepti addita statura Bκ Lζ; umbre semper addita
     statura tua ab oculo ad planitam(*!*) pedis Nζ   statura] longitudine stature Bη; *add.*
     mensurantis Bε; *add.* tua Bζ Bθ Bι Cγ Eγ Eλ Eo Eυ Fγ Fε Gα Mγ Mι Mκ Mλ Mμ Nγ Oβ
     Oφ Pγ Pδ Pι Pκ Pτ Pχ Rα Rε Sβ(*interlin.*) Vα Vν Vξ Vϱ Vσ Vφ Vψ Wζ Wλ Xδ   Et]
     Etiam Vη   si] *om.* Mτ; *interlin.* Mκ; *add.* autem Wγ   fuerit] ceciderit Pι Wγ; *add.*
     regula Cδ   super] sub Eα; supra *some*   umbram extensam] puncta umbre
     extense Pι; *add.* rectam Zα; *add.* tunc Fε   est] erit Bδ Bε Bη Cγ Cζ₁ Cζ₂ Cι Eβ Eγ Fα Fζ
     Kε Lγ Lη Lλ Mα Mη Mφ Mτ Nδ Oγ Oζ Oη Oι Oξ Oυ Pα Pβ Pδ Pθ Pμ Pν Pϱ Pω Qβ Qγ
     Qε Qη Rδ Sβ Sδ Sθ Sκ Tδ Vγ Vη Vψ Wα Wβ; et Mγ Nγ; regulaa est rei Nζ; *add. interlin.*
     erit Oφ

16   altitudo] *om.* Kθ   maior] minor Pφ; *add.* sua Bη Cζ₁ Cζ₂; *add.* tua Oη   maior ...
     est₂] *om.* Eo   longitudine₁] altitudine Mo; si vero super umbra extensa est altitudo
     maior longitudine Eυ; *add.* statura sua Zα; *add.* umbre Nζ   si ... longitudine₂] *om.* Bζ
     Tδ Vψ Wβ   vero] *om.* Cγ Eγ; autem Bε Wγ   est₁] *om.* Bε Bη Bθ Bκ Cζ₁ Cζ₂ Eγ Eλ
     Eυ Kδ Kθ Lζ Lλ Mα Mγ Mκ Mλ Oσ Oυ Pζ Pκ Pχ Qε Sβ Sι Sθ Vα Vγ Vμ Vν Vυ; ceciderit
     Wγ; fuerit Cγ Oβ Oη; fuerit regula Nζ; sit regula Cδ   super] *om.* Kδ Sθ; supra *some*;
     add. umbram Bε Cδ Eκ Nζ Oη Wγ Wζ   versam] puncta umbre verse Pι; versa Sθ;
     add. ceciderit regula tunc(*om.* Rε) Bθ Eλ Eυ Mκ Rε Vπ Vσ; *add.* tunc Cδ   *add.* rei Bθ
     Cζ₁ Cζ₂ Eλ Eυ   est₂] *om.* Bι Cη Eκ Eτ Mν Pθ Po Qμ Vξ Wι; *interlin.* Bγ; erit Bη Cγ Cε
     Cζ₁ Cζ₂ Eλ Eγ Eμ Lλ Mα Oγ Oη Oσ Oφ Pζ Pκ Pχ Qε Sβ Sθ Vγ; rei Vι; tunc est Cδ; *add.*
     altitudo Bη Bθ Bκ Cδ Cζ₁ Cζ₂ Eλ Eμ Eo Eυ Lζ Lλ Mα Mγ Mλ Oβ Oη Oι(*interlin.*) Oϱ Oσ
     Oφ Pζ Pι Pφ Qε Rε Sβ Sθ Sι Vα Vβ Vγ Vν Vπ Vυ; *add.* altitudo rei Mκ Vσ; *add. interlin.*
     erit Vβ   est ... longitudine₂] est longitudo umbre minor altitudine Nζ(*add.* rei) Wγ
          minor] maior Cζ₂ Mα Pφ Vυ Wλ; melior Bθ Vι   minor longitudine] *marg.* Wα;
     longitudo maior altitudinem Eγ; longitudo maior latitudinem(*expunged*) altitudinem Cγ
          longitudine₂] *om.* Eσ Fε; *add.* etc. / et cetera Kθ Pκ Pχ Rδ Vη; *add.* extense inter te et
     rem visam Bη Cζ₁ Cζ₂ Eμ Oη Pζ; altitudine [*blank*] extense Mo(*add.* et ... est [*ll.* 13-15]
     longitudini); *add. 5 lines* Zα; *ms* Qδ *ends*

the height of the object is equal to the distance, [your] height being added. And if it is on the extended shadow [scale] the altitude is greater than the distance; if, however, it is on the reversed [shadow scale], it is less than the distance.

[Comment:

In order to find the height of an accessible object (that is, an object whose distance from the observer is measurable), set the alidade at 45° and move forward or backward until you can see the top of the object through the two holes in the vanes of the alidade. Then the height of the object will be the distance from the observer to the base of the object, with the height of the viewer (i.e., the distance from the astrolabe to the ground) added.

If, however, it is not possible to move from one spot, then raise or lower the alidade until the top of the object can be seen through the two holes in the vanes, and note the position of the alidade against the shadow scales. If the shadow falls on a point on the extended-shadow scale, the object is higher than the distance from the observer to the base of the object; and the proportion of 12 that the shadow-point has will be the proportion of the distance (to the object) by which it is larger, and that proportional distance should be added to the distance to the object (plus the height of the astrolabe to the ground) in order to determine the height of the object.

If, however, the shadow falls on a point on the reversed-shadow scale, the object is shorter than the distance from the observer to the base of the object; and the proportion of 12 that the shadow-point has will be the proportion of the distance (to the object) by which it is shorter, and that proportional distance should be subtracted from the distance to the object (although the height of the astrolabe to the ground is still added) in order to determine the height of the object.]

[CAPITULUM 46.] DE ALTITUDINE REI INACCESSIBILIS METIENDA.

Si autem rei inaccessibilis altitudo fuerit metienda, per utrumque regule

Cap. 46] *two versions* Cζ₁ Cζ₂

1   De ... metienda] *om.* Bγ Bδ Bε Bζ Bκ Cγ Cδ Cε Dδ Eα Eγ Eκ Eλ Eυ Fε Gα Kε Kι Lζ Lι Mα
         Mκ Mμ Mπ Mτ Nα Nζ Oβ Oσ Pγ Pι Pκ Pξ Pσ Pφ Pχ Qε Qη Sθ Sι Tβ Vα Vη Vμ Vν Vσ
         Vυ Vφ Wγ Wζ Wλ Zα; *faded/illeg.* Eδ Eζ Lλ Fγ Wα; *marg.* Pθ; Ad altitudinem
         inaccessibilem Vξ; Ad inveniendum altitudinem rei inaccessibilis Lμ Qθ(*later hand*); De
         altitudine(*add.* rei Pδ) inaccessibili mensuranda Bη(*add. in marg.* 36) Cζ₁ Cζ₂ Oη Pδ; C. 42.
         De altitudine rei inaccessibilis Sβ(*marg., later hand*); De idem de altitudine inaccessibile
         Eϱ; De inaccessibilis rei altitudinem metienda Pζ(*marg, later hand*) Vβ(*add. in marg.*
         Inventio altitudinis rei inaccessibilis) Vγ; De mensuratione (*add.* alicuius Mλ) rei
         inaccessibilis Bι(*add. in marg.* C. 5(!)) Mλ Xβ(*later hand*); De noticia rei altitudinis elevate
         inaccessibilis Oφ(*marg.*); Inventio altitudinis rei alicuius(*add.* rei Qμ) inaccessibilis Po
         Pτ(accessibilis!) Qμ; Modus mensurationis rei inaccesibilis Vϱ; *add. in marg.* 48 Pκ; *add. in
         marg.* 49 Mκ Oϱ(C. 49); *add. in marg.* 50 Qζ(5[0]ᵘˢ) Vμ   inaccessibilis] accessibilis Pμ;
         add. y'ndal'/ #undal' Mυ(*later hand*) Vι   metienda] *om.* Dγ Kθ Mγ Mι Nγ Oφ Pμ Pν
         Rα Rε Wβ Wι; mensuranda Pυ   habenda Mν; invenienda Kα Kδ Lε Sη; *add.*
         Capitulum Cη Eα Nδ Qβ; *add.* etc. Rδ; *add.* Rubrica Bθ Qδ

2   Si] *add.* cuius Lλ Mα Pζ Qε Sβ Sθ Vβ(*add. interlin.* alicuius)   Si autem] Cum vero Vμ
                 Si ... metienda] *om.* Vγ   autem] *om.* Cγ Eγ Vσ Wγ; alicuius Bθ Eo Eυ Lζ Mγ Mλ
         Oφ Pφ Sι Vπ; aliter Bζ; vero *many*   rei] *om.* Kα Qβ Vξ; alicuius rei Bη Bκ Cδ Eλ Oβ
         Oη Oϱ Oσ Vα Vυ   inaccessibilis] inexcessibilis Vη   altitudo] *om.* Fε Pβ; *illeg.* Zα;
         latitudo Mo; *add.* eminus Cγ Eγ Lλ Mα Pζ Qε Sβ Sθ Vβ; *add.* visor(?) longitudine Wα
                 fuerit metienda] metiri volueris Kα; vis habere Bκ   metienda] medianda Bθ;
         mensuranda Tδ; mesienda Sι; metianda Cζ₂; metuenda Rα; *corr. from* muemenda Vμ
                 utrumque foramen] utramque foramina Oη; utroque foramen Vπ   regule] *om.*
         Cγ Eσ Pτ Vσ Wγ; regione Fζ; regrede Pν; rigule Nγ; tabule Nζ; *add.* aspice Pμ; *ms* Aα
         resumes

[CHAPTER 46.] ON MEASURING THE HEIGHT OF AN INACCESSIBLE OBJECT[1]

If indeed the height of an inaccessible object has to be measured, sight the top of the object to be measured through both holes of the rule

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[1] In Gunther's edition this is Capitulum 46 in the Latin (p. 231), but it is numbered as 47 in the English (p. 191).

foramen metiende rei summitatem aspice, quia inspecta puncta umbre quot sint
metientur; que, exempli causa, dicantur 3, que in latere umbre quater continentur. Quo

3   foramen] *om.* Aα   metiende] *om.* Eδ Lι; mediende Bθ; mesiende Pι; metienda Lβ;
         corr. from meuemende Vμ; *add. interlin.* vide Qζ   rei] *twice* Mo; eius Lι
                 summitatem] altitudinem Kδ; altitudinem sive summitatem Vξ; sumitates Pγ; *add.*
         vel altitudinem Fγ   aspice] accipe Mγ; respice Bγ Cη Fγ Fε Kδ Kθ Mν Pγ Vξ Wι;
         vide Mμ Nζ Pκ Pχ Vμ Wζ; visa Oβ   quia] *illeg.* Eγ; qua Bθ Bι Dδ Fγ Kα Kι Lγ Mα
         Mδ Mη Mκ Mμ Mo Nα Nγ Nζ Oζ Oη Oϱ Oσ Oτ Pγ Pκ Pμ Pχ Pω Qβ Qη Qθ Qμ Rα Rε
         Sβ Sι Sκ Tδ Vβ Vη Vι Vν Vφ Wα Wλ Pϱ Sη Wζ Wμ Xβ; quis Bκ Lζ; que Mγ Mλ; quod
         Gα; quorum Cγ   inspecta] *om.* Bκ Lζ; aspecta Eλ Qθ; visa Nζ; visa per eam Mμ Pκ
         Pχ Wζ; visa | vide Vμ; *add.* umbre verse Gα   inspecta puncta] aspecta specta Cε
                 puncta umbre] puncta de umbre Pγ; puncta et puncta umbre Bκ Lζ Oβ;
         puncta(*interlin.*) umbre puncta Qζ   umbre] *om.* Cη Qη; *illeg.* Pβ; *add.* rei Qβ; *add.*
         scilicet verse Nα Sη; *add.* verse Gα Oφ   quot] que(?) Pι; quod Eϱ Gα Lβ Mλ Pξ Qζ
         Vη Vπ Wι Wλ; quota Oγ   quot sint] per eam Kε Kι Mτ Qη   sint] fuit Mλ; si Gα;
         sic Pι; sunt Bι Lγ Nα Nγ Nζ Pω Rδ Sη

3-4   quia ... metientur] et re numeri quot sunt puncta umbre Vγ; qua inspecta puncta umbre
         quot sint. Deinde tamen rether de q~ umbra retro exponotat tibi maior uno puncto.
         Deinde vide quantum est miro(?) duas staciones et idevita 2ª pars altitudinis rei. Respice
         Dδ

4   metientur] aspice Pϱ Qβ; inveniatur Cγ Oβ; metiantur Mτ Pι Rα; metrantia Vμ;
         numerentur Eo Mγ Mλ Rε Vβ Vυ   respice Bδ Bε Eα Eβ Eη Eσ Fα Fβ Fε Fζ Kα Kδ Kθ
         Lβ Lγ Lε Lη Lι Lμ Mδ Mι Mπ Mυ Mφ Nγ Nδ Oγ Oζ Oι Oξ Oτ Oυ Pβ Pδ Pθ Pμ Pν Pξ Pσ
         Pω Qγ Qθ Qλ Rδ Sδ Sκ Tβ Tδ Vη Vι Vψ Wα Wμ Xδ Zα; *add. interlin.* numerentur Qμ
                 que₁] *om.* Pι Lι; et Cδ; qui Lζ quo Fζ; *add.* sint Kι Qζ; *add.* sunt Mτ   que₁ ... 3]
         que sit exempla causa eam tercia Kε   exempli causa] ex ea Bη; in exempli causa Qη;
         verbi gratia Pι   causa] *om.* Mτ Nα; *illeg.* Wζ; *blank* Mι Nγ; gratia Eγ Fγ Fε Nζ Pϱ Vμ;
         t'a Nγ; sibil' me cam Oτ   dicantur] *om.* Mγ Qη; sint Mμ Nζ Pκ Pχ Vμ Wζ
                 dicantur 3] *om.* Kι Qζ   3] 3ª / tria / tres *some*; III Pζ Qε Sβ Sθ   que₂] *om.* Oϱ;
         add. 3 Bδ Pξ   latere] *add.* est verse Oη; *add.* scilicet verse Cζ₁ Cζ₂   umbre] *add.*
         latere Cγ; *add.* quadrantis Nζ; *add.* verse Tβ; *add. illeg.* Eσ   quater] *om.* Eo Fγ Qη;
         marg. Sκ; c' Bι; illa Eγ; quadrantis Oγ Vμ; quantitatis Vψ; quarte Nγ; quartum(?) Oϱ; quot
         Sθ; quotiens Wγ; *del. and add. in marg.* recte vel extense qualiter in XII Pϱ
                 continentur] quia si cadent super umbram extensam tunc oportet horum accedere
         ad rem et non contenditur Cζ₁ Cζ₂   quo] cum Cε; quot Eα

4-5   Quo ... peracto] Tunc Vγ

because they will measure how many [reverse]-shadow points have been observed; which, for example, let these be stated as [being] 3, which are contained 4 times in the side of the [reversed] shadow. Having done this, move back from

5   peracto, retro ab eodem loco perge, ut mensurande rei cacumen iterum per utrumque foramen videas. Quo viso, numerum punctorum umbre denuo vide, que scilicet erunt

5   peracto] facto Eλ Kε Kι Mα Mτ Nα Qζ Qη; pacto Aα Bδ Cε Mδ Nε Pφ Sθ; peracta Eo
        retro] *om.* Sι; ante vel retro Pι; *add.* 4 Nα; *add. interlin.* vel ante Qμ Rε   eodem]
eo Kα   loco] *om.* Kδ; directe Aα Bθ Eλ Mκ Vπ   perge] perage Sκ; perie Cε; *add. interlin.* directe Qμ   perge ut] pergendo Cγ Eγ; pergent Mδ   ut] *om.* Eσ; ad Pϱ;
et Mτ Wλ   mensurande] mansurans Bδ; mensurandum Eα; *add.* numerum Eγ
      rei] *om.* Fζ Vσ   cacumen ... foramen] rerum summitatem Eλ   cacumen]
rep. Sκ; cachumen Cγ Wγ; chachumen Oφ; *add. interlin.* ut Pϱ   iterum] *om.* Cδ Eγ Xδ
      utrumque] utrum Vϱ; *add.* rei Bδ

6   foramen] foramine Oη   videas] respice Eκ; vide Pι; *add.* Quia si caderet super
umbram extensam tunc oportet hominem accedere ad rem et non recedere Oη; *add.* va que
scilicet erunt 2° puncta cat Vσ   Quo viso] et tunc Vγ; *add. in marg.* Hic vult dicere quia
minorem numerum denominantem quotiens puncta data continentur in 12 debet alio
denominante maiori minui. Ut 3 puncta quatur continentur in umbre puncta. Et ita 4or est
denominans et 2 puncta sexies. Subtractis 4 de 6 remanent 2. Et sic distantia 2a acquisita
per recessum a priori loco, est dupla ad altitudinem rei vise Vβ   numero ... scilicet]
que verbi gratia Vφ   punctorum] *add.* versorum Pθ   umbre] *om.* Kε Kι Lη Mτ
Pι Xδ; *interlin.* Eκ Qζ; *add.* verse Vμ   denuo] *del.* Vμ; *illeg.* Fε Oσ; de numero Cγ Mη;
de quo Sη; de uno Eo Oϱ Vπ; uno Cε; de uno *corr. to* denuno Sκ   vide] *om.* Eσ; videas
Fε   que] *om.* Mo Pκ Pχ   scilicet] *om.* Eλ Mμ Vγ; *illeg.* Oσ Wζ; si Kε Kθ Mτ Nγ
Pϱ(*interlin.*) Qη; exempli gratia Wγ; verbi gratia Cγ Eγ Eϱ Gα Lλ Mα Oβ Pζ Pι Pκ Pχ Qε
Rα Sβ Sθ Vβ(*add. interlin.* al' scilicet) Xβ; *add.* verbi gratia Nζ   erunt] erit Pζ; exa Sι;
fuerint Fε Pϱ; sint Oσ Pκ Pχ Wζ; sunt Pι; *add.* verbi gratia Vγ

6-7   que ... puncta] *om.* Wλ

the same place [where you made the first measurement], so that you see the peak of the object to be measured again through both holes. Having seen it, see again the number of points on the [reversed] shadow, which, for example, will be

2 puncta, que in 12 punctis continentur sexies; et intervallum stationum 12 pedum
notabis esse. Hiis itaque peractis, minus continens ternarii, scilicet 4, a maiori

7   2] 2° / duo *some*; II Sβ; *interlin.* Pϱ; et Bθ Eυ Vπ   puncta] *om.* Eγ Fε Lλ Mα Mμ Nζ Pζ
Pκ Pχ Qε Sβ Sθ Vγ Wγ Wζ; gradus Vμ   que] quem Oη; *add.* duo Tβ   que in]
quia Nε   12$_1$] duodecim *few*; XII Pζ Pϱ Qε Sβ Sθ; secundam Eσ; *corr. from* 2, *corr. from*
21 Mπ   punctis] *om.* Kδ Mγ Pγ Pϱ Vη Zα; puncta Mμ; punctos umbre (*expunged*) Oσ;
punctorum Pκ Pχ; *add.* umbre Bι Bκ Cγ Cδ Dδ Eγ Eo Eϱ Gα Kε Kι Lλ Lζ Mα Mμ Mτ Nζ
Oβ Oι(*marg.*) Oϱ Pζ Pκ Pχ Qε Qζ Qη Rα Sβ Sθ Vα Vβ(*interlin.*) Vγ Vϱ Vυ Vφ Wζ Xβ; *add.*
umbre versa Vμ; *add.* umbro Wγ; *add.* umbrorum Pι   continetur] *om.* Lμ; *add.* punctis
Mφ Qβ; *add.* punctus Kα Oτ; *add.* erasure Pϱ   continetur sexies] *om.* Oσ   sexies]
6es *some*; sexcies Oτ; sexiges Eϱ; *add.* 6 Nα; *add.* erasure Pϱ   stationum] *om.* Qγ; *add.*
duarum Bκ Kε Kι Lζ Mμ Mτ Nζ Pκ Pχ Qζ Qη Sβ Vμ Wζ; *add.* duarum intra Oβ; *add.*
illarum Aα Bζ Bθ Eλ Eσ Eυ Fγ Mγ Mκ Oφ Pγ Pφ Qμ(*interlin.*) Rε Sι Vν Vπ Vσ Wγ Wλ;
add. tuarum Bη Cζ$_1$ Cζ$_2$ Eϱ Lλ Mα Oη Oι(*interlin.*) Oϱ Oσ Pζ Pι Qε Rα Sθ Vα Vβ(*add.*
interlin. al' illorum) Vυ Vφ Xβ   12$_2$] *om.* Tδ; XII Pζ Qε Sβ Sθ; 2 Eδ; et Nγ; *add.* id est si
ponatur esse 12 Oφ Vβ(*interlin.*)   pedem] pedes Mμ Pκ Pχ Wζ; *corr. to* pedes Qζ; *add.*
vel plurium Bδ Bε Cε Cι Dδ Eβ Eη Eκ Eσ Eτ Fα Fβ Fε Kα Kε Kδ Kι Lβ Lγ Lε Lη Lι Lμ Mδ
Mη Mι Mν Mπ Mτ Mυ Mφ Nα Nγ Nδ Nε Oγ Oζ Oι Oξ Oτ Oυ Pα Pβ Pγ Pδ Pθ Pμ Pν Pξ
Pϱ Pσ Pω Qβ Qγ Qε Rα Rδ Sδ Sκ Tβ Tδ Vη Vι Vψ Wα Wβ Wμ Xδ Zα; *add. and del.* vel
plurium Qζ; *add.* vel punctum Eα Eζ(*marg.*)

7-10   12$_2$ ... commendetur] *2 garbled lines* Cγ

8   notabis] pernotabis/prenotabis Aα Bζ Bθ Eλ Eo Mκ Mλ Vν Vπ Vσ   esse] *om.* Eκ Eϱ
Eτ Kθ Mμ Mν Nα Qη Sη Vι Vμ Wζ; *marg.* Wα   *add. in marg.* al' tuas 12 pedes notabis
esse vel 12 pedum vel plurium Oφ   esse. Hiis] *illeg.* Wβ   itaque] *om.* Lι Zα; ita
Lλ Mα Pζ   peractis] pactis Aα Nε; paractis Lλ   minus] unus Cζ$_2$; *add.* contigem
Fβ; *add.* numerus Nα Rδ; *add.* scilicet Nζ   minus continens] *del. and add. interlin.*
numerus continens 4^{or} Pϱ   continens] *blank* Lμ; *marg.* Wα; *interlin.* Rε; *twice* Eσ;
contitico per Rα; pertinens Gα; *add.* per Xβ   ternarii] 3 Fε; tenarium Oη; terciarii(?)
Mδ; tercii denarii *corr. in marg (later hand) to* ternarii Mλ; terciarii(?) Oφ(*add. in marg.* al'
ternarii); *add.* enarum Eβ   scilicet] id est Bη Cγ Cδ Cζ$_1$ Cζ$_2$ Eγ Eδ Lγ Mo Oη Oσ Pζ
Po Pυ Rα Sβ Sθ Sι Vα Vβ Vγ Vυ Wβ Wγ Xβ   scilicet 4] om. Pκ Pχ; 5.4 Vφ   4]
om. Lμ Pϱ Pσ Qθ; 4^a / 4^{uor} / quartam *some*; IIII Sθ; IIII^{or} Pζ Qε Sβ; 9 Oϱ; grad~ Dγ; q^a Pφ Sι;
quattuor decim Eγ; 4, 5 Pξ; *add.* quarum(?) Xβ   a] *om.* Eδ Lβ Lι Mo Nδ Nε Nζ Po Pσ
Pυ Qθ Wβ; *interlin* Qλ; 7 Pγ; de Bη Bι Bκ Cζ$_1$ Cζ$_2$ Dγ Eγ Eϱ Eσ Eυ Gα Kα Kι Lζ Mα Mη
Mκ Mλ Mμ Mτ Oη Oξ(*interlin.*) Oϱ Oσ Pζ Pκ Pτ Pφ Pχ Qβ Qη Qμ Rα Rε Sβ Sθ Sι Vα Vβ
Vγ Vμ Vν Vπ Vϱ Vσ Vυ Vφ Wγ Wζ Wλ Xβ; qui de Oφ   maiori] alio Vμ; maiore Rε;
minori Eη

2 points which are contained six times in 12 points; you will note that the space between the stations is 12 feet. Therefore these things having been completed, let the lesser containing triplicate sets,[2] that is 4, be taken from the larger

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[2] "Triplicate sets", that is, sets of 3 points of which there are 4 sets in 12 points.

continenti binarii, scilicet 6, auferatur, et binarius qui pertransierit memorie
10 commendetur et intervallum duarum stationum, quia ex proportionibus remansit

9   continenti] continent Oη Pφ; continente Kδ Lη Mγ Mδ Mν Pυ Qβ Rα; exerite/exrinte Eκ;
         nente Mι Nγ; *add.* minori si Mτ   binarii] binari Pγ; binarium Oη; *add.* scilicet 6 Pν
                binarii scilicet 6] *erasure and add. interlin.* bineato scilicet sex Pϱ   scilicet] *om.* Dγ
         Fζ Eδ Mμ Mo Po; *interlin.* Eζ; est Pσ; id est Bη Cδ Cζ₁ Cζ₂ Eγ Gα Lλ Mα Oη Oϱ Oσ Oφ Pζ
         Sβ Sθ Vα Wγ; idem de Vυ; si Mτ; *add.* per maiori continente Fγ   scilicet 6] δ Sι
                6] 6ᵉˢ / sex *some*; ᴠɪ Pζ Qε Sθ; 16 Eκ; sexies Oβ   auferatur] auferantur
         (aufferantur *some*) Bγ Bη Bθ Bι Cε Cζ₁ Cζ₂ Cι Dγ Dδ Eβ Eδ Eζ Eη Eκ Eλ Eo Eσ Eτ Fα Fβ
         Fγ Fε Kδ Kθ Lβ Lγ Lε Lη Lι Mη Mν Mπ Mτ Mυ Mφ Nα Nε Nζ Oγ Oι Oξ Oυ Pα Pβ Pγ
         Pδ Pι Pκ Pμ Pν Po Pϱ Pυ Pφ Pχ Pω Qβ Qγ Qθ Qλ Qμ Rδ Sδ Sη Sκ Tβ Tδ Vβ Vγ Vη Vι Vμ
         Vξ Vϱ Vψ Wα Wβ Wζ Wι Wμ Xδ Zα; auferetur Sβ; auferuntur Mι; aufferuntur Nγ;
         auf | auferantur Pσ; minuatur Eγ   binarius] *om.* Tβ; 2ʳⁱᵘˢ Mμ   qui] *om.* Dγ Mo Mτ
         Pγ Po Pυ; quo Oη; quod Cδ; *add.* super Fγ; *add.* tibi Pι   qui ... commendetur]
         remanens id est quatuor de maiori id est 6 minuatur binarius Eγ   pertransierit] *blank*
         est Nα; *illeg* est Sη; per totam si erit Pγ; rem~ Cε; remansat Bδ; remanserit Cι Dδ Eβ Eη Eϱ
         Eσ Fα Fβ Fζ Gα Kδ Kε Kι Kθ Lβ Lγ Lε Lη Lι Lλ Mα Mδ Mι Mμ Mπ Mτ Mυ Mφ Nγ Nδ
         Nζ Oβ Oγ Oζ Oι Oξ Oτ Oυ Oφ Pα Pβ Pθ Pι Pκ Pμ Pν Pξ Pϱ Pσ Pχ Pω Qβ Qγ Qε Qζ Qη
         Qλ Rδ Sβ Sδ Sθ Sκ Tβ(*add. interlin.* scilicet binarius) Tδ Vβ Vγ Vη Vι Vμ Vφ Vψ Wα Wγ
         Wζ Wμ Xβ Xδ Zα; transierit Aα Bε Bθ Eα Eo Eυ Mγ Mκ Mo Nε Pτ Qμ Vξ Vπ Vσ; *corr.*
         interlin. to supererit(*?*) Bγ; *add.* secundus / 2ᵘˢ Kε Mτ Qζ

9-12   et₂ ... remanserit] *om.* Eη; *marg.* Bε

10   commendetur] commenda Bζ Mγ Mλ; commende Vπ; mandetur Pϱ   et] *add.* etiam
         Nζ Vμ   duarum] *om.* Eη Kθ Mμ Nζ Pκ Pχ Rα Wζ Xβ; 2 /2ᵃʳᵘᵐ *some*; δ Sι; et Nγ; id
         est/1 Vφ; tuarum Pι   stationum] *add.* scilicet 2ᵃ Vμ; *add.* servetur Cγ Eγ   quia]
         quare Fγ; que Vϱ; qui Cγ; quod Cδ Mδ Nα Oι; sed quia Tβ; tunc quia Pι; *add.* ergo Kθ Mφ
         Vι; *add. in marg.* multiplica per 12 et productum divide per differencia in prius acceptam
         et quia ex Pϱ   ex] si sex Mτ   proportionibus] proportione Mτ; propositionalibus
         Nα; subtractione 4 a 6 Kθ Mφ Vι; *add.* illis propinquibus Fγ   remansit] remanserit
         Cγ Dδ MτPυ; remanset Sθ

containing binary sets,[3] that is 6, and let the binary [number] which is carried over [or left] be committed to memory, and the distance separating the two stations, since it remained binary [or duplicate] from the proportions,

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[3] "Binary sets", that is, sets of 2 points of which there are 6 sets in 12 points.

binarius, duplum altitudini inaccessibili rei pro certo habeatur. Est enim omnibus hec universalis regula: subtractione continentium facta, si unum remanserit, intervallum stationum metientis erit altitudini rei equalis; si duo, duplum; si tria, triplum; et sic de ceteris intellige.

11   binarius] 2^{rius} Mμ; *add.* ideo Tβ; *add.* in Bι Vϱ; *add.* intervallum stationum predictarum Pι;
         add. qui remanserit binarius Nγ; *add. interlin.* tue(?) Bγ   duplum] 2^{lum} Mμ; *add.* in Nε;
         add. and del. subtractione Aα   altitudini] *om.* Oβ Wγ; altitudinis Cγ Eϱ Eσ Kδ Kε Lγ
         Lε Lλ Mδ Mη Mι Nγ Nε Oγ Oυ Pζ Rδ Sκ Vβ Vγ Vη   inaccessibili] inaccessibilis Cγ
         Eϱ Fγ Fε Kδ Kε Lλ Lλ Mδ Mη Mι Nγ Nε Oγ Oη Oυ Oφ Pζ Sκ Tβ Vβ Vγ; in excessibilis
         Vη; non accessibili Vφ   rei] *om.* Cη Eκ Eτ Kθ Mν Pγ Wι; *interlin.* Bδ; *illeg.* Pξ
                enim] autem Bη Cζ$_1$ Cζ$_2$ Oη; igitur Sθ   omnibus] *om.* Bε Eβ Eσ Fα Fβ Fε Fζ Lγ
         Lβ Lε Lι Lμ Mδ Mι Mυ Mφ Nγ Nδ Oγ Oζ Oξ Oτ Oυ Pα Pβ Pμ Pν Pξ Pϱ Pσ Pω Qβ Qγ
         Qθ Qλ Sδ Tβ Tδ Vη Vι Wμ Xδ Zα; in omnibus Aα Bζ Bη Bθ Bκ Cγ Cδ Cζ$_1$ Cζ$_2$ Eγ Eλ Eυ
         Lζ Lλ Mγ Mκ Mλ Oη Oι(*interlin.*) Oϱ Oσ Oφ Pτ Pφ Qμ(in *interlin.*) Rε Sβ Sθ Sι Vα Vβ Vγ
         Vν Vπ Vσ Wγ Wλ; in omnibus modis Vυ   omnibus ... universalis] *illeg.* Bδ Lη;
         vol[uer]is [*illeg.*] Kα   hec] his / hiis Gα Kε Pκ Pχ Qη Wζ; hiis vis Qζ; hiis volueris Kι;
         hoc *some*; qui Xβ; regula Mμ; regulis Mτ

11-12   inaccessibili ... continentium] *marg.* Wα

11-14   altitudini ... intelligo] *illeg.* Mα

12   universalis] *om.* Kι Oη Vη Vυ; *illeg.* Mπ; generalis Mτ Vμ; ris Kε; universialius Pζ; utilis
         Oβ Oϱ; utillis Mγ; *add. interlin.* vera et Pϱ   regula] *rep.* Oβ; in illius Oη; *add.* generalis
         Kε Qη; *add.* quod Fγ; *add. illeg.* Mυ Vι   continentium] *blank* Sι   facta] *ms* Vξ *ends*
              facta ... stationum] *om.* Nα   si] *add.* autem Oσ Vα   remanserit] remansit Bδ
         Vϱ

13   stationum] *om.* Oβ   metientis] medietas Cγ; mentientis Pγ; messientis Wι; mestientis
         Sι; metiens Cε Fα Fβ Mτ   erit] erunt Vπ   altitudini] altitudo Pι   rei] *om.* Lμ;
         in rei Sθ; *add. interlin.* mensurande Bγ   equalis] equale Bδ Kδ Lζ Mγ Mι Mπ Nα Nγ
         Oη Pγ Pκ Pχ Sθ Vγ Vη Vυ Wμ; equali Lβ; *add.* ei Pφ Sι; *add.* ei scilicet Wγ   si$_1$] *add.*
         remanservit Tβ   duo] 2 *some*; et Gα Nα   duplum] 2^{lum} Mμ   si$_2$] scilicet Sι
              tria] *om.* Mτ; 3 *some*; et Gα; triplum Qη   triplum] 3^{lum} Mμ; duplum Sη; *add.* si
         quatuor quadruplum Vμ   et sic] *om.* Vμ; etc. Kε Mν Oβ Pκ Pχ Vη   sic] *om.* Bη
         Kα Mμ Vφ   sic de] *om.* Wζ   de] in Lλ Mμ Sθ Vγ

13-14   et ... intellige] *om.* Cγ Eγ Wλ; sic ... cetera] *illeg.* Kι Lμ; sic ... intellige] *illeg.* Bε; cetera Nζ;
         sic simili modo facias de ceteris suo ordine et cetera Bκ

14   ceteris] aliis Pι Mτ Qη Vη Wβ Zα; *add.* intervallis Aα Bθ Eλ Eo Mκ Oφ Vβ Vπ Vσ
              ceteris intellige] aliis suo modo Pκ Pχ   intellige] *om.* Lι Mι Nγ Qθ Wβ;
         intervallis Bζ Mγ Pφ Sι Vν; *add.* etc. / et cetera Kθ Mτ Pι Rδ Vη Vι; *add.* finem itaque ad
         quem vis metiri Oη; *add. interlin.* intervallis Qμ; *mss* Eκ Eυ *end*

should certainly be considered as double the inaccessible height of the thing. For this rule is universal in all cases: after the [sets] containing [the number of measured points] have been subtracted, if one remains, the interval of the stations will be equal to the height of the thing being measured; if 2, double; if 3, thrice, and you deduce thus concerning the rest.

[ADDENDUM 46]

Added text found in Dδ(f. 14ʳ) Eκ(f. 171ᵛ) Eσ(f. 151ʳ) Eτ(f. 150ᵛ) Fβ(f. 216ʳ) Mπ(f. 141ʳᵃ⁻ᵇ) Oϱ(f. 21ʳ) Vβ(f. 71ᵛ)

DE EODEM ET ALITER

Vel aliter, accipe altitudinem rei inaccessibilis, et scito ex predictis cuiuscumque lateris sint; quota sit affinitas longitudinis ex rei altitudine, ut si cadat super puncta umbre recte denotabis eam de 12. Si super latus umbre verse, divides ea per 12 et exiens erit affinitas. Et similiter in secunda statione affinitatem scito. Tunc numerum pedum vel cubitorum inter duas stationes divide per differentiam duarum affinitatum, et exiens erit altitudo rei inaccessibilis adiuncta statura tua.

1   De ... aliter] Vβ *only* (*add. in marg.* Hoc capitulum "Vel aliter" est additum); Item aliter Eτ

2   Vel aliter] *rubric* Oϱ   predictis] punctis Dδ Eσ Oϱ

3   lateris] latitudinis Eσ Dδ Fβ Oϱ   sint] *om.* Eσ; *ms* Eκ *ends*

4   denotabis] denominans Vβ   eam de] ea de Eτ Fβ Mπ; eadem Dδ Eσ   ea per] per ea Eτ Vβ

5   secunda] 4ᵃ Fβ

6   vel] per Eσ   duas] 2 *some*   duarum] 2 *some*

7   adiuncta] addita Eσ

[ADDENDUM 46]

ANOTHER CONCERNING THE SAME

Or in another way: take the height of the inaccessible thing and know from the aforementioned of whichever side it is. However much is the relationship of the length from the height of the thing, that if it falls on the extended shadow [line], you will mark it from 12. If [it falls] on the reversed shadow [line], you will divide it by 12, and the result will be the relationship. And similarly in a second station know the relationship. Then divide the number of feet or cubits between the two stations by the difference of the two relationships, and the result will be the altitude of the inaccessible thing, joined by your height.

[Comment:

      If you wish to know the height of an inaccessible object (that is, if you cannot measure the distance between yourself and the object), sight the top of the object from two different positions, noting the position of the rule on the reverse shadow scale each time. (Since the object is most likely to be some distance away from the observer – otherwise it would not be inaccessible – the sighting will generally be on the reverse-shadow scale rather than the extended-shadow scale.) Also measure the distance on the ground between the two positions.

      For example, the first measure might be 3 on the reversed-shadow scale (counting from the top down) and the second measure might be 2 on the same scale; and the distance on the ground might be 12 feet.

      Divide 12 by each of the two values found on the reverse-shadow scale, and take the difference. Then the height times that difference will equal the distance between the two sighting positions (that is, the height is inversely proportional to the measured distance).

      In this example, 12 divided by the first measure (3) will be 4, and 12 divided by second measure (2) will be 6, and the difference is (6-4 =) 2. Thus the distance between the two points of observation will be twice the height of the object (12 feet of separation yields a height of 6 feet). If the calculated difference were 3, the distance moved would be thrice the height, and so on.

      Note: Although not mentioned, and to be more accurate, one should also add the height of the observation (ground up to astrolabe) to the calculated height of the object.

      Note: Dividing 12 by the number of units on the reversed-shadow scale is necessary to, in effect, convert the vertical measure on the shadow scale into a horizontal measure which can then be related (inversely proportionally) to the horizontal measure between the two points of observation.

      If, however – and this is not mentioned in the capitula – the object is close enough that the sightings fall on the extended-shadow scale, one works proportionally. Sight the top of the object from the two different positions, noting the position of the rule on the extended-shadow scale each time. Also measure the distance between the two positions as above.

      For example, the first measure might be 3 on the extended-shadow scale and the second measure might be 2 on the same scale; and the distance on the ground might be 12 feet.

      Take the difference between the two shadow points and compare it to the total number of shadow-scale points; then the distance between the two sighting positions compared to the height of the object will be proportional.

      The difference of 1 shadow-scale unit compared to the 12 shadow-point units (1:12) is proportional to the 12 feet on the ground compared to the height of the object. Thus the height of the object is (12 units x 12 feet =) 144 feet.]

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[CAPITULUM 47.] DE MENSURATIONE PLANI.

Si queris cum astrolabio metiri planitiem, per utrumque foramen regule limitem

Cap. 47] *two versions* Cζ₁ Cζ₂; *illeg.* Mα; *om.* Qδ Xβ

1   De ... plani] *om.* Aα Bδ Bε Bζ Bκ Cγ Cδ Cε Dδ Eα Eγ Eλ Eσ Fβ Fε Kε Kι Lζ Lι Mμ Mκ Mπ
       Nα Nζ Oβ Oσ Pγ Pι Pκ Pσ Pφ Pχ Qε Qζ Qη Sθ Sι Tβ Vα Vη Vμ Vν Vσ Vυ Vφ Wγ Wζ
       Wλ Zα; *faded/illeg.* Eδ Fγ Wα; Ad inveniendum planiciem Mγ; Ad mensurandum
       planiciem Eϱ Lμ Qθ; Ad metiendum planiciem Gα; Alicuius planiciei in longum tantum
       Wι; Alius modus mensurandi planum etc. Mτ; Capitulum. De mensuratione alicuius
       planitie Mλ(*add.* De mensuratione alicuius planitie); De [*cut off*] Kδ; De mensuranda
       planicie Bη(*add. in marg.* 37) Cζ₁ Cζ₂; De planitie mensuranda Dγ Oφ Pζ(*marg., later hand*)
       Rα Rε Sβ(*marg., later hand; add.* C. 43); De plano mensurando per astrolabium Sη; Modum
       mensure planiciei rerum Vϱ *add. in marg.* Canon ultimus Qζ; *add. in marg.* C. 6(!) Bι; *add.
       in marg.* 45 Sδ(*later hand*); *add. in marg.* 49 Pκ; *add. in marg.* 50 Mκ Oϱ(C. 50); *add. in marg.*
       51 Vμ   mensuratione] mensura Eo Mι Nγ Oη; *add.* alicuius Eζ Eτ(?) Kθ Mν Mυ Pτ
       Qμ Vβ Vι Wβ   plani] planitiei Bι Eη(*twice*) Eτ Mν Mυ Mφ Oη Pθ Vγ Vι Wβ; *add.*
       Capitulum Qβ; *add.* etc. Rδ; *add. in* loci cautum(= tantum) Mυ Vι; *add. in* longum tantum
       Mν; *add.* per astrolabium Bι Kθ; *add.* per longum Vβ Wβ; *add. interlin.* al' planitiei Vβ; *add.*
       cum astrolabio habenda. Rubrica Mo; *add* Rubrica/Rx Cη Vπ

2   Si] [ ]I si Vπ; *add.* autem Bδ Bε Bκ Cε Cι Eβ Eη Eσ Fε Fζ Kα Kδ Kε Lβ Lγ Lε Lη Lμ Mδ Mη
       Mι Mo Mυ Mφ Nγ Nδ Nζ Oγ Oζ Oι Oτ Oφ Pα Pβ Pδ Pϱ Pσ Pθ Pμ Pξ Pω Qγ Qζ Qη Qθ
       Qλ Rδ Sβ Sκ Tδ Qβ Vι Vψ Wα Wμ Xδ   Si ... planitiem] *om.* Vγ; Si autem per
       astrolabium queris scire planitiem Mτ   queris] quam vis Sθ; queras Mκ; quesieris Mι
       Nγ Vι; quod Cγ; veteri volueris Nζ; vis Pκ Pχ; volueris Lι   cum] per Bε Zα
              astrolabio] *add.* scire Fζ   metiri] scire Bδ Bε Cε Cι Eη Eσ Fα Fε Kα Kδ Kε Kι Lβ
       Lγ Lε Lη Lι Lμ Mη Mo Mυ Mφ Nδ Nε Oγ Oζ Oξ Oτ Oυ Pα Pβ Pδ Pμ Pν Pσ Pω Qβ Qγ
       Qζ Qη Qθ Qλ Rδ Sδ Sκ Tβ Tδ Vι Vψ Wα Wμ; *add.* volueris Cγ Eγ   planitiem]
       plani[*illeg.*] *del. and add. interlin.* planitiem id est longitudinem area Pϱ; *add.* aliquam Fγ;
       add. eius Wμ; *add.* id est longitudinem area Zα   per] *om.* Bθ Bζ   per utrumque]
       utriusque Nζ; utrumque per utrumque Bκ Lζ   foramem] foramina Oη   regule]
       om. Cγ Cη Eϱ Eγ Qβ Sδ; eius Kδ Mλ Rδ; rigule Nγ   limitem] *om.* Bζ Eλ Mγ Mλ Pφ
       Sπ; finem Oφ(*add. in marg.* al' limitem) Wγ; utroque limite Bθ; utrumque limitem Aα Vπ;
       add. interlin. al' finem Vβ; *add. interlin.* scilicet initiam Lζ; *add.* imeram(?) Bκ

2-3   per ... considera] considera utramque limitem eius punctumque regule foramina ex
       adverso positum Bθ   limitem eius] *marg.* Mκ

[CHAPTER 47.] ON MEASURING A PLANE.[1]

If you seek to measure a flat surface with an astrolabe, look at its boundary placed on the opposite side through both holes [in the vanes] of the rule;

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[1] In Gunther's edition this is Capitulum 47 in the Latin (p. 231), but it is numbered as 48 in the English (p. 192).

eius ex adverso positum considera; post hec puncta umbre super quam steterit regula ad 12 compara; et qualis fuerit comparatio punctorum ad 12, talis est comparatio stature

3   eius] *om.* Bζ Qβ Vμ; eis Eτ   ex] *interlin.* Bγ   ex adverso] ex adversum Nζ Oη; exdverso(*!*) Bζ; ex transverso Kε Kι Mτ Qη; *corr. in marg. to* adversa eius positum Qζ   positum] *om.* Cγ Eγ; *illeg.* Eϱ Sθ; *interlin* Pϱ; collocatum Bη Cζ$_1$ Cζ$_2$ Eμ Oη; positam Pδ Qμ; posito Bγ Cη Vϱ Wι Wλ; punctum Pκ Pχ   considera] *add.* utramque limitem eiusdem Eλ; *add.* ^{glo} id est sumendo astrolabium per manum sinistram quia si cum dextra allidada caderet extra umbras ^{sa} Vβ   post hec] post hoc *some*; tunc Vγ   puncta] *om.* Mγ; *interlin.* Lε; posito Eγ   umbre] *om.* Mμ Pκ Pχ Wζ; *add.* puncta Gα; *add.* que Eδ; *add.* scilicet verse Oφ; *add. interlin* verse Vβ   super quam] que Mλ; supra Wι; supra quam Fγ   quam] *om.* Cη Wλ; quanta Cγ; que Aα Bγ(*interlin.*) Bδ Bι Bκ Cζ$_1$ Cζ$_2$ Cι Dγ Eβ Eζ Fα Fβ Fζ Kα Lλ Mδ Mι Mν Mπ Mτ Nα Nγ Nδ Nε Oγ Oι Oϱ Oσ Oτ Oφ Pϱ Qγ Qμ Rα Rε Sι Sκ Tβ Vα Vν Vυ Vφ Vψ Wβ; quem Oη;   steterit] fuerit Pκ Pχ; stabat Cγ; steterint Mγ; stetit Oη; *add.* vel ceciderit Fγ   regula] respectu Cδ; rigula Nγ; *add.* puncta Mγ Mλ

4   ad$_1$] a Wλ; ab Oβ   12$_1$] duodecim *few*; XII Pζ Pϱ Qε Sβ Sθ; *blank* Lλ; *add.* puncta Bδ   compara] *om.* Vσ; comparabis Pϱ   et ... comparatio$_1$] *marg.* Wα   qualis] equalis Bθ Lβ Qθ Sη Vγ   fuerit] erit Kθ; est Mφ; fiat Vγ; fuit Vϱ   comparatio$_1$] computatio vel comparatio Cι Pδ Pθ; proportio Pκ Pχ Zα; *add.* vel Lβ Lμ Qθ; *add.* vel computatio Kδ Oξ(*del.*) Rδ Sκ; *add. interlin.* sive proportio Pϱ   comparatio punctorum] *om.* Bζ   punctorum] *om.* Kδ Pσ   punctorum ... comparatio$_2$] *om.* Lλ Oβ Vγ; *marg.* Pτ   ad 12$_2$] *om.* Pι   12$_2$] XII Pζ Pϱ Qε Sβ Sθ   talis est] *illeg.* Kα   est] *om.* Mν Wι; erit Cγ Eγ Qε   comparatio$_2$] *om.* Pβ   stature] statuere Pδ

4-5   et ... planitiem] ostendent tibi planici longitudinem talis enim que comparatio stature tue ad totam planiciem qualis erit comparatio punctorum ad 12 Eλ

then compare the points of the umbra on which the rule rests with 12; and whatever the comparison of these points is to 12, such is the comparison of your height

5   tue ad planitiem.

5   tue] *om*. Bζ Eϱ Eγ Kε Kι Qη Wι; *interlin*. Qζ   tue … planitiem] *om*. Fβ   ad] *add*.
         rectam Sθ; *add*. totam Aα Bζ Bη Bθ Bκ Cγ Cδ Cζ₁ Cζ₂ Cδ Eγ Lκ Mγ Mκ Oβ Oη Oι(*marg*.)
         Oϱ Oσ Oφ Pζ Pτ Pφ Qε Qθ Qμ Sβ Sι Vβ Vγ Vν Vσ Vυ Wγ   planitiem] *add. illeg*. Pξ;
         add. etc. / et cetera Lι Pτ Rδ Vι Vη Vπ; *add*. Et hoc de astrolabio sufficiant Tδ; *add*. Hic(Et
         hoc Vμ) intellige si regula ceciderit super puncta umbre verse Mμ Nζ(*add*. Et sic est finis)
         Qζ(*later hand*) Vμ Wζζ; *add*. in longum rectam Wβ; *add*. Sed hoc intellige si regula
         ceciderit super puncta umbre verse vel recte Pκ Pχ; *add*. Seu migras mensoris
         longitudinis tue statura ad ipsam planitiem Pϱ; *add. illeg. 2 lines* Xδ; *add. chapter "AD*
         INVENIENDUM CENTRUM PER DIVISIONEM CIRCULUM" Mγ (fol. 21ᵛᵃ⁻ᵛᵇ); *add. chapter "Si vis scire*
         utrum astrolabii regula pendet …" Kε(*23 lines*) Nζ(*7 lines*) Qζ(*12 lines*) Qη(*11 lines*) Qθ(*9*
         lines); *add*. 16-line *chapter "Primo determinat de motu longitudinis pl[an]orum…"* Fβ; *add*.
         20-line chapter "Quanto sit altitudo rei in planum erecta" Mτ; *add. 40-line chapter "Quomodo*
         [illeg.] dividendum zodiaci signa" Eo; *an extraneous chapter* [DE RE PERDITA INVENIENDA] *is*
         found here in 3 mss: see Appendix.²

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² This material is also sometimes found elsewhere: see Appendix.

to the flat surface.

[Comment:

       To measure the distance across a flat surface, view the far edge through the two holes in the vanes of the rule and note where the rule crosses the reverse-shadow scale. The proportion which the number of points between the bottom corner of the scale ("12") and the place on the reverse-shadow scale is to 12 will be the proportion of your height from the ground (or more specifically the height of the astrolabe off the ground) to the far edge of the flat surface.]

Explicit practica astrolabii / The "Practica astrolabii" ends.

Explicit ... astrolabii] Eβ Eσ Fζ Kα Lβ Lγ Lε Lι Mδ Mφ Nδ Oγ Oι Oξ Oτ Oυ Pι Pμ Pω Qβ Qγ Qλ Sδ Tδ Vσ Wα; *om.* Bδ Bζ Bη Bκ Cζ₁ Eυ Fβ Mα Mλ Oβ Oη Oρ Pδ Pξ Qη Sβ Vα Vυ Wγ Xδ; *faded* Fγ; *expunged* Vφ¹; *add.* et cetera Mι Nγ; *add.* Deo gratias Pα; *add.* Messehallach Fα; Amen Eα; Annis domini N.L.XI cum inperfecto VI adde et totam summam per XV divide et residuum erit presens indictio Qε; Canonum pro astrolabii usu finis. Anno 1493 currente 7ᵐ Mayo Vμ; Christo [= χρō] gracias Pζ; De laus Mτ; Et sic est finis huius; Christo insuper gratias Bε; Et sic est finis operationum astrolabii Gα(*twice*); Explicit Dγ Eζ Eλ Kε Kι Lζ Mπ(*add. and del.* Explicit de gomonis(*!*) officio in astrolabio constitua)² Oζ Oσ Po Pυ Qμ Rα; Explicit *illeg.* Qζ; Explicit astrolabium Cι(*expunged; add. further astronomical material*) Eδ Eo Sθ Vψ Wι; Explicit astrolabium 1432, 7 die maii Mo; Explicit astrolabium cum quadrate Nα; Explicit astrolabium Mechale, Deo gratias Cε Mη; Explicit astrolabium Messahalla. [*illeg.*] 1450 Mυ; Explicit astrolabium Messehale. Deo dicimus gratias: alleluya Pθ; Explicit astrolabium Messehalla qui vivit et regnat prestare dignus erit Amen. Pγ; Explicit astrolabium Messehalle Bγ Bι Cη Mν(Meshalle) Sκ(Messahalle) Wβ; Explicit astrolabium Messehalle. Sit laus deo pax vivis. Requies defenctorum et cetera. Amen. Deo gratias.; Explicit astrolabium Mesthale. Deo gracias. Amen Kθ; Explicit astrolabium secundum Mesahalam Eα; Explicit de oper[ati]one astrolabii Eγ; Explicit Deo gratias amen. Astrolabium Messa. Nε; Explicit et incipit Pτ³; Explicit. Explicit practica astrolabii Messehalle et aliorum Eτ; Explicit feliciter practica astrolabii. Anno [*illeg.*] Wμ; Explicit liber astrolabii novi Vρ; Explicit liber de operatione astrolabii Vγ; Explicit practica astrolabii {see top}; Explicit practica astrolabii altissimo domino Deo nostro Iesu Christo s[*cut off*] gracias Pβ; Explicit practica astrolabii Deo et Sancto Christoforo nec non Sancto Ieronimo gratias etc. Fε; Explicit practica astrolabii et conones [*illeg.*] Mμ; Explicit practica astrolabii Messehale. Sit laus deo trino et uno Tβ; Explicit practica astrolabii Messehallath per quendam fratrem ᶠʳⁱᵈᵉʳⁱᶜᵘᵐ ⁿᵒᵐⁱⁿᵉ ordinis S. Benedicti et professum monesterii Sancti Emmerani et sic finitur sabbato ante dominicam Esto michi aureus numerus 4. Explicit astrolabium Mesahalle per quendam frantrem ᶠʳᵉᵈᵉʳⁱᶜᵘᵐ ⁿᵒᵐⁱⁿᵉ ordinis S. Benedciti professum necnon in monesterio Sancti Emmerani [*illeg.*] 1447 in die Gregorii Pape. Vι Explicit practitha sive operatio astrolabii Cγ; Explicit tractatus astrolabii Aα Bθ Mκ Vα Vπ; Explicit tractatus astrolabii secundum. Deo gratias, Amen Oφ; Explicit tractatus de astrolabio Cδ Sι; Explicit tractatus de astrolabio de compositione et usu eius Pφ; Expliciunt capitula de utilitate astrolabii Lμ Qθ(*expunged*); Expliciunt canones astrolabii Cζ₂ Eμ Nζ; Expliciunt canones astrolabii ipsius Mesalach finiti anno [*illeg.*]95°, 19 die mensis Aprilis Wζ(2'cl 95°); Expliciunt canones astrolabii nove ompilationis Pκ(*add.* sequitur Theorica Plantarum) Pχ; Expliciunt canones de usu et utilitatibus astrolabii Rε; Expliciunt canones de utilitatibus et operationibus astrolabii. Sη

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¹ This deleted explicit is found on fol. 18ʳ, after the intervening extra capitulum, "De re perdita invenienda".

² Cf. Cap. 41 line 4.

³ In ms Pτ the *Compositio* follows the *Practica*.

Vβ(*add*. [E]go Johannes de Calomonte Flandrinus[4] sub anno Christi 1473 currente propria manu scripsi. Deo gratias.); Expliciunt utilitates astrolabii cum compositione Eη; Expliciunt utilitates astrolabii. Deo gratias Qδ; Expliciunt utilitates tractata astrolabii Mesallae Dδ; Finis Kδ; Finis practice Messahath 1482 Zα; Finit tandem MDXII. Jovis V Aug. ex scrip. Jo. Tosenus Pϱ; Finite operationes astrolabii. Deo gratias Sι Wλ; Finitur opera Messahalach astrolabii Vη; Finitus 1332. Indict[ione] 15ª die 18 Jull[ii] in civit[ate] Vincencie. Explicit opus astrolabii. Deo gratias. Lλ; Hec de practica astrolabii sufficiant. Explicit etc. Pν; Hic est finis astrolabii Mγ

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4 See note to *Compositio*, Cap. 7 line 9.

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APPENDIX

DE RE PERDITA INVENIENDA

This capitulum is found in some mss after Cap. 33, and in others after Cap. 41 (and elsewhere in four mss). The first group of mss belongs to Subgroup A of the *Practica*.

Following Cap. 33 (and before Cap. 45):
Bζ(fol. 39ᵛ) Bι(fol. 73ᵛᵃ⁻ᵇ) Eo(fol. 190ʳᵇ) Gα(fol. 147ᵛᵇ) Mγ(fol. 21ʳᵃ⁻ᵇ) Vν(ff. 182ᵛᵇ-183ʳᵃ) Vϱ(fol. 29ʳᵃ)
Following Cap. 38 (and before Cap. 40):
Eλ(fol. 36ʳᵃ⁻ᵇ)
Following Cap. 41 (and before Cap. 42):
Bγ(fol. 81ʳ, *marg. later hand*) Bθ(fol. 118ᵛ) Eυ(fol. 25ᵛᵇ) Fβ(fol. 215ʳ) Pδ(fol. 60ʳᵃ⁻ᵇ) Pι(fol. 300ʳᵃ) Vπ(fol. 66ʳ)
Following Cap. 47:
Lζ(fol. 41ʳ, *marg.*) Pω(ff. 39ʳ⁻ᵛ) Vφ(ff. 17ᵛ-18ʳ)

This material is actually from what may indeed be a genuine work of Māshā'allāh, the very popular *Liber interpretationum* (also known as *De inventione occultorum*, *De interpretatione cogitationis*, *De occultis*, *Liber interpretationum de occultis*, or *Liber interragationum*, etc.).[1] The capitulum deals with the location of hidden or lost (and sometimes stolen) objects, which is one of the functions attributed to astrology, specifically the branch of astrology called "interrogations." Although it has little to do with astrolabes, it was probably included in these manuscripts as another astrological capitulum amongst the astrological capitula in the *Practica*.[2] Also, one might use an astrolabe to find the relevant ascendant.

The procedure in this capitulum depends on associating the ascendant with different parts of the "search area" (divided by the cardinal directions), and subdividing the part selected, and so on, to guide the searcher to the lost or hidden item. Help in understanding this capitulum may be found in Benjamin N. Dykes' introduction to texts by Sahl and Māshā'allāh.[3]

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[1] Charles Burnett notes at least one example of this text in an early manuscript (Paris, Bibliothèque nationale de France, ms lat. 16208, ff. 52ᵛᵃ⁻ᵇ) where it is chapter 6.

[2] I wish to thank Josep Casulleras and Charles Burnett for identifying this capitulum and for other information about it.

[3] See "On Hidden Things", in *Works of Sahl and Māshā'allāh*, translated by Benjamin N. Dykes (Minneapolis: Cazimi Press, 2008), pp. 425-436, and the introduction, pp. xiii-xx and lxxvi-lxxviii; and also *Abraham ibn Esra* Latinus *on Elections and Interrogations*, ed. Shlomo Sela (Leiden: Brill, 2020), *passim*.

DE RE PERDITA INVENIENDA

Ut rem perditam invenias constitue ascendens ut melius poteris. Deinde divide dominum in quatuor partes. Post hoc vide ubi sit dominus ascendentis; qui si fuerit in signo orientali, erit ipsa res in quarta orientali divisionis emisperii. Sume ergo ipsam
5   quartam et dimitte reliquas; et divide etiam ipsam in 4 partes. Postea quere dominum ipsius signi orientalis in quo invenisti dominum ascendentis. Qui si fuerit in signo septentrionali, accipe septentrionalem quartam divisionis eiusdem et dimitte reliquas. Et vide ubi sit etiam dominus eiusdem signi septentrionalis. Qui si fuerit in signo occidentali, accipe quartam occidentalem illius divisionis, et dimitte reliquas. Et vide
10   ubi sit dominus signi occidentalis. Qui si fuerit in signo meridiano, accipe quartam meridianam et dimitte reliquas. Et aspice ubi sit dominus eiusdem signi meridiani et tunc similiter divides illam quartam in quatuor partes, donec pervenias ad locum occultationis et invenies.

1   De ... invenienda] Bθ(*add.* sed nichil est) Mγ Pδ Vπ(*add.* sed nichil est); *om.* Bγ Bζ Eυ Fβ Gα Lζ Lλ Pι Vν Vφ; Ad inveniendam rem perditam Eo(*faded*) Pω; De inveniendum rem perditam Pω; De inventione rei perdite Bι; Modo investigandi rem perditam Vϱ(*later hand*)

2   Ut] Et ut Eλ; *add.* autem Fβ   invenias] invenies Bζ Eυ Pδ Vπ Vφ   ascendens] Bζ Mγ Pδ Pι Vφ; ascendentem Bθ Bι Eλ Eυ Lζ Vν Vπ Vϱ   Deinde] *om.* Bθ; *marg.* Eo   Deinde divide] Dividere Vπ   divide] *marg.* Fβ

3   quatuor] 4 / 4ᵒʳ *some*   partes] *om.* Mγ   qui] quia Bζ   in₂] *add. illeg.* Vπ

4   quarta] 4 / 4ᵃ *some*   emisperii] dominus Pι   Sume] Deinde Vφ   ipsam] *om.* Bζ; ipsas Eλ Mγ

5   quartam] *om.* Bθ Eλ Eo Eυ Fβ Pδ Pω; *add.* orientalem Pι   reliquas] alias Eo Fβ Pδ   etiam] *illeg.* Pι; *add.* quartam Bθ Eλ Eυ Vπ   4] 4ᵒʳ / quatuor *some*   quere] queras Pι

6   signi] *om.* Gα; *interlin.* Vφ

7   accipe septentrionalem] *om.* Pδ   quartam] partem Pι Vφ; plagam Pω   divisionis] et divide Vφ   eiusdem] eius Mγ; *add.* partem Pι

8   vide] aspice Bζ; *add.* tunc Pι   etiam] *om.* Bζ Bι Eo Eυ Fβ Lζ Pι Vϱ Vφ   dominus] *add.* ascendentis Lζ Vϱ   eiusdem] *om.* Eo Eυ Fβ Pδ   Qui] Que Pδ   si] *om.* Mγ

8-9   eiusdem ... divisionis] signi divisionis eiusdem Eυ

9   illius] eiusdem Gα Pι Vφ; *add.* ultime Lζ   dimitte] *om.* Vϱ   vide] *add.* etiam Pδ

9-10 accipe ... meridiano] *om.* Bζ

10   dominus] *add.* eiusdem Pι   meridiano] meridionali Fβ Lζ   quartam] 4ᵃᵐ *some*

{1}[4] ON FINDING A LOST ITEM

{2} In order to find a lost [or hidden] item, fix the ascendant as best you can. Then divide {3} the Lord[5] [of the Ascendant?] into four parts. After this, see where the Lord of the Ascendant is, which if it is in {4} the eastern sign, this thing will be in the eastern quarter of the division of the hemisphere. Assume, therefore, this {5} quarter and ignore the rest; and divide it into four parts. Next seek the Lord of {6} this eastern sign in which you have found the Lord of the Ascendant. If this is in the {7} northern sign, take the northern quarter of the same division and ignore the rest. {8} And see where the Lord of the same northern sign also is. If this is in the {9} western sign, take the western quarter of this division, and disregard the rest. And see {10} where the Lord of the western sign is. If this is in the southern sign, take the {11} southern quarter and ignore the rest. And see where the Lord of the same southern sign is; and {12} then similarly you divide this quarter into four parts, until you reach the place {13} of occultation, and you will find it.

[*apparatus criticus continued*]

11   meridianam] meridiam Fβ Pδ; meridionalem Lζ   et₁ ... reliquas] om. Pω   ubi]
        quis Pω   sit] est Mγ   eiusdem] eius Fβ Pδ   meridiani] meridionalis Vφ
        continued

12   similiter] *om.* Bθ   divides] *om.* Vφ; *add.* super Bθ Vπ   illam] *om.* Eυ
        quartam] 4ᵃᵐ *some*   quatuor] 4 / 4ᵒʳ *some*   partes] *om.* Fβ Pω
        pervenias] pervenians Eο; perveniant Vφ; perveīs Fβ

13   et] *add.* tunc Fβ   et invenies] *om.* Bζ Gα Vφ; et invenias Eο Mγ; ubi re latet Pι{res
        cadet?}; *add.* si deus voluerit Bγ

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[4] The numbers in braces {} are the line numbers of the Latin text, added here for the convenience of the reader.

[5] The use of the term "Lord" or "Dominus" (rather than "domus" as in the *Practica*, although the abbreviations for both words are confusingly similar) is typical of astrological texts.