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The Chronological Treatise *Autores Kalendarii* of 1317, Attributed to John of Murs: Text and Introduction*

C. Philipp E. Nothaft

Introduction

While the Western civil and Catholic ecclesiastical calendar reached its present shape only in 1582, as a result of the reform promulgated and presided over by Pope Gregory XIII, papal initiatives to improve the calendar's accuracy go as far back as the fourteenth century.[1] The earliest known example dates from 1344, when Pope Clement VI (1342–52) invited the renowned French astronomers John of Murs and Firmin of Beauval to his court in Avignon with the mandate of investigating and correcting "certain doubts or defects concerning the Golden Number," which represented the new moons used by the Church to fix the time of Easter.[2] Although no actual reform was achieved at the time, the two men

* I am grateful to Fritz S. Pedersen and Christopher Schabel for their kind help in revising this article. All remaining errors are entirely my own.

[1] On the Gregorian reform, see George V. Coyne, Michael A. Hoskin, and Olaf Pedersen, eds., *Gregorian Reform of the Calendar: Proceedings of the Vatican Conference to Commemorate Its 400th Anniversary 1582–1982* (Vatican City: Specola Vaticana, 1983); Dirk Steinmetz, *Die Gregorianische Kalenderreform von 1582: Korrektur der christlichen Zeitrechnung in der Frühen Neuzeit* (Oftersheim: Steinmetz, 2011). I am currently working on a book-length study of the medieval pre-history to the Gregorian calendar reform, which will provide the context for the present edition.

[2] Eugène Déprez, *Clément VI (1342-1352): lettres closes, patentes et curiales*, vol. 1.2 (Paris: E. de Boccard, 1925), col. 209 (no. 1134): "Dilecto filio Johanni de Muris, canonico ecclesie de Maseriis, Biturícensis diocesis. Cum super quibusdam dubiis seu

complied with this request by composing the well-known *Epistola super reformatione antiqui kalendarii* (1345), addressed to Clement VI, and an attached *Tractatus de reformatione kalendarii*, in which they sketched a whole series of methods by which the Golden Number might be corrected.[1]

Significant as John's and Firmin's work may be, it was by no means the only contribution to the subject to emerge during the fourteenth century. A whole 'dossier' of calendar reform treatises from this period has been preserved in MS Vienna, Österreichische Nationalbibliothek, 5292 (s. XVI), where the familiar *Epistola/Tractatus* is preceded by another treatise attributed to John of Murs, which starts with the words *Autores kalendarii*, as well as by the anonymous text *Ad correctionem calendarii*, which weighs the pros and cons of a

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defectibus aureum numerum tangentibus, ad utilitatem universalis ecclesie declarandis, seu corrigendis, tu, tanquam peritus, ut intelleximus, in talibus dicaris existere multipliciter oportunus, discretioni tue per apostolica scripta mandamus quatinus una cum dilecto filio Firmino de Bellavalle, alias dicto de Ambianis, perito similiter in arte hujusmodi, sicut fertur, venire ad Sedem Apostolicam quantocius non postponas." The letter in question is dated 25 September 1344. See also Déprez, "Une tentative de reforme du calendrier sous Clement VI: Jean des Murs et la Chronique de Jean de Venette," *Mélanges d'archéologie et d'histoire* 19 (1899): 131–43. On the Golden Number and its history, see Walter Émile van Wijk, *Le Nombre d'or: étude de chronologie technique suivie du texte de la Massa compoti d'Alexandre de Villedieu* (The Hague: Nijhoff, 1936); André van de Vyver, "Hucbald de Saint-Armand, écolâtre, et l'invention de Nombre d'or," in *Mélanges Auguste Pelzer* (Louvain: Bibliothèque de l'Université, 1947), 61–79; Arno Borst, *Die karolingische Kalenderreform* (Hannover: Hahn, 1998), 702–8.

[1] Two modern editions exist: Christine Gack-Scheiding, *Johannes de Muris: Epistola super reformatione antiqui kalendarii*; *Ein Beitrag zur Kalenderreform im 14. Jahrhundert* (Hannover: Hahn, 1995), and Chris Schabel, "John of Murs and Firmin of Beauval's Letter and Treatise on Calendar Reform for Clement VI," *Cahiers de l'Institut du Moyen-Âge Grec et Latin* 66 (1996): 187–215. The latter has the more reliable text.

reformation of the Julian calendar. The whole sequence finishes with a letter that the monk John of Thermis wrote to Clement's successor Pope Innocent VI in the year 1354.[1] In contrast to the *Epistola/Tractatus*, which is extant in seven copies, the other three texts have thus far only been found in said 'dossier', which was re-copied into MS Vienna, Österreichische Nationalbibliothek, 5273. Both the *Epistola/Tractatus* (1345) and the treatise *Ad correctionem calendarii* (ca. 1343–45) will be known to long-time readers of the *Cahiers de l'Institut du Moyen-Âge Grec et Latin* from Chris Schabel's critical editions, published in 1996 and 1998.[2] With the present article, I would like to expand on Schabel's important contributions by making available another text from the Viennese dossier: the aforementioned treatise *Autores kalendarii*, which dates from 1317 and is thus roughly three decades older than the works addressed to Clement VI.

The *communis opinio* on this text, which has thus far received very little attention,[3] is that it was an early work by John of Murs, written during his student years, from which he would emerge as one of the most accomplished astronomers, mathematicians, and music theorists of his

[1] The existence of this dossier was first noted by Ferdinand Kaltenbrunner, "Die Vorgeschichte der gregorianischen Kalenderreform," *Sitzungsberichte der philosophisch-historischen Classe der kaiserlichen Akademie der Wissenschaften* [Vienna] 82 (1876): 289–414 (322–23).

[2] See n. 1 on p. 2 above and Chris Schabel, "*Ad correctionem calendarii...* The Background to Clement VI's Initiative? Text and Introduction," *Cahiers de l'Institut du Moyen-Âge Grec et Latin* 68 (1998): 13–34.

[3] The most substantial published disscussion of the text is in found in Emmanuel Poulle, "Les astronomes parisiens au XIV^{e} siècle et l'astronomie alphonsine," in *Histoire littéraire de la France*, vol. 43.1 (Paris: Diffusion de Boccard, 2005), 1–54 (5, 12–16), where Poulle argues for John of Murs's authorship. Another, quite unsatisfactory, summary appears in Gack-Scheiding, *Johannes de Muris*, 57–64.

time.[1] Since *Autores kalendarii* was produced using a set of astronomical tables for the meridian of Toulouse, which were based on the parameters of the old Toledan Tables, it is generally agreed that John must have written *Autores kalendarii* at a time when he was still unfamiliar with the Alfonsine Tables, which began to circulate in Paris around the year 1320 and were to dominate European astronomy until the middle of the sixteenth century.[2] His conversion to Alfonsine astronomy, however, was already complete by 1319/21, when he composed his *Expositio intentionis regis Alfonsii circa tabulas eius*, which is the earliest known description of the Alfonsine Tables in Latin.[3] During subsequent years, John was also engaged in the construction of various astronomical tables

[1] The text was edited as a work by John of Murs in a 1975-dissertation by Joël Plassard, which has never been printed and is only available in summary form. See Plassard, "Projets de réforme du calendrier à Paris au début du XIV^{e} siècle: textes édités et commentés," *École Nationale des Chartes: Positions des thèses* (1975): 175–81. I have not been able to access this dissertation in its full form. The ascription to John has been accepted in all publications since. See, e.g., Emmanuel Poulle, "John of Murs," in *Dictionary of Scientific Biography*, vol. 7 (New York: Charles Scribner's Sons, 1973), 128–33; Max Lejbowicz, "Présentation de Jean de Murs, 'observateur et calculateur sagace et laborieux'," in *Méthodes et statut des sciences à la fin du Moyen Âge*, ed. Christophe Grellard (Villeneuve d'Ascq: Presses Universitaires du Septentrion, 2004), 159–80 (175); Paul L. Butzer, "John of Murs," in *The Biographical Encyclopedia of Astronomers*, ed. Thomas Hockey et al., 2 vols. (New York: Springer Science, 2007), 1:599–600. Doubts concerning John's authorship were previously only expressed by Lynn Thorndike, *A History of Magic and Experimental Science*, 8 vols. (New York: Columbia University Press, 1923–58), 3:296–98.

[2] On the background, see José Chabás and Bernard R. Goldstein, *The Alfonsine Tables of Toledo* (Dordrecht: Kluwer, 2003).

[3] Emmanuel Poulle, "Jean de Murs et les tables alphonsines," *Archives d'histoire doctrinale et littéraire du Moyen Âge* 55 (1980): 241–71; Matthieu Husson, "L'astronomie alphonsine dans *l'Expositio intentionis regis Alfonsii circa tabulas ejus* de Jean de Murs," *Archives d'histoire doctrinale et littéraire du Moyen Âge* 78 (2011): 229–45.

of his own, for which he generally relied on Alfonsine parameters, whilst experimenting with new and more user-friendly formats.[1]

Although none of this precludes the possibility that John wrote *Autores kalendarii* shortly before his crucial encounter with the Alfonsine Tables, the evidence for his authorship is in fact rather limited. Were it not for the sixteenth-century colophon in both MSS, which explicitly mentions John of Murs (*Et sic est finis kalendarii Ioannis de Muris de observantia termini paschalis*), the text itself would offer very little in support of such an identification. If anything, the heavy use of excerpts from Giles of Lessines (O.P.) in the initial chapters and the appearance of two Dominican saints in the otherwise sparsely annotated *kalendarium* at the end of the treatise point towards a member of the Order of Preachers.[2] More important is the fact that two passages in

[1] Beatriz Porres and José Chabás, "John of Murs's *Tabulae permanentes* for Finding True Syzygies," *Journal for the History of Astronomy* 32 (2001): 63–72; Richard L. Kremer, "John of Murs, Wenzel Faber and the Computation of True Syzygy in the Fourteenth and Fifteenth Centuries," in *Mathematics Celestial and Terrestrial: Festschrift für Menso Folkerts zum 65. Geburtstag*, ed. Joseph W. Dauben, Stefan Kirschner, Andreas Kühne, Paul Kunitzsch, and Richard P. Lorch (Stuttgart: Wissenschaftliche Verlagsgesellschaft, 2008), 147–60; José Chabás and Bernard R. Goldstein, "John of Murs's Tables of 1321," *Journal for the History of Astronomy* 40 (2009): 297–320; Chabás and Goldstein, "John of Murs Revisited: The *Kalendarium Solis et Lune* for 1321," *Journal for the History of Astronomy* 43 (2012): 411–37; Chabás and Goldstein, "Computing Planetary Positions: User-Friendliness and the Alfonsine Corpus," *Journal for the History of Astronomy* 44 (2013): 257–76.

[2] The *kalendarium* contains entries for St Dominic of Guzman (5 August) and the thirteenth-century Dominican martyr St Peter of Verona (29 April). This is in line with the formal decision passed by the General Chapter of the Dominicans in 1254 that the "priors and all brethren shall take diligent care that the names of blessed Dominic and of Blessed Peter Martyr be inscribed in calendars and litanies." See *Acta Capitulorum Generalium Ordinis Praedicatorum*, vol. 1, *1220–1303*, ed. Benedict M. Reichert (Rome: Ex Typographia Polyglotta S. C. De Propaganda Fide, 1898), 70. For the English citation, see Donald Prudlo, *The Martyred Inquisitor: The Life and Cult of*

Autores kalendarii give the impression that its author had already been an active astronomer at the beginning of the 1290s, which is at or even before the time of John of Murs's birth.[1] On balance, John's authorship strikes me as too doubtful to be comfortably maintained, which is why I shall treat *Autores kalendarii* as an anonymously transmitted text for the purpose of the present edition.[2]

Overview of contents

Chapters 1–3

In the form in which it has come down to us, the text is divided into 23 chapters or sections, most, but not all, of which are identified by summarizing captions found in the margins. Given the late date of the two preserved manuscripts and the signs of textual corruption present in both of them, it is possible that this structure deviates considerably from

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Peter of Verona († 1252) (Aldershot: Ashgate, 2008), 91. See also the notes regarding calendrical entries in Fritz S. Pedersen, ed., *Petri Philomenae de Dacia et Petri de S. Audomaro Opera quadrivialia*, 2 vols. (Copenhagen: Gad, 1983–84), 1:247, 259–60.

[1] Ch. 1: "Porro ego, considerans introitus annorum, quando scilicet sol intrat primum initium Arietis, ab anno Christi 1290 usque ad annum eius 1310, inveni…" Ch. 15: "…qui error fuit anno Christi 1291. Et hoc Iudei nobis Christianis eo anno irridendo improperaverunt." Regarding John's biography, see Lawrence Gushee, "New Sources for the Biography of Johannes de Muris," *Journal of the American Musicological Society* 22 (1969): 3–26; Gushee, "Jehan de Murs and His Milieu," in *Musik—und die Geschichte der Philosophie und Naturwissenschaften im Mittelalter: Fragen zur Wechselwirkung von 'Musica' und 'Philosophia' im Mittelalter*, ed. Frank Hentschel (Leiden: Brill, 1998), 339–71.

[2] The complexity of the question demands that I defer a full discussion of all the arguments for and against John's authorship to a separate article, which will be entitled "John of Murs and the Treatise *Autores kalendarii* (1317): A Problem of Authorship" (forthcoming).

the original composition, which was evidently written in the year 1317.[1] Suspicions are highlighted by a massive interpolation that occurs in both preserved copies halfway into Chapter 9. The text is here interrupted by a nativity horoscope for the year 1408, accompanied by an astrological commentary and a series of astronomical parameters for that date, which are all clearly unrelated to the present treatise. At a seemingly arbitrary point, the astrological text segues back into Chapter 9, without any break or indication.[2]

Yet even if such scribal interventions are disregarded, the text's structure appears unusual. In place of a proper introduction, the first four 'chapters' of *Autores kalendarii* are to a large extent composed of excerpts from another work, which are occasionally interspersed with the author's own remarks. These excerpts are all taken from the *Summa de temporibus*, a massive compendium of historical and technical chronology written between 1260 and 1264 by the Dominican astronomer and Thomistic philosopher Giles of Lessines. The author of our present treatise used passages from four different chapters in the third and final book of Giles's *Summa*, which is dedicated to the astronomical foundations of time reckoning and the problems of the ecclesiastical calendar. This book also circulated separately and was edited in 1926 by Robert Steele as the *Compotus* of Roger Bacon, based on the misleading ascription found in certain manuscripts.[3]

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[1] Ch. 7: "Item constat quod annus Christi 1317, in quo iam sumus, est primus annus cicli solaris." Ch. 21: "Porro in quinta et sexta videbit diem mensis in quo secundum veritatem pro tempore in quo sumus, hoc est anno Christi 1317, deberet peragi dies paschalis, si placeret ecclesie."

[2] The horoscope's extraneous character is also recognized by Poulle, "Les astronomes," 5n6, who, however, gives the year as 1407.

[3] The passages of the *Summa* found in *Autores kalendarii* come from book III, ch. 1.3, 1.12, 2.18–19, edited in Robert Steele, *Opera hactenus inedita Rogeri Baconi*, vol. 6, *Compotus Fratris Rogeri* (Oxford: Clarendon Press, 1926), 13–15, 55–58, 146–50.

Chapter 1 reproduces most of the historical information that Giles of Lessines had collected with regard to ancient Greek and medieval Arabic astronomers' estimates of the length of the solar year. Giles himself preferred 365d 6h – 1/106d = 365d 5h 46m 25s,[1] which he attributed to Thābit b. Qurra and al-Battānī, claiming that this value received confirmation from his own observations, based on "instruments and eclipses" (*que temporibus nostris probavimus per instrumenta et per eclypses*).[2] The author of *Autores kalendarii* reproduces this statement, but immediately goes on to add his own opinion: he refers to regular observations of the sun's entry into Aries, i.e. the vernal equinox, made from 1290 to 1310, which make him conclude that the difference between the Julian year (365d 6h) and the tropical year is only 11 minutes (and hence ca. 2.5m less than according to Giles's estimate).[3]

Giles's authorship is conclusively demonstrated in Ferdinand M. Delorme, "De auctore Compoti sub nomine Rogeri Baconis recenter editi," *Antonianum* 14 (1939): 313–22. For manuscripts and further literature on Giles, see Olga Weijers, *Le travail intellectuel à la Faculté des arts de Paris: textes et maîtres (ca. 1200–1500)*, vol. 2, *Répertoire des noms commençant par C–F* (Turnhout: Brepols, 1996), 62–64.

[1] In Giles's text, this is expressed as 365d 5h + 4/5h "que faciunt 46m." The precise equivalent of 4/5h are 48m, which explains the change from '46' to '48' in the text of *Autores kalendarii*. See Giles of Lessines, *Summa de temporibus* (III.1.3), ed. Steele, 15, ll. 20–21.

[2] Ibid. (III.1.3), ed. Steele, 15, ll. 3–4.

[3] The corresponding length of the solar year, 365d 5h 49m, is very close to the Alfonsine value that became widely accepted in later decades (365d 5h 49m 16s). This length is equivalent to 365 diurnal revolutions of the sun + 87;15°. By contrast, the exact value stated in the text is 365d 5h 58m, which would imply only 2 minutes difference. A marginal gloss found in both manuscripts corrects this to *verius 49m*, but the diurnal longitude is still given as 88;30°, which is equivalent to 6 minutes or a year length of 365d 5h 54m. Due to the evident corruption this passage has undergone, the author's original intention may well be irretrievable. The estimate of an 11-minute discrepancy between the Julian year and the true solar year is also found in Richard of Wallingford's *Exafrenon pronosticationum temporis*, which is exactly contemporary,

The information contained in this paragraph is very valuable, because it implies that the author was already an active astronomer during the 1290s, provided that it was he who made the observations in question. Since John of Murs was probably not even alive by the year 1290, this speaks against the common attribution of *Autores kalendarii* to him.[1]

The chapter closes by listing three possible reasons as to why past astronomers have differed so greatly in their estimates: (1) the imperfections of astronomical instruments;[2] (2) the motion of 'access and recess' in the eighth sphere; and (3) the existence of a hitherto undetected motion in the heavens.[3] While this is taken almost verbatim from Giles's *Summa*, our author introduces the three points with a few words of his own, which effectively state that all the estimates mentioned were once correct in the past and will again come true in the future.[4] This statement, not found in Giles's text, makes clear that the author subscribed to the theory of trepidation, which stated that the length of the tropical year varied over long periods of time and that the rate of variation would eventually come full circle.[5] This endorsement of a variable solar year

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and in William of St.-Cloud's *Kalendarium regine*, written in 1296. See John D. North, *Richard of Wallingford*, 3 vols. (Oxford: Clarendon Press, 1976), 1:186; William of St.-Cloud, *Kalendarium regine* (c. 12), ed. Richard I. Harper, "The *Kalendarium Regine* of Guillaume de St.-Cloud" (PhD Diss., Emory University, 1966), 128–34.

[1] Details will be discussed in Nothaft, "John of Murs."

[2] The ultimate source for this passage is Abraham Ibn Ezra, *Liber de rationibus tabularum*, ed. José María Millás Vallicrosa, *El libro de los fundamentos de las Tablas astronómicas de R. Abraham Ibn Ezra* (Madrid: Casa Provincial de Caridad, 1947), 81.

[3] Ibid., 80.

[4] Ch. 1: "*Ratio autem diversitatis opinionum* predictarum, quas omnes nec prima excepta dico fuisse vera et fore in futurum temporibus singulis, *est* aliqua *trium*." The italicized part is taken over from Giles of Lessines, *Summa de temporibus* (III.1.3), ed. Steele, 15, ll. 6–7.

[5] The author's acceptance of this theory is also apparent from ch. 10, where he mentions the 'equation of the eighth sphere' for the first conjunction of AD 34, whose value he

would seem to explain why the error of the solar year drops out of sight after the first chapter and only the error of the lunar calendar is tended to in the second part of the treatise. If trepidation was correct and the length of the solar year varied over time, a correction of the Julian calendar could seem impractical or even futile, unless the rate of variation and the average year length of a full cycle of trepidation were known to a high degree of certainty. The author of *Autores kalendarii* claimed no such knowledge, meaning that his measurement of the year length as 365.25d – 11m was probably only meant to be a snapshot of the present.

Chapters 2 and 3 are excerpted from chapter I.12 of the third book of Giles of Lessines's *Summa de temporibus*, which is dedicated to the quantity of the lunar year. Giles takes as his basis the Muslim lunar calendar, which existed in a pre-calculated, cyclical version, used for

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derived from the trepidation tables attached to the Toulouse Tables. See n. 1 on p. 20 below. There are no signs that the author was aware of the empirical criticism levelled against pseudo-Thābit's trepidation model by William of St.-Cloud in the 1290s. See Nothaft, "John of Murs," for further discussion. For more on the theory of trepidation and its history, see Otto Neugebauer, "Thâbit ben Qurra 'On the Solar Year' and 'On the Motion of the Eighth Sphere'," *Proceedings of the American Philosophical Society* 106 (1962): 264–99; Bernard R. Goldstein, "On the Theory of Trepidation According to Thābit b. Qurra and al-Zarqāllu and Its Implications for Homocentric Planetary Theory," *Centaurus* 10 (1964–65): 232–47; Raymond P. Mercier, "Studies in the Medieval Conception of Precession," 2 pts., *Archives internationales d'histoire des sciences* 26 (1976): 197–220 and 27 (1977): 33–71, repr. as ch. 2 in idem, *Studies on the Transmission of Medieval Mathematical Astronomy* (Aldershot: Variorum, 2004); Mercier, "Accession and Recession: Reconstruction of the Parameters," in *From Baghdad to Barcelona: Studies in the Islamic Exact Sciences in Honour of Prof. Juan Vernet*, ed. Josep Casulleras and Julio Samsó, 2 vols. (Barcelona: Instituto "Millás Vallicrosa" de Historia de la Ciencia Arabe, 1996), 1:299–47, repr. as ch. 3 in idem, *Studies*; Jerzy Dobrzycki, "The Theory of Precession in Medieval Astronomy," in idem, *Selected Papers on Medieval and Renaissance Astronomy*, ed. Jarosław Włodarczyk and Richard L. Kremer (Warsaw: Instytut Historii Nauki PAN, 2010), 15–60.

astronomical purposes, whose average year length was 354;22d (in sexagesimal notation). A 19-year cycle of 235 months based on this year length will last just 6939;40,50d compared to the 6939;45d presupposed by the 19-year cycle of the ecclesiastical calendar, yielding a discrepancy of 0;4,10d or 1h 40m per cycle. After six cycles or 114 years, these 1h 40m will have accrued to 10h. A full day is hence reached after ca. 275 years (correct: 273.6), meaning that the new moons will recede from the dates assigned to them in the calendar at a rate of 1d/275y.

In the next chapter, the error rate just determined is compared to a solar year of 365.25 – 1/131d, corresponding to the 11 minutes just mentioned, which is here attributed to al-Ṣūfi (*Azophi*).[1] The annual difference compared to the Julian year is ca. 0;0,27,28d, which will have grown to 0;8,41,52d after 19 years, although Giles's text reduces this to 0;8,22d. According to the correct value, 19 solar years will encompass 6939;45 – 0;8,41,52 = 6939;36,18,8d and hence be 0;4,31,52d shorter than 235 lunations of 6939;40,50d. Based on Giles's faulty numbers, one would expect a duration 6939;45 – 0;8,22 = 6939;36,38d and a difference of 6939;40,50 – 6939;36,38 = 0;4,12d. Giles speaks of 0;3,12d instead, which he incorrectly lists as being larger than 1/20 (= 0;3d) and smaller than 1/19d (= ca. 0;3,9d). He also argues that this error, which runs in the opposite direction compared to that of the ecclesiastical calendar, will have accrued to one day before 20 × 19 = 380 years have passed. The exact error rate would have been 356.25y, based on Giles's value (0;3,12d), or just 251.59y, based on the correct value (0;4,31,52d).

After some further remarks taken from Giles's *Summa*, the author of *Autores kalendarii* inserts a passage of his own, in which he presents the times and longitudes of a series of calculated mean conjunctions for the first month of the year (here counted from March), spaced by

[1] On al-Ṣūfi's parameters, see Raymond Mercier, "The Lost Zīj of al-Ṣūfi in the Twelfth-Century Tables for London and Pisa," ch. 8 in idem, *Studies*.

intervals of 380 years. Confusingly, the author introduces this by calling it the error "according to the [Arabs] if the years are accepted with an imperfect quarter day" (*secundum eosdem si accipiantur anni cum quarta imperfecta*). This makes it seem as if he is comparing the mean lunation in the Muslim calendar with a 19-year cycle based on the solar year length according to al-Ṣūfi (365.25 – 1/131d), for which Giles had previously established an error of more than one day in 380 years. In reality, the data presented in this section plot the astronomically calculated syzygies against the Julian calendar, showing that the conjunctions recede at a rate of ca. 1d 5h per 380-year period. This is the approximate difference between 20 × 19 years according the Julian year length (365.25) and 20 × 235 months based on the Hipparchic-Ptolemaic value of the mean synodic month of 29;31,50,8,20d, which underlies the Toledan Tables.[1] It was also the length of the lunation used in the Tables of Toulouse (in the form 29d 12;44,3,20h), a mid-thirteenth-century adaptation of the Toledan mean motion tables for the Christian calendar, on which the author relies throughout the present treatise.[2] In a later

[1] The calculation goes as follows: 20 × 19 × 365;15 – 20 × 235 × 29;31,50,8,20 = 1;12,27,13d = 1d 4h 59s. On the history of this value for the synodic month, see José Luis Mancha, "A Note on Copernicus' 'Correction' of Ptolemy's Mean Synodic Month," *Suhayl* 3 (2002–3): 221–29; Bernard R. Goldstein, "Ancient and Medieval Values for the Mean Synodic Month," *Journal for the History of Astronomy* 34 (2003): 65–74.

[2] The Toulouse Tables are published and analysed in Emmanuel Poulle, "Un témoin de l'astronomie latine du XIII^{e} siècle: les tables de Toulouse," in *Comprendre et maîtriser la nature au Moyen-Âge: mélanges d'histoire des sciences offerts à Guy Beaujouan* (Geneva: Droz, 1994), 55–81, repr. as ch. 1 in idem, *Astronomie planétaire au Moyen Âge latin* (Aldershot: Variorum, 1996). Another edition is found in Fritz S. Pedersen, *The Toledan Tables*, 4 vols. (Copenhagen: Reitzel, 2002), 3:1197–1205 (mean motions); 4:1341–46 (syzygies), 1546–47 (eighth sphere). See further Pedersen, "The Toulouse Tables: A List of Manuscripts," *Cahiers de l'Institut du Moyen-Âge Grec et Latin* 68 (1998): 3–12.

passage, he justifies this choice by stating that experience has shown these tables to be "truer than other tables and they are easier to handle when it comes to finding the mean time of the conjunction of the luminaries."[1] As the following comparison shows, the Toulouse Tables were doubtlessly the basis for the calculations presented in Chapter 3, although some of the values have undergone corruption:

First mean conjunction	Time		Longitude	
	Aut. Kal.	Tab. Tol.	Aut. Kal.	Tab. Tol.
1 BC	24 March 10:52:30h	24 March 10:51:30h	0s 07;21,11°	0s 06;13,13°
Diff.	1d 5h 0m 9s	1d 4h 59m 9s	03;37[!],43[!]°	03;38,05°
AD 380	23 March 05:52:21h	23 March 05:52:21h	0s 03;35,38°	0s 02;35,08°
Diff. Total	1d 5h 0m 8s 2d 10h 0m 17s	1d 5h 0m 8s 2d 9h 59m 17s	---	02;38,05°
AD 760	22 March 00:52:13h	22 March 00:52:13h	---	11s 29;57,03°
Diff. Total	1d 4h 58m 8s 3d 14h 58m 25s	1d 4h 58m 7s 3d 14h 57m 24s	---	03;38,05°
AD 1140	20 March 19:54:05h	20 March 19:54:06h	---	11s 26;18,58°
AD 1311	21 March 00:59:23h	21 March 00:51:28	11s 24;40,50°	11s 24;40,50°
Total Diff.	4d [!] 10h 0m 2s	3d 10h 0m 2s		

The basic argument made in this passage is repeated, in somewhat more elaborate fashion, in Chapter 22 towards the end of the treatise, with the

[1] Ch. 16: "Ad inveniendum ergo secundum veritatem medias coniunctiones et oppositiones luminarium, quantum ad tempus, describam tabulas extractas de tabulis ad meridiem Tholose, quia eas veriores aliis tabulis sum expertus et planior est in eis operatio ad inveniendum medium tempus coniunctionis luminarium, quod est prime incensionis lune, vel oppositionis eorum, quod est impletionis ad principium lune 15e."

difference that in Chapter 3 the starting point of the calculation is the first conjunction in 1 BC, whereas in the later chapter the author uses AD 1. The series of calculated conjunctions listed in Chapter 22 and in the accompanying table (table 8) goes up to the year AD 3801, but once again the author either miscalculated several entries or the numbers found in the manuscripts have undergone corruption, as can be seen from the first five entries:

First mean conjunction	Aut. Kal.	Tab. Tol.
AD 1	13 March 19:40:09h	13 March 19:40:11h
AD 381	12 March 14:00:51h	12 March 14:41:01
AD 761	11 March 09:14:53h	11 March 09:41:53h
AD 1141	10 March 04:42:46h	10 March 04:42:45h
AD 1521	8 March 23:42:40h	8 March 23:43:37h

Returning to his excerpts from Giles of Lessines (III.2.18), the author concludes with confidence that 19 (Julian) solar years are larger than 235 whole lunations, which raises the question why the ecclesiastical calendar equates both sums. Two answers are given in Giles's text: one is based on the idea that the 19-year cycle was taken over by the Church from the ancient Hebrews, who had competent astronomers amongst their ranks,[1] and who thus knew that the solar year was shorter than

[1] Based on Josephus (*Ant.* 1.106, 158, 167), the author specifically names Sem, Abraham, and Moses, who are not listed in Giles's original text.

365.25d by a certain amount, which they took to be 1/320d.[1] Yet the 'Latins', when adapting this cycle, misunderstood the Hebrew equation of 235 months and 19 solar years as intending Julian years of 365.25d. Alternatively, they might have borrowed from Ptolemy, ignoring that he took the solar year to be shorter than 365.25d by 1/300d. Giles goes on to list three errors inherent in the ecclesiastical lunar calendar: (1) its use of an imprecise alternate count of 29d and 30d, which, unlike the Muslim calendar, does not intercalate whenever the additional fractions in the synodic month accrue to a full day; (2) the long-term displacement of the lunar phases, which is due to the aforementioned insufficiency of the 19-year cycle; (3) the system of the Golden Number, in which only 234 different days in the Julian year are marked as the potential seat of a new moon, leaving all other calendar days unoccupied. The latter error, Giles writes, can be tolerated on account of practical considerations.

Chapters 4–13

The first half of Chapter 4, still excerpting from Giles of Lessines, applies the previously determined errors to the calculation of the date of Easter, which is dependent on the vernal equinox. According to the ecclesiastical calendar installed in antiquity, the date of the equinox is 21 March, but Giles points out that it has since receded by nine days to 12 March. The author of *Autores kalendarii* corrects this to 13 March, based on the calculated entry of the sun into Aries in the year 1308, which he says happened 0 hours and 10 minutes after noon on the meridian of Toulouse. The date he gives is "13 elapsed days of March" (*lapsis de Martio 13 diebus*) which is actually 14 March, but since the days in astronomical tables are counted from the preceding noon, this is

[1] This value comes via Giles from Abraham Ibn Ezra, *Liber de rationibus tabularum*, ed. Millás Vallicrosa, 76, 100.

equivalent to a civil date of 13 March at midday.[1] As a result of this discrepancy, Easter is technically celebrated in the second month of spring in many years. Although this poses no danger to the Christian faith *per se*, Giles notes that it gives infidels an undue occasion to laugh at Christian incompetence.

Another point raised in this section is the way the calendar's errors impact the investigation of the date of the first historical Easter, i.e. the dates of Jesus's crucifixion and resurrection.[2] Giles complains that the ecclesiastical calendar does not allow for a Friday to fall on the fifteenth day of the first lunar month in the year of Christ's Passion, even though this combination is stipulated by the Gospels. At this point, the author abandons Giles's text and starts to write in his own words about the chronological problems surrounding Christ's death. He adds that Jesus is commonly held to have been born on 25 December and to have died in the 33rd or 34th year of his life, while some also say that he was

[1] According to the Tables of Toulouse, the mean longitude of the sun for 1296y (11s 5;30,57°) + 11y (0s 0;10,32°) + 13d (0s 12;48,46°) + 10m (0;0,25°) = 11s 18;30,40°. In order to get from mean to true longitude, one must first subtract the solar apogee (2s 17;50,10°) and then use the result (9s 0;40,30°) for entering the appropriate equation table (Pedersen, *The Toledan Tables*., 4:1248), where the corresponding value for argument 9s 0;40° is 1;58,59°. The true *motus* is hence 11s 18;30,40° + 1;58,59° = 11s 20;29,39°. Next, one must add the *motus* of the eighth sphere. According to the Toulousan trepidation tables (ibid., 4:1547), the argument for trepidation on the corresponding date was 2s 1;25,54,20° (1296y) + 0;58,34,13° (11y) + 0;0,11,22° (13d) = 62;24,39,55°. The corresponding equation tables (ibid., 4:1554) show a precession of 9;17,44° for 60° and 9;43,53° for 65°. For 62;25°, a precession value of 9;30,22° can be interpolated on this basis. If added to the sun's true longitude (11s 20;29,39°), the result is 0s 0;0,1°, in virtually flawless agreement with the statement made in the text. I am grateful to Fritz S. Pedersen for his advice on this calculation.

[2] For a detailed history of this problem and its treatment by medieval authors, see C. P. E. Nothaft, *Dating the Passion: The Life of Jesus and the Emergence of Scientific Chronology (200–1600)* (Leiden: Brill, 2012).

incarnated on 25 March, the Feast of Annunciation. A complementary assumption is that Jesus was born on a Sunday, which demands that the year of his incarnation had the Sunday or dominical letter B, in which case the first year after his nativity would have had the dominical letter A. The author's plan, which is pursued over the next nine chapters, is to investigate the reliability of these various traditions and to determine the true historical date of the crucifixion, by finding out in which of the two candidate years—33 or 34 CE—the 15th of the moon coincided with the sixth day of the week. As his motivation for doing so, he cites his frequent disputations with "a certain astrologer, quite well-known and renowned in this discipline" (*quidam astrologus satis notus et in scientia approbatus*), who had complained about the ignorance of Christians regarding this chronology, although in the eyes of our author he was himself devoid of understanding in the matter (*hac materia sibi omnino ignota*).

An important preliminary question concerns the dominical letter in the year of Christ's birth, which also determines the weekdays in the possible years of the Passion. Some confusion can arise from the fact that the Toulouse Tables have the beginning of the year in March, which has the side effect that the bisextile or leap day in February of a current year "according to the computists" will fall in the previous year from an astronomical perspective (Chapter 6). After discussing the leap-year cycle, the author turns to the 28-year solar cycle and the sequence of dominical letters, for which he is able to establish, via extrapolation from the present year 1317, that AD 1, the first year after the nativity, had the letter B. This directly refutes the position of those who claim that Jesus's birth on 25 December (a day with the weekday letter B) took place on a Sunday (Chapter 7). In order for this to be true, B should have been the dominical letter of the preceding year 1 BC, which in reality was a Julian leap year with the letters D (before the leap day) and C (after the leap

day).[1] Although this argument is very straightforward, the author later, in Chapter 9, takes additional time to refute the position of a hypothetical 'adversary' (perhaps the aforementioned astrologer), who wants to assign the letter B to 1 BC and A to AD 1. It appears that this erroneous position was motivated by the wish to safeguard the traditional view that Jesus was crucified on 25 March AD 34. This would have been a Thursday rather than a Friday according to the conventional solar cycle, but by lowering the dominical letter by one the desired day of the week can be obtained.

With regard to the 19-year lunar cycle, which determines the dates of the new moon in the ecclesiastical calendar, the author establishes that this cycle began in 1 BC, based on the fact that the first spring conjunction of this year fell on 24 March, while in the following year it fell on 13 March at 19:40:09h (Chapter 8).[2] This is in rough agreement with the ecclesiastical calendar, which has the Golden Numbers I and II on 23 and 12 March. The author also refers to a *kalendarium* that he himself put together by re-assigning the Golden Number according to the actual dates of mean conjunction in the 19-year cycle that started in AD 1311. In contrast to this *kalendarium*, which is the one that appears at the very end of the treatise, the Golden Numbers in table 1 are calculated for the 19-year cycle at the beginning of the Christian era (1 BC to AD 18). In addition, some of the days in the table are marked for significant conjunctions and oppositions in the years AD

[1] In his discussions of Jesus's birth year, the author designates AD 1 as the year of the nativity, although technically the nativity itself belonged to the previous year 1 BC, which he calls the year of the incarnation. This is just one of several doctrinal differences between *Autores kalendarii* and the works of John of Murs, who, in his *Sermo de regulis computistarum* (ca. 1332), dates the birth of Jesus to the end of AD 1. See Nothaft, "John of Murs."

[2] The accurate time according to the Tables of Toulouse, if projected back to the year before their epoch date, would have been 19:40:11h.

34 to 36, which will become relevant later on for establishing the true date of the crucifixion.

The next chapter (9) essentially recapitulates the results obtained thus far. It is complemented by a double table, which shows all conjunction and opposition dates of the first spring lunation from AD 1 to AD 36 in two variants: one for the conventional assignment of dominical letter B to AD 1, the other for the 'adversarial' view according to which the dominical letter in AD 1 was A. The author confirms that the syzygy times in question were calculated for the meridian of Toulouse, which he says can easily be converted to the coordinates of Jerusalem/Bethlehem. He specifically mentions the mean opposition of AD 33 as falling on Friday, 3 April, 16:48h. His remarks on this and other dates show that he treats the time of mean opposition as the point when the 14th day of the lunar month ends and the 15th day begins.[1] In a later chapter (12), the author claims that this method of equating the point of opposition with the beginning of *luna* 15 was or is also practiced by the 'Hebrews' in determining their feast days (such as Passover on 15 Nisan). This is a specious claim, to say the least, although the author is correct in insisting that the Jewish calendar follows the mean, rather than the true course of the moon.[2]

[1] Since one half of a lunation lasts roughly 14.75 days, this definition has the effect that the day of opposition is oftentimes the 16th day since the preceding conjunction. This is the case in table 1, where the conjunction and opposition of AD 34 are marked on 9 and 24 March respectively. Confusingly, table 2 has the full moon on 23 March, which would be consistent with *luna* 15 if the month is counted from 9 March, as indicated.

[2] This holds true, at any rate, for the Jewish calendar used in medieval and contemporary times. See Sacha Stern, *Calendar and Community: A History of the Jewish Calendar, Second Century BCE–Tenth Century CE* (Oxford: Oxford University Press, 2001), and C. P. E. Nothaft, *Medieval Latin Christian Texts on the Jewish Calendar* (Leiden: Brill, forthcoming 2014).

Chapter 10 spells out the results that can be obtained from table 2 in more detail. The author makes plain that the crucifixion cannot have taken place on 25 March AD 34, as commonly assumed, since the conjunction in question already occurred on 9 March, while the following mean and true oppositions were on 24 March.[1] Since this day was a Wednesday in AD 34, it cannot be accepted as the date of the crucifixion, neither can 25 March, which would have been *luna* 16 according to the present calculation. A crucifixion on the same date in AD 35 is excluded on the grounds that the relevant opposition only fell on 10 April, in which case 25 March would have belonged to the twelfth lunar month of the previous year, which is against the biblical stipulations for the date of Passover.

Chapter 11 touches upon a side issue, namely the precise day of Christ's conception or incarnation. Although ecclesiastical tradition was virtually unanimous in placing its anniversary on 25 March together with that of the Passion, the author was suspicious of this date, presumably because his previous investigation had shown 25 March to be an invalid date as far as the crucifixion was concerned. Instead of following tradition, he proposes an astrological investigation of the date of the incarnation, supposing that God would have subjected the timing of his own conception and birth to the same natural influences that governed the human gestation period. Astrological sources translated from Hebrew and Arabic used the distance from the moon to the ascendant, as

[1] Besides mean and true times and longitudes, the author states the 'equation of the eighth sphere' for the conjunction of March AD 34 as 8;18,17,8°. According to the Toulousan trepidation tables (Pedersen, *The Toledan Tables*, 4:1547), the argument for trepidation on 9 March AD 34 was 10s 8;33,28,41° (24y) + 0;47,54,52° (9y) + ca. 0;0,7,0° (8d) = 309;21,30,33°. The corresponding equation tables (ibid., 4:1558) show a precession of 8;14,0° for 310° and 8;47,48° for 305°. For an argument of 309;21,30,33°, this implies 8;47,48° –0;29,28° = 8;18,20°, in reasonably good agreement with the value given in the text.

measured at birth, to retrospectively determine the duration of a pregnancy, which was thought to normally range between a minimum of 259 days and a maximum of 288 days.[1] Based on the traditional dates for Christ's conception and birth (25 March and 25 December), he should have stayed inside Mary's womb for 276 days, which is three days above the mean duration of 273 days. As the author indicates, he did not find the moon at the time of Christ's nativity in the appropriate place (in the first house), which is why he feels inclined to dismiss 25 March as a realistic date for either the conception or the crucifixion.

In Chapter 12, he returns to the year 33, already discussed in Chapter 9, which had a conjunction on 19/20 March and a mean opposition on 3 April, 16:48h. Since this is the only feasible candidate

[1] See José Chabás and Bernard R. Goldstein, *A Survey of European Astronomical Tables in the Late Middle Ages* (Leiden: Brill, 2012), 223–26. The different gestation periods are also discussed in the brief text that accompanies the interpolated horoscope of 1408. MS A, fol., 202r: "Notandum ad investigandum verum ascendens huius nativitatis per locum lune et eius distantiam ab angulo occidentali vel orientali tempore nativitatis estimato. Isto supposito quod locus lune tempore conceptionis erit gradus ascendens tempore nativitatis, et econverso, locus lune tempore nativitatis fuit ascendens tempore conceptionis. Supposito similiter secundo quod triplex est mora in utero, scilicet minor, media et maior. Minor enim mora habet de tempore dies 259, horas 13, minuta 20. Maior autem mora habet dies 286, horas 21, minuta 3. Sed mora media dies continet 273, horas 5, minuta 11, secunda 30. Tercio supposito quod si luna tempore nativitatis fuerit precise in gradu occidentis, id est in initio secunde domus, puer stetit in utero matris per moram minorem. Sed in gradu ascendentis per moram mediam. Si autem in sexta domo, per moram maiorem. Si vero fuerit luna in alio loco super terram, stetit puer in utero plus mora minori et minus media secundum proportionem distantie eius ab occidente vel oriente. Et si sub terra fuerit, stetit puer in utero minus mora maiori et plus media. Quibus suppositis consideravi lunam distare a gradu orientis super terram tamen per unum gradum, unde dico puerum istum stetisse in utero matris sue per moram mediam minus duabus horis, hoc est per 273 dies, 3 horis, minuta 11, secunda 30, quibus subtractis a tempore nativitatis eius." The text breaks off at this point and segues back into Chapter 9 of *Autores kalendarii*.

for a full moon falling on a Friday in the relevant range of years, the author accepts it as the historical Passion date. He adds a complementary chapter (13), in which he once more states the mean conjunction and opposition times for the following year AD 34, namely 9 March, at 07:14:50h, and 24 March, at 01:36:41h, which would have implied that Christ died on a Wednesday. In AD 35, the corresponding times were 28 March, at 04:47:32h and 12 April, 23:10:23h, with the beginning of *luna* 15 falling on a Tuesday.[1] In contrast to the partly corrupt data presented in Chapter 3, the mean syzygies used by the author for dating the Passion are nearly all correctly calculated according to the Tables of Toulouse:

First mean conjunction	Aut. Kal.	Tab. Tol.
AD 34 (ch. 10, 13)	9 March 07:14:50h	9 March 07:14:50h
AD 35 (ch. 13)	28 March 04:47:32h	28 March 04:47:32h
First mean opposition	Aut. Kal.	Tab. Tol.
AD 33 (ch. 9, 23)	3 April 16:48h	3 April 16:48h
AD 34 (ch. 10, 13)	24 March 01:36:41h	24 March 01:36:41h
AD 35 (ch. 13)	12 April 23:10:23h	12 April 23:09:23h

Chapters 14–23

Chapter 14 marks the beginning of the second main part of the treatise, which deals with the calculation of Easter and the errors that arise from

[1] For unclear reasons, table 2 instead marks the conjunction and opposition of AD 35 on 27 March and 10 April.

the incorrect placement of the Golden Number. The author opens his discussion with some references to the *Decretum Gratiani*, which contains a number of (partly forged) decretals on the celebration of Easter. Even though this and other sources make it clear that Easter Sunday can fall anywhere from the 15th to the 21st day of the first lunar month, the author claims that the Church in his own day does not celebrate the feast on the 15th day, in order to avoid a coincidence of Easter Sunday with Passover, which falls on the 15th of Nisan in the Jewish calendar. This puzzling remark becomes somewhat clearer if we take into account the following chapter (15), where the author compares the astronomically determined lunar ages of recent Easter Sundays with the 'official' lunar age in the ecclesiastical calendar. He starts with the year 1291, when Easter was celebrated on 22 April, even though it was technically already the 23rd day of the moon.[1] Similar cases, where Easter Sunday fell on *luna* 22–24, are listed for 1294, 1298, 1301, 1304, 1305, 1307, 1308, 1311, 1314 as well as for the future Easters in 1318, 1321, 1322, 1325, 1328, 1329.[2]

According to the author, the Church "encourages" (*coadiuvat*) this error, because it wants to avoid the charge of "judaizing" (*iudaisare*), which is attached to the celebration of Easter Sunday on the 15th day of the moon. He disapproves of this timidity: in his view, Christians are no more liable to "judaize" when celebrating Easter on *luna* 15 than Jews

[1] The author reminisces how the Jews made fun of the Christians for this error in said year. If this is a personal reminiscence, it is further proof that the author was already past his early childhood at the beginning of the 1290s, which is incompatible with the biography of John of Murs. See Thorndike, *A History*, 3:297.

[2] Oddly enough, the author also lists 1324 among the years where Easter should be celebrated a week earlier than tabulated, even though the date he proposes, 15 April, is the one predicted by the traditional Easter cycle. The author designates the corresponding lunar age as *luna* 21, whereas the ecclesiastical reckoning demands *luna* 17. Both are within the permissible limits for Easter Sunday.

would be engaged in an act of "christianizing" when celebrating Passover on a Sunday, as is frequently the case.[1] From the context, it becomes plain that the author is here talking about the 15th day of the moon as determined by astronomical means, not the *luna* 15 indicated by the ecclesiastical calendar, which, of course, could frequently be the seat of Easter Sunday. What his argument opposes is a specific claim, apparently made by certain contemporaries, according to which the discrepancy between the Church's own lunar reckoning and the actual lunar phases could and should be tolerated, because it conveniently ensured that Easter would always fall later than the 15th day of the moon and hence later than the Jewish Passover.[2] While I am not aware of any contemporary Latin source for this assertion, an argument to this effect can indeed be found in a Greek text on Easter written by Barlaam of Calabria (ca. 1333) and in a letter written in 1470 by Cardinal Bessarion to Pope Paul II.[3]

The following three chapters (16 to 18) introduce and explain a set of calculation tables for the time of mean conjunction and opposition. These are extracted from the Toulouse Tables, where the collected years are grouped into cycles of 24 years, starting with the epoch of the Christian calendar and going up to the year 1416. The author, by contrast, starts his own table with 1296, i.e. the epoch that is closest to his own time, and extends the table until 1488.[4] Chapters 17 and 18 subjoin

[1] In ch. 20, he adds: "Et quidem Christiani non viderentur in hac observatione iudaisare cum in multis aliis temporibus discrepent a Iudeis in celebritate diei paschalis."

[2] Cf. Poulle, "Les astronomes," 15, whose treatment of this passage slightly misses the point.

[3] Anne Tihon, "Barlaam de Seminara: traité sur la date de Pâques," *Byzantion* 81 (2011): 362–411 (380); Ludwig Mohler, *Kardinal Bessarion als Theologe, Humanist und Staatsmann; Funde und Forschungen*, 3 vols. (Paderborn: Schöningh, 1923–42; repr. Aalen: Scientia Verlag, 1967), 3:548.

[4] In terms of numerical content, tables 3a–c in the present treatise are more or less identical to the 'tempus' columns in tables GB11–14 printed in Pedersen, *The Toledan*

reckoning examples for two contemporary dates, one being the mean conjunction on 2 April 1318, at 04:44:17h. The author explicitly states that he used this conjunction for his reformed calendar, found at the end of the treatise, where the Golden Number 8 is indeed positioned on 2 April. For the mean opposition, the example given pertains to 16 April 1318, at 23:06:08h. As in Chapters 9 and 12 above, the author once more stresses that the day on which the mean opposition falls can be taken as the beginning of *luna* 15 and hence as the earliest permissible date for Easter Sunday, although the Church currently shuns this date.

Chapters 19 to 21 introduce two further tables, which indicate the *intervallum minus*, i.e., the distance in weeks and days between Christmas and Quadragesima Sunday (the first Sunday in Lent), for each of the 35 possible Easter dates. In the first table, which conforms to the rules of the official ecclesiastical calendar, these 35 dates run from 22 March to 25 April, whereas the second table changes this range of dates to 19 March–22 April.[1] The author informs us that the second table shows the dates on which Easter *should* be celebrated, if the Church deigned to follow his correction, but he does not go into any greater detail concerning the implementation of this reform. His new Easter

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Tables, 4:1344–46, with three more lines for '1440', '1464', and '1488' in the case of GB11 and 12.

[1] The first of these tables (table 6) was evidently adapted from a more extensive table for all five movable feast days, which circulated in manuscripts alongside the *Kalendarium* of Peter of Dacia since ca. 1301. See Pedersen, ed., *Petri Philomenae de Dacia ... Opera quadrivialia*, 1:407–12, for further information. As Poulle, "Les astronomes," 14, 31, 35, correctly notices, different versions of table 6 also appear in John of Murs's *Sermo de regulis computistarum* (ca. 1332) and in a 'user's manual' on the *Tractatus de reformatione kalendarii* of 1345. Poulle evidently takes this as evidence for John's authorship of *Autores kalendarii*, but the mentioned manuscript evidence suggests that both John and the anonymous author were using a widely circulating template. For more details, see Nothaft, "John of Murs."

limits reflect a shift of the earliest new moon of the Easter lunation from 8 March to 5 March, which is also the position of the Golden Number 16 in the attached *kalendarium*.[1] The author confirms that the earliest lunation of April is currently found on 5 March and that there has been a shift of roughly four days between the beginning of the Christian era and AD 1312, which were both the second year of a 19-year cycle. The syzygy times mentioned in this chapter once more conform to the Tables of Toulouse:

Mean conjunction	Auc. Kal.	Tab. Tol.
First in AD 1312	9 March 09:40:08h	9 March 09:40:08h
Earliest in the 19-year cycle (= AD 1326)	5 March 04:41:45h	5 March 04:41:45h

Chapter 20 also addresses the date of the equinox, which no longer falls on 21 March, as stipulated by the rules of the *computus*, but on 13 March. In principle, this would allow Easter Sunday to fall as early as 14 March. The author justifies his more conservative change of Easter limits with the fact that any lunation starting earlier than 4 March would already come to an end in the month of March (since the Easter lunation only has 29 days) and thus violate the principle that the first lunar month of the year must terminate in April. As he points out towards the end of Chapter 21 and in Chapter 22, his tables are strictly valid only for the present and cannot prevent further shifts of the Golden Numbers in the distant future.

[1] Poulle, "Les astronomes," 14, erroneously states that the Golden Numbers are displaced by only two days. His confusion arises from the fact that the Golden Numbers in the first table are correlated with the *terminus paschalis* (i.e. the 14th of the moon), whereas they are found next to the earliest Easter Sunday (i.e. the 15th of the moon) in the second table. This seemingly brings the Golden Numbers one day closer to their original position.

In order to guarantee the calendar's accuracy in the long term, it is necessary to take into account the shift of ca. 1d 5h in 380 years that was already discussed in Chapter 2. Table 8 emphasizes this point once more by tracking the date of the first mean conjunction in spring for intervals of 380 years, starting in AD 1 and ending in AD 3801 (see p. 14 above).

The treatise closes with a brief postscript or summary of the author's main 'intention' in writing the present text. He says that his principal goal was to find the date of the first Easter (i.e. the historical date of the crucifixion and resurrection), while the second was to inquire into the calendrical limits for all other Easters. As before, he notes that the current lower limit for the Easter lunation is 5 March, but that it will fall as early as 4 March in future cycles. To this, he adds a few remarks on the topics he did not breach in the present treatise, despite the fact they are commonly treated in computistical works. These include the rules for finding the age of the moon on any given day of the year or on the first of each month, which our author regards as an unnecessary complication, "by which the computists weaken themselves and their students" (*circa quod computiste per regulas lunares et epactas enervaverunt semetipsos et suos discipulos*). Instead of following ready-made reckoning rules, which ignore the fact that the position of the new moons in the calendar changes over time, he prefers to simply count forward the days from the date of *luna* 1, as expressed in the brief mnemonic verse appended to Chapter 22. He shows similar disdain for the system of *claves terminorum*, which was used by computists to find the date for the five main movable feast days (Quadragesima, Septuagesima, Easter, Rogationtide, Pentecost).[1] In his opinion, these are overly artificial devices, blinding rather than illuminating to the mind. As his remarks indicate, the author did not see himself as a computist

[1] See Friedrich Karl Ginzel, *Handbuch der mathematischen und technischen Chronologie*, 3 vols. (Leipzig: Hinrichs, 1906–14), 3:143–48.

(*computista*), but as an astronomer, who looked down on the practitioners of the traditional art of calendar reckoning with a certain sense of professional pride. The same attitude of condescension towards the computists was later also exhibited by John of Murs, in his brief *Sermo de regulis computistarum* (ca. 1332), but it is doubtful whether the present treatise can be ascribed to him on this basis.[1]

Appended to the whole treatise is the 'reformed' *kalendarium* that was previously mentioned in Chapters 8 and 17. It runs from March to February, in line with the numbering of the months in the Toulouse Tables. For each day of the month, there are four columns, for (1) the day count, (2) the Golden Number, (3) the dominical letter, and (4) the Roman day numbering from the kalends, ides, and nones. In addition, some days come with notes concerning important saint or feast days. The Golden Number marked in this calendar is between three and five days ahead of the traditional position, which is in line with the magnitude of the error of the lunar calendar exposed in the main text. As we learn from Chapter 8, the Golden Numbers were calculated for the cycle starting in 1311, based on the mean conjunction times of the sun and moon on the meridian of Toulouse.

[1] Poulle, "John of Murs," 129, saw the "critical and impassioned style" as confirmation of John's authorship. A different conclusion is defended in Nothaft, "John of Murs."

Manuscripts and editorial principles

The treatise *Autores kalendarii* is extant in two sixteenth-century manuscripts, whose description is as follows:

MS A = Wien, ÖNB, CVP 5292, fols. 199r–209v. This paper codex (II + 317 fols., 295 × 215) was copied during the first quarter of the sixteenth century.[1] *Autores kalendarii* is followed by the anonymous work *Ad correctionem calendarii* (fols. 210r–17v) and slightly later by John of Murs and Firmin of Beauval's *Epistola/Tractatus* (221r–29v) and the *Tractatus de tempore celebrationis Paschalis* by John of Thermis (231r–42v). Although these works all deal with the same subject matter, the text of *Autores kalendarii* represents its own codicological unit (48/51 lines, 210 × 130/140 mm), which was copied independently and probably by a later hand than the treatises that follow.[2]

MS B = Wien, ÖNB, CVP 5273, fols. 91r–102r. This paper codex (358 fols., 315 × 207 mm) was once in the possession of the mathematician and astronomer Johannes Vögelin, who lectured at the University of

[1] See *Tabulae codicum manu scriptorum praeter graecos et orientales in Bibliotheca Palatina Vindobonensi asservatorum,* 10 vols. (Vienna: Gerold, 1864–99), 4:88–89; Franz Unterkircher, *Inventar der illuminierten Handschriften, Inkunabeln und Frühdrucke der Österreichischen Nationalbibliothek,* vol. 1, *Die abendländischen Handschriften* (Vienna: Prachner, 1957), 105; Gack-Scheiding, *Johannes de Muris,* 108; Martin Roland, *Die Handschriften der alten Wiener Stadtbibliothek in der Österreichischen Nationalbibliothek* (Vienna: Wiener Stadt- und Landesbibliothek, 1999), 117–20.

[2] Roland, *Die Handschriften*, 118–19.

Vienna.[1] *Autores kalendarii* is followed by the same block of calendrical treatises as in MS A, ending with the letter by John of Thermis on fol. 138v. The colophon to the latter text, written by Vögelin's hand, is dated 5 June 1527. This can probably be applied to the entire sequence of texts, which appears to have been copied en bloc from MS A (see below). The same year is given in the colophon to an *Opus de astronomia practica seu instrumentali, in tres tractatus divisum*, found on fols. 156r–257r.

Since both MSS show little to no textual variation in their rendering of *Autores kalendarii*, it seems evident that they are closely related, and likely that the slightly earlier MS A served as the exemplar for MS B.[2] The relationship is particularly clear from the marginal corrections to the numbers in Chapter 22, which were all faithfully replicated in MS B. As another sign of dependence, one may point to the aforementioned interpolation of a nativity horoscope of 1408 and the attached text (see p. 7 and n. 1 on p. 21 above), which occur in identical form on fols. 201v–2r in MS A and on fol. 94r–v in MS B.

With the exception of this interpolation, which has been omitted from the present edition, the text below closely follows the wording in MS A, applying only minor modifications to the orthography (e.g. *Christus* in place of *Cristus*, *pascha* and *paschalis* for *pasca* and *pascalis*). The passages taken from Giles of Lessines as well as other source quotations appear *italicized*. Where captions in the margins are

[1] *Tabulae codicum,* 4:81; Paul Joachim Georg Lehmann, *Eine Geschichte der alten Fuggerbibliotheken,* 2 vols. (Tübingen: Mohr, 1956–60), 2:566–67; Franz Unterkircher, *Katalog der datierten Handschriften in lateinischer Schrift in Österreich,* vol. 4, *Die datierten Handschriften der Österreichischen Nationalbibliothek von 1501 bis 1600* (Vienna: Verlag der Österreichischen Akademie der Wissenschaften, 1976), 50; Unterkircher, *Inventar,* 105; Gack-Scheiding, *Johannes de Muris,* 107–8.

[2] This also holds true for the other texts in the 'dossier'. See Schabel, "John of Murs," 193; Schabel, "*Ad correctionem calendarii*," 18–19; and Plassard, "Projets," 181.

found at the beginning of a section, they were used as chapter headings. All tables were moved to the end of the chapter to which they belong, even if they are placed at some remove in the manuscripts. Where information was evidently lost in transmission, I have occasionally made conjectural additions to the text not found in either manuscript, which are signalled <in this fashion>. Page breaks in the manuscripts are indicated in [square brackets]. The apparatus uses the following abbreviations:

(?)	uncertain reading
add.	text added
a.c.	text before correction
gem.	text duplicated
lac.	lacuna in the manuscript
mg.	text in margin
om.	text omitted
p.c.	text after correction
s.l.	text added below or above line

<Tractatus de anno nativitatis et passionis Christi atque de terminis festi paschalis>

<CAP. I>

[A: 199r/B: 91r] *Autores kalendarii*[1] *nostri* duo *principaliter* tractaverunt *in doctrina inveniendi lunam primam et significandi* eam *per numerum* certum, *ex* quorum utroque *ad sensum apparet eos non attigisse ad complementum doctrine sue*. Primum *est quod 19 annos acceptos singulos cum quarta diei integra super dies 365 tradiderunt equari*[2] *235 lunationibus secundum cursum medium*. Secundum est[3] *consequens ex hoc* primo *quod aureum numerum designantem circulum decemnovenalem collocaverunt in kalendario aliter quam ratio medii cursus exigat*. *Nam in primo erraverunt*[4] quia ipsi autores kalendarii nostri secuti sunt autoritatem *Feli*cis philosophi *qui*, ut *recitat Ptolomeus tertia dictione Almagesti*, *capitulo primo*, dixit annum solarem *constare ex 365 diebus* et 6 horis perfectis. *Iste* Felix *fuit 6 annis ante mortem Alexandri*[5], *que fuit ante incarnationem Christi 329 annis*. Super hanc opinionem fundatum est kalendarium nostrum et est omnibus opinionibus quas recitabo a veritate remotior. *Post hunc fuit Abrachis, qui et Yparchus,* ante incarnationem Christi annis 145 *investigator motuum* celestium *sagacissimus*, *qui invenit probatione certissima annum* solarem *continere minus quarta integra*. *Et dixit in libro suo 'De quantitate longitudinis anni' quod in 145 annis sol festinat ante superfluitatem*

[1] kalendarii] calendarii *B*

[2] equari] equare *a.c. A*

[3] est] ex *a.c. A*

[4] Autores kalendarii … erraverunt] Giles of Lessines, *Summa de temporibus* (III.2.18), ed. Steele, 146, ll. 10–20.

[5] mortem Alexandri] cohortem Allerii(?) *AB*

quarte per medietatem diei et noctis, ut *dicit Ptolomeus in capitulo predicto*, *in computo autem Iudeorum deesse quarte diei ad perfectionem suam pars 300a*[1] *et 20a*. *Ptholomeus autem, in hac scientia <summus>, probavit*, *sicut dix*it *Abrachis*, *annum huiusmodi minorem quarta integra, et hanc portionem investigatione subtilissima probavit esse 300mam partem diei*, *ita quod si aliqua die nota* ponamus *15 kalendas Aprilis sol intrasset primum* initium *Arietis, post 300 annos sol intraret* idem initium *16 kalendas et est superfluum super revolutione*m *88 gradus et 12*[2] *minuta*. Et *fecit Ptolomeus hanc probationem 140 annis post incarnationem* Christi *et post considerationem Abrachis 285*. *Post* Ptolomeum *fuerunt Thebit Christianus et magistri probationum quamplurimi Sarraceni*, *qui dixerunt huiusmodi annum constare ex 365 diebus et minus quarta* integra *quantum est 106a pars diei*. *Fuit autem Thebit post Ptholomeum 643 annis*. *Post* Thebit *fuit Asophius*, *vir sapientissimus in motibus celestium corporum*, qui *proba*vit *annum constare ex 365 diebus et minus quarta quantum est 131a*[3] *pars diei*, *ita quod post 131 annos invenietur equinoctium retrocessisse*[4] *uno die et est superfluum super revolutiones integras secundum* eum *87 gradus et 15 minuta* fere. *Arzachel* vero *Hispanus postmodum probavit veritatem*, *et ideo secundum* eum *annum facte sunt tabule quibus utuntur quamplures Latini*, *et* sunt *fundate super Annos Domini sicut tabule Londonienses, Massilienses*. Que autem harum opinionum, *excepta prima*, que falsa est, sit verior *nondum certissime puto esse probatum*.[5] Prefertur tamen *opinio Thebit et Albategni*, quia videtur *propinquior veritati*, sicut *proba*mus

[1] 300a] 360a *AB*

[2] 12] 13 *AB*

[3] 131a] 130a *AB*

[4] retrocessisse] *add.* et kalendas(?) *AB*

[5] Felicis … probatum] Giles of Lessines, *Summa de temporibus* (III.1.3), ed. Steele, 13, ll. 7–14, l. 34.

nostris temporibus per instrumenta et per eclipses. *Est* igitur *quantitas anni* solaris *ut propinquius veritati*, ut *invenit Thebit*, spatium temporis ex 365 *diebus constans et 5 horis et 4 quint*is[1] *hore*, *que faciunt* 48 *minuta hore* fere, *secundum quod hora continet 60 minuta*.[2]

Porro ego, considerans introitus annorum, quando scilicet sol intrat primum initium Arietis, ab anno Christi 1290 usque ad annum eius 1310, inveni quod[3] de quarta integra tantum defecerunt videlicet 11 minuta, quorum 60 faciunt horam unam. Erit ergo quantitas anni solaris spatium temporis quo sol ab uno punctorum zodiaci fixi, verbi gratia equinoctiali puncto, movetur super orbem suum versus orientem secundum successionem signorum donec redeat ad idem punctum, hoc est ab equinoctiali ad equinoctialem, 365 dies, 5 hore et 49[4] minuta. Et erit superfluum revolutionis super revolutiones integras 88 gradus et 30 minuta, que sunt dimidius gradus.

Ratio autem diversitatis opinionium predictarum, quas omnes nec prima excepta dico fuisse veras et fore in futurum temporibus singulis,[5] *est* aliqua *trium*: *vel imperfectio artis in compositione instrumentorum*, *sicut refert Thebit*, *vel <propter> motum ascensionis et descensionis*, [B: 91v] quem *plures ignoraverunt*, quod *facit quod sol in aliquo <anno> citius redit ad* aliquem *punctum zodiaci immobil*em et *in alio tardius, <vel,>*[6] *ut dicit Albategni, possibile est aliquem motum* esse *in celo quem nullus philosophorum*[7] adhuc vidit. Patet igitur quod quantitas anni

[1] quintis] quantitatis *AB*

[2] opinio … minuta] Giles of Lessines, *Summa de temporibus* (III.1.3), ed. Steele, 15, ll. 2–4, 18–22.

[3] quod] *gem. AB*

[4] 49] *a.c.* 58 *AB*

[5] singulis] singularis *AB*

[6] vel] *lac. A*

[7] Ratio … philosophorum] Giles of Lessines, *Summa de temporibus* (III.1.3), ed. Steele, 15, ll. 6–14.

considerata a philosophis accipienda est cum diminutione quarte super 365 dies.

<CAP. II:> IN QUOT ANNIS SOLARIBUS CONIUNCTIONES RETROCEDUNT AD UNUM DIEM INTEGRUM NATURALEM[1]

Restat videre quomodo tempora lunationum perfectarum secundum doctrinam predictorum, qui dicebantur magistri probationum, se habeant ad 19 annos solares acceptos cum quarta perfecta. *Determinaverunt* enim *annum lunarem, tempus quo luna ab una coniunctione sua cum sole usque ad aliam sequentem duodecies percurrit, esse 354 dies et 11 partes de 30 partibus unius diei*, hoc est 22 minuta. *Si* autem [A: 199v] *hoc tempus anni lunaris dividatur per 12, erit portio* cuiuslibet *duodecime 29 dies et 31 minuta*, *secundum quod dies continet 60 minuta, et 50 secunda*, *quorum 60* faciunt *unum minutum*. *Et hec est quantitas anni lunaris secundum* medium *cursum* suum, *que si extendatur per 235 lunationes*, *quas continent 19 anni solares*, *surgent dies 6939*, *minuta 40*, *secunda 50*. Porro *<cum>* inde *19 anni solares accepti*[2] *cum quarta integra contineant*[3] *totidem dies integros et insuper 45 minuta* diei, *que sunt tres quarte diei*, id *est 18 hore*, *apparet quod 19 anni solares super integras lunationes habundent in 4 minutis diei et 10 secundis*, *que sunt plus quam 15a pars diei*, sed *minus 14a*. *Et in <114> annis solaribus inveniuntur 25 minuta unius diei excrescere super lunationes integras*, *que sunt tertia diei*, *id est 8 hore, et 12a unius <diei>*, que sunt[4] *10 hore*, excrescentes[5] super *6* circulos *decemnovenales* in annis 114 solaribus

[1] naturalem] Annus lunaris *B*

[2] solares accepti] accepti solares *AB*

[3] contineant] continent *AB*

[4] sunt] *add.* solis *AB*

[5] excrescentes] excrescentis *AB*

super lunationes perfectas.[1] *Et secundum hoc accidit error unius diei fere in 275 annis solaribus in* probatione *lune secundum artem kalendarii*. *Verbi gratia: si ante 275 annos luna per aliquem numerum in kalendario prima signabatur competenter, post annos tot invenietur non die signat*o *per dictum numerum sed die precedente. Et secundum hoc post tot annos a constitutione kalendarii erat numerus* de*signans primationes lune scribendus* ante *per unum diem ad correctionem kalendarii*.[2]

<CAP. III:> DE ERRORIBUS KALENDARII NOSTRI[3]

Videamus nunc qualiter 235 lunationes se habeant ad 19 annos solares acceptos cum quarta imperfecta secundum doctrinam eorundem. Sciendum igitur quod *secundum doctrinam Azophii annus solaris deficit a perfectione quarte diei in 131a parte diei*, *que est 27 secunda unius minuti et 28 tertia, que in 19 <annis> solaribus surgunt in 8 minuta et 22 secunda fere*. *Et* secundum hoc *tempus perfectarum lunationum 235 erit maius tempore* 19 *annorum acceptorum cum quarta imperfecta*, *secundum istos Arabes*, *in tribus minutis diei et 12*[4] *secundis*, *que sunt maior 20a parte diei et minor 19a*. *Unde si luna accendatur coniuncta cum sole per medium cursum in aliqua die in qua sol fuit in puncto equinoctiali vel solstitiali*, *ante 20 ciclos decemnovenales*, *hoc est ante 380 annos* solares, *post tot annos invenietur coniuncta sol* medio cursu *per unum diem postquam fuisset in* predicto puncto.

Ex his igitur patet *error kalendarii nostri, tam in determinatione quantitatis anni* lunaris, quam in determinatione *quantitatis* mensis,

[1] perfectas] perfectis *AB*

[2] Determinaverunt … kalendarii] Giles of Lessines, *Summa de temporibus* (III.1.12), ed. Steele, 55, l. 32–56, l. 26.

[3] kalendarii] *add.* In quot annis solaribus coniunctiones retrocedunt unum diem integrum naturalem *B*

[4] 12] 13 *AB*

scientibus nobis *quod Arabes*, qui ceteris perfectius tractaverunt, *ann*um *lunar*em dicunt *contin*ere *354 dies et* 22 minuta, que sunt *11 partes de 30 partibus diei*, hoc *est 1/5 et 1/6 diei*, *que collect*a *in 30 annis faciunt 11 dies integros*. Unde et *annos* suos *lunares in tabulis suis colligunt per 30. Si autem 354*[1] *dies dividantur per 12*, *erit quelibet portio 29 dies et dimidia*. *Hinc est quod ipsi menses* suos *alternatim constituunt unum ex 30 diebus integris*, *alium ex 29 tantum*. *Ex illis autem 11 partibus superexcrescentibus in anno lunari super dies integros colliguntur in tribus annis 33 partes quarum 30 constituunt integrum diem. Et ideo in tertio anno lunari secundum ipsos sunt 355 dies et ultima lunatio anni tertii, que in aliis duobus annis precedentibus erat 29 dierum tantum, habet 30 dies*. *Et hunc annum vocant bisextilem propter unum diem additum sibi ex* fractionibus *collectis in tribus annis*, *sicut et nos vocamus quartum annum bisextilem in annis solaribus propter unum diem additum similiter ex fractionibus quartarum*. Similiter et annum sextum et octavum eadem [B: 92r] ratione habent bisextilem, *quia quandocumque partes 30<me> colliguntur ultra 15, computantur pro uno die*. *Et sic usque ad tricesimum annum*, *in quo omnes tricesime collecte faciunt 11 dies. Et ideo 11 anni de illis 30 sunt bisextiles*. *In summa* igitur *colligitur diversitas anni lunaris*. Nam *secundum Caldeos habet dies 354, 22 minuta, 3 secunda. Secundum Abrachim et Ptolomeum 354 dies, 22 minuta, 1 secundum,*[2] *37 tertia. Secundum Arabes 354 dies, 22 minuta. Secundum artem kalendarii 354 dies, 22 minuta, 12 secunda, 45 tertia, <57 quarta>, 24 quinta.*[3]

Colliguntur etiam errores secundum dictos annos qui accidunt in kalendario ex aureo numero in primatione lune: *secundum Caldeos unus*

[1] 354] 345 *AB*

[2] secundum] 2a *AB*

[3] quinta] quarta *AB*

dies in 4056 annis, secundum Ptolomeum in 305[1] *annis fere, secundum Arabes unus dies in 275 annis*.[2] Secundum eosdem si accipiantur anni cum quarta imperfecta unus dies in 380 annis et 5 hore. Verbi gratia: anno incarnationis et nativitatis Christi fuit primatio lune 0 in mensibus, 23 diebus, 10 horis, 52 m'a, 30 2a. Et fuit media coniunctio 0 in signis, 7 gradus, 21 m'a, 11 2a. Annis autem post incarnationem elapsis 379 primatio lune 0/ 22/ 5/ 52/ 21. Et fuit differentia temporis inter has duas primationes unus dies, 5 hore, 0 minuta, 9 secunda. Media coniunctio: 0/ 3/ 35/ 38. Et fuit differentia loci coniunctionis prime et sequentis 0/ 3/[A: 200r] 37/ 43. Annis post incarnationem elapsis 759 fuit primatio lune 0/ 21/ 0/ 52/ 13. Et fuit differentia temporis <2 dies, 10 hore, 0 minuta, 17 secunda>. Et differentia[3] inter loca coniunctionum[4] eadem que iam dicta est. Anticipatur ergo coniunctio solis et lune in 380 annis 1 die, 5 horis et valde parum plus. Transactis enim post incarnationem Christi 1139 annis solaribus fuit coniunctio solis et lune media 0/ 19/[5] 19/ 54/ 5. Et fuit differentia temporis inter duas coniunctiones proximas 1 dies, 4 hore, 58 minuta, 8[6] secunda, quod est minus 2[7] minuta quam prius in precedenti differentia. Locorum vero coniunctionum duarum ea<dem> est differentia que supra. Igitur elapsis 60 ciclis 19libus, hoc est ab anno in quo Christus incarnatus est usque ad complementum anni Christi 1139, precessit coniunctio solis et lune media 3 diebus, 14 horis, 58[8] m'a, 25 2a.

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[1] 305] *a.c.* 306 *B*

[2] secundum doctrinam … annis] Giles of Lessines, *Summa de temporibus* (III.1.12), ed. Steele, 56, l. 31–58, l. 17.

[3] differentia] *add.* loci inter primas duas coniunctiones. Et differentia loci coniunctionis inter primas duas coniunctiones. Et differentia loci coniunctionis *AB*

[4] coniunctionum] coniunctioni *A*

[5] 19] *om. AB*

[6] 8] 5 *AB*

[7] 2] 21 *AB*

[8] 58] 57 *AB*

Annis autem 1310 elapsis, qui sunt 69 decemnovenales post incarnationem Christi, est media coniunctio 0/ 20/ 0/ 59/ 23, locus coniunctionis medie 11/ 24/ 40/ 50. Et est differentia inter tempora coniunctionis que fuit in anno incarnationis Christi et coniunctionis in anno Christi 1311 4 dies, 10 hore, 0 minuta, 1 secunda. Patet igitur manifeste error kalendarii nostri. Qui qualiter corrigi possit infra dicetur. Super eclipses quoque solis et lune, que sunt propter coniunctionem vel oppositionem diametralem, apparet error ipsorum.

Ex quo concluditur quod *19 anni solares plus continen*t *quam 235 lunationes integras*. *In hunc autem errorem inciderunt ex duobus*: primo *quod Hebreos imitati ciclum 19lem post eos instituerunt.* Hebrei autem *a patribus suis patriarchis*, scilicet Sem filio Noe, Abraham et Moyse, quos peritissimos in arte astronomie refert Iosephus,[1] *dicunt se accepisse vel tenuisse quod diebus 19 annorum solarium equantur* 235 *menses lunares*. Hoc autem *diminute acceperunt nostri Latini*, *ut* videtur, *quia non de annis solaribus cum quarta integra hoc dicunt Hebrei*, *sed potius de annis solaribus quorum quantitatem supponunt esse ex 365 diebus*, *5 horis integris et sexta imperfecta*, *ad cuius completionem deest pars diei 320a*. *Propter quod si quis velit secundum eos corrigere doctrinam kalendarii <quoad ciclum 19lem, debet primo scire annum primum fundacionis kalendarii>, qui fuit secundum quod nunc est ab anno* Christi *630. Et ab illo anno semper lapsis 320 annis solaribus debet una dies minui de loco primationis lunationum, ita quod si in principio fundationis kalendarii luna Septembris fuerit in kalendis ipsius <quinta>*, *debet post 320 annos ab fundationis dici sexta*.[2] Similiter *de aliis lunationibus et mensibus*. Et sic *faciendum est* iterum *post alios 320 annos*. Unde inventus *est error in primatione lune in kalendario ex*

[1] Josephus, *Antiquitates Iudaicae* (1.3.9/1.106 ; 1.7.2/1.158; 1.8.2/1.167), ed. Franz Blatt, *The Latin Josephus I* (Copenhagen: Munksgaard, 1958), 136–37, 144–45.

[2] sexta] 8a *AB*

superfluitate duorum dierum anno Domini 1264. Aliud etiam *potuit decepisse autores kalendarii nostri in* circulo *19li ex eo quod antiqui philosophi*, *quibus assentit Ptholomeus, dixerunt communiter dies 19 annorum solarium equari lunationibus* 235 *integris*. *Sed ipsi similiter non intellexerunt nisi secundum quod annus solaris accipitur cum quarta imperfecta*, *ut patet ex predictis*.

In collocatione quoque *aurei numeri in kalendario per quem designare*nt *prima*tionem *lune in singulis annis et mensibus annorum erraverunt tripliciter*. *Primo quod <per> ipsum non designa*nt *medi*os *motus*[1] *lune equaliter in singulis mensibus secundum modum possibilem regularem, secundum quem omnes lunationes duorum <annorum> sic deberent distingui* vel designari *per aureum numerum* [B: 92v] *quod singule due lunationes sibi continue succedentes essent 59 dierum et in tertio anno deberent determinari <10 lunationes> per similem modum et due residue per 60 dierum*, *et sic continue usque ad 30 annos lunares*, *quia sic exigit* ratio medii *cursus lune secundum naturam*. Iste *autem modus non servatur in kalendario, sicut patet*, *et propter collocationem lunationum et propter annos bisextiles*. -- *Secundo erraverunt in* hoc *quod per ipsum aureum numerum post multos*[2] *annos a collocatione*[3] *sua in kalendario invenitur ad sensum luna insufficienter primari per ipsum*, *ita quod post 1000 annos a collocatione sua in kalendario luna per ipsum signabitur prima*, *quando* est *sensibiliter et secundum medium curusm suum quarta*. *Et provenit iste error*, ut dictum est, *ex insufficientia* circuli *19lis*. -- *Tertio erraverunt in hoc quod quosdam dies mensium per ipsum* aureum *numerum signaverunt*, *quosdam vero vacuos ab ipso reliquerunt*, cum *non sit aliquis dies in anno seu in mense in quo*

[1] motus] cursus motus *AB*

[2] multos] menses *AB*

[3] collocatione] collatione *AB*

non inveniatur luna prima regulariter[1] *secundum cursum suum medium in aliquo tempore*. *Sed iste error posset tolerari propter utilitatem quam ex ipso elegerunt in certa arte inveniendi singulis*[2] *annis terminum pasche*.[3]

<CAP. IV:> DE ERRORE TERMINI PASCHALIS

Ex predictis autem *erroribus et precipue ex insufficientia* circuli *19lis incidit quidam* alter *error in usu ecclesie circa inventionem termini paschalis singulis annis*, pro *parte quidem tolerandus secundum quem*[4] *non vergit in periculum fidei et bonorum morum*, *sed in parte non* [A: 200v] *dissimulandus prout vergit in aliquod fidei nostre detrimentum*. *Terminus enim pasche, quem secundum legem et dominicam observantiam in evangeliis scriptam*[5] *acceperunt autores computi quartamdecimam lunam primi mensis lunaris, semper debet secundum institutionem et observantiam legalem incidere post equinoctium vernale sive in ipso equinoctio*, *ubi primo occurrit luna 14a*. Sed *autores kalendarii equinoctium annotaverunt immobiliter esse 12 kalendas Aprilis et ideo secundum ipsos et secundum usum ecclesie primus terminus pasche 12 kalendas Aprilis*, *quod* contingit *in 16 anno cicli 19lis*. *Scimus autem quod equinoctium* vernale *post initium kalendarii iam retrocessit* 8 *dies et invenitur esse* 3 *idus que est dies Martii* 13. Fuit enim introitus solis in Arietis primum initium anno Christi 1308 lapsis de Martio 13 diebus, 0 horis, 10 m'a, ad meridiem et longitudinem Tolose.

[1] regulariter] circiter *AB*

[2] singulis] simul *AB*

[3] Ex quo … pasche] Giles of Lessines, *Summa de temporibus* (III.2.18), ed. Steele, 146, l.33–148, l.24

[4] quem] quam *AB*

[5] scriptam] scriptum *AB*

Unde *si terminus pasche regulariter*[1] *acciperetur in prima 14a luna post equinoctium*, *iam non in 16 cicli 19lis primus terminus*, *sed potius in 14 cicli*, *et sic non quereretur 14 luna post <nonas Martis ad terminum pasche, sed potius luna 14 post> pridie kalendas Martii*. Potest autem *tolera*ri *error iste, quia non vergit in aliquod fidei detrimentum*. *Est tamen signum ignorantie et materia derisionis his qui non ambulant in fidei simplicitate*, quia *consequitur ex ipso quod in 3, 8, 11,*[2] *14, 19 anno cicli ecclesia pascha suum celebraret non* in *primo mense lunari secundum naturam*, sed in secundo mense, quod lex ex causis permisit. *Primus enim mensis lunaris <anni> secundum naturam et antiquam legis observantiam haberetur ille cuius luna 14 invenitur in equinoctio vernali vel primo post equinoctium*. *Sed in annis predicti cicli, scilicet 3, 8, 11,*[3] *14, 19, ille lunationes in quibus secundum kalendarium et usum ecclesie pascha celebratur non sunt lunationes in quibus primo post equinoctium luna 14a invenitur*, *sed in* eis *hoc secundo* loco *reperitur* et in aliis omnibus *precedentibus ipsas hoc primo invenitur*.

Consequitur[4] ex predictis alter *error non tolerandus quod*[5] *secundum rationem cicli 19lis et collocationem aurei numeri in kalendario nequit inveniri in anno dominice passionis Dominum nostr*um *fuisse pass*um *in sexta feria luna 15a primi mensis lunaris, sed invenitur aliud*[6] *semper seu contra veritatem evangelicam*, *cui non licet alicui katholico contra*riari, vel accidit aliquid contra aliquam *famosam suppositionem de etate Christi in carne*, *aut contra* communem *opinionem sanctorum autenticam de mense* aut de *die mensis in quo*

[1] regulariter] circiter *AB*

[2] 11] *a.c.* 10 *AB*

[3] 11] *a.c.* 10 *A*; 10 *B*

[4] Consequitur] consequenter *A*; *a.c.* consequenter *B*

[5] quod] qui *AB*

[6] aliud] aliquando *AB*

passus dicitur.[1] Preceptum nempe legis erat quod 14a luna primi mensis completa incipiente vespera [B: 93r] lune decime quinte immolaretur agnus paschalis typum gerens veri agni nostri, ut patet Exodi 13o. Evangeliste etiam concorditer testantur Christum agnum nostrum crucifixum sexta feria parasceves, que est ante Sabathum, ut patet Mathei penultimo, Marci 14o, Luce 22o, Iohannis 19o. Est autem famosa suppositio quod Christus passus sit anno etatis sue 33o. Crisostomus[2] et quidam alii doctores et scriptores cronicarum tradunt eum passum anno etatis sue 34o. Porro communiter asserunt Christum natum 25 die Decembris, que per B litteram designatur. Item dicunt eum passum in die incarnationis sue, que est 25 Martii, id est dies Annunciationis Dominice. Item, si B fuit littera dominicalis in anno incarnationis, sequitur necessario quod in anno nativitatis Christi primo, <qui> sumpsit initium in Martio sequenti ipsam nativitatem, fuerit A littera dominicalis.

De his mallem discere et doceri quam aliquid dicere. Sed ne <frustra> operer in domo Domini offeram saltem pilos caprarum, unde fiunt saga tabernaculi ad protegendum ipsum,[3] specialiter contra linguas quorundam dicentium nos Christianos ignorare quid loquamur de sacramentis nostre salutis, quo scilicet tempore Christus natus sit aut passus. Sic enim mihi obiecit quidam astrologus satis notus et in scientia approbatus, incitans me ad inquirendum in hac materia sibi omnino ignota, sicut ex disputatione crebra inter nos habita comperi. Si non inveni in hac inquisitione veritatem, correctorem non abnuo.[4]

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[1] Giles of Lessines, *Summa de temporibus* (III.2.19), ed. Steele, 148, l. 29–150, l.11

[2] Possibly a reference to Johannes Chrysostomos, "Homiliae in Matthaeum" (10.1), in *Patrologiae cursus completus, series Graeca*, ed. Jacques Paul Migne, 161 vols. (Paris, 1857–66), vol. 57, cols. 183–85.

[3] Exodus 36:14: "Fecit et saga undecim de pilis caprarum ad operiendum tectum tabernaculi."

[4] abnuo] abiuro *B*

<CAP. V>: QUE SUNT NECESSARIA INTENTIONI AUTORIS HIC ENUMERANTUR

Una igitur famosorum[1] et omnium concorditer doctorum et sanctorum opinio est et suppositio quod, ut proximo dictum est, Dominus noster Ihesus Christus natus sit nocte Dominice diei, cum in mane illucesceret 25 dies Decembris, super quam scribitur B pro littera dominicali. Ergo sequenti anno, qui incepit in Martio secundum astrologos, fuit A littera dominicalis, quod patebit falsum esse. Ad inveniendum igitur investigatam veritatem necessarium est inquirere in quo annorum etatis Christi, scilicet 33o an 34o, luna fuerit 15a super aliquam litteram signantem sextam feriam parasceves. Ex quo concluditur quod anno ipso mense illo et die Christus passus sit. Et invenietur quod impossibile est secundum preceptum legis et evangelicam veritatem [A: 201r], salvato quod oportet motu naturali solis et lune, quod Christus passus sit in die vel in vigilia Annunciationis sue <annis> 33 vel 34 revolutis. Oportet ergo investigare que fuerit littera dominicalis in anno primo nativitatis Christi, super quem, sumpto initio a Martio, et fundate sunt plures tabule equationum planetarum. Ex quo habemus quod astronomi annum suum tardius incipiunt duobus mensibus quam computiste, qui in Ianuario incipiunt annum suum. Item necesse est scire quis fuerit annus Christi primus, videlicet bisextilis vel quotus a bisexto. Et quod presciri necesse est oportet inquiri quotus fuerit annus primus Christi in numero cicli 19lis. Scire autem quotus fuerit in ordine annorum cicli solaris ad rem non pertinet, intendo enim annum Christi primum, a quo astronomi suum sumpserunt initium, ponere primum annum eiusdem cicli. Nec ullum sequitur inconveniens, eo quod in circulo ubique est sumere vel finem vel principium.

[1] famosorum] famosarum *AB*

<CAP. VI:> INCEPTIO ANNI SECUNDUM ASTRONOMOS ET SECUNDUM COMPUTISTAS DIVERSA EST. ET QUO ANNO CHRISTUS SIT NATUS

Annos Christi 1316 perfectos divisi per 4 et exierunt cicli 329 et 0 fuit residuum. Sed idem annus[1] secundum computistas fuit bisextilis in Februario, addita die bisextili super sexto kalendas Martii. Et quia idem mensis fuit finis anni 1315, eodem fuit bisextus addito die bisextili in fine mensis. Ex quo sequitur quod annus Christi 1316 fuit secundum astronomos primus post bisextum. Et quia annus Christi 1317 fuit initialis, sicut primus annus Domini, et fuit sumpto initio a Martio secundus post bisextum, igitur annus primus Domini fuit secundus post bisextum secundum astronomos, quod in idem redit cum positione computistarum. Non enim variatur mensis in quo est bisextus secundum hos vel secundum illos. Et secundus annus Domini secundum astronomos fuit tertius post bisextum. Tertius annus Domini in fine Februarii fuit bisextilis, deinde 7us, post 11us, dehinc [B: 93v] 15us, deinde 19us, ut patet in tabulis Tolosanis, 23us et 27us, sicut apparet in tabulis fundatis super Novariam.

<CAP. VII:> DE CICLO SOLARI ET LITTERA DOMINICALI ANNO PRIMO CHRISTI

Annos Christi 1316 perfectos divisi per 28 et exiverunt cicli solares 47. Et quia post divisionem 0 fuit residuum constat quod annus 1316 fuit ultimus annus cicli solaris. Item constat quod annus Christi 1317, in quo iam sumus, est primus annus cicli solaris. Quoniam autem eodem circulo simul currunt anni cicli istius et littere dominicales, necesse est quod quecumque littera est dominicalis in anno Christi 1317 eadem etiam fuit littera dominicalis in primo anno Christi. Sed anno 1317 est B, ergo et

[1] annus] annis *B*

tunc fuit B. Si enim in anno incarnationis B fuisset littera dominicalis et in primo anno, qui fuisset nativitatis, fuisset A, sequeretur necessario quod in anno presenti, scilicet 1317[1], A esset littera dominicalis, quod falsum est secundum usum ecclesie, qui hoc probat. Quod autem obiicitur contra hanc demonstrationem de opinione et suppositione doctorum sanctorum, dicendum est quod propter assertiones huiusmodi, que nulla necessaria assertione probantur, non est sanum recedere a demonstrativa ratione sumpta a suppositione et usu totius ecclesie—quod autem refert si posito quod Christus natus sit, quod non oportuit nec esse nec dici, in die Dominica et quod illam Dominicam eo anno significabat littera C et in Februario precedente diem bisextilem signabat littera D.

<CAP. VIII:> DE AUREO NUMERO SIVE CICLO LUNARI ANNO CHRISTI PRIMO

Annos Christi 1316 perfectos divisi per 19, qui sunt numeri cicli 19lis, exierunt cicli lunares 69. Et quia post divisionem remanserunt 5 et sic inveni quod in anno Christi 1316 erat pro aureo numero senarius, inveni quod toti summe annorum ipsorum debui addere unitatem et totam supremam dividere per 19, ex quo concluditur quod primus annus Christi, nativitatis scilicet, fuit secundus annus cicli 19lis, secundum illud quod dicunt computiste quod annus fuit Domini lune secundus, quando fuit Dominus sacra de virgine natus. Ideo anno incarnationis Christi fuit media coniunctio solis et lune super 24 diem Martii, cui inscribitur pro illo tempore unitas aureus numerus. In anno autem primo nativitatis Domini in Martio fuit media coniunctio solis et lune super 13 diem Martii, elapsis scilicet 12 diebus, 19 horis, 40 minutis, 9 secundis, ubi in kalendario pro anno illo signatus est binarius pro aureo numero. Unde inter alias positiones securius immo verius tenendum quod primus annus

[1] 1317] 1316 *AB*

Christi, super quem fundate sunt tabule plereque equationum tabularum, fuit secundus annus cicli 19lis. Et hoc magis concordat[1] cum annotatione primationis lune in kalendario, quem fundavit Dionisius abbas Romanus super annum Domini 630. Concordat etiam magis cum annotatione primationis lune in kalendario quem ego ipse secundum medios motus, id est medias coniunctiones solis et lune, fundavi super annum Christi 1311. Magis etiam consonat usui ecclesie, que in anno Christi 1311 tenuit ipsum annum pro primo anno et annum 1317 pro septimo cicli 19lis. In hoc etiam Iudeorum observantia consentit. Fuit ergo annus nativitatis Christi, qui et ipse primus erat, annus cicli 19lis secundus. Si enim anno incarnationis Christi primabatur luna super[2] diem [A: 201v] 24 Martii, necesse est ut in anno sequenti et nativitatis Christi primaretur super diem 13, propter quod annus lunaris grossa computatione deficit a quantiate anni solaris 11 diebus. Formabo igitur ex coniunctionibus iam demonstratis, sed premittam kalendarium duorum mensium ad primos annos Christi.

[1] concordat] concordet *AB*

[2] super] *add.* lunam *AB*

<Tab. 1> [A: 202v/ B: 95r]

Martius				Aprilis		
1	D	14		1	G	3
2	E			2	A	11
3	F	3		3	B	
4	G			4	C	19
5	A			5	D	
6	B	19[1]		6	E	8
7	C			7	F	16
8	D	8		8	G	5
9	E	16	Media et vera coniunctio in anno Christi 34	9	A	13
10	F	5		10	B	
11	G	13		11	C	2
12	A			12	D	
13	B	2	Media coniunctio in anno Christi primo	13	E	10
14	C			14	F	18
15	D	10		15	G	
16	E	18		16	A	7
17	F			17	B	
18	G	7		18	C	15
19	A			19	D	
20	B	15	Coniunctio luminarium in anno Christi 33	20	E	4
21	C			21	F	12
22	D	4		22	G	1
23	E	12		23	A	9
24	F	1	Media et vera luna 15 in anno Christi 34	24	B	
25	G	9		25	C	17
26	A			26	D	
27	B	17	Luna prima anno Christi 36	27	E	6
28	C			28	F	14
29	D	6		29	G	
30	E	14		30	A	3
31	F					

[1] 19] 9 *AB*

<CAP. IX:> DE LITTERA DOMINICALI ET AUREO NUMERO ANNO PASSIONIS CHRISTI

Recolligendo igitur que predicta sunt et conclusa ex usu ecclesie dico quod annus incarnacionis Christi fuit secundum computistas bisextilis, et ideo in divisione annorum Christi perfectorum additur unus annus et summa tota dividitur per 4. Item idem annus secundum eos habuit per Ianuarium et Februarium D pro littera dominicali et per reliquos 10 menses C. Et hoc modo posuit Dionisius, qui primum annum Domini posuit decimum cicli solaris. Concordant in hoc astronomi, qui annum incarnationis primum ponunt post bisextum, quia incipiunt in Martio post bisextum et nativitatem Christi. Igitur formabo tabulam in cuius prima linea ponam numerum annorum [B: 94r] cicli solaris, incipiendo a primo anno etatis Christi. Finitis autem annis cicli addam in eadem linea annos etatis Christi usque ad 36. In secunda linea ponam litteras bisextiles usque ad finem tabule. In tertia linea ponam litteram dominicalem, in primo anno Christi scilicet B, et ipsa erit secundum rationem secundi anni post bisextum secundum astrologos et primi post bisextum secundum computistas. In quarta linea ponam numerum annorum cicli 19lis, incipiendo a binario, eo quod Christus natus est[1] secundo anno lunari, quod sic intelligendum est quod primus annus etatis Christi fuit secundus cicli lunaris. In quinta et sexta ponam diem et mensem medie coniunctionis solis et lune, hoc est primationis lune, id est in quo die mensis luna sit prima secundum medium cursum suum. In septima et octava linea ponam diem et mensem medie oppositionis solis et lune, quando scilicet luna est perfecta et completa 14a, incipiente[2] eodem instanti luna 15a, in qua verus agnus Dei Christus immolatus est, adimplens legis preceptum. Deinde, facto intervallo competenti, ponam ordinem litterarum dominicalium incipiendo ab A, propter eos qui

[1] est] sit *B*

[2] incipiente] incipienti *AB*

asserunt B fuisse [A: 202r/ B: 94v] in anno incarnationis litteram dominicalem et in anno nativitatis A. Eadem A significabit ex ipotesi[1] adversarii annum secundum post bisextum, ut patebit in litteris bisextilibus secundum significationem ipsorum. In sequenti linea directe contra A ponam annos cicli 19 secundum ordinem, incipiens a binario, et completo ciclo addam pro reliquis annis incipiens ab uno quousque sufficiat.

Verbi gratia: dicit adversarius, A fuit littera dominicalis in primo anno etatis Christi; dico, eodem anno fuit secundus annus cicli lunaris, ut demonstratum est supra. Et probatur per tabulas mediarum coniunctionum habentes pro radice 0 in mensibus, 12 in diebus, 19 in horis, 40[2] in minutis, 9 in secundis, ad meridiem longitudinis Tolose, quod de facili equari potest ad longitudinem Iherusalem iuxta quam ad unam dietam[3] est Bethlehem, ubi Christus ex virgine natus est. Acceptis autem principiis anno Christi primo, item A littera dominicali ex ipotesi et binario[4] pro anno lunari, procedendo usque ad annum Christi 33 in secunda tabula, inveniemus C litteram dominicalem et 15 pro aureo numero. Et fuit media oppositio luminarium, sicut examinavi, super terium diem Aprilis, elapsis annis 32, 1 mense solari, duobus diebus, 16 horis, 48 minutis. Vera autem oppositio, quantum ad locum, fuit 0 in signis, 10 in gradibus, 37 m'a, 7 2a, 3 3a. Luna autem erat 6/ 10/ 37/ 7/ 30. Et erat verum tempus et equale annis Christi 32bus, 1 mense, 3 diebus, 2 horis, 5 m'a, 54 2a transactis post meridiem. Ergo luna 15 secundum medium cursum fuit tertio die Aprilis super litteram B, que tunc fuit Sabathum. Ex quo sequeretur Christum passum in Sabatho. Item

[1] ipotesi] ypotesi *A*

[2] 40] 48 *AB*

[3] dietam] *a.c.* directa *AB*

[4] binario] b maior *A*; *a.c.* b maior *B*

vera oppositio[1] fuit super quartum diem Aprilis, ubi signatur C, que fuit littera dominicalis [A : 202v/ B : 95r]. Christus ergo passus esset die Dominica vel Sabatho, quod est contra evangelicam veritatem, quamvis verum sit inspecto naturali motu luminarium. Item, ut supra dictum est, si fuisset A littera dominicalis in anno Christi primo, qualitercumque etiam fingeretur annus Christi primus bisextilis vel communis, oportet quod annus Christi 1317 similiter se haberet, quod est contra usum ecclesie, que ipso anno habet B pro littera dominicali.

Si autem dicat adversarius Christum passum anno etatis sue 34, ut sentit Crisostomus,[2] hoc videtur stare non posse. Si enim in anno primo B fuit littera dominicalis, tunc resumptis principiis, scilicet secundo anno cicli, B littera dominicali et secundo anno post bisextum, similiter procedendo invenimus quod in anno Christi 34 annus Christi lunaris 16 et C fuit littera dominicalis. Ergo F fuit quarta feria et erit media et vera oppositio luminarium super eadem feria 24 die Martii. Christus ergo passus fuisset[3] quarta feria, quod falsum est. Fuit etiam eodem die equinoctium vernale et fuit oppositio ipsa ante introitum solis in primum initium Arietis, ut examinavi. Quod si quis Christum dicat passum anno etatis sue 34 et in primo anno Domini A fuisse litteram dominicalem, tunc sumptis eisdem principiis procedendo invenietur quod ipso anno B fuit littera dominicalis et F, super quam fuit media et vera oppositio et luna 15, signabat quintam feriam. Christus ergo passus fuisset quinta feria, quod similiter non est verum. Ideo autem feci mentionem de litteris dominicalibus B et A, quia de istis est contentio, que scilicet earum fuerit littera dominicalis in primo anno, videlicet nativitatis Christi. Sequuntur hic due tabule de quibus iam mentio facta est.

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[1] oppositio] coniunctio *AB*

[2] See n. 2 on p. 43 above.

[3] fuisset] fuit *AB*

<Tab. 2a> [A: 203r/ B: 95v]

Prima Tabula							
Anni	Bisextiles	Dominicales	19les	Dies et menses medie lunationis		Dies et menses medie oppositionis	
1		B	2	13	Mar	27	Mar
2		A	3	1	Apr	15	Apr
3	G	F	4	22	Mar	5	Apr
4		E	5	10	Mar	24	Mar
5		D	6	29	Mar	12[1]	Apr
6		C	7	18	Mar	1	Apr
7	B	A	8	5	Apr	19	Apr
8		G	9	25	Mar	8	Apr
9		F	10	15	Mar	29	Mar
10		E	11	2	Apr	17	Apr
11	D	C	12	23	Mar	6	Apr
12		B	13	11	Mar	25	Mar
13		A	14	30	Mar	13	Apr
14		G	15	20	Mar	3	Apr
15	F	E	16	9	Mar	23	Mar
16		D	17	27	Mar	10	Apr
17		C	18	16	Mar	30	Mar
18		B	19	4	Apr	18	Apr
19	A	G	1	24	Mar	7	Apr
20		F	2	13	Mar	27	Mar
21		E	3	1	Apr	15	Apr
22		D	4	22	Mar	5	Apr
23	C	B	5	10	Mar	24	Mar
24		A	6	29	Mar	12[2]	Apr
25		G	7	18	Mar	1	Apr
26		F	8	5	Apr	19	Apr
27	E	D	9	25	Mar	8	Apr
28		C	10	15	Mar	29	Mar
29		B	11	2	Apr	17	Apr
30		A	12	23	Mar	6	Apr

[1] 12] 15 *AB*

[2] 12] 15 *AB*

31	G	F	13	11	Mar	25	Mar
32		E	14	30	Mar	13	Apr
33		D	15	20	Mar	3	Apr
34		C	16	9	Mar	23	Mar
35	B	A	17	27	Mar	10	Apr
36		G	18	16	Mar	30	Mar

<Tab. 2b>

Secunda Tabula						Dies et menses medie oppositionis	
Anni	Bisextiles	Dominicales	19les	Dies et menses medie lunationis			
1		A	2	13	Mar	27	Mar
2		G	3	1	Apr	15	Apr
3	F	E	4	22	Mar	5	Apr
4		D	5	10	Mar	24	Mar
5		C	6	29	Mar	12[1]	Apr
6		B	7	18	Mar	1	Apr
7	A	G	8	5	Apr	19	Apr
8		F	9	25	Mar	8	Apr
9		E	10	15	Mar	29	Mar
10		D	11	2	Apr	17	Apr
11	C	B	12	23	Mar	6	Apr
12		A	13	11	Mar	25	Mar
13		G	14	30	Mar	13	Apr
14		F	15	20	Mar	3	Apr
15	E	D	16	9	Mar	23	Mar
16		C	17	27	Mar	10	Apr
17		B	18	16	Mar	30	Mar
18		A	19	4	Apr	18	Apr
19	G	F	1	24	Mar	7	Apr
20		E	2	13	Mar	27	Mar
21		D	3	1	Apr	15	Apr
22		C	4	22	Mar	5	Apr
23	B	A	5	10	Mar	24	Mar

[1] 12] 15 *AB*

24		G	6	29	Mar	12[1]	Apr
25		F	7	18	Mar	1	Apr
26		E	8	5	Apr	19	Apr
27	D	C	9	25	Mar	8	Apr
28		B	10	15	Mar	29	Mar
29		A	11	2	Apr	17	Apr
30		G	12	23	Mar	6	Apr
31	F	E	13	11	Mar	25	Mar
32		D	14	30	Mar	13	Apr
33		C	15	20	Mar	3	Apr
34		B	16	9	Mar	23	Mar
35	A	G	17	27	Mar	10	Apr
36		F	18	16	Mar	30	Mar

<CAP. X:> QUO ANNO CHRISTUS PASSUS EST

Famosa est opinio[2] quorundam affirmantium ac dicentium quod Christus eodem die quo annunciatus est et ex intemerata virgine miseriam[3] humane conditionis absque peccati macula assumpsit, revolutis annis 33 vel 34 passus est postremo, anno etatis sue 33o vel 34o secundum diversimode sentientes. Sed inspecta utraque tabula annus Christi 33us fuit 15 cicli et primabatur luna supra 19 vel 20 diem Martii. Ex quo sequitur quod Christus passus sit sexto die post novilunium et quinta feria vel quarta, inspecta littera dominicali in prima vel secunda tabula, scilicet D vel C. Assertio autem eorum qui dicunt quod Christus passus sit anno etatis sue 34 in die 25, cui inscribitur Annunciatio Dominica, reprobatur quia, sicut examinavi, eodem anno primata fuit luna, id est media coniunctio solis et lune,[4] 9 die Martii, elapsis 8 diebus, 7 horis, 14 minutis, 50 secundis ipsius mensis ad meridiem Tholose. Et fuit locus

[1] 12] 15 *AB*

[2] opinio] *add. s.l.* assertio *AB*

[3] miseriam] *a.c.* miseriam, *p.c. s.l.* mesterium(?) *A*; *a.c.* misterium *B*

[4] lune] *add.* fuit *AB*

coniunctionis medie 11 signa, 21 gradus, 34 minuta, 36 secunda. Vera autem coniunctio fuit 11/ 15/ 37/ 6. Subtrahebatur enim a loco coniunctionis vere equatio octave sphere, scilicet 8 gradus 18 minuta, 17 secunda, 8 tertia. Porro tempus equale et verum coniunctionis fuit 8 dies, 15 hore, 29 minuta, 38 secunda de Martio. Demum media oppositio luminarium fuit eodem die et mense 23 diebus, 1 h'a, 36 m'a, 41 2a elapsis. Et tempus verum ad meridiem Tholose fuit 23 dies, 3 hore, 3 minuta, 9 secunda.[1] [A: 203r/ B: 95v] Locus autem solis verus 11 signa, 29 gradus, 44 minuta, 20 secunda, locus lune verus 5/ 29/ 44/ 20. Igitur 24 die Martii fuit luna primi mensis, id est Aprilis, 15a. Sed eodem anno in prima tabula C fuit littera dominicalis, F autem, que est super 24 diem Martii, signabat quartam feriam. Igitur si ipso die passus est Dominus sequitur quod passus sit quarta feria. Si autem passus est in die Anunciationis sequeretur quod passus sit luna 16a, quod est contra preceptum legis, quam Christus *veni*t *non solvere sed adimplere*.[2] Eodem die, ut clarius hic loquar, fuit equinoctium verum et intravit sol primum minutum Arietis elapsis de Martio 23 diebus, 11 horis, 38 minutis. Postremo si Christus passus est, quod tamen nemo dicit, anno etatis sue 35, sequeretur quod passus esset post plenilunium 12 mensis anni 34 etatis sue, quod est secundum legem et evangelium intolerabile inconveniens, quia secundum preceptum legis agnus typicus occidi debuit 15 luna primi mensis, ut habetur Exodi 12. Erat enim annus ille 12us cicli lunaris. [A: 203v]

<CAP. XI:> DE DIE ET ANNO INCARNATIONIS CHRISTI

Preterea eque dubium est et magis de die incarnationis Christi sicut de die passionis Christi. De hac enim sciri potest sumptis simul primis

[1] secunda] *a.c.* signa *A*

[2] Matthew 5:17.

principiis, scilicet de[1] littera dominicali, de anno bisextili et lunari et mediis coniunctionibus ac mediis oppositioni<bu>s luminarium. De die autem Annunciationis nihil certi haberi potest, nisi quod in evangelio sine expressione diei dicitur: *In sexto autem mense missus est angelus Gabriel a Deo ad virginem desponsatam viro*.[2] Et quamvis Dominus Ihesus [B: 96r] Christus tempori non subiaceat, utpote[3] Dominus et factor temporum, qui scivit et elegit tempus et diem in quo nasci voluit, secundum tamen naturam et veritatem de die incertum est nativitatis sue, nisi per revelationem Deus alicui hoc manifestasset. Ipse Christus institutor et salvator omnis nature, qui supra opus et vim naturae, in statu lapse nature humane de virgine nasci voluit, qui modus nascendi solum competebat statui hominum in originali iustitia, ut probat Augustinus 15 *De civitate Dei* et Aymo in omelia *Cum esset desponsata*,[4] ipse, inquam, naturam et cursum eius quantum ad tempus servasse probabiliter dici posset, ut videlicet in utero virginali ab hora incarnationis usque ad horam nativitatis fuisset 273 diebus, que est media mora nascentium. Maior autem mora nascentium est 288 dies, minor vero 258 secundum astronomos. A die autem Annunciationis usque ad diem nativitatis, sicut tenet ecclesia, fuerunt 276 dies, qui sunt plus media mora et minus maiore. Qualiter autem hec sciri possint in moris natorum in utero tractat Ptholomeus in 3o *Quadripartiti*,[5] Omar[6] in fine libri sui *De iudiciis*

[1] de] d *AB*

[2] Luke 1:27–27.

[3] utpote] ut puta *AB*

[4] Haymo of Auxerre, "Homilia VIII. in vigiliis nativitatis Domini," in *Patrologiae cursus completus, series Latina*, ed. Jacques Paul Migne, 221 vols. (Paris, 1844–65), vol. 118, cols. 47–54. Cf. Henri Barré, *Les homéliaires carolingiens de l'école d'Auxerre* (Vatican City: Biblioteca Apostolica Vaticana, 1962), 33–42.

[5] Ptolemy, *Tetrabiblos* (3.1), ed. F. E. Robbins (Cambridge, MA: Harvard University Press, 1940), 222–28.

[6] Omar] Aomor *AB*; *a.c.* Azmor *B*

nativitatum[1] et Hermes ac Abraham Israelita in libro *Iudiciorum nativitatum*.[2] Ego etiam, procedens ex suppositione usus ecclesie, equavi nativitatem Christi omnibus nativitatibus solam super sanctissimam, <sed> non inveni lunam in horoscopo, id est in domo oriente, que est prima domorum 12. Quid igitur utile est altercari de die Annunciationis et an Christus passus sit in ea et annotare tertio die post Annunciationem 'resurrectio prima' supra litteram B, cum tamen ipsa B non fuerit eo anno littera dominicalis, sed D, ut in prima tabula, quam teneo?

<CAP. XII:> DE ANNO ET DIE PASSIONIS CHRISTI

Sit ergo primo anno Domini, qui est nativitatis Christi, B littera dominicalis, sit annus secundus post bisextum, sit annus secundus cicli lunaris, sit annus primus cicli solaris, quia inde incipitur numeratio, procedant simul hec 4 usque ad annum 33m. Et invenietur D littera dominicalis et annus lunaris 15, nihil operante in hoc negotio anno solari inquantum huiusmodi, inveniemus etiam mediam coniunctionem super 19 diem Martii vel 20. Examinavi autem et inveni mediam oppositionem, hoc est principium lune 15, annis Christi 32, mense 1, diebus 2, horis 16, minutis 48, super tertium diem Aprilis, qui est primus mensis et principium mensium in mensibus anni secundum Hebreos, a quibus vocatur Nisan. Et erat ipso die secundum medium cursum suum super litteram B luna 15. Et quia in observantia festorum suorum utuntur Hebrei etate lune secundum medium cursum suum, nihil curantes de vera oppositione et de equali tempore, que augentur vel minuuntur addita vel subtracta distantia cum sua 12a et tempore per divisionem proveniente, idcirco ubicumque est media oppositio et quandocumque, ibi et tunc est principium lune 15 et locus oppositionis; quod tamen adhuc numquam

[1] ʿUmar Ibn al-Farrukhān al-Ṯabarī, *Liber de nativitatibus et interrogationibus*, ed. Luca Gaurico (Venice: Sessa, 1503), fol. 31r.

[2] Abraham Ibn Ezra, *Liber de nativitatibus* (Venice: Ratdolt, 1484), sig. a2r–v.

inveni quod scilicet punctualiter esset in coniunctionibus et oppositionibus idem locus verus et medius et idem tempus medium et verum. Signabat igitur B anno Christi 33'o sextam feriam et erat ipso die luna 15a post equinoctium vernale. Igitur Christus ipso die verus agnus Dei pro salute nostra passus est. Sed quia D fuit et quinta dies Aprilis necessario sequitur quod Christus passus sit 3o die Aprilis et resurrexit 5to die mensis eiusdem, ubi antecedenti die scribitur Ambrosii episcopi. Male igitur scribitur ab antiquis resurrectio prima super diem 27 Martii vel 26, cum impossibile sit eo anno fuisse A vel B litteram dominicalem vel in illis diebus patratam resurrectionem Domini vel passionem eius, ut supra ostensum est. Habemus igitur quod investigando quesivimus, quo scilicet die Dominus Ihesus passus sit, quem invenimus [B: 96v] secundum veritatem motuum naturalium, qui aliter se habere non possunt, eo quod uniformiter semper se [A: 204r] habeant; porro, qualicumque modo aliter quam quesivimus scrutari velimus, nullo modo consequi possumus quod volumus. Ex quo volumus tenere quod sine periculo possumus salva fide.

<CAP. XIII:> QUOD CHRISTUS NON SIT PASSUS ANNO 34[1]

At[2] si quis dicat Christum passum anno etatis sue 34, dico pro[3] constanti hoc fore non posse, ut etiam supra ostensum est, quia eo anno C fuit littera dominicalis et luna prima 9 die Martii, et erat <tempus> coniunctionis medie 0 mensibus, 8 diebus, 14 minutis, 7[4] horis, 50 secundis. Tempus autem medie oppositionis fuit 0 mensibus, 23 diebus, 1 hora, 36 m'a, 41 2a super F litteram diei 24. Ex quo concluditur quod Christus passus est quarta feria, quam tunc F significabat. Ultra annum

[1] 34] quarto et tricesimo *B*

[2] At] Ad *B*

[3] pro] quod *B*

[4] 7] 9 *AB*

34 nullus concedit de 35, eo enim anno ante Martium fuerat bisextus in Februario, et propter hoc ipso anno, scilicet 35, A fuit littera dominicalis et media coniunctio 0/ 27/ 4/ 47/ 32 et media oppositio, quo ad tempus, 1/ 11/ 23/ 10/ 23. Erat enim annus cicli 19lis 17us.[1] Fuit ergo luna 15 die Aprilis 12 super litteram D, que significabat quartam feriam, quod falsum est et repugnat evangelice veritati.[2]

<CAP. XIV:> DE TERMINO CELEBRANDI FESTUM PASCHE

His habitis procedendum est ad inveniendum terminum paschalem, hoc est diem in qua prima lunatio Aprilis sit 15a. Ab antiquo enim consuevit celebrari pascha post equinoctium vernale, quod est in introitu solis in primum initium Arietis, qui est exaltatio solis et domus Martis, et <ubi> secundum cursum naturalem revolvuntur anni mundi. Item consuetum est ex precepto legis ab exitu filiorum Israel de Egypto quod pascha celebratum est luna 15a primi mensis, qui apud Hebreos Nisan, apud Latinos Aprilis vocatur. Et eo tempore, id est luna 15 eiusdem mensis[3] prima post equinoctium, se ipsum pro nobis offerens in ara crucis, pascha verum immolavit. Idem tempus in celebratione pasche ecclesia primitiva observavit usque ad tempora Pii pape, 9 a beato Petro, qui statuit ut uno die, id est Dominica, uno tempore, id est in equinoctio vernali vel post ipsum a luna 14a Aprilis exclusive usque ad lunam 21 eiusdem mensis inclusive, paschalis solemnitas peragatur. Probantur hec in 'de consecratione', dist. III, capitulo 'nosse vos volumus'[4] et capitulo 'celebritatem'[5] et tribus capitulis[1] sequentibus usque ad capitulum

[1] 17us] 19us *B*

[2] veritati] veritatem *B*

[3] mensis] *om. B*

[4] *Decretum magistri Gratiani*, pars III, dist. 3, cap. 21, ed. Emil Friedberg (Leipzig: Tauchnitz, 1879; repr. Graz, 1959), col. 1358.

[5] Ibid., cap. 22, ed. Friedberg, col. 1358.

'perlatum'.[2] Ratio autem quare ecclesia non celebret moderno tempore, id est a diebus Pii pape, suum pascha 15a luna Aprilis est quia Hermes, doctor fidelis et magnus in ecclesia fulgens in diebus eiusdem pape, per angelicam apparitionem in forma pastoris ita observandum ab ecclesia ipsi pape aperuit, ut dicitur in capitulo 'nosse'.[3] Est et alia ratio, ne Christiani iudeizare videantur celebrando pascha nostrum uno eodemque die cum Iudeis, qui nesciunt nec habent quid in[4] suo paschate venerentur.

<CAP. XV:> QUOD FESTUM PASCHE ULTRA STATUTUM TERMINUM IN DECRETIS CELEBRATUR ET QUOD ECCLESIA IN HOC SEQUITUR DOCTRINAM, QUE INSUFFICIENS ET DIMINUTA EST,[5] COMPUTISTARUM

Observaturi igitur antiquam consuetudinem, Christi observantiam, legis preceptum quantum licet ac statutum ecclesie, videamus primo an ecclesia tenens usum suum sequendo regulas computistarum sibi ipsi et decretis suis bene obediat. Constare de facili potest si quis medias oppositiones luminarium inveniat, in quo scilicet puncto luna Aprilis est complete 14a, quod ecclesia secundum usum suum celebrat diem pasche 22 die Aprilis, luna existente 23, quod est contra statuta decretorum suorum predictorum, qui error fuit anno Christi 1291. Et hoc Iudei nobis Christianis eo anno irridendo improperaverunt. Anno 1294 celebrata est dies pasche 18[6] die Aprilis, luna 22. Anno 1298 fuit pascha sexta die Aprilis, luna 24. Item anno 1301 2 die Aprilis, luna 24. Anno sequenti 22 die Aprilis, luna 25. Anno 1304 29 die Martii, luna 22. Post anno 1305

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[1] capitulis] *a.c.* causis *B*

[2] *Decretum magistri Gratiani*, pars III, dist. 3, cap. 23–26, ed. Friedberg, 1359–60.

[3] See n. 4 on p. 59 above.

[4] in] *a.c.* est *B*

[5] que insufficiens et diminuta est] que insufficiens est et diminuta *B*

[6] 18] 19 *AB*

18 die [B: 97r] Aprilis, luna 24. Item 1307 26 die Martii, luna 22.[1] Sequenti anno 14 Aprilis, luna 23. Post hoc anno 1311 11 die Aprilis, luna 22. Anno 1314 7 die Aprilis, luna 22. Item 1318 23 die Aprilis, luna 22. Item 1321 19 die Aprilis, luna 22. Item 1322 11 die Aprilis, luna 24. Anno 1325 7 die Aprilis, luna 24. Porro 1328 3 die Aprilis, luna 23. Anno sequenti [A: 204v] 23 die Aprilis, luna 24. Ecce quot errores infra tam paucos annos sustinuit ecclesia! Sed veritate primationis lune et eius impletionis servata, ut de aliis taceamus, anno Christi 1308 pascha celebrari debuit 7 die Aprilis super litteram dominicalem F secundum usum ecclesie, luna 16. In anno 1311 die quarto Aprilis, luna 15. In anno 1314 die 31[2] Martii, luna 15. In 1318 die 16 Aprilis, luna 15. In anno 1321 die 12 Aprilis, luna 15. Anno sequenti quarto die Aprilis, luna 17. Anno 1324 die 15 Aprilis, luna 21. Anno sequenti ultimo die Martii, luna 17. Anno 1328 die 27 Martii, luna 16. Anno sequenti 16 die Aprilis, luna 17.[3]

Consideret lector, si placet, differentiam dierum paschalium[4] secundum veritatem, que servari deberet, <et> secundum[5] regulas computistarum super falso fundatas, et tamen eos sequitur ecclesia. Contingunt autem huiusmodi errores eo quod secundum regulas computistarum falso accipiuntur medie coniunctiones et oppositiones luminarium, et coadiuvat his erroribus quod, si luna 15 coincidat in diem Dominicam, ecclesia non vult in ipsa die pascha celebrare, sed in Dominica sequente, ne videatur iudaisare. Sed, obedientia mea salva ad ecclesiam et meliori iudicio, Christiani non ideo iudaisarent si celebrarent

[1] Post anno 1305 18 die Aprilis luna 24. Item 1307 26 die Martii luna 22] *mg. A*

[2] 31] 13 *AB*

[3] Anno 1328 die 27 Martii, luna 16. Anno sequenti 16 die Aprilis, luna 17] *mg. A* 27] 17 *B* 16] 15 *A*; *p.c.* 15 *B*

[4] paschalium] *add.* si placet *AB*

[5] secundum] sed *AB*

pascha suum in die Dominica[1] in quo esset luna 15, sicut nec Iudei christianisarent celebrando suum pascha in die Dominica[2] luna 15a.

<CAP. XVI:> MODUS ET PRACTICA INVENIENDI CONIUNCTIONES ET OPPOSITIONES[3] MEDIAS

Ad inveniendum ergo secundum veritatem medias coniunctiones et oppositiones luminarium quantum ad tempus, describam tabulas extractas de tabulis ad meridiem Tholose, quia eas veriores aliis tabulis sum expertus et planior est in eis operatio ad inveniendum medium tempus coniunctionis luminarium, quod est prime incensionis lune, vel oppositionis eorum, quod est impletionis ad principium lune 15e. Sumendi sunt anni Christi perfecti, tam collecti quam expansi, ad novilunium vero querendum sumitur mensis perfectus, sed ad plenilunium mensis imperfectus. Igitur ad inveniendum primationem, hoc est tempus coniunctionis medie, intra tabulam annorum collectorum, si inveneris eos in ordine annorum collectorum, et quod inveneris in descriptione in 5 quadratis eo ordine quo descriptum est scribe. Si autem non inveneris numerum annorum quem queris, accipe proximum minorem sub illis. Scribes quod est in directo eorum in mensibus, diebus, horis, minutis, et secundis. Post hoc, ut pervenias ad numerum annorum quot volueris, sume residuum in annis expansis et quod ibi inveneris in mensibus, diebus, horis, minutis, et secundis in 5 cellulis, ponens unumquodque sub suo genere, scilicet menses sub mensibus, dies sub diebus, horas sub horis, minuta sub minutis, secunda sub secundis. Deinde adde secunda secundis, ex quibus si provenerint 60 scribe in loco secundarum 0 et transfer unitatem ad locum minutorum versus sinistram. Si autem ex additione non provenerint 60 id quod provenit scribe in loco

[1] Dominica] Dominico *AB*

[2] Dominica] Dominico *AB*

[3] coniunctiones et oppositiones] oppositiones et coniunctiones *B*

secundorum. Porro si ex additione proveniant plura quam 60, quia 60 secunda faciunt unum minutum, pone unitatem in loco minutorum et quod superfuerit in locum secundorum. Eodem omnino modo de minutis, ex quorum additione si resultaverint 60 scribe in loco minutorum 0 et transfer in locum horarum unitatem, quia 60 minuta faciunt unam horam, si vero non provenerint in ordine minutorum. Verum si plura [B: 97v] quam 60 evenerint, unum, quod significat 60, sinistra ad locum horarum et residua minuta scribe in loco minutorum. Postea adde horas horis, ex qua additione si resultaverint 24 fac ex eis unum quem pones versus sinistram in loco dierum. Si exiverint pauciores hore quam 24 pone eas in ordine horarum, porro si plures quam 24 fac unum diem quam sinistra ad locum dierum et residuum scribe in ordine horarum. Quarto adde dies diebus, faciens ex 30 diebus 1 mensem aliquando, quandoque vero ex 31 -- quam differentiam docebit te labor et industria, si ad [A: 205r] tempus quod ex omnibus provenerit extrahes medium cursum solis seorsum et seorsum medium cursum lune, ex tabulis propriis --, et quod residuum fuerit pone in ordine dierum et sinistra quod provenerit ex mensibus ad locum mensium. Si autem pauciores dies provenerint ex additione tali scribe eos in ordine dierum. Ultimo adde menses mensibus: si ex additione provenerint pauciores <quam 12> menses, scribe eos in loco mensium. Quod si plures provenerint, 12 <abice> et residuum nota in ordine suo. Postremo, si aliqui menses sunt addendi annis, accipe quod inveneris in directo ipsorum in 5 cellulis, ponas singulum eorum quod inveneris sub genere suo, operans sicut prius, addendo sinistrando, faciendo ex secundis minuta, ex minutis horas, ex horis dies, ex diebus menses; et invenies medias coniunctiones ad tot menses, dies, horas, minuta, secunda. Et erit tempus coniunctionis medium. Similiter omnino operare in inventione temporis impletionis lune seu oppositionis, quando luna incipit esse 15 medio cursu suo. Sequitur nunc tabula de coniunctione et oppositione.

<Tab. 3a> [A: 205v/ B: 98r]

Tempus medie coniunctionis					
Anni collecti	Menses	Dies	Hore	Minuta	Secunda
1296	0	4	12	8	30
1320	0	9	2	12	59
1344	0	13	16	18	28
1368	0	18	6	21	57
1392	11	23	7	42	23
1416	11	27	12	46	52
1440	0	2	11	51	21
1464	0	7	1	55	50
1488	0	11	16	0	19
Tempus medium impletionis					
1296	11	19	17	46	18
1320	11	24	7	50	47
1344	11	28	21	55	16
1368	0	3	11	59	45
1392	0	8	2	4	14
1416	0	12	16	8	43
1440	0	17	6	13	12
1464	11	22	7	33	38
1488	11	26	21	38	7

<Tab. 3b>

	Expansi					
	Anni	Menses	Dies	Hore	Minuta	Secunda
	1	0	9	2	30	1
	2	11	28	11	18	41
b	3	11	16	20	7	21
	4	0	5	17	40	4
	5	11	25	2	28	46
	6	0	14	0	1	29
b	7	0	2	8	50	9
	8	11	21	17	38	49
	9	0	10	15	11	33
	10	0	0	0	0	12
b	11	11	18	8	48	53[1]
	12	0	7	6	21	35
	13	11	26	15	10	15
	14	0	15	12	42	58
b	15	0	3	21	31	38
	16	11	23	6	20	18
	17	0	12	3	53	1
	18	0	1[2]	12	41	41
b	19	11	19	21	30	21
	20	0	8	19	3	4
	21	11	28	3	51	44
	22	11	17	12	40	24
b	23	0	5	10	13	8
	24	11	24	19	1	49

[1] 53] 52 *AB*

[2] 1] 0 *AB*

<Tab. 3c>

Tabula mensium					
Nomina mensium	Menses	Dies	Hore	Minuta	Secunda
Martius	0	29[1]	12	44	3
Aprilis	1	28[2]	1	28	6
Maius	2	27[3]	14	12	10
Iunius	3	26[4]	2	56	13
Iulius	4	25[5]	15	40	16
Augustus	5	24[6]	4	24	20
September	6	22	17	8	23[7]
October	7	22[8]	5	52	26
November	8	20	18	36	30
December	9	20[9]	7	20	33
Ianuarius	10	18	20	4	36
Februarius	11	17	8	48	40

<CAP. XVII:> EXEMPLUM PRACTICE DE CONIUNCTIONE

Bene est ut dictorum ponam exemplum: anno Christi 1318 volui scire medium tempus incensionis lunationis paschalis. Et quia iam dictum numerum non inveni in annis Christi collectis accepi numerum minorem quam 1320, proximiorem tamen, scilicet 1296. In cuius directo inveni 0 in mensibus, 4 in diebus, 12 in horis, 8 in minutis, 30 in secundis, scribens ea in tabula. Deinde accepi de annis expansis 21, qui cum primis faciunt annos 1317 Christi perfectos, in quorum 21 directo supersunt 11 in mensibus, 28 in diebus, 3 in horis, 51 in minutis, 44 in secundis. Post hoc accepi mensem perfectum, scilicet Martium, in cuius directo habui 0

[1] 29] 28 *AB*
[2] 28] 27 *AB*
[3] 27] 26 *AB*
[4] 26] 25 *AB*
[5] 25] 24 *AB*
[6] 24] 23 *AB*
[7] 23] *a.c.* 29 *A*; 22 *B*
[8] 22] 21 *AB*
[9] 20] 19 *AB*

in mensibus, 29 in diebus, 12 in horis, 44 in minutis, <3 in secundis>, quibus aggregatis exivit 1 in mensibus, 1 in diebus, 4 in horis, 44 in minutis, 17 in secundis. Eundem numerum temporis medie coniunctionis inveni in kalendario quem formavi super totum ciclum 19lem, quo ad dies et horas et minuta et secunda omnium mensium.

<Tab. 4> [A: 205r/ B: 97v]

Anni	Menses	Dies	Hore	Minuta	Secunda
1296[1]	0	4	12	8	30
21	11	28	3	51	44
Martius	0	29	12	44	3
Anni	Menses	Dies	Hore	Minuta	Secunda
1317[2]	1	1	4	44	17

<CAP. XVIII:> EXEMPLUM PRACTICE DE OPPOSITIONE

Post hoc querens impletionem lune intravi tabulas impletionis medie et accepi quod inveni in directo annorum Christi 1296, scilicet 11/ 19/ 17/ 46/ 18. Item 21 annos expansos perfectos, in directo quorum habui 11/ 28/ 3/ 51/ 44.[3] In directo Aprilis mensis imperfecti inveni 1/ 28/ 1/ 58/ 6, post quorum omnino aggregationem exivit 1317[4] in annis perfectis, unus mensis, 15[5] dies, 23 hore, 6 minuta, 8 secunda. Est ergo <luna> 14 mensis Aprilis completa transactis anni Christi perfectis 1317, 1 in mense, 15[6] in diebus, 23 hore, 6[7] minuta, 8[1] secunda [A: 206v/ B: 98r],

[1] 1296] 1269 *AB*
[2] 1317] 1318 *AB*
[3] 44] 4 *AB*
[4] 1317] *a.c.* 130...7 *A*
[5] 15] 13 *AB*
[6] 15] 13 *AB*
[7] 6] 23 *AB*

anno Christi imperfecto 1318, et incipit in ipso puncto luna 15, que semper est terminus paschalis. Et post hunc terminum consuevit ecclesia celebrare proxima Dominica diem pasche, in tantum quod si luna 15 evenerit die Dominica <non in ipso die celebrat>, sed in dominica sequenti. Quacumque igitur hora cuiuscumque diei inveneris, incipe numerare lunam 15am. Ipsa dies est terminus paschalis, omissis omnibus difficultatibus quibus se implicuerunt patres nostri ad inveniendum hunc terminum.

<Tab. 5> [A: 205v/ B: 98r]

Anni	Menses	Dies	Hore	Minuta	Secunda
1296	11	19	17	46	18
21	11	28	3	51	44
Aprilis	1	28	1	28	6
Tempus aggregatum					
1317	1	15[2]	23	6	8

<CAP. XIX:> PRACTICA TABULE DE INTERVALLO SECUNDUM ECCLESIAM

Faciam ergo tabulam in qua secundum usum ecclesie indubitanter et semper invenies diem pasche. Et quia a multo tempore preterito et etiam moderno sumpta est primo prima lunatio Aprilis in anno cicli 19lis 16o, eo quod talis lunatio terminetur in Aprili et 'in quo completur mensi lunatio detur', ibi primo acceperunt lunam primam Aprilis, quod erat 8 Martii. Et quia luna 14 fuit 12 kalendas Aprilis post equinoctium vernale, ideo 11 kalendas Aprilis signabatur primum pascha. Tene ergo pro regula quod, invento in prima linea aureo numero significante annum cicli cuius diem pasche queris, quere in secunda linea litteram dominicalem positam post aureum numerum. Et in tertia linea in directo littere dominicalis

[1] 8] 6 *AB*

[2] 15] 13 *AB*

habebis numerum ebdomedarum inter diem nativitatis Domini et Quadragesimam, id est Dominicam ‘Invocavit’. In quarta invenies dies superfluos septimane non complete, in quinta et in sexta diem et mensem in quo consuevit ecclesia celebrare diem pasche.

<CAP. XX>

Post hec depingam aliam tabulam in qua deberet secundum veritatem mediarum oppositionum, quo ad tempus, pascha celebrari. Et tunc videbitur manifeste quantum distet usus ecclesise a veritate et a preceptis canonum suorum. Et assignabo huiusmodi diversitatis rationem: 16 [A: 206r] enim, que ponebantur et ponuntur adhuc super 8 diem Martii, ubi primo, ut dicunt, inveniebatur prima lunatio Aprilis, iam invenitur super 4 diem Martii et 4 horas, 41 minuta, 45 secunda. Item annotatio numeri 16 cadit super[1] quintum diem Martii. Ex quo apparet quod lunationum primatio anticipata est ad 4 dies et plus ab anno Christi primo usque ad annum [B: 98v] Domini 1312. Fuit etiam, ut sepe dictum est, anno Christi primo secundus annus cicli 19lis et media coniunctio super 12 dies, 19 horas, 40 minuta, 9 secunda. In anno autem Christi 1312 fuit annus cicli 19lis secundus et fuit primata luna super dies 8, horas 9, 40 minuta, 8 secunda. Et fuit differentia temporis inter has duas coniunctiones 4 dies, 10 hore, 0 m'a, 1 2a. Accipitur igitur prima[2] primatio lunationis Aprilis, cuius luna 14[3] cadit post equinoctium vernale proximo, vel si contingat in equinoctio ipso, et in prima die que est post 14 lunam, si est Dominica, celebratur dies pasche usque ad 21am lunam inclusive, ut ‘de consecratione’, dist. 3, capitulo ‘celebritatem’, ubi manifeste dicitur quod in Dominica post 14 lunam rite celebratur dies

[1] super] semper *B*

[2] prima] primo *AB*

[3] 14] 15 *AB*

pasche.[1] Sit ergo terminus pasche luna 14 in die Sabathi: quando est[2] in crastino, que est dies Dominica et luna 15, tunc rite[3] celebraretur dies paschatis, presertim cum sic statuit ecclesia in capitulo iam dicto, et quidem Christiani non viderentur in hac observatione iudaisare cum in multis aliis temporibus discrepent a Iudeis in celebritate diei paschalis. A die autem 3o Martii, super quem scribuntur 8, non potest sumi in 8 anno cicli 19lis prima luna Aprilis. Idem enim mensis habet 29 lunationes et si prima lunatio Aprilis acciperetur super 3 diem Martii, lunatio 29a eveniet ultimo die Martii. Et sicut non accipitur ab 8, sic nec in aliis annis qui sunt embolismales scilicet 3us, 6us, 8us, 11us, 14us, 17us et 19us. Signatur[4] autem equinoctium pro isto tempore 13 die Martii, in crastino beati Gregorii pape, et 14 luna eveniens post equinoctium huiusmodi est primi mensis et signatur pro termino paschali super 18 diem Martii. Et sic primum pascha inscribendum est super 19 diem Martii, ut patet in hac tabula, et ultimum pascha erit super 22 diem Aprilis.

[1] *Decretum magistri Gratiani*, pars III, dist. 3, cap. 22, ed. Friedberg, col. 1358–59.

[2] quando est] quem *AB*

[3] rite] non *AB*

[4] signatur] S(a) *AB*

<Tab. 6> [A: 206r/ B: 98v]

Tabula intervalli prima					
Aureus numerus	Littera Dominicalis	Ebdomade	Concurrentes	Dies pasche	Mensis
16					
5	D	6	3	22	Mar
	E	6	4	23	Mar
13	F	6	5	24	Mar
2	G	6	6	25	Mar
	A	7	0	26	Mar
10	B	7	1	27	Mar
	C	7	2	28	Mar
18	D	7	3	29	Mar
7	E	7	4	30	Mar
	F	7	5	31	Mar
15	G	7	6	1	Apr
4	A	8	0	2	Apr
	B	8	1	3	Apr
12	C	8	2	4	Apr
1	D	8	3	5	Apr
	E	8	4	6	Apr
9	F	8	5	7	Apr
	G	8	6	8	Apr
17	A	9	0	9	Apr
6	B	9	1	10	Apr
	C	9	2	11	Apr
14	D	9	3	12	Apr
3	E	9	4	13	Apr
	F	9	5	14	Apr
11	G	9	6	15	Apr
	A	10	0	16	Apr
19	B	10	1	17	Apr
8	C	10	2	18	Apr
	D	10	3	19	Apr
	E	10	4	20	Apr
	F	10	5	21	Apr
	G	10	6	22	Apr
	A	11	0	23	Apr
	B	11	1	24	Apr
	C	11	2	25	Apr

<Tab. 7> [A: 206v/ B: 99r]

Tabula secunda intervalli					
Aureus numerus	Littera Dominicalis	Ebdomade	Concurrentes	Dies pasche	Mensis
16	A	6	0	19	Mar
5	B	6	1	20	Mar
	C	6	2	21	Mar
13	D	6	3	22	Mar
2	E	6	4	23	Mar
	F	6	5	24	Mar
10	G	6	6	25	Mar
	A	7	0	26	Mar
18	B	7	1	27	Mar
7	C	7	2	28	Mar
	D	7	3	29	Mar
15	E	7	4	30	Mar
4	F	7	5	31	Mar
	G	7	6	1	Apr
12	A	8	0	2	Apr
1	B	8	1	3	Apr
	C	8	2	4	Apr
9	D	8	3	5	Apr
	E	8	4	6	Apr
17	F	8	5	7	Apr
6	G	8	6	8	Apr
	A	9	0	9	Apr
14	B	9	1	10	Apr
3	C	9	2	11	Apr
	D	9	3	12	Apr
11	E	9	4	13	Apr
	F	9	5	14	Apr
19	G	9	6	15	Apr
8	A	10	0	16	Apr
	B	10	1	17	Apr
	C	10	2	18	Apr
	D	10	3	19	Apr
	E	10	4	20	Apr
	F	10	5	21	Apr
	G	10	6	22	Apr

<CAP. XXI>

Volens ergo operari secundum hanc tabulam sciat quotus sit annus cicli 19lis in quo vult scire quod querit, quem annum inveniet in prima linea versus sinistram. Deinde sciat que sit littera dominicalis cuiusque anni, quam inveniet vel in directo aurei numeri vel post ipsum in linea secunda versus dextrum. In tertia versus dextrum inveniet in directo littere dominicalis numerum ebdomedarum inter nativitatem Domini et primam Dominicam in Quadragesima; dies vero ebdomade imperfecte occurrent sibi in linea quarta dextrorsum. Porro in quinta et sexta videbit diem mensis in quo secundum veritatem pro tempore in quo sumus, hoc est anno Christi 1317, deberet peragi dies paschalis, si placeret ecclesie. Dixi autem 'pro tempore in quo sumus',[1] quia futuris temporibus non accipietur luna prima Aprilis, post cuius 14 post equinoctium vernale celebretur pascha, ab aureo numero, verbi gratia, 16, 5, 13 etc., sed ab aliis numeris sequentibus, sicut olim quando 6 vel 14 fuit signatum super primum diem Martii, sicut facile patet volenti inspicere. De hoc tamen faciam postea mentionem, quando descripsero correctionem kalendarii usualis, non intendens ad unguem facere calculationem, sed quanto possum propinquius accedam ad veritatem, grossa tamen computatione more computistarum, hoc premonens quod diem incipio a meridie antecedentis diei. [B: 99r]

<CAP. XXII>

Ad sciendum quod futuris temporibus non accipientur prime lune Aprilis in anno 16 super diem quintum Martii, ubi signantur[2] 16, non a die super quem scribuntur 13, neque ubi scribuntur 5, nec ubi [A: 206v] ponuntur duo, et ita de reliquis, considerandum est quod sicut in anno Christi

[1] hoc est anno Christi 1317, deberet peragi dies paschalis, si placeret ecclesie. Dixi autem 'pro tempore in quo sumus'] *mg. A*

[2] signatur] *add. s.l.* signando *A*

primo, anno cicli 19lis secundo, erat luna prima super 13 diem Martii sic 0/ 12/ 19/ 40/ 9, sic revolutis annis Christi 380, cicli 19lis secundo[1], fuit media coniunctio luminarium super 11[2] dies, 14 horas, 0 minuta, 51 secunda.[3] Et fuit differentia temporis 1 dies, 5 hore, 39[4] minuta, 18 secunda. Item annis Christi 760 perfectis secundo anno cicli 19lis fuit media coniunctio solis et lune super 10 dies, 9 horas, 14[5] minuta, 53 secunda. Et fuit differentia temporis inter has duas coniunctiones 1 dies, 4[6] hore, 45[7] minuta, 58[8] secunda. Postea eodem anno cicli 19lis transactis Christi annis 1140 fuit media coniunctio super 9 dies, 4 horas, 42 minuta, 46 secunda. Et fuit differentia temporis inter duas coniunctiones 1 dies, 4[9] hore, 32[10] minuta, 7 secunda.[11] Deinde eodem anno cicli 19lis transactis annis Christi 1520 erit media coniunctio luminarium super dies 7 Martii, 23 horas, 42 minuta, 40[12] secunda. Deinde eodem anno eiusdem cicli 1900 completis erit media coniunctio super 6 dies, 18 horas, 41[13] minuta, 44 secunda. Post<ea> eodem anno cicli 2280 annis Christi elapsis erit media coniunctio solis et lune super 5 dies 13 horas, 43 minuta, 43 secunda. Item eodem anno cicli 19lis Christi annis[14] finitis 2660 erit media coniunctio super 4 dies Martii, 8 horas, 43 minuta, 42

[1] secundo] 2i *AB*
[2] 11] 13 *AB*
[3] secunda] secundis *AB*
[4] 39] *add. s.l.* 51 AB
[5] 14] 10 *AB*
[6] 4] 5 (4 *mg.*) *AB*
[7] 45] 0 (45 *mg.*) *AB*
[8] 58] 2 (58 *mg.*) *AB*
[9] 4] 5 (4 *mg.*) *AB*
[10] 32] 0 (32 *mg.*) *AB*
[11] 7 secunda] circiter (7 *mg.*) *AB*
[12] 40] 4 (40 *mg.*) *AB*
[13] 41] *add. s.l.* 42 AB
[14] annis] *add. s.l.* AB

secunda. Et ex tunc desinet prima luna Aprilis accipi[1] super aureum numerum qui est 2. Item eodem anno cicli 19lis transactis anni Christi 3040 erit media coniunctio super 3[2] dies Martii, 3 horas et aliquot minutis. Postea eodem anno eiusdem cicli terminatis annis 3420 erit media coniunctio super 1 diem Martii, 21 horas, 43[3] minuta, 52[4] secunda. Postremo anno secundo eiusdem cicli annis Christi 3800 <elapsis> erit media coniunctio super 0 in Martio, horas 16, minuta 41, secunda 49. Ex his manfeste patet quod verum est quod demonstrare volui. De sumenda ergo prima luna Aprilis quicumque fuerit aureus numerus, indifferens enim est, tene hos versus:

> A quarto Martis primam perquirito[5] lunam,
> Et post bis septem lux proxima pascha celebrat.

Accepta enim luna prima in Martio a quarta die ipsius inclusive, vel post ipsum quartum diem quicumque fuerit aureus numerus pro tempore, lunatio ipsa terminabitur in Aprili. Ponam ergo hic exemplum premisse demonstrationis tabulam hanc, ut clarius pateat mea intentio.

---

[1] prima … accipi] primam lunam Aprilis accepi *AB*

[2] 3] tres *B*

[3] 43] 44 *AB*

[4] 52] 5 *AB*

[5] perquirito] per quinto *A*; *a.c.* per quinto, *p.c. s.l.* perquirito *B*

<Tab. 8> [A: 206v/ B: 99r]

Anni	Menses	Dies	Hore	Minuta	Secunda
1	0	12	19	40	9
380	0	11	14	0	51
760	0	10	9	14	53
1140	0	9	4	42	46
1520	0	7	23	42	40
1900	0	6	18	41	44
2280	0	5	13	43	43
2660	0	4	8	43	42
3040	0	3	3	40	40
3420	0	1	21	43	52
3800	0	0	16	41	49

<CAP. XXIII>

Intentio mea principaliter inquirebat de die prime resurrectionis et esus veri agni et potus vivifici sanguinis eius. Et secundo volui inquirere de terminis et diebus ceterorum festorum paschalium, prout nunc currit lunatio prima Aprilis, que tempore isto invenitur super quintum diem Martii in littera A, ubi nunc signantur 16 anni cicli 19lis. Eadem tamen 16 signabuntur super quartum diem Martii, quia ab eo poterit numerari luna prima Aprilis quasi a remotissimo principio. Nec fuit mihi voluntas ullas dare regulas de etate lune in quocumque die, nedum[1] in capitibus mensium, circa quod computiste per regulas lunares et epactas enervaverunt[2] semetipsos et suos discipulos, nescientes quod impossibile est regulas eorum semper fixas et infallibiles permanere propter anticipationem coniunctionum, quam scire non poterant, eo quod est altioris scientie et profundioris ac nobilioris artificis demonstratoris astronomi, qui tamen in operationibus suis ulterius subservit astrologo. Obmisi ergo scientiam de clavibus terminorum, si scientia dici potest quod superfluum est, cum omnia festa mobilia dependeant a festo

[1] nedum] *p.c. mg.* nec non *AB*

[2] enervaverunt] *a.c.* enarravert *B*

paschali. Sunt enim regule ille de clavibus terminorum [B: 99v] quedam involuta et obcecationes, non lumina intellectus. Facile insuper est invenire etatem lune in singulis diebus, si inspiciatur quo die cuiuscumque mensis luna sit prima, quod est ipsa die et hora et parte hore qua est media coniunctio luminarium, que est sufficiens notitia vulgari computationi. Benedicatur filius Dei, qui me perduxit ad finem eius quod[1] ad gloriam sui et edificationem fidelium scribere volui.

[1] quod] quid *B*

[A: 207r/ B: 99v]

Marcius				
Numerus dierum	Aureus numerus	Littere feriarum		
1 2	19	D E	Kalende 6	Martii[1]
3 4	8	F G	5 4	
5 6	16 5	A B	3 2	
7 8	 13	C D	None 8	
9 10	2 10	E F	7 6	
11 12	 18	G A	5 4	Gregorii pape[2]
13 14	 7	B C	3 2	
15 16	15	D E	Ydus 17	Kalende Aprilis
17 18	4	F G	16 15	
19 20	12	A B	14 13	Ioseph nutritoris domini
21 22	1 9	C D	12 11	Benedicti abbatis
23 24	 17	E F	10 9	
25 26	6 14	G A	8 7	Annunciatio Christi
27 28	 3	B C	6 5	
29 30	11	D E	4 3	
31	19	F	2	

[1] Kalende Martii] *om. B*

[2] Gregorii pape] *om. B*

Aprilis				
Numerus dierum	Aureus numerus	Littere feriarum		
1 2	 8	G A	Primo 4	Kalende Aprilis
3 4	16	B C	3 2	Ambrosii episcopi
5 6	5 13	D E	None 8	
7 8	2	F G	7 6	
9 10	10	A B	5 4	
11 12	18 7	C D	3 2	
13 14	 15	E F	Idus 18	Kalende Maii
15 16	 4	G A	17 16	
17 18	12	B C	15 14	
19 20	1	D E	13 12	
21 22	9 17	F G	11 10	
23 24	6	A B	9 8	
25 26	14 3	C D	7 6	Marci Evangeliste
27 28	 11	E F	5 4	
29 30	19	G A	3 2	Petri Martiris

[A: 207v/ B: 100r]

Maius				
Numerus dierum	Aureus numerus	Littere feriarum		
1 2	8	B C	Primo 6	Kalende Maii Philip. et Iacobi
3 4	16	D E	5 4	Inventio S. Crucis
5 6	5 13	F G	3 2	Ioannis ante portam latinam
7 8	2	A B	None 8	
9 10	10 18	C D	7 6	
11 12	7	E F	5 4	Nerei et Achillei martirum
13 14	15	G A	3 2	
15 16	4	B C	Ydus 17	Kalende Iunii
17 18	12	D E	16 15	
19 20	1 9	F G	14 13	
21 22	17	A B	12 11	
23 24	6 14	C D	10 9	
25 26	3	E F	8 7	Urbani pape
27 28	11	G A	6 5	
29 30	19	B C	4 3	
31	8	D	2	

Iunius				
Numerus dierum	Aureus numerus	Littere feriarum		
1 2	16	E F	Primo 4	Kalende Iunii Marcellini et Petri
3 4	5 13	G A	3 2	
5 6	2	B C	None 8	
7 8	10	D E	7 6	
9 10	16 7	F G	5 4	
11 12	 15	A B	3 2	Barnabe apostoli
13 14	 4	C D	Idus 18	 Kalende Iulii
15 16	12	E F	17 16	Viti et sociorum eius
17 18	1	G A	15 14	
19 20	9 17	B C	13 12	
21 22	6	D E	11 10	
23 24	14 3	F G	9 8	 Nativitas sancti Ioannis baptiste
25 26	 11	A B	7 6	
27 28	19	C D	5 4	
29 30	8	E F	3 2	Petri et Pauli apostolorum

[A: 208r/ B: 100v]

Iulius				
<Numerus dierum>	<Aureus numerus>	<Littere feriarum>		
1 2	16	G A	Kalende 6	Iulii
3 4	5 13	B C	5 4	
5 6	2	D E	3 2	
7 8	10 18	F G	None 8	
9 10	 7	A B	7 6	 Septem fratrum
11 12	 15	C D	5 4	
13 14	4	E F	3 2	
15 16	12	G A	Ydus 17	Divisio apostolorum Kalende Augusti
17 18	1 9	B C	16 15	
19 20	 17	D E	14 13	
21 22	6 14	F G	12 11	 Marie Magdalene
23 24	 3	A B	10 9	
25 26	 11	C D	8 7	Iacobi apostoli
27 28	19	E F	6 5	
29 30	8 16	G A	4 3	
31		B	2	

Augustus				
<Numerus dierum>	<Aureus numerus>	<Littere feriarum>		
1 2	5	C D	Kalende 4	Augusti
3 4	13 2	E F	3 2	
5 6	10	G A	None 8	Dominici patris predicatorum
7 8	17 7	B C	7 6	
9 10	15	D E	5 4	Laurentii martiris
11 12	4	F G	3 2	
13 14	12	A B	Idus 19	Kalende Septembris
15 16	1	C D	18 17	Assumptio virginis gloriose
17 18	9 17	E F	16 15	
19 20	6	G A	14 13	
21 22	14 3	B C	12 11	Thimotei
23 24	11	D E	10 9	Bartholomei apostoli
25 26	19	F G	8 7	
27 28	8	A B	6 5	Augustini luminis ecclesie
29 30	16	C D	4 3	
31	5	E	2	

[A: 208v/ B: 101r]

September				
<Numerus dierum>	<Aureus numerus>	<Littere feriarum>		
1 2	13 5	F G	Kalende 4	Septembris. Egidii
3 4	 10	A B	3 2	
5 6	18	C D	None 8	
7 8	7	E F	7 6	Nativitas virginis gloriose
9 10	15 4	G A	5 4	
11 12	 12	B C	3 2	
13 14	 1	D E	Idus 18	Kalende Octobris
15 16	9	F G	17 16	
17 18	17 6	A B	15 14	
19 20	14	C D	13 12	
21 22	3	E F	11 10	Mathei evangeliste
23 24	11 19	G A	9 8	
25 26	 8	B C	7 6	
27 28	16	D E	5 4	
29 30	5	F G	3 2	Omnium angelorum Ieronimi confessoris

October				
<Numerus dierum>	<Aureus numerus>	<Littere feriarum>		
1 2	13 2	A B	Kalende 6	Octobris. Remigii episcopi
3 4	10	C D	5 4	
5 6	18 7	E F	3 2	
7 8	 15	G A	None 8	
9 10	 4	B C	7 6	Dionisii et sociorum eius
11 12	12	D E	5 4	
13 14	1	F G	3 2	
15 16	9 17	A B	Idus 17	 Kalende Novembris
17 18	6	C D	16 15	 Luce evangeliste[1]
19 20	14	E F	14 13	
21 22	3 11	G A	12 11	Undecim milium virginum
23 24	19	B C	10 9	
25 26	8	D E	8 7	
27 28	16 5	F G	6 5	 Simonis et Iude
29 30	 13	A B	4 3	
31	2	C	2	

[1] Luce evangeliste] *om. B*

[A: 209r/ B: 101v]

November				
<Numerus dierum>	<Aureus numerus>	<Littere feriarum>		
1 2	 10	D E	Kalende 4	Novembris. Omnium sanctorum
3 4	 18	F G	3 2	
5 6	 7	A B	None 8	
7 8	15 4	C D	7 6	
9 10	 12	E F	5 4	
11 12	 1	G A	3 2	Martini episcopi
13 14	9	B C	Idus 18	 Kalende Decembris
15 16	17 6	D E	17 16	
17 18	14	F G	15 14	
19 20	3	A B	13 12	Elisabeth
21 22	11 19	C D	11 10	
23 24	 8	E F	9 8	Clementis pape
25 26	16	G A	7 6	
27 28	5	B C	5 4	
29 30	13 2	D E	3 2	 Andree apostoli

December				
<Numerus dierum>	<Aureus numerus>	<Littere feriarum>		
1 2	10	F G	Kalende 4	Decembris
3 4	18	A B	3 2	
5 6	7 15	C D	None 8	Nicolai episcopi
7 8	 4	E F	7 6	
9 10	12	G A	5 4	
11 12	1	B C	3 2	
13 14	9 17	D E	Idus 19	Lucie Kalende Ianuarii
15 16	6	F G	18 17	
17 18	14 3	A B	16 15	
19 20	 11	C D	14 13	
21 22	 19	E F	12 11	Thome apostoli
23 24	8	G A	10 9	
25 26	16 5	B C	8 7	Nativitas Domini Ihesu Christi
27 28	 13	D E	6 5	
29 30	2	F G	4 3	
31	10	A	2	Silvestri pape

[A: 209v/ B: 102r]

Ianuarius				
<Numerus dierum>	<Aureus numerus>	<Littere feriarum>		
1 2	19	A B	Kalende 4	Ianuarii. Circumcisio Domini
3 4	8	C D	3 2	
5 6	16	E F	None 8	Epiphania Domini
7 8	5 13	G A	7 6	
9 10	 2	B C	5 4	
11 12	10	D E	3 2	
13 14	18 7	F G	Idus 19	Kalende Februarii
15 16	15	A B	18 17	S.[1] frater Theodericus
17 18	4 12	C D	16 15	Prisce virginis
19 20	 1	E F	14 13	
21 22	 9	G A	12 11	
23 24	17	B C	10 9	
25 26	6	D E	8 7	Conversio S. Pauli
27 28	14 3	F G	6 5	
29 30	11	A B	4 3	
31	19	C	2	

[1] S.] *AB*; *an ex* o(biit)*?*

Februarius				
<Numerus dierum>	<Aureus numerus>	<Littere feriarum>		
1 2	8	D E	Kalende 4	Februarii. Ignatii episcopi Purificatio virginis
3 4	16	F G	3 2	
5 6	5 13	A B	None 8	
7 8	 2	C D	7 6	
9 10	 10	E F	5 4	
11 12	18 7	G A	3 2	
13 14	 15	B C	Idus 16	 Kalende Martii
15 16	 4	D E	15 14	
17 18	12	F G	13 12	
19 20	1	A B	11 10	
21 22	9 17	C D	9 8	 Cathedra Sancti Petri
23 24	 6	E F	7 6	 Mathie apostoli
25 26	14 3	G A	5 4	
27 28	 11	B C	3 2	

Et sic est finis kalendarii Ioannis de Muris de observantia termini paschalis.