



# Theodore of Tarsus and the Study of Computus at the Canterbury School

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## ABSTRACT

The Irish *Computus Einsidlensis* (*CE*) of c. 700 contains a reference to a certain Theodore. This article makes the case that this Theodore should be identified with Theodore of Tarsus, archbishop of Canterbury from 668/9 to his death, 690, on the basis of comparison not only with other contemporary Latin versions of the same *argumentum*, but also Byzantine *computi*. The passage under discussion represents the only known computational tract that can with confidence be ascribed to the famous Canterbury school under Theodore and Hadrian. From the evidence provided, it appears that Theodore learnt this algorithm while studying in the Byzantine Empire and introduced it through his teaching to his Canterbury audience; his Irish students brought it to Ireland, from where it got popularised on the Continent through Willibrord.

## INTRODUCTION: THEODORE OF TARSUS AND THE SCHOOL OF CANTERBURY\*

The school of Canterbury has attracted considerable attention, not least because of Bede's praise of its curriculum and key figures, Theodore and Hadrian. Unfortunately, sources on these two scholars and the school itself are sparse and mainly limited to Bede's account in his *Historia ecclesiastica* and *Historia abbatum*, and a passage in Aldhelm's Letter to Heahfrith.<sup>1</sup> Bede's information can be summarised as

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<sup>1</sup> For the purpose of this article, see especially Bede, *Historia ecclesiastica* [hereafter *HE*] iii. 29, iv. 1 and 2, v. 8, 20, and 24, ed. C. Plummer, *Venerabilis Baedae Historiam ecclesiasticam gentis Anglorum, Historiam abbatum, Epistolam ad Ecgbertum, una cum Historia abbatum auctore anonymo*, 2 vols. (Oxford, 1896) I, 196–9, 201–6, 294–6, 330–1, 354–5, with still unsurpassed commentary in vol. II; for translation, see also B. Colgrave and R. A. B. Mynors, *Bede's Ecclesiastical History of the English People* (Oxford, 1969), pp. 318–23, 328–37, 472–5, 530–1, and 564–5; Bede, *Historia abbatum* c. 3, ed. and trans. C. Grocock and I. N. Wood, *Abbots of Wearmouth and Jarrow: Bede's Homily i. 13 on Benedict Bishop; Bede's 'History of the Abbots of Wearmouth and Jarrow'; the Anonymous 'Life of Ceolfrith'; Bede's 'Letter to Ecgbert, Bishop of York'* (Oxford, 2013), pp. 26–9; Aldhelm, *Epistola ad Eahfridum*, ed. R. Ehwald in *MGH Auct. ant.* 15 (Berlin, 1919), 486–94, at 492–3, with M. Lapidge and M. Herren, *Aldhelm: the Prose Works* (Cambridge, 1979), pp. 160–4, at 163.

follows: Theodore, a native of Tarsus in Cilicia, was chosen by Pope Vitalian in 667 as the new archbishop of Canterbury after the previous candidate Wighard had died in Rome before he could be consecrated. Bede relates that Theodore's appointment happened upon suggestion by Hadrian, a native of Northern Africa, who had himself declined the position and who was then sent along to accompany Theodore, to ensure that Theodore would not spread Eastern teachings contrary to Roman doctrine. While Theodore was consecrated in 668 and arrived in England a year later, Hadrian in turn was held up in the Frankish kingdoms for another year before he could assume the abbacy of St Peter and Paul at Canterbury, allowing his predecessor Benedict Biscop to leave for the north of England.

Bischoff and Lapidge have further argued – based mainly on their analysis of the so-called *Biblical Commentaries* from Canterbury – that Theodore would have spent some time in Antioch and/or Edessa, coming into contact with Antioch's exegetical traditions and possibly learning some Syriac, before fleeing the Arab conquests to Constantinople. The evidence as carefully assembled by Bischoff and Lapidge further suggests that Theodore found his way into a Greek monastery in Italy before 649, at which point he seems to have been involved in the preparation of the Lateran Council of that year. Similarly, Hadrian is thought to have fled the Arab invasion of the southern Mediterranean, entering a Greek monastery in Campania prior to the developments described above.<sup>2</sup>

Thus, both Theodore and Hadrian have often been considered as mediators of Greek knowledge and teaching to Anglo-Saxon learning, not least because of Bede's appraisal of their school at Canterbury:<sup>3</sup>

<sup>2</sup> B. Bischoff and M. Lapidge, *Biblical Commentaries from the Canterbury School of Theodore and Hadrian*, Cambridge Stud. in AS England 10 (Cambridge, 1994), 5–81, esp. 25–8, 35–7, 40–2, 60–9, 77–81, 233–40, 550–2 (for Theodore), 89–92 and 120–32 (for Hadrian); M. Lapidge, 'Byzantium, Rome and England in the Early Middle Ages', *Roma fra Oriente e Occidente*, Settimane di studio del Centro italiano di studi sull'alto Medioevo 49 (Spoleto, 2002), 363–400, at 366–9; S. Brock, 'St Theodore of Canterbury, the Canterbury School and the Christian East', *Heythrop Journal* 36 (1995), 431–8, at 432–3; M. Lapidge, 'The Study of Greek at the School of Canterbury in the Seventh Century', *The Sacred Nectar of the Greeks: the Study of Greek in the West in the Early Middle Ages*, ed. S. A. Brown and M. Herren, King's College London, Med. Stud. 2 (London, 1988), 169–94, at 169. For Theodore's biography, see also M. Lapidge, 'The Career of Archbishop Theodore', *Archbishop Theodore: Commemorative Studies on His Life and Influence*, ed. M. Lapidge (Cambridge, 1995), pp. 1–29; a critique of Lapidge's narrative can be found in B. Kaczynski, 'Review Article: the Seventh-Century School of Canterbury: England and the Continent in Perspective', *The Journal of Medieval Latin* 8 (1998), 206–15, at 210; M. Gorman, 'Theodore of Canterbury, Hadrian of Nisida and Michael Lapidge', *Scriptorium* 50 (1996), 184–92, at 184; see now also J. Siemens, *The Christology of Theodore of Tarsus: the Laterculus Malalianus and the Person and Work of Christ*, *Studia Traditionis Theologiae* 6 (Turnhout, 2010), 1–20.

<sup>3</sup> Bede, *HE* iv. 2 (Plummer, *Baedae Historiam ecclesiasticam* I, 204–5; 'And because both of them were extremely learned in sacred and secular literature, they attracted a crowd of students into whose minds they daily poured the streams of wholesome learning. They gave their hearers instruction

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Et quia litteris sacris simul et saecularibus, ut diximus, abundanter ambo erant instructi, congregata discipulorum caterua, scientiae salutaris cotidie flumina inrigandis eorum cordibus emanabant; ita ut etiam metricae artis, astronomiae, et arithmeticae ecclesiasticae disciplinam inter sacrorum apicum uolumina suis auditoribus contraderent.

This passage is usually interpreted as the key evidence for the existence of a school at Canterbury, which some scholars believe Theodore had actually founded, although Bede does refer to an earlier foundation.<sup>4</sup> So instead of founding the school, it rather seems that the new archbishop together with the abbot of SS Peter and Paul brought Canterbury teaching to new heights.<sup>5</sup> According to Bede's description, the curriculum included not only exegesis, Latin, and possibly Greek,<sup>6</sup> but also *metricae artis, astronomiae, et arithmeticae ecclesiasticae disciplinam*, that is grammar (or poetry?), astronomy, and computistics. To this list can be added the discipline of liturgical music as reported by Bede as well,<sup>7</sup> and perhaps canon law as implied by Aldhelm.<sup>8</sup>

not only in the books of the holy Scripture but also in the art of metre, astronomy, and ecclesiastical computation.' Colgrave and Mynors, *Bede's Ecclesiastical History*, pp. 332–5).

<sup>4</sup> Bede, *HE* iii. 18 (Plummer, *Baedae Historiam ecclesiasticam* I, 162; Colgrave and Mynors, *Bede's Ecclesiastical History*, pp. 266–9). An earlier foundation is accepted by N. Brooks, *The Early History of the Church of Canterbury: Christ Church from 597 to 1066* (Leicester, 1984), p. 94. Otherwise, the idea of a new foundation generally seems to be taken for granted in modern scholarship, see for example: M. Lapidge, 'The School of Theodore and Hadrian', *ASE* 15 (1986), 45–72, at 45; Bischoff and Lapidge, *Biblical Commentaries*, pp. 172–3; B. C. Hardison, 'Words, Meanings, and Readings: Reconstructing the Use of Gildas's *De Excidio Britanniae* at the Canterbury School', *Viator* 47 (2015), 1–22, at 2; D. Porter, 'Isidore's *Etymologiae* at the School of Canterbury', *ASE* 43 (2014), 7–44, at 7; G. Gower, 'Race-ing Plainchant: Theodore of Tarsus, Hadrian of Canterbury, and the Voices of Music History', *Viator* 51 (2020), 103–20, at 107–8; some doubt is only verbalised by Lapidge and Herren, *Aldhelm*, p. 146.

<sup>5</sup> P. Riché, *Éducation et culture dans l'occident barbare: VI–VIII siècles*, Patristica Sorbonensia 4 (Paris, 1967), 420. The improvement of ecclesiastical education seems to have played an important role in Theodore and Hadrian's mission, cf. Hardison, 'Words, Meanings, and Readings', p. 4; J. McGowan, 'An Introduction to the Corpus of Anglo-Latin Literature,' *A Companion to Anglo-Saxon Literature*, ed. P. Pulsiano and E. Treharne, Blackwell Companions to Lit. and Culture 11 (Oxford, 2001), 11–49, at 19.

<sup>6</sup> For the teaching of both Latin and Greek, see Bede, *HE* iv. 2 (Plummer, *Baedae Historiam ecclesiasticam* I, 205; Colgrave and Mynors, *Bede's Ecclesiastical History*, pp. 334–5). Cf. B. Bischoff, 'Das griechische Element in der abendländischen Bildung des Mittelalters', *Byzantinische Zeitschrift* 44 (1951), 27–55, repr. in B. Bischoff, *Mittelalterliche Studien: ausgewählte Aufsätze zur Schriftkunde und Literaturgeschichte*, 3 vols. (Stuttgart, 1966–81) II, 246–75, at 265; Lapidge, 'The Study of Greek', pp. 169–70 and 189; J. B. Stevenson, *The 'Laterculus Malalianus' and the School of Archbishop Theodore*, Cambridge Stud. in AS England 14 (Cambridge, 1995), 17–20; P. Moran, 'Greek in Early Medieval Ireland', *Multilingualism in the Graeco-Roman Worlds*, ed. A. Mullen and P. James (Cambridge, 2012), pp. 172–92, at 174.

<sup>7</sup> Bede, *HE* iv. 2 (Plummer, *Baedae Historiam ecclesiasticam* I, 205; Colgrave and Mynors, *Bede's Ecclesiastical History*, pp. 334–5). See especially Gower, 'Race-ing Plainchant', pp. 105, 107 and 110.

<sup>8</sup> This is, if Aldhelm's *Epistola ad Leutherium* (ed. Ehwald, pp. 475–8, with Lapidge and Herren, *Aldhelm*, pp. 152–3) is a reflection of his Canterbury studies (see especially the commentary *ibid.* pp. 137–8).

Despite Bede's praise of Theodore and Hadrian's high standard of teaching, there exists no text or manuscript that could be attributed beyond doubt directly to either of the two. It rather seems that it is through their students that traces of their teaching have survived,<sup>9</sup> possibly because it has principally been conducted orally.<sup>10</sup> Thus, various attempts have been made by modern scholars to link material to the Canterbury school through textual and source analyses, reflecting almost the entire range of disciplines listed by Bede and Aldhelm, and beyond.<sup>11</sup> Among the attributed texts, the so-called *Biblical Commentaries* and the *Laterculus Malalianus* are of special interest.<sup>12</sup> While the *Biblical Commentaries* are considered notes taken by Canterbury students,<sup>13</sup> the *Laterculus Malalianus*, on the other hand, has been attributed to Theodore himself by its editor, Jane Stevenson.<sup>14</sup> Though

<sup>9</sup> Cf. P. W. Finsterwalder, *Die Canones Theodori Cantuariensis und ihre Überlieferungsformen*, Untersuchungen zu den Bußbüchern des 7., 8. und 9. Jahrhunderts 1 (Weimar, 1929), 1–2 and 214–8; Lapidge, 'Byzantium', p. 370; Gower, 'Race-ing Plainchant', p. 108.

<sup>10</sup> See Aldhelm, *Epistola ad Eabfridum*, ed. Ehwald, pp. 486–94, at 493, with Lapidge and Herren, *Aldhelm*, pp. 160–4, at 163. Cf. Bischoff and Lapidge, *Biblical Commentaries*, pp. 173, 266–7 and 269–74; B. Bischoff, 'Wendepunkte in der Geschichte der lateinischen Exegese im Frühmittelalter', *Sacris Erudiri* 6 (1954), 189–281, repr. in Bischoff, *Mittelalterliche Studien*, pp. 205–73, at 206–7.

<sup>11</sup> See, for example, the various contributions in *Commemorative Studies*, ed. Lapidge; and further Bischoff and Lapidge, *Biblical Commentaries*, pp. 180–4; Siemens, *Christology of Theodore of Tarsus*, pp. 25–34; E. Hellgardt, 'Das lateinische-althochdeutsche Reimgebet „Sancte Sator“ (sog. „Carmen ad deum“) Theodore von Tarsus/Canterbury zugeschrieben', *Zeitschrift für deutsches Altertum und deutsche Literatur* 137 (2008), 1–27; C. V. Franklin and P. Meyvaert, 'Has Bede's Version of the Passio S. Anastasii come down to us in BHL 408?', *Analecta Bollandiana* 100 (1982), 373–400; *Canones Theodori*, ed. Finsterwalder, *Canones*, pp. 239–334.

<sup>12</sup> The Commentaries are edited in Bischoff and Lapidge, *Biblical Commentaries*, and the *Laterculus* is edited in Stevenson, *Laterculus Malalianus*.

<sup>13</sup> Bischoff and Lapidge, *Biblical Commentaries*, pp. 173, 175–6 and 269–74; Bischoff, 'Wendepunkte', pp. 207–9. For further possible traces of exegesis from Canterbury, see G. T. Dempsey, 'Aldhelm of Malmesbury and the Paris Psalter: a Note on the Survival of Antiochene Exegesis', *Journal of Theological Studies* ns 38 (1987), 368–86. The attribution to Canterbury first suggested by Bischoff and Lapidge was criticised most prominently by Michael Gorman, but the references to Theodore and Hadrian by name in the glossary in particular are a clear indicator of its origin. For those references, see Bischoff and Lapidge, *Biblical Commentaries*, pp. 1, n. 4, and 177–9; Lapidge, 'The School', pp. 58–9; Lapidge, 'The Study of Greek', p. 170; for the critique, see M. Gorman, 'A Critique of Bischoff's Theory of Irish Exegesis', *The Journal of Medieval Latin* 7 (1997), 178–233, at 191; M. Gorman, 'The Myth of Hiberno-Latin Exegesis', *Revue Bénédictine* 110 (2000), 42–85, at 46, n. 15; Gorman, 'Theodore', pp. 187–191; see also Kaczynski, 'Review Article', pp. 211–4; R. McKitterick, 'Glossaries and Other Innovations in Carolingian Book Production', *Turning Over a New Leaf: Change and Development in the Medieval Book*, ed. E. Kwakkel, R. McKitterick, and R. Thomson (Leiden, 2012), pp. 21–78.

<sup>14</sup> Stevenson, *Laterculus Malalianus*, pp. 1–116; J. B. Stevenson, 'Theodore and the *Laterculus Malalianus*', *Commemorative Studies*, ed. Lapidge, pp. 204–21. See also Bischoff and Lapidge, *Biblical Commentaries*, pp. 180–2; Siemens, *Christology of Theodore of Tarsus*, pp. 40–54.

this identification may be stretching the available evidence,<sup>15</sup> the text displays a negative attitude towards Irish scholars in two passages that Stevenson links to Aldhelm's description of Irish students debating with Theodore as proof of the latter's authorship.<sup>16</sup>

But hardly anything that has been linked to Theodore could be classified as astronomy or ecclesiastical arithmetic (*computus*), two of the core disciplines ascribed to the Canterbury school by Bede.<sup>17</sup> It has been considered likely that Theodore introduced into Britain the paschal tract by Victor of Capua of 550 – now lost, but cited at length by Bede in his *De temporum ratione* c. 51 and his *Epistola ad Wictbedum* c. 8<sup>18</sup> – but then this was more to stock the Canterbury library rather than a reflection of Theodore's original teaching. More importantly, M. C. Welborn implies that Bede's account of finger calculation in *De temporum ratione* chapters 1 and 55 may derive from Theodore's teaching.<sup>19</sup> This idea is certainly strengthened by the fact that chapter 1 of Bede's *De temporum ratione* and related versions enjoyed a very early separate transmission, which suggests pre-Bedan origin.<sup>20</sup> But in no manuscript are these tracts attributed to Theodore or anybody else associated to the Canterbury school.

There is, however, an ascription to Aldhelm of a conversion table to synodic lunar ages of an A-P alphabet in the margin of calendars. Jones saw no reason to doubt the attribution,<sup>21</sup> and Borst, in his monumental study of early medieval

<sup>15</sup> The ascription to Theodore is called 'conjectural' by M. Herren, 'Scholarly Contacts between the Irish and the Southern English in the Seventh Century', *Peritia* 12 (1998), 24–53, at 34.

<sup>16</sup> Theodore's disagreement with Irish views is outlined in *Laterculus Malalianus* c. 1 and 4 (Stevenson, *Laterculus Malalianus*, pp. 120–1, 124–5, with commentary pp. 10–1, 26–8, 177–8). See also Herren, 'Scholarly Contacts', pp. 34–5.

<sup>17</sup> Cf. Bischoff and Lapidge, *Biblical Commentaries*, pp. 61–2.

<sup>18</sup> C. W. Jones, *Beda's Opera de temporibus* (Cambridge, 1943), p. 74.

<sup>19</sup> M. C. Welborn, 'Notes and Correspondence', *Isis* 17 (1932), 260–3, at 261–2.

<sup>20</sup> See especially A. Cordoliani, 'À propos du chapitre premier du De temporum ratione, de Bède', *Le moyen âge* 54 (1948), 209–23; C. W. Jones, *Beda's pseudepigrapha: Scientific Writings Falsely Attributed to Bede* (Ithaca, 1939), pp. 53–4; Jones, *Beda's Opera*, p. 330; and also F. del Mar Plaza Picón and J. A. González Marrero, 'De computo uel loquela digitorum: Beda y el cómputo digital', *Faventia* 28 (2006), 115–23. Crucially, one version (*Romana computatio*, ed. Jones, *Beda's pseudepigrapha*, pp. 106–8) is part of the so-called Sirmund corpus of texts, which proves its pre-Bedan origin; see C. W. Jones, 'The 'Lost' Sirmund Manuscript of Bede's Computus', *English Historical Review* 52 (1937), 204–19, at 217 (no. 30). Important for the present study is its inclusion in Willibrord's *Computus Cottonianus* of 689, where it (c. 21) is preceded by two curious argumenta for 672 (c. 17–8), a significant year for Theodore, and followed by the passage in question in the present article (c. 24); see I. Warntjes, 'The Computus Cottonianus of AD 689: a Computistical Formulary Written for Willibrord's Frisian Mission', *The Easter Controversy of Late Antiquity and the Early Middle Ages: its Manuscripts, Texts, and Tables*, ed. I. Warntjes and D. Ó Cróinín (Turnhout, 2011), pp. 173–212, at 211–2, and p. 22 below.

<sup>21</sup> Jones, *Beda's pseudepigrapha*, pp. 69–70; of the manuscripts listed by Jones, we did not check the Zurich and the Milan codices; Karlsruhe, Badische Landesbibliothek, Aug. perg. 167, 2r and the

calendars, followed his lead.<sup>22</sup> In his Letter to Leuthere, Aldhelm highlights how he had recently fundamentally increased his computational competence, which is usually attributed to his study at Canterbury outlined in his Letter to Hadrian.<sup>23</sup> Read against this background, Lapidge is inclined to classify the synodic lunar table in question (which we may want to label the AEINB table from its first line) as a product of Aldhelm's Canterbury class-notes.<sup>24</sup> If this is the case, either the teaching was poor, or Aldhelm was not a very observant student, or the table suffered from careless copying. Where the table is attributed to Aldhelm, it is introduced as a device for charting the course of the moon through the zodiac (i.e. containing sidereal lunar letters), though its purpose was rather to establish the synodic lunar age of a given Julian calendar date. The system only worked in combination with a corresponding A-P column in a calendar, which according to Borst survives in only one pre-900 codex. The manuscript, Karlsruhe, Badische Landesbibliothek, Aug. perg. 167, also contains the conversion table attributed to Aldhelm (2r), and was written by an Irish hand on the Continent in the mid-ninth century. Ó Cróinín has drawn attention to the fact that another synodic lunar table is ascribed to an 'Aldhelm, brother of Iohannes Scottus' (*Frater Iohannis Scotti Aldelmus fecit istam paginam*) in Paris, Bibliothèque nationale de France, Lat. 12949,

related St Gall, Stiftsbibliothek, 248, 63 have the ascription to Aldhelm, whereas Vatican, Biblioteca Apostolica Vaticana, Vat. lat. 644, 32v does not. The Oxford MS mentioned by Jones (St. John's College, 17, 26v), attributes a different table to Aldhelm, referencing a synodic lunar letter alphabet A-K; for this AKIHG table, see Jones, *Bedae pseudepigrapha*, pp. 76–7; [https://digital.library.mcgill.ca/ms-17/folio.php?p=26v&showitem=26v\\_5ComputusTablesTextsII\\_10LunarLettersA-K](https://digital.library.mcgill.ca/ms-17/folio.php?p=26v&showitem=26v_5ComputusTablesTextsII_10LunarLettersA-K); Abbo, *Computus* c. 8–9 (CCCM 300, 31–3 with LV); I. Warntjes, 'The Computistica of the Antiphonary of León in Context', *Les folios introductifs de l'Antiphonaire de León (Archivo de la Catedral de León, ms. 8, fol. 1-27)*. *Étude et édition*, ed. T. Deswarte (Turnhout, 2023), pagination tbc.

<sup>22</sup> A. Borst, *Die karolingische Kalenderreform* (Hannover, 1998), pp. 406–9.

<sup>23</sup> Aldhelm, *Epistola ad Leutherium* (ed. Ehwald, pp. 475–8, at 477–8, with Lapidge and Herren, *Aldhelm*, pp. 137–8, 152–3). His letter to Hadrian is transmitted solely through excerpts quoted by William of Malmesbury, which are ed. Ehwald, p. 478, with Lapidge and Herren, *Aldhelm*, pp. 138–9, 153–4. For Aldhelm's study at Canterbury as against his previous Irish education, see now G. T. Dempsey, *Aldhelm of Malmesbury and the Ending of Late Antiquity* (Turnhout, 2015), pp. 31–63.

<sup>24</sup> M. Lapidge, 'The Present State of Anglo-Latin Studies', *Insular Latin Studies: Papers on Latin Texts and Manuscripts of the British Isles, 550–1066*, ed. M. W. Herren (Toronto, 1981) pp. 45–82, at 49 with 69; M. Lapidge and J. L. Rosier, *Aldhelm: the Poetic Works* (Cambridge, 1985), p. 17 with 225; Lapidge, 'School of Theodore and Hadrian', p. 53, n. 53; but not in Bischoff and Lapidge, *Biblical Commentaries*, pp. 60–1, 263–6. See also W. M. Stevens, 'Scientific Instruction in Early Insular Schools', *Cycles of Time and Scientific Learning in Medieval Europe*, ed. W. M. Stevens (Aldershot, 1995), article VI, 83–111, at 96–9 with 110; W. M. Stevens, 'Sidereal Time in Anglo-Saxon England', *ibid.* article VII, 125–52, at 129–31 with 146; S. Hollis, 'Scientific and Medical Writings', *A Companion to Anglo-Saxon Literature*, ed. P. Pulsiano and E. Treharne, Blackwell Companions to Lit. and Culture 11 (Oxford, 2001), 188–208, at 188; Dempsey, *Aldhelm*, p. 48.

42r.<sup>25</sup> Given that the AEINB table enjoyed some popularity in Irish continental circles in the mid-ninth century and that there is no earlier attestation of the table or its corresponding column in calendars before that time, a ninth-century Aldelmus connected to Irish circles as suggested by the rubric in Lat. 12949 is much more likely than the seventh-century bishop of Sherborne.

Keeping in mind Bede's special interest in the Easter controversy and computus, and the vibrancy of this monastic discipline in the Insular world in the late seventh and early eighth centuries, this is a rather meagre result. That not a single computistical idea can with any confidence be attributed to Theodore is even more surprising when considering what a crucial role computus played in Theodore's initial appointment as archbishop of Canterbury.

#### THE IMPORTANCE OF COMPUTUS FOR THEODORE'S APPOINTMENT

Theodore's appointment as archbishop of Canterbury was intrinsically linked to the synod of Whitby of 664.<sup>26</sup> In his *Historia ecclesiastica*, Bede narrates that differences in liturgical practices within the Northumbrian royal family had grown to a substantial conflict by the early 660s.<sup>27</sup> Some twenty years earlier, the Bernician King Oswiu had married the Deiran princess Eanfled in an attempt to unite the northern and southern parts of Northumbria. Northern Bernicia had received Christianity in the 630s from the *regiones Scottorum*, particularly the monastery of Iona, while southern Deira was Christianised from Kent and Canterbury. In terms of liturgical practices, Bernicia therefore followed 'Irish' customs, while Deira was 'Roman' in outlook, or so Bede wants to make us believe. In 664 a synod, or rather council, was held at the Deiran royal monastery of Whitby, at which Oswiu renounced his 'Irish' heritage and accepted his wife's 'Roman' practices as binding in his kingdom.

Bede is deliberately selective in the information he presents to his readers. Differences in liturgical practice were only the trigger of the conflict, not its source, which was a succession struggle between Oswiu and his son Alhfrith, omitted by Bede.<sup>28</sup> Also, Bede is vague as to what exactly 'Roman' liturgical practice meant.

<sup>25</sup> D. Ó Cróinín, review of *Insular Latin Studies* in *Peritia* 1 (1982), 404–9, at 406–7. This table is neither the AEINB nor the AKIHG tables of n. 21.

<sup>26</sup> The most recent commentators on Theodore's appointment do not include computus in their considerations, but principally focus on church organisation and his doctrinal expertise and standing; R. Shaw, 'Bede, Theodore and Wighard: Why Did Pope Vitalian Need to Appoint a New Bishop for the English Church in the 660s?', *Revue d'histoire ecclésiastique* 113 (2018), 521–43; S. Lin, 'Bede, the Papacy, and the Emperors of Constantinople', *EHR* 136 (2021), 465–97, at 475–89.

<sup>27</sup> Bede, *HE* iii. 25 (Plummer, *Baedae Historiam ecclesiasticam* I, 181–9; Colgrave and Mynors, *Bede's Ecclesiastical History*), pp. 294–309).

<sup>28</sup> H. Mayr-Harting, *The Coming of Christianity to Anglo-Saxon England* (London, 1972, repr. 1991), pp. 107–8; R. P. Abels, 'The Council of Whitby: a Study in Early Anglo-Saxon Politics', *Jnl of Brit.*

The main issue was the date of Easter, which the Irish and Britons calculated differently from the rest of Christianity.<sup>29</sup> But the divide was not as clear cut as 'Irish' versus 'Roman' as suggested by Bede, who wanted to place the Northumbrians at the heart of the salvation history of a unified Western Church. In order to create this illusion, Bede remained silent in his *Historia ecclesiastica* about the fact that Rome had only changed in the 640s or 650s from a method of calculation introduced in 457 by Victorius of Aquitaine to Alexandrian practice in guise of Dionysius Exiguus' Latin translation.<sup>30</sup> This meant that at the time of Whitby, Rome followed Dionysius, while the Frankish kingdoms still subscribed to Victorius' method, as did Eanfled, in accordance with the practice of the early Deiran church. Oswiu's challenger Alhfrith and his spokesman Wilfrid, who had only recently returned from Rome, therefore tried to play the Dionysian card against both the 'Irish' Oswiu and his wife steeped in Victorian tradition.<sup>31</sup>

With the censored information provided by Bede and the limited details presented by Stephen of Ripon, it is not quite clear what exactly Oswiu and his

*Stud.* 23 (1983), 1–25. For the impact of the Easter difference on the royal couple, see L. Holford-Strevens, 'Marital Discord in Northumbria: Lent and Easter, His and Hers', *Computus and its Cultural Context in the Latin West, AD 300–1200*, ed. I. Warntjes and D. Ó Cróinín (Turnhout, 2010), pp. 143–58.

<sup>29</sup> For the *latercus* used by the Irish and British clergy, see especially: D. Mc Carthy and D. Ó Cróinín, 'The 'Lost' Irish 84-Year Easter Table Rediscovered', *Peritia* 6–7 (1987–8), 227–42, repr. in D. Ó Cróinín, *Early Irish History and Chronology* (Dublin, 2003), pp. 58–75 (discovery); D. Mc Carthy, 'Easter Principles and a Fifth-Century Lunar Cycle Used in the British Isles', *Jnl for the Hist. of Astronomy* 24 (1993), 204–24 (reconstruction); B. Blackburn and L. Holford-Strevens, *The Oxford Companion to the Year* (Oxford, 1999), pp. 870–5 (translation); L. Holford-Strevens, 'Paschal Lunar Calendars up to Bede', *Peritia* 20 (2008), 165–208, at 178–87 (technical commentary); I. Warntjes, 'The Munich Computus and the 84 (14)-Year Easter Reckoning', *Proceedings of the Royal Irish Academy* 107C (2007), 31–85 (evidence of the Munich Computus); I. Warntjes, 'The Mechanics of Lunar Calendars and the Modes of Calculating Easter, AD 400–1100: Context and Perspectives', *La conoscenza scientifica nell'alto medioevo*, Settimane di studio del Centro italiano di studi sull'alto Medioevo 67 (Spoleto, 2020), 273–310, at 282–6 (recent summary).

<sup>30</sup> Victorius' and Dionysius' *Computistica* are ed. by B. Krusch, 'Studien zur christlich-mittelalterlichen Chronologie. Die Entstehung unserer heutigen Zeitrechnung', *Abhandlungen der Preussischen Akademie der Wissenschaften, Jahrgang 1937, phil.-hist. Kl.*, no. 8 (Berlin, 1938), 4–52 and 59–86. Literature on these two reckoning is listed in Warntjes, *Munich Computus*, p. xxxviii, n. 82 and p. xxxix, n. 85.

<sup>31</sup> By conflating *latercus* and Victorian lunar limits of 14–20 and 16–22 respectively to 14–22, Stephen of Ripon is quite explicit that Wilfrid argued against followers of either method; Stephen of Ripon, *Vita Wilfridi* c. 10, ed. with correction of XXII of the sole manuscript witness (London, British Library, Cotton Vespasian D VI, 83v) to XX by W. Levison in MGH SS rer. Merov. 6 (Hanover, 1913), 203; Colgrave, *Life of Bishop Wilfrid*, pp. 20–1 with commentary pp. 157–8. See especially M. Ohashi, 'The Easter Table of Victorius of Aquitaine in Early Medieval England', *Easter Controversy*, ed. Warntjes and Ó Cróinín, pp. 137–49; E. T. Dailey, 'To Choose One Easter from Three: Oswiu's Decision and the Northumbrian Synod of AD 664', *Peritia* 26 (2015), 47–64.



retinue considered 'Roman'.<sup>32</sup> Certainly, the Pope was worried that Oswiu's recent conversion may have been misdirected. In the same year as Whitby, 664, the archbishop of Canterbury died. Oswiu, as the most powerful ruler in the Anglo-Saxon kingdoms, had an interest in influencing the next appointment to this prestigious position, and his recent conversion gave him the moral authority needed. Together with the Kentish King Ecgberht, he sent a certain Wighard to Rome, either as chief negotiator or as a candidate.<sup>33</sup> Wighard died after arrival, but he or his party (or, indeed, Benedict Biscop)<sup>34</sup> briefed Pope Vitalian on recent developments in Northumbria. Vitalian appears to have been extremely troubled by what he heard, and immediately took matters into his own hands. If Wighard was sent to be consecrated archbishop, the Pope decided that the choice of candidate should rest with him rather than with Anglo-Saxon kings and clergy.

The reasons he outlined in a letter to King Oswiu, which documents the urgency felt by the Pope about developments in the Anglo-Saxon kingdoms: the Pope could have sent any correspondence with the appointed successor to the Canterbury see, but no time was to be wasted, the letter had to be dispatched immediately. After congratulating Oswiu on his recent conversion to 'the true and apostolic faith' (*veram et apostolicam fidem*), the Pope hastens to specify what exactly this means in a passage that Bede deliberately omits because of its explicit reference to Victorius:<sup>35</sup>

<sup>32</sup> See now M. Clear, 'New Insights into the Easter Controversy: Whitby (664) and Hertford (672)', forthcoming.

<sup>33</sup> Bede, *HE* iii. 29, iv. 1 (Plummer, *Baedae Historiam ecclesiasticam* I, 196, 201–2; Colgrave and Mynors, *Bede's Ecclesiastical History*, pp. 318–9, 328–9); Bede, *Historia abbatum* c. 3 (Grocock and Wood, *Abbots of Wearmouth and Jarrow*, pp. 26–9). Plummer, *Baedae Historiam ecclesiasticam* II, 201 highlighted the discrepancy between Bede's account stressing that Wighard was sent for consecration and Vitalian's letter treating Wighard as a mere envoy; R. Shaw, 'Bede, Theodore and Wighard: Why Did Pope Vitalian Need to Appoint a New Bishop for the English Church in the 660s?', *Revue d'histoire ecclésiastique* 113 (2018), 521–43, is now inclined to view Wighard simply as envoy.

<sup>34</sup> Bede, *Historia abbatum* c. 2 (Grocock and Wood, *Abbots of Wearmouth and Jarrow*, pp. 24–7).

<sup>35</sup> 'Specifically, never to celebrate holy Easter if not according to the Apostolic and Catholic faith, as it is celebrated throughout the world by the Christian people, that is according to the Apostolic rule of the 318 holy fathers and the computus of St Cyril and Dionysius. For in the entire world, one single dove (*columba*) of holy Christ, that is one immaculate church, celebrates holy Easter, the day of resurrection. For the Apostolic See does not approve of the Easter rule of Victorius. Therefore, it (the Apostolic See) does not follow his (Victorius') disposition for Easter.' This passage survives in Oxford, Bodleian Library, Digby 63, 59v; we here reproduce the manuscript readings, as the standardisations in the edition (Krusch, 'Studien', p. 86) are not essential for an understanding of the passage, which is further facilitated by our translation. Most recent commentators overlooked this passage (e.g. Shaw in his 'Bede, Theodore and Wighard' and *How, When and Why Did Bede Write his Ecclesiastical History?* (New York, 2021), especially pp. 70–1, but also T. M. Charles-Edwards, *Early Christian Ireland* (Cambridge, 2000), p. 434; C. Corning, *The Celtic and Roman Traditions: Conflict and Consensus in the Early Medieval Church* (New York, 2006),

Nunquam enim celebrare sanctam pascae nisi secundum apostolicam et catholicam fidem ut in toto orbe caelebratur a Christiane blebe, id est secundum apostolicam regulam CCCXVIII sanctorum patrum ac compototum Sancti Cirilli et Dionisi. Nam in toto terrarum orbe sancti Christi una columba, hoc est ecclesia immaculata, sanctam pascae resurrectionis diem celebrat. Nam Victoris sedis apostolica non adprobavit regulam pascae. Ideo nec sequitur dispositionem eius pro pascae.

The following two sentences that Bede does transmit become intelligible in context, but only through this missing passage:<sup>36</sup>

Hominem denique docibilem et in omnibus ornatum antistitem, secundum vestrorum scriptorum tenorem, minime valuimus nunc reperire pro longinquitate itineris. Profecto enim dum huiusmodi apta reppertaque persona fuerit, eum instructum ad vestram dirigemus patriam, ut ipse et viva voce, et per divina oracula omnem inimici zizanium ex omni vestra insula cum divino nutu eradicet.

Thus, the Pope struggled with finding a person suitable to ‘eradicate the weeds of the enemy’, i.e. Victorius of Aquitaine, mentioned in the immediately preceding passage omitted by Bede. Competence in computus, a full understanding of the Alexandrian/Dionysiac system that was to replace Victorius in the Anglo-Saxon kingdoms, was an – if not *the* – essential criterion in Vitalian’s job profile for the Canterbury see.

This specialism Vitalian thought could best be found outside of Rome, which had converted to Dionysius only some ten to thirty years earlier. He conducted his search in the Byzantine contact zone south of Rome. His first choice was Hadrian, whom Bede describes as ‘vir natione Afir, sacris litteris diligenter inbutus, monasterialibus simul et ecclesiasticis disciplinis institutus, Graecae pariter et Latinae

p. 131). The passage is well-known to scholarship since J. Ussher, *Veterum epistolarum Hibernicarum sylloge, quae partim ab Hibernis, partim ad Hibernos, partim de Hibernis vel rebus Hibernicis sunt conscriptae* (Dublin, 1632), p. 126; its authenticity was doubted by Mac Carthy, *Annals of Ulster, vol. 4: Introduction and Index* (Dublin, 1901), pp. cxlv–cxlvii, but vindicated by Jones, *Beda opera*, pp. 102–4; the passage has been readily accessible to Bedan scholars through Plummer’s edition: *Baedae Historiam ecclesiasticam* II, 201; the commentary to the recent edition by M. Lapidge with Italian translation by P. Chiesa, *Beda, Storia degli inglesi (Historia ecclesiastica gentis Anglorum)*, 2 vols. (Rome, 2008) II, 568–9 reproduces Plummer’s account, except for his discussion of the Victorian dimension of this passage. See now also I. Warntjes, ‘Pope Vitalian’s Letter to King Oswiu of Northumbria and the Beginning of Armagh’s Claim to Primacy over the Irish Churches’, *Revue Bénédictine* 134 (2024), pagination tbc.

<sup>36</sup> Bede, *HE* iii. 29 (Plummer, *Baedae Historiam ecclesiasticam* I, 197–8; ‘Finally, in view of the length of the journey, we are not at present able to find a man who is entirely suitable and fitted to be your bishop. But as soon as a fit person is found, we will send him to your land with full instructions so that he may, by his preaching and with the help of the word of God, entirely root out, by divine blessing, the weeds of the enemy throughout all your island.’ Colgrave and Mynors, *Bede’s Ecclesiastical History*, pp. 320–1).

linguae peritissimus'.<sup>37</sup> When read in connection with Vitalian's letter, the 'monastic and ecclesiastical disciplines' certainly included, first and foremost, computus. The language specification is also very interesting in this context. Fluency in Greek was certainly not needed for communication in the target country, the Anglo-Saxon kingdoms. The insistence on Greek, as a book language, is rather an acknowledgement that a full understanding of Alexandrian computus could not be achieved through Dionysius' Latin translation alone. More information could be found in Greek texts, and first-hand oral teaching.

Hadrian declined, arguing that he lacked seniority and erudition. This may be dismissed as a common expression of humility, but it could also indicate genuine concern by Hadrian about his own ability, as this job required a highly specialist skill-set. Hadrian helped in finding a suitable candidate, and eventually suggested Theodore, 'natus Tarso Ciliciae, vir et saeculari et divina litteratura, et Grece instructus et Latinus'.<sup>38</sup> Here, Bede more specifically refers to Greek literature rather than more broadly to learning, confirming the point made above. Unknown to Bede, there may have been more arguments for choosing Theodore as a specialist in Alexandrian computus, as his personal network may well have included key Eastern scientists. The reign of Emperor Heraclius (610–641) saw a peak of computistical activity:<sup>39</sup> in 623, the Emperor himself composed a short computistical manual that was added to Stephanos of Alexandria's *Ptolemaei tabulas manuales* of 617–619,<sup>40</sup> and under the patronage of the patriarch of Constantinople, Sergius, the anonymous *Chronicon paschale* of 630 incorporated computistical material;<sup>41</sup> more importantly, the two most substantial Eastern works on computus were written towards the end of Heraclius' life within three years of each other, by Georgios Presbyter – the spokesman for the Byzantine era – in 638/9 and Maximus Confessor – once secretary to Heraclius – in 640/1.<sup>42</sup> Theodore will

<sup>37</sup> Bede, *HE* iv. 1 (Plummer, *Baedae Historiam ecclesiasticam* I, 202; 'a man African by birth, fully trained in sacred scripture, instructed in monastic as well as ecclesiastical disciplines, and equally fluent in Greek and Latin', Colgrave and Mynors, *Bede's Ecclesiastical History*, pp. 328–9).

<sup>38</sup> Bede, *HE* iv. 1 (Plummer, *Baedae Historiam ecclesiasticam* I, 202; 'born in Tarsus in Cilicia, a man instructed in secular and divine literature, both Greek and Latin', Colgrave and Mynors, *Bede's Ecclesiastical History*, pp. 330–1).

<sup>39</sup> See the overview in context in F. Acerbi, 'Byzantine Easter Computi: an Overview with an Edition of *Anonymus 892*', *Jahrbuch der Österreichischen Byzantinistik* 71 (2021), 1–62, at 6–7.

<sup>40</sup> Edited by H. Usener, *Kleine Schriften*, 4 vols. (Leipzig, 1912–1914) III, 311–7.

<sup>41</sup> The *Chronicon paschale* is ed. with additional material (including Heraclius' manual) by L. A. Dindorf, *Chronicon paschale*, 2 vols. (Bonn, 1832).

<sup>42</sup> Georgios Presbyter's computus is edited by F. Diekamp, 'Der Mönch und Presbyter Georgios, ein unbekannter Schriftsteller des 7. Jahrhunderts', *Byzantinische Zeitschrift* 9 (1900), 14–51, at 24–32, with commentary at 44–51; Maximus Confessor's computus is printed and trans. into Latin in PG 19, col. 1217–80. For these two texts in particular, see recently J. Lempire, 'Le calcul de la date de pâques dans les traités de S. Maxime le Confesseur et de Georges, moine et prêtre', *Byzantion* 77 (2007), 267–304.

have had access to this circle of intellectuals in Constantinople in the 630s, and he must have been in close contact with Maximus Confessor in Rome in the lead-up to the Lateran Council of 649.<sup>43</sup>

The first few years of Theodore's incumbency agree with these assumptions, and demonstrate that Theodore certainly took the brief he had received from Pope Vitalian very seriously. After arrival in Britain in 669, he immediately toured the Anglo-Saxon kingdoms, with one main purpose, to teach 'rectum vivendi ordinem, ritum celebrandi paschae canonicum'.<sup>44</sup> In the same passage, Bede specifies four disciplines taught by both Theodore and Hadrian to students attracted by their erudition: exegesis, grammar, astronomy, and computus ('ita ut etiam metricae artis, astronomiae, et arithmeticae ecclesiasticae disciplinam inter sanctorum apicum volumina suis auditoribus contraderent'). This laid the intellectual ground on which true Roman Easter customs could grow and spread, but more than anything this liturgical reform needed institutional backing throughout the Anglo-Saxon kingdoms. Theodore made sure that bishops already in place were in line with Rome, and filled vacant posts with appropriate candidates. This work came to a close at the Council of Hertford in September 672. It laid out ten decrees, which may be considered the foundational charter of an English Church. Tellingly, the very first decree stipulated 'that we all observe the Holy Day of Easter universally on Sunday after the fourteenth moon of the first month' ('Primum capitulum: "Ut sanctum diem paschae in commune omnes seruemus dominica post XIII<sup>am</sup> lunam mensis primi."')<sup>45</sup> Dionysius was finally accepted by all church officials of the Anglo-Saxon kingdoms. Three years into his office, Theodore had accomplished the principal task given to him by Pope Vitalian: the 'weeds of the enemy' Victorius had been eradicated.<sup>46</sup>

#### LINKS BETWEEN IRELAND, THE ANGLO-SAXON KINGDOMS AND THE SCHOOL OF CANTERBURY

Theodore's appointment to the Canterbury see, therefore, came with a clear doctrinal mandate – the universal acceptance of Alexandrian Easter practice – that had to be underscored by proper education in liturgical practices, especially

<sup>43</sup> See, in particular, Bischoff and Lapidge, *Biblical Commentaries*, pp. 47–81; Lapidge, 'The Career', pp. 105–18.

<sup>44</sup> Bede, *HE* iv. 2 (Plummer, *Baedae Historiam ecclesiasticam* I, 204; 'the right way of life and the canonical custom of celebrating Easter', Colgrave and Mynors, *Bede's Ecclesiastical History*, pp. 332–3).

<sup>45</sup> Bede, *HE* iv. 5 (Plummer, *Baedae Historiam ecclesiasticam* I, 215–6; Colgrave and Mynors, *Bede's Ecclesiastical History*, pp. 350–1).

<sup>46</sup> For the Council of Hertford in this context, see now Clear, 'New Insights'; for the Council of Hertford more generally, see C. Cubitt, *Anglo-Saxon Church Councils c. 650–c. 850* (London 1995), especially pp. 62–4, 249–50, 298–300.

‘ecclesiastical arithmetics’ – computus. An existing Canterbury school was upgraded, one might say, into an academy.<sup>47</sup> This may have changed, to a degree, the educational dynamics of Britain and Ireland. Certainly in northern Northumbria, with its strong Irish links, the first generation of monastic students went to the *regiones Scottorum* for their studies.<sup>48</sup> This was probably out of necessity, since monastic libraries and educational structures had to be set up first in Northumbria, while they were fully functioning in neighbouring Ireland with its already existing, two-century old Christian tradition. With Oswiu’s decision at Whitby, those not renouncing their Irish heritage went to the *regiones Scottorum* for religious exile, both Irish and *Angli* clerics.

These movements created substantial networks of scholars in the Insular world, of which only glimpses are transmitted to us through the most well-known figures and institutions mentioned by Bede, like Eggerht and Rath Melsigi or Colmán and Mayo. Rath Melsigi deserves special mention here, as it became a key player in the Easter controversy: The debates at and following Whitby doubtlessly reached the Northumbrian intellectuals in this monastery, which became one of the earliest Irish communities to embrace the Alexandrian/Dionysiac reckoning. Rath Melsigi may have been instrumental in Armagh’s conversion to this method of calculating Easter,<sup>49</sup> and when the last stronghold of traditional practice, Iona, contemplated change, it invited Eggerht himself as a specialist advisor, completing the switch to Dionysius in 716.<sup>50</sup> Further afield, Rath Melsigi’s doctrinal views travelled with Willibrord to Francia and especially his monastic foundation of Echternach in Austrasia, which became a powerhouse in the introduction of Dionysius on the Continent.<sup>51</sup>

Arguably the most prominent product of these networks was the Northumbrian King Aldfrith, who received a monastic education in the *regiones Scottorum* and when king invested in monastic education in his realm.<sup>52</sup> A continuous influx of Irish texts into their libraries in the first two or three generations after the adoption

<sup>47</sup> See n. 4 above.

<sup>48</sup> The classic references here are Bede, *HE* iii. 27 (Plummer, *Baedae Historiam ecclesiasticam* I, 192, with commentary at II, 196–7; Colgrave and Mynors, *Bede’s Ecclesiastical History*, pp. 312–3) and Aldhelm’s Letter to Heahfrith discussed p. 15 below.

<sup>49</sup> Wartjes, ‘Pope Vitalian’s Letter’.

<sup>50</sup> Bede, *HE* iii. 4, v. 22, 24 (Plummer, *Baedae Historiam ecclesiasticam* I, 134–5, 346–8, 356; Colgrave and Mynors, *Bede’s Ecclesiastical History*, pp. 224–5, 552–5, 566–7).

<sup>51</sup> See n. 85 below.

<sup>52</sup> On Aldfrith, see more recently B. Yorke, ‘Adomnán at the Court of King Aldfrith’, *Adomnán of Iona: Theologian, Lawmaker, Peacemaker*, ed. J. M. Wooding (Dublin, 2010), pp. 36–50; C. Ireland, ‘Where was King Aldfrith of Northumbria Educated? An Exploration of Seventh-Century Insular Learning’, *Traditio* 70 (2015), 29–74; Ireland, *Gaelic Background*, pp. 74–5, 193–200, 266–7, 283–96. On the circumstances of accession to the Northumbrian throne and the involvement of intellectual networks in this process, see I. Wartjes, ‘The Role of the Church

of Christianity meant that Northumbrian students could study Irish learning at home and became less dependent on travel. Bede is a good example of this generation, managing to have a prosperous scholarly career without leaving his monastery of Wearmouth and Jarrow.

This means that much of the nascent Anglian but also Saxon churches were stocked with Irish books. Outside of Northumbria, Irish presence – and with this learning and books – was substantial, particularly in East Anglia and Wessex as represented by the known figures of the brothers Fursa, Foillán, and Ultán,<sup>53</sup> but also the Frank Agilbert, who studied in Ireland before becoming bishop of Wessex.<sup>54</sup> In consequence, educational travel from Ireland to the Anglo-Saxon kingdoms did not make that much sense, as not much new could be learned there by a mobile Irish cleric with a thirst for knowledge. The main exception was, of course, Canterbury. How welcoming to students from the West Canterbury may have been in the early decades since its foundation in 597 must remain speculative. Certainly, the earliest archbishops of Canterbury pursued a rather antagonistic policy against its western neighbours, with an uncompromising stance against differences in liturgical practices. The hostility between Canterbury and Briton clergy soon became institutional.<sup>55</sup> At least the southern Irish turn towards a more Roman outlook in the 630s could have provided for a more amiable relationship with Canterbury, but Cummian's Letter suggests that, for guidance and knowledge acquisition, the Irish went to Rome directly rather than relying on a second-generation intermediary in the south-eastern corner of Britain.<sup>56</sup>

The arrival of Theodore changed these dynamics. The Canterbury see had been held by the first generation of missionaries sent to England in 596/601 until 655, when this generation was followed by the incumbency of one native archbishop, Deusdedit. This means that, in terms of personnel, there was no direct appointment from Rome from the foundation of the Canterbury church to

in Irish Regnal Succession – the Case of Iona', *L'Irlanda e gli Irlandesi nell'alto medioevo*, Settimane di studio del Centro italiano di studi sull'alto Medioevo 57 (Spoleto, 2010), 155–213, at 176–82.

<sup>53</sup> For Fursa and Foillán, see Bede, *HE* iii. 19 (Plummer, *Baedae Historiam ecclesiasticam* I, 163–8; Colgrave and Mynors, *Bede's Ecclesiastical History*, pp. 268–76), which is based on the *Transitus Fursei* (the chapters relevant for Fursa's life are ed. by B. Krusch in MGH SS rer. Merov. 4 (Hanover, 1902), 434–40); see also especially Plummer, *Baedae Historiam ecclesiasticam* II, 173; P. Grosjean, 'Chronologie de S. Feuillen', *Analecta Bollandiana* 75 (1957), 379–92; P. Ó Riain, 'Les Vies de Saint Fursy: les sources irlandaises', *Revue du nord* 68 (1986), 405–13; I. N. Wood, *Fursey and his Brothers: their Contribution to the Irish Legacy on the Continent* (Attleborough, 2016).

<sup>54</sup> For Agilbert, see especially C. I. Hammer, "'Holy Entrepreneur': Agilbert, a Merovingian Bishop between Ireland, England and Francia', *Peritia* 22–3 (2011–12), 53–82.

<sup>55</sup> Bede, *HE* ii. 2 and 4 (Plummer, *Baedae Historiam ecclesiasticam* I, 81–8; Colgrave and Mynors, *Bede's Ecclesiastical History*, pp. 134–49).

<sup>56</sup> Cummian's Letter *De controversia paschali* is ed. and trans. by M. Walsh and D. Ó Cróinín, *Cummian's Letter De controversia paschali, together with a Related Irish Computistical Tract 'De ratione computandi'*, Pontifical Inst. of Med. Stud.: Stud. and Texts 86 (Toronto, 1988), 1–97, here 92–5.

the arrival of Theodore. This fact alone will have made it attractive to study under Theodore, who brought first-hand knowledge from the centre of Western Christianity. The circumstances of his appointment added to this: the recent change of liturgical practices by the Roman curia (from Victorius to Dionysius) made it desirable to learn about the details, and being able to do this closer to home than Rome will have been most welcome, especially if the teacher sent was an evident expert. Theodore's Greek background, which opened up an entirely new universe, both theologically and linguistically, will only have been the icing on the cake of this fresh learning opportunity in neighbouring Britain.

That the Canterbury school of Theodore and Hadrian attracted Irish students is evidenced by Aldhelm's Letter to a certain Heahfrith.<sup>57</sup> In this curious document, Aldhelm welcomes Heahfrith's return to Britain to take up his 'vocation as teacher' (*praeceptoris vocamine*) after a six-year study stay in north-western Ireland (Mayo?). He hopes that Theodore's and Hadrian's school will remove the decade-old necessity to study in Ireland because of a lack of suitable alternatives in Britain. In fact, Aldhelm drives the point that the Canterbury school has fully turned the tide. This he illustrates by one example, Theodore's superiority in debating the 'obscure and acute syllogisms of chronography' (*chronographiae opacis acutisque syllogismis*) with his Irish students, which may well be a reference to the Easter question.<sup>58</sup>

Aldhelm's language could suggest an aversion on the part of Theodore to this group of Irish critics, which would be further accentuated if the *Laterculus Malalianus* is, in fact, from Theodore's pen.<sup>59</sup> If so, it seems not to have impacted the Irish desire to study at Canterbury, as travel dictionaries may provide additional evidence: the codex St Gall, Stiftsbibliothek, 913 is directly connected to the Canterbury School through its Leviticus glosses, which refer by name to Hadrian (p. 143).<sup>60</sup> These are followed by the famous *Vocabularius Sancti Galli*, a glossary in three parts:<sup>61</sup> thematic, alphabetic, and glosses to Aldhelm's *De*

<sup>57</sup> Aldhelm, *Epistola ad Eabfridum*, ed. Ehwald, pp. 486–94; see also the translation with introduction in Lapidge and Herren, *Aldhelm*, pp. 143–6, 160–4.

<sup>58</sup> This interpretation was put forward by Ehwald in MGH Auct. ant. 15, 493 and accepted by Lapidge and Herren, *Aldhelm*, p. 202. Cf. Hollis, 'Scientific and Medical Writings', p. 188.

<sup>59</sup> See n. 15 above.

<sup>60</sup> The manuscript is readily available online at e-codices: <https://www.e-codices.unifr.ch/en/list/one/csg/0913>. The Hadrian gloss is edited by Bischoff and Lapidge, *Biblical Commentaries*, p. 535 (no. 30) with commentary p. 541.

<sup>61</sup> The *Vocabularius* is transcribed in R. Henning, *Über die sanctgallischen Sprachdenkmäler bis zum Tode Karls des Großen* (Straßburg, 1874), pp. 14–23; E. von Steinmeyer and E. Sievers, *Die althochdeutschen Glossen*, 5 vols. (Berlin, 1979–1922) III, 1–8; see also the classic by G. Baesecke, *Vocabularius Sti. Galli in der angelsächsischen Mission* (Halle, 1933), and now K. Dekker, 'Collecting Encyclopaedic Knowledge in the *Vocabularius Sancti Galli*?, *Crafting Knowledge in the Early Medieval Book: Practices of Collecting and Concealing in the Latin West*, ed. C. Arthur and S. O'Sullivan (Turnhout, 2023), pp. 255–313.

*laudibus virginum*. The alphabetic part is rooted in the Anglo-Saxon glossing tradition, and the glosses to Aldhelm point in the same direction (and provide another link to Canterbury where Aldhelm studied).<sup>62</sup> The thematic Latin–German glossary, which makes up more than three quarters of the *Vocabularius*, is more complex. It is extremely practically oriented, including architecture, social rank, weather, animals, etc. Wolfgang Heil has proven that it was the work of an English author, who turned an existing Latin–Old English glossary into a Latin–German one by translating the Old English terms into a mix of Franconian and Upper German dialect.<sup>63</sup> This obviously raises the question of who composed the Latin–Old English original that formed the basis for the *Vocabularius*.<sup>64</sup> Since much of the manuscript context points to the Canterbury school, it may not be too far-fetched to imagine that the original was used by one of its students (if not by one of its teachers, like Hadrian?). The one major group of foreign students who would be in need of a Latin–Old English glossary known to have attended the Canterbury School is the Irish contingent. The potential Willibrord/Echternach connection of the glossary may further corroborate this theory (given that Willibrord came to the continent from Rath Melsigi in Ireland),<sup>65</sup> as does the fact that the same codex contains some computistica of evidently Irish influence.<sup>66</sup>

#### BISSEXTUS ALGORITHM

It would therefore not be surprising to encounter Canterbury learning of the late 670s and 680s in Irish educational, especially computistical texts of the late seventh and early eighth centuries. Three Irish computistical textbooks of this period survive: the *Computus Einsidlensis* (CE),<sup>67</sup> the Munich

<sup>62</sup> See n. 8 above.

<sup>63</sup> W. Klein, ‘Zu Herkunft, Sprache und Übersetzer des Vocabularius Sti. Galli’, *Zeitschrift für deutsche Philologie* 131 (2012), 3–32.

<sup>64</sup> This point has already been made in I. Warntjes, ‘Die Verwendung der Volkssprache in frühmittelalterlichen Klosterschulen’, *Wissenspaläste. Räume des Wissens in der Vormoderne*, ed. C. Fasbender and G. Mierke (Würzburg, 2013), pp. 153–83, at 163–6.

<sup>65</sup> H. Mettke, ‘Zum Kasseler Codex theol. 4<sup>o</sup> und zur Herleitung des Vocabularius Sti. Galli aus Fulda’, *Althochdeutsch. I: Grammatik, Glossen und Texte* (Heidelberg, 1987), pp. 500–7, at 507.

<sup>66</sup> The most obvious example is the monthly increment of the saltus lunae as ‘III momenta et XII pars momenti et quadragensima VII<sup>ma</sup> pars duodecimae partis momenti’ on p. 103; cf. Warntjes, *Munich Computus*, pp. 272–7, and see now also Dekker, ‘Collecting Encyclopaedic Knowledge’, pp. 271–3, 292–303. For the computistica in this manuscript see also the problematic account of A. Cordoliani, ‘Les manuscrits de comput ecclésiastique de l’Abbaye de Saint Gall du VIII<sup>e</sup> au XII<sup>e</sup> siècle’, *Zeitschrift für schweizerische Kirchengeschichte* 49 (1955), 161–200, at 162–4.

<sup>67</sup> The *Computus Einsidlensis* is preserved in Einsiedeln, Stiftsbibliothek, 321 (647), pp. 83–125 (St. Gall?, 874?); a first critical edition by Tobit Loevenich is near completion. For this text, see I. Warntjes, ‘A Newly Discovered Irish Computus: Computus Einsidlensis’, *Peritia* 19 (2005),



Computus (*MC*),<sup>68</sup> and *De ratione computandi* (*DRC*).<sup>69</sup> Of these, only the Munich Computus is securely datable, to 718/9.<sup>70</sup> Comparison to this text combined with its early Frankish reception suggests a date between 719 and 727 for *De ratione computandi*.<sup>71</sup> The same textual analysis also indicates that the *Computus Einsidlensis* predates *MC*, but postdates one of *MC*'s main sources, the *Victorian Computus* of 689.<sup>72</sup> A prologue of 699 to an updated Victorian Easter table further suggests that the southern Irish still followed Victorius as late as the end of the seventh century, which would narrow the date of the Dionysiac *CE* to 699 × 718.<sup>73</sup> Especially because of their familiarity with Victorius, who was followed in the seventh century in southern but not northern Ireland, all three textbooks have been located in Ireland's south.<sup>74</sup>

All three Irish texts, and for that matter also Bede's *De temporibus* and *De temporum ratione*, are structured in a very similar way, with the first major

61–4, with corrections in J. Bisagni and I. Warntjes, 'The Early Old Irish Material in the Newly Discovered *Computus Einsidlensis* (c. AD 700)', *Ériu* 58 (2008), 77–105.

<sup>68</sup> The Munich Computus is ed. and trans. by I. Warntjes, *The Munich Computus: Text and Translation. Irish Computistics between Isidore of Seville and the Venerable Bede and its Reception in Carolingian Times*, Sudhoffs Archiv Beihefte 59 (Stuttgart, 2010), including an introduction to modern scholarship on the text at xv–xxiii.

<sup>69</sup> *De ratione computandi* is ed. by D. Ó Cróinín in Walsh and Ó Cróinín, *Cummian's Letter*, pp. 101–213. The text was highlighted as potentially 'contemporary with Bede' by C. W. Jones in CCSL 123, xiii, and subsequently introduced into scholarship by D. Ó Cróinín, 'A Seventh-Century Irish Computus from the Circle of Cummianus', *Proceedings of the Royal Irish Academy* 82C (1982), 405–30, repr. in Ó Cróinín, *Early Irish History and Chronology* (Dublin, 2003), pp. 99–130. For its transmission and reception, see also A. Borst, *Das Buch der Naturgeschichte: Plinius und seine Leser im Zeitalter des Pergaments*, 2nd ed. (Heidelberg, 1995), p. 97, n. 48; Warntjes, *Munich Computus*, pp. cv–cvi, cc, 333–6; J. Bisagni, 'The Newly-Discovered Irish and Breton Computistica in Città del Vaticano, BAV, MS Reg. Lat. 123', *Peritia* 28 (2017), 13–34.

<sup>70</sup> For the date, see Warntjes, *Munich Computus*, pp. lvii–lxi.

<sup>71</sup> Warntjes, *Munich Computus*, pp. lv and exci–ccii, which may be further corroborated by T. Loevenich, 'The Date of *De ratione computandi*', *Peritia* 34 (2023), pagination tbc. Ó Cróinín, 'A Seventh-Century Irish Computus', especially p. 121, dates the treatise to the middle of the seventh century based on textual analysis. A ninth-century date was proposed by W. Stevens, 'Ars computi quomodo inventa est', *Zwischen Niederschrift und Wiederschrift: Hagiographie und Historiographie im Spannungsfeld von Kompendienüberlieferung und Editionstechnik*, ed. R. Corradini, M. Diesenberger and M. Niederkorn-Bruck (Vienna, 2010), pp. 29–65, at 50; for arguments against this suggestion, see I. Warntjes, 'Köln als naturwissenschaftliches Zentrum in der Karolingerzeit: die frühmittelalterliche Kölner Schule und der Beginn der fränkischen Komputistik', *Mittelalterliche Handschriften der Kölner Dombibliothek: viertes Symposium der Diözesan- und Dombibliothek Köln zu den Dom-Manuskripten (26. bis 27. November 2010)*, ed. H. Finger (Cologne, 2012), pp. 41–96, at 71–2.

<sup>72</sup> Warntjes, *Munich Computus*, pp. cxxxiii–clii.

<sup>73</sup> I. Warntjes, 'A Newly Discovered Prologue of AD 699 to the Easter Table of Victorius of Aquitaine', *Peritia* 21 (2010), 255–84.

<sup>74</sup> Warntjes, *Munich Computus*, pp. lxxvii–xcvi. Ó Cróinín, 'A Seventh-Century Irish Computus', pp. 126–7, prefers to place the Munich Computus on Iona.

section focussing on solar theory and the mechanics of the Julian calendar.<sup>75</sup> The *bissextus*, the additional leap-day every four years, was one of the key mechanisms of the Julian calendar, and there was considerable discussion about its origin and appropriate placement within the calendar year (24 February according to Macrobius, 2 March as suggested by Isidore, or 21 March linked to Creation), especially among societies that had just been introduced to this calendar through Christianity. The reason for the additional day obviously was that the period from one vernal equinox to the next was calculated as 365  $\frac{1}{4}$  days, which made the addition of an extra day every four years necessary. But this phenomenon attracted numerous other explanations and allegories.<sup>76</sup>

The only reference to a certain Theodore in early medieval *computistica* can be found in a discussion of the *bissextus* in the oldest of these Irish textbooks, *CE*.<sup>77</sup> Here, the chapter proper on the intercalated calendar day is followed by an additional subchapter with a peculiar *argumentum*.<sup>78</sup>

De bissexto quem secundum Theodorum formamus hoc modo: ut in numero horarum diei per totum annum septenum ponamus numerum et quodcumque superfuerit septenum numerum, hoc fiat materia bissexti.

<sup>75</sup> For the structure of these texts, see especially Warntjes, *Munich Computus*, pp. cvii–cxiii; I. Warntjes, ‘Isidore of Seville and the Formation of Medieval Computus’, *A Companion to Isidore*, ed. A. Fear and J. Wood (Leiden, 2020), pp. 457–523, at 464–83.

<sup>76</sup> For a survey, see M. Smyth, ‘Once in Four: the Leap Year in Early Medieval Thought’, *Late Antique Calendrical Thought and its Reception in the Early Middle Ages*, ed. I. Warntjes and D. Ó Cróinín, *Studia Traditionis Theologiae* 26 (Turnhout, 2017), 229–64.

<sup>77</sup> To our knowledge, the name Theodore appears in only one other computistical collection, Paris, Bibliothèque nationale de France, nal 1616, 4r (Brittany, s. x<sup>1</sup>): *Teodorus episcopus dicit: Si porci casu*. This, however, is a reference to Theodore’s penitential ii. 11.7 on the edibility of pigs that came in contact with carrion or human blood (*Councils and Ecclesiastical Documents relating to Great Britain and Ireland*, ed. A. W. Haddan and W. Stubbs, 3 vols. (Oxford, 1869–1871) III, 198), and is disconnected from the preceding *pagina epactarum* (the lunar ages on the first day of each month throughout the nineteen-year cycle) and the following twelve Egyptian (unlucky) days (the latter not recorded in D. Juste, *Les manuscrits astrologiques latins conservés à la Bibliothèque nationale de France* (Paris, 2015), p. 267).

<sup>78</sup> ‘On the bissextile (day), which we form according to Theodore in this way: from the number of the hours of a day over the whole year we would divide by 7 and whatever will be left after the division by 7, this will be the substance of the bissextile (day). The calculation of which is this: a year is reckoned with 365 days. 100 days, however, have 1200 hours (i.e. of daytime). Thus, 300 days have 3600 hours. 60 days, however, have 720 hours. 5 days, then, have 60 hours, which together make 4380 hours. Thus, the night also has the same number of hours over the whole year. On this basis, 8760 hours of the entire year are reckoned. Divide this by 7: 7700, 1060 remain. In the same way delete 700, 360 remain. Divide this number again into 50, that is 7 times 50, 10 remain. Subtract 7 from this number, 3 hours remain, which are left after the division by 7 and which over four years make the bissextile day, though as an artificial (i.e. 12h) and not a day proper (i.e. 24h).’ *CE*, p. 108; the text printed here is that of the forthcoming edition.

*Theodore of Tarsus and the Study of Computus at the Canterbury School*

Cuius probatio hæc est: Annus diebus CCCLXV computatur. C uero dies horas habent ICC. Ita et CCC dies habent horas IIIIDC. LX uero dies habent horas DCCXX. V autem dies horas LX habent, que simul faciunt horas IIIICCCCLXXX. Ita et nox eundem numerum horarum per totum annum habet. Hinc conpotus est horarum totius anni VIIIDCCCLX. Hoc septeno numero diuide, VII milia et DCC, remanent I et LX. Remitte itidem DCC, remanent CCCLX. Partire iterum hunc numerum in quinquaginta, hoc est septies quinquaginta, remanent X. Deduc VII ex hoc numero, remanent III horę, que septenum numerum supersunt et que per quadriennium diem bissexti licet abusiuum faciunt et non diem proprium.

The argument here is that a non-bissextile year of 365 days (i.e. without the excess of 6 hours actually necessitating the intercalation every four years) has 8760 hours; if these are divided by 7 (clearly a reference to the seven-day week), 3 hours remain, which make up a quarter of the 12 hours of daytime, and therefore accumulate to a 12-hour day in four years.<sup>79</sup>

The same curious algorithm can also be found in a parallel passage in *MC*, but with distinctly different wording.<sup>80</sup> The concept is so counterintuitive, but also complex, that it is difficult to perceive that two authors would have developed the same idea independently of each other or of a common source. Bearing this in mind, the attribution is noteworthy: *CE* ascribes this algorithm to a certain Theodore, *MC* to 'the Greeks'. The rarity of the name Theodore in the context of seventh- and early eighth-century Insular computistics has already been pointed out and an identification with Theodore of Tarsus proposed.<sup>81</sup> This is supported by *MC*'s reference to the Greeks. Apparently, the author of *MC* considered this *argumentum* to be of Greek origin, either because he knew which Theodore was meant if he was working from *CE*, or he had learned the algorithm from a source he clearly thought to be of eastern origin. The latter option seems to be the more likely one, given the fact that the two passages in *CE* and *MC* have only the concept in common, but display no interdependency in wording (see [Table 1](#) below). While in both *CE* and *MC*, the calculation of the hours of a year is comprised of the same intermediate steps, the division by seven is not carried out in detail in *MC*. This textual and structural difference may in fact be an indicator of an oral source, for otherwise there would be clear textual parallels between these

<sup>79</sup> For discussion of this *argumentum*, see Springsfeld, *Alkuins Einfluß*, pp. 204–5; K. Springsfeld, 'Rechnen', *Ex oriente: Isaak und der weisse Elefant; Bagdad-Jerusalem-Aachen; eine Reise durch drei Kulturen um 800 und heute*, ed. W. Dreßen (Aachen, 2003), pp. 224–33, at 226; Warntjes, *Munich Computus*, p. clxii; Warntjes, 'Argumenta', pp. 92–4; Smyth, 'Once in Four', pp. 257–8; Acerbi, 'Byzantine Easter Computi', p. 31; C. Gastgeber, 'Neue Texte zum Computus byzantinischer Zeit im Codex Ambrosianus A 45 sup', *Jahrbuch der Österreichischen Byzantinistik* 71 (2021), 62–258, at 244, n. 248.

<sup>80</sup> *MC* c. 41, lines 92–106 (Warntjes, *Munich Computus*, p. 138).

<sup>81</sup> Warntjes, *Munich Computus*, pp. cl–clii; Bisagni and Warntjes, 'Computus Einsidlensis', pp. 89–90.

Table 1:  
The three oldest extant witnesses of the *bissextus* algorithm paralleled

<i>CE</i> of c. 700 (Einsiedeln, Stiftsbibliothek, p. 108)	<i>MC</i> of 718/9, c. 41 (Warntjes, <i>Munich Computus</i> , p. 138)	<i>Computus Digbaeanus</i> of 675, <i>Argumentum XVI</i> (Krusch, 'Studien', pp. 80–1)
De bissexto quem secundum Theodororum formamus hoc modo: ut in numero horarum diei per totum annum septenum ponamus numerum et quodcumque superfuerit septenum numerum, hoc fiat materia bissexti.	Aliter Grecorum bissextus preparari artificiose intellegitur. Greci autem anni horas rimari sollicitant. Quas per VII diuidunt in figuram VII dierum per quos mundi circulus inuoluitur. Quod itaque extra VII sentiunt superesse, ex eo diem bissexti faciunt. Hoc modo horas anni numerabis:	Sex diebus fecit deus mundum, septimo requieuit. Ut ergo plenius intellegatur, computa quantas (!) horas habet unus dies (recte: annus), et divides illas in VII partes et quantas remanent, exinde fit bissextus.
Cuius probatio hec est: Annus diebus CCCLXV computatur. C uero dies horas habent ICC.	Nam X horę per X dies duabus horis relictis sunt uniuscuiusque diei, CXX efficiunt. Ac deinde CCC diebus IIII numerantur et duabus horis relictis DC.	Primo computa dies CCC, quomodo horas habent, decies tricenteni, sunt IIII. Iterum facis: bis tricenteni, sexcenteni, fiunt in tricentenis diebus horae III DC. Iterum facis: decies sexageni DC et bis sexageni CXX.
Ita et ccc dies habent horas IIIIDC.	LX diebus DCCXX horae rimantur.	Fiunt ergo in sexagenis diebus horae DCCXX. Iterum facis: decies quini L, et bis quini X.
LX uero dies habent horas DCCXX.	Et de V diebus LX horę sunt. Hic est totus numerus, quem diximus, IIIICCLXXX. Quibus	Ecce habes in quinque diebus horas LX. Fiunt simul integro anno in diebus CCCLXV horae

(Continued)

Table 1 (Continued)

CE of c. 700 (Einsiedeln, Stiftsbibliothek, p. 108)	MC of 718/9, c. 41 (Warntjes, <i>Munich Computus</i> , p. 138)	<i>Computus Digbaeanus</i> of 675, <i>Argumentum XVI</i> (Krusch, 'Studien', pp. 80–1)
<p>numerum horarum per totum annum habet. Hinc conpotus est horarum totius anni VIIIDCCLX.</p>	<p>parem horarum noctium numerum coniungas, VIIIDCCLX utrumque inuenire scias.</p>	<p>IIII CCCLXXX, et alias tantas in nocte, fiunt simul dierum et noctium totius anni horae VIIII DCCLX.</p>
<p>Hoc septeno numero diuide, VII milia et DCC, remanent I et LX. Remitte itidem DCC, remanent CCCLX. Partire iterum hunc numerum in quinquaginta, hoc est septies quinquaginta, remanent X. Deduc VII ex hoc numero,</p>	<p>Inde per VII diuisas</p>	<p>Divide illas in VII partes. Primum facis: septies milleni VII, remanent IDCCLX. Item facis: septies ducenteni, fiunt ICCCC, remanent CCCLX. Item facis: septies quinquageni, fiunt CCCL, remanent X.</p>
<p>remanent III horę, quę septenum numerum supersunt et quę per quadriennium diem bissexti licet abusiuum faciunt et non diem proprium.</p>	<p>III horas superesse noscas. Quibus per quadriennium XII horas effici intellegas. Quas peracto IIII annorum curso in diem bissexti unari putant.</p>	<p>Item facis: septies as (!) VII, remanent III. Iste tres horae faciunt in III&lt;I&gt; annis diem.</p>

two closely related texts. Either way, *MC*'s awareness of the Greek origin of the *argumentum* supports the identification of Theodore.

*CE* of c.700 and *MC* of 718/9, however, are not the only texts transmitting this *argumentum*. Its earliest occurrence, to our present knowledge, is attested in the *Computus Digbaeanus* of 675, a computistical formulary of sixteen items initially published as Dionysius Exiguus' *argumenta* of 525,<sup>82</sup> but subsequently proven to be a revised and elaborated version of Dionysius' original corpus updated in 675.<sup>83</sup>

<sup>82</sup> W. Jan, *Historia cycli dionysiani cum argumentis paschalibus et aliis eo spectantibus* (Wittenberg, 1718), pp. 79–94, repr. PL 67, cols. 497–508, and Krusch, 'Studien', pp. 75–81.

<sup>83</sup> See especially I. Warntjes, 'The *Argumenta* of Dionysius Exiguus and their Early Recensions', in *Computus and its Cultural Context in the Latin West, AD 300–1200*, ed. I. Warntjes and D. Ó Cróinín, *Studia Traditionis Theologiae* 5 (Turnhout, 2010), 40–111.

Our algorithm is part of the final item, and is therefore commonly known as pseudo-Dionysius *Argumentum XVI* (§2). Though slightly disconnected from the preceding 15 *argumenta* in the *codex unicus* of the *Computus Digbaeanus* (Oxford, Bodleian Library, Digby 63, 78v–79r), it appears that *Argumentum XVI* was added to the Dionysiac canon in 675.<sup>84</sup> This date for the first occurrence of this algorithm in Latin computus certainly fits very well with the theory that it was introduced by Theodore of Tarsus. It is noteworthy that, again, the *argumentum* in the *Computus Digbaeanus* represents the same concept as in *CE* and *MC*, yet disclosing no textual relation. This is another indicator that this *argumentum* was originally transmitted in oral form.

Another copy of this *argumentum* – closely related to the *Computus Digbaeanus* – was included in the *Computus Cottonianus* of 689, which has been argued to have been composed in Rath Melsigi in Ireland for Willibrord's Frisian mission,<sup>85</sup> preserved in a codex from mid-eighth-century north-eastern France (London, British Library, Cotton Caligula A XV, 79r). The version of the *argumentum* in these two texts is almost identical with the one in the codex of 823 that transmits *MC* (Munich, Bayerische Staatsbibliothek, Clm 14456, 65v–66r), and also very close to the version in the computistical compilation of c. 874 containing *CE* (Einsiedeln, Stiftsbibliothek, 321 (647), p. 146). It seems, therefore, that by way of Willibrord's mission this initially orally transmitted *argumentum* started a new life in a fixed written form once it had crossed the Channel, being disseminated widely across the Carolingian kingdoms, often alongside other Insular computistica.<sup>86</sup>

Thus, there are several observations to be summarised here: the *argumentum* appears not only in the related Irish textbooks *CE* of c. 700 and *MC* of 718/9, but also in the (probably Anglo-Saxon) *Computus Digbaeanus* of 675, from where it was probably copied into the *Computus Cottonianus* of 689 linked to Willibrord and Rath Melsigi. The distinct differences in wording suggest that the *argumentum* was taught orally and then noted down by different authors in their respective *computi*. It would not be inconceivable to assume an Irish origin of the *argumentum* that was then taught to Anglo-Saxon computists e.g. in Rath Melsigi.<sup>87</sup> However, all of the texts just discussed have been composed within or close to Theodore's incumbency as archbishop of Canterbury, and while his name is stated explicitly in *CE*, *MC*, which was evidently composed twenty-eight years after Theodore's and eight years after Hadrian's death, attributes the *argumentum* more generally to a Greek origin. This makes an Irish origin unlikely while at the same time fitting perfectly with Theodore's

<sup>84</sup> Warntjes, 'Argumenta', pp. 45 and 92–5.

<sup>85</sup> I. Warntjes, 'The Computus Cottonianus of AD 689: a Computistical Formulary Written for Willibrord's Frisian Mission', *Easter Controversy*, ed. Warntjes and Ó Cróinín, pp. 173–222.

<sup>86</sup> See pp. 25–30 below.

<sup>87</sup> An Irish origin of this *argumentum* is argued by Walsh and Ó Cróinín, *Cummian's Letter*, p. 161; Springsfeld, *Alkuins Einfluß*, p. 205.

eastern background. Moreover, the *argumentum*'s initial oral transmission – deduced from the high level of variation among the earliest Insular witnesses – aligns with Bede's and Aldhelm's description of Theodore and Hadrian's way of teaching (as well as with the related problem of identifying texts directly with either of the two).

BYZANTINE PARALLELS

At this point, it may still be argued that either the attribution to Theodore in *CE* could be spurious – especially since the *Computus Digbaeanus* composed in Theodore's lifetime does not contain any ascription – or that *CE* simply refers to a different Theodore. Theodore of Tarsus's authorship, however, can be corroborated further by comparison with Byzantine computistics.<sup>88</sup> The most important witness for our context is the potentially oldest one, the *Florilegium Coislinianum*. This is an alphabetic encyclopaedia, probably of the late-ninth/early-tenth centuries, surviving in tenth-century and later manuscripts. Under letter Π, a discussion of Πάσχα is included, which contains calendrical algorithms. One of them is the *bissextus* algorithm under discussion here, another refers to Byzantine *annus mundi* 6224 = AD 716. In true encyclopaedic fashion, the author draws from a variety of sources. It may be the case that one of these was a calendrical layer of 716, but only the ongoing new edition of the *Florilegium* may shed more light on this.<sup>89</sup> If so, this would attest to the *bissextus* algorithm in Byzantine sources as early as 716, within range of Theodore's lifetime. It reads:<sup>90</sup>

ρξθ. περὶ τοῦ γνῶναι πόθεν ἐστὶ τὸ βίσεκστον

Δέον σε τιθεῖν τὰς ἡμέρας τοῦ ἐνιαυσιαίου κύκλου, τουτέστι τῶν τξε ἡμερῶν καὶ νυκτῶν, καὶ πολυπλασιάζειν αὐτὰς ἐκάστου νυκτοημέρου τῶν κδ ὥρων· καὶ ἀνατάσσουν ἡψξ ὥραι· ταῦτα ἀναλύειν εἰς τὸ ζ, καὶ περιττεύουσιν ὥραι τρεῖς καθ' ἕκαστον ἐνιαυτόν, καὶ εἰς τὸν δ<sup>ov</sup> καιρὸν γίνονται ὥραι ιβ. ἐπιλαμβάνεται οὖν ὁ Φεβρουάριος μὴν τὴν περισσειαν τῆς μιᾶς ἡμέρας, καὶ λέγεται βίσεκστον.

<sup>88</sup> This section on the Byzantine evidence has benefited greatly from collaboration with Fabio Acerbi (Paris).

<sup>89</sup> An edition letter-by-letter is underway at the University of Leuven; published so far are: A – *CCSG* 66 (2018); B – *Byzantion* 80 (2010), 72–120; Γ – *Byzantion* 78 (2008), 159–223; Δ–Z – *CCSG* 91 (2022); H – *Byzantion* 81 (2011), 74–126; Θ – *Byzantion* 86 (2016), 91–128; N – *Byzantion* 88 (2018), 103–27; Ξ – *Byzantion* 84 (2014), 49–79; P – *Byzantion* 87 (2017), 143–58; Y – *Byzantion* 89 (2019), 359–95; Ψ – *Byzantion* 83 (2013), 49–82.

<sup>90</sup> 'On knowing whence a bissextile (day) takes place | You must put the days of the yearly circle, that is, of the 365 days and nights, and multiply them by each *nychthemeron* of 24 hours; and 8760 hours are set in order; resolve these into 7, and there remain three hours each year, and on the 4th year they yield 12 hours. Then, the month of February takes in addition the remainder of one day, and this is called bissextile (day).' Transcribed from the two best manuscripts, Milan, Biblioteca Ambrosiana, Q 74 sup. and Paris, Bibliothèque nationale de France, gr. 924, by Fabio Acerbi, who also kindly provided the translation.

It is interesting that the calculation proper was omitted, which could indicate that at the time of writing, this algorithm was common knowledge and did not need elaboration or additional explanation.

We are on firmer ground with two ninth-century computi, the *Anonymi* of 830 and 892 that have just been made available to scholarship by Gastgeber and Acerbi.<sup>91</sup> They largely share the same material,<sup>92</sup> including the *bissexstus* algorithm, which has different corruptions in each version. The slightly more complete *Anonymus* of 830 reads:<sup>93</sup>

ὁ ἐνιαυτὸς ἔχει ἡμέρας τξε και δ<sup>ον</sup>, ὥρας ,δπ· ταύτας δίπλωσον· και γίνεται ,ηψξ, και ὕφειλε αὐτὰ εἰς ἐπτᾶη· οἶον ἐπτᾶη ,α, ζ· ζ σ, ,αυ· και μένουσι τξ· ἐπτᾶη ν, <τν·> μένουσι ι· <ἐπτᾶη μίαν, ζ·> και μένουσι κατ' ἐνιαυτὸν ὥραι γ· και ἐκ {lege εις} τοὺς δ χρόνους γίνονται ὥραι ιβ, και οὕτως γίνεται τὸ βίσεξστον.

The level of corruption, including the mistaken inclusion of the quarter-day at the beginning that is shared between the two *Anonymi*, point to a transmission history that had gone through numerous hands by the ninth century. Except for the excerpts preserved in the *Florilegium Coislinianum* and a few scattered *argumenta*, no Byzantine *computistica* between the 640s and 830 survive.<sup>94</sup> Had more survived, it would surely have included the *bissexstus* algorithm, probably as early as the seventh century, judging by the evidence just outlined. Interestingly, the manuscript transmission of all three texts (*Florilegium Coislinianum* and the two *Anonymi*) point to southern Italy for their place of composition, mirroring Pope Vitalian's search for expertise in eastern computus south of Rome.

#### THE TRANSMISSION OF THE THEODORE *BISSEXTUS* ALGORITHM

Whenever texts have been ascribed to the Canterbury school, their reception has tended to be quite limited (with exceptions, of course), usually explained by the exoticism of content. In this respect, the *bissexstus* algorithm breaks fundamental new ground in studies on Theodore (though – with one exception – the medieval scribes themselves were not aware of its links to Theodorean teaching), not only because it proved extremely popular throughout the early Middle Ages, but also

<sup>91</sup> *Anonymus* of 830, ed. C. Gastgeber, 'Neue Texte', pp. 237–45; *Anonymus* of 892, ed. and trans. F. Acerbi, 'Byzantine Easter Computi', pp. 28–56.

<sup>92</sup> For details, see Acerbi, 'Byzantine Easter Computi', pp. 7–8, 56–7.

<sup>93</sup> 'The year has 365¼ days, 4380 hours; double these: and they yield 8760; and remove them by seven; viz. seven times 1000, 7000; 7 (times) 200, 1400: and there remain 360; seven times 50, (350:) there remain 10; (seven times one, 7:) and there remain 3 hours per year, and they yield twelve hours in four years, and in this way the bissexstus (day) comes to be.' *Anonymus* of 830 c. 31, ed. Gastgeber, 'Neue Texte', p. 244, with correction and translation provided by Fabio Acerbi. Cf. *Anonymus* of 892 c. 3, ed. Acerbi, 'Byzantine Easter Computi', pp. 30–1; later occurrences of the *argumentum* in Greek texts are listed *ibid.* p. 31, n. 124.

<sup>94</sup> See the overview in Acerbi, 'Byzantine Easter Computi', pp. 3–9.



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because these witnesses can be traced quite accurately due to their occurrence in datable computistical contexts. It is worth separating two transmission stages, a pre-Carolingian oral one and a codified written one in the Carolingian period.

ORAL TRANSMISSION STAGE IN PRE-730 TEXTS

The witnesses to the oral stage can all be explained in a Theodorean context: A, the formularies of the 670s and 680s extending the original Dionysiac *Argumenta*, have been argued to be products of, possibly, Rath Melsigi in Ireland, which had strong connections to the Anglo-Saxon kingdoms. B and C, the Irish textbooks of the first two decades of the eighth century, could well have contained Theodorean learning brought to Ireland by Irish students of the Canterbury school, which is evidenced by the only surviving reference to Theodore in one of them. D and E, Victorian *Computi* from Neustria and Burgundy, are more curious because of their place of origin and their Victorian (as against Theodore's Dionysiac) context; considering, however, that Theodore spent considerable time in Arles, Paris and other places in Neustria and Burgundy *en route* to Kent, his explanation of a calendrical phenomenon disconnected from Easter calculation could well have been absorbed by local intellectuals. To these texts should be added the tract *De bissexto I* attributed to Alcuin, which is a Carolingian reworking of 789 of presumably late-seventh- or early-eighth-century Irish material.<sup>95</sup>

- A. *Computus Digbaeanus* of 675 (ed. Krusch, 'Studien', pp. 80–1) = *Argumentum XVI*
1. Oxford, Bodleian Library, Digby 63, 78v–79r (northern England, s. ix<sup>2</sup>) copied in: *Computus Cottonianus* of 689
  2. London, British Library, Cotton Caligula A XV, 79r (north-eastern France, 743?)
- B. *Computus Einsidlensis* of c. 700  
Einsiedeln, Stiftsbibliothek, 321 (647), p. 108 (St Gall?, 874?)
- C. Munich *Computus* c. 41 (718/9; ed. Warntjes, *Munich Computus*, p. 138)  
Munich, Bayerische Staatsbibliothek, Clm 14456, 22v–23r (St Emmeram in Regensburg, 823)
- D. Victorian *Computus* of 696 (ed. Cordoliani, 'Les plus anciens manuscrits', p. 112)<sup>96</sup>

<sup>95</sup> See A. Borst, 'Alcuin und die Enzyklopädie von 809', *Science in Western and Eastern Civilization in Carolingian Times*, ed. P. L. Butzer and D. Lohrmann (Basel, 1993), pp. 53–78, 60–1; A. Borst, *Das Buch der Naturgeschichte: Plinius und seine Leser im Zeitalter des Pergaments* (Heidelberg, 1995), p. 125; Springsfeld, *Alkuins Einfluß*, pp. 76–8; Warntjes, *Munich Computus*, p. xxii, n. 37. See also Borst, *Kalenderreform*, pp. 188–9.

<sup>96</sup> A. Cordoliani, 'Les plus anciens manuscrits de comput ecclésiastique de la bibliothèque de Berne', *Zeitschrift für Schweizerische Kirchengeschichte* 51 (1957), 101–112.

1. Bern, Burgerbibliothek, 645, 50v (northern France?, 696?) copied in:
2. Cologne, Dombibliothek, 83-II, 36r (Cologne, 805)
3. Vatican, Biblioteca Apostolica Vaticana, Reg. lat. 1530, 46rb (southern France?, 1054?)

E. *Dial. Burg.* c. 14 of 727 (ed. Borst, *Schriften*, p. 366)  
Bern, Burgerbibliothek, 611, 95v (Corbie or Luxeuil?, 727 × 750)

F. Pseudo-Alcuin, *De bissexto I* (ed. PL 101, cols. 993–8, at 994–5)

The manuscripts listed by Springsfeld, *Alkuins Einfluß*, pp. 66–80, are:

Calibration to Septuagint *annus mundi* (AMII) 5989 = AD 789 (not 790):

1. Basel, Universitätsbibliothek, F III 15k, 52r–55v (Benediktbeuren?, s. ix<sup>1/3</sup>)
2. Geneva, Bibliothèque de Genève, lat. 50, 148v–151r (Massay, 825)
3. Oxford, Bodleian Library, Bodley 309, 74r–76r (Vendôme, s. xi<sup>ex.</sup>)
4. Vatican, Biblioteca Apostolica Vaticana, Ross. 247, 170r–173r, with reference to AMII 5889, evident scribal mistake for 5989 (because of the subsequent calculation) = AD 789 (St Chaffre, c. 1020)
5. Vatican, Biblioteca Apostolica Vaticana, Vat. lat. 642, 83r–85v (Lyon?, post-1100?)

Calibrated to AMII 6023 = AD 823 (not 824):

6. Vatican, Biblioteca Apostolica Vaticana, Reg. lat. 226, 26v–31v (southern France?, s. x?)

We have not systematically checked for further witnesses, but can at least add the following:

Calibrated to AMII 5989 = AD 789:

7. Munich, Bayerische Staatsbibliothek, Clm 29790/3 (fragment, s. x)<sup>97</sup>
8. Paris, Bibliothèque nationale de France, Lat. 16361, pp. 279–86 (s. xii)

Calibrated to AMII 6013 = AD 814 (slightly different algorithm to above):

9. Monza, Biblioteca capitolare, c-9/69, 47v–50r (northern Italy, 837)

Calibrated to AMII 6033 (? the 6034 mentioned are clearly after addition of 1; then updated to 6075) = AD 834:

10. Vatican, Biblioteca Apostolica Vaticana, Reg. lat. 1723, 68r–70v (Netherlands?, s. xii<sup>in.</sup>)

#### CODIFIED WRITTEN TRANSMISSION POST-750

This is not the place to adequately discuss the transmission of the *bissextus* algorithm in the Carolingian period (c. 750–900), but we want to provide some directions of travel of the idea to guide future researchers. In the end, the question is slightly premature. What is needed first is a catalogue of all computational

<sup>97</sup> Also listed at mirabileweb: [http://sip.mirabileweb.it/title/de-bissexto-\(ac-de-cursu-et-saltulunaec\)-title/13310](http://sip.mirabileweb.it/title/de-bissexto-(ac-de-cursu-et-saltulunaec)-title/13310).

*argumenta* and tables (or ‘objects’, as they are now called) with their transmissions.<sup>98</sup> More often than not, these computistical objects travelled in clusters, which are much more indicative than tracing isolated examples.

The following is likely not an exhaustive, but is, we believe, a representative list of witnesses to the Theodore algorithm before 900, with a few post-900 additions when they occurred to us (or have been brought to our attention by Jacopo Bisagni’s work on Breton manuscripts). It testifies to the influence of Theodore’s teaching in continental Europe, which would be extended considerably if computistical manuscripts post-900 were surveyed systematically.

It has been argued above that Willibrord brought the Theodore algorithm as pseudo-Dionysius *Argumentum XVI* §2 to the Continent as part of the *Computus Cottonianus* of 689, which was copied in north-eastern France in around 743 (-London, British Library, Cotton Caligula A XV). Through Willibrord and his introduction of the Dionysiac Easter reckoning into the Frankish kingdoms, the region between Seine and Rhine became a hotbed for Latin computus. From here, *Argumentum XVI* radiated out into all parts of the Frankish Empire (A): through Arn of Salzburg it was brought to south-eastern Germany (3); there it also arrived through apparently Irish channels which were further responsible for it travelling to the Lake Constance region, or at least this is what the manuscript context of 8 and 9 suggests, the only codices to transmit the Munich Computus and the *Computus Einsidlensis* respectively. But it appears to have also crossed the Alps to Italy, from where it was brought back to the Reichenau (7). More importantly, it was reviewed at two of the key centres responsible for collecting and testing computistica during Charlemagne’s reign, the episcopal see of Cologne under Hildebold (4) and the palace school (5); interestingly (and understandably), this algorithm apparently was not considered worthy of inclusion in the fundamental *encyclopaediae* that were compiled close to imperial power (*Lib. ann.* of 793, *Lib. comp.* of 809/10, *Lib. calc.* of 818).<sup>99</sup> From the Frankish heartland, *Argumentum XVI* moved to Brittany (Angers 476), and from there to southern France (10 and 11).

But the collection and systematisation of computistical thought was obviously not a royal and episcopal prerogative, it also happened in the bigger monastic centres; key for the transmission history of the Theodore algorithm is Saint-Denis under Abbot Fardulf (G): In 802, Saint-Denis produced its own collection of computistical material that survives in a copy of 804 (1). In or shortly after 810, a fresh version of this collection was sent to the Lake Constance region when Waldo, former abbot of St Gall and then Reichenau, had become abbot

<sup>98</sup> See I. Warnjtes, T. Sijnders, J. ter Horst, and Mathew Clear, ‘Towards a Database of Early Medieval Scientific Ideas: Object Oriented Cataloguing of Latin Computus Manuscripts’, forthcoming.

<sup>99</sup> These computistical *encyclopaediae* are ed. by Borst, *Schriften*, pp. 660–772, 1054–334, 1367–451.

at Saint-Denis (2, 3). When, in 859, Saint-Denis produced its own copy of *Lib. calc.* of 809/10, it was updated by adding some items considered essential and missing in this *encyclopaedia*, including the Theodore algorithm (5). The algorithm was also copied in Saint-Denis's vicinity (4, 6).

A re-arranged and re-worked version of what we may call the *Computus Fardulfi* was produced in 803 (H) and is best preserved in a Loire valley codex of the third quarter of the ninth century (3), with a reduced copy of the eleventh century (7). The early ninth-century occurrence of this algorithm in north-eastern France reflects an original Saint-Denis connection (1 and 2), as does the Italian link (4) that may be traced back to the Irish scholar Dúngal who moved from Saint-Denis to Pavia in the 810s or early 820s. The later spread of this algorithm south and east (and maybe west?) in the tenth and eleventh century is testimony to the influence of Loire valley intellectual thought (especially from Fleury) in that period. In Fleury, one variation of this algorithm from the *Computus Fardulfi* was composed in the mid-ninth century (I 1), which then travelled with other items of 1 further south (2) and east (3). A second variation, also from Fleury shortly after the middle of the ninth century but with Visigothic additions, can be found in J.

The early witness to the *bissexus* algorithm found in St Gall (K 1) also appears in slightly later manuscripts from north-eastern France and Wissembourg (2 and 3), and these occurrences are probably best understood as part of a general trend at the beginning of the Carolingian period, when much computistical knowledge travelled from the region between Seine and Rhine up the Rhine to the Lake Constance area; from this Carolingian heartland this algorithm spread to England (6) and Brittany (4), whence it moved south (5). This group (J) also points to three particularly outstanding witnesses for this algorithm (2, 4 and 5), each of which incorporating three versions of it in their truly encyclopaedic sections on the phenomenon of the bissextile day. These three codices are a great reminder that the transmission of individual computistical objects can only be achieved through a full-scale cluster analysis, which may well change the picture presented here.

A. *Argumentum XVI*

3. Munich, Bayerische Staatsbibliothek, Clm 14725, 8v (St Amand, 783 × 797)
4. Cologne, Dombibliothek 83-II, 35v (Cologne, 805; partly)
5. Vatican, Biblioteca Apostolica Vaticana, Pal. lat. 1447, 32r (798 × 813, Mainz; partly)
  - 5a. Angers, Bibliothèque municipale, 476, 10r (Brittany, 926?)
6. Milan, Biblioteca Ambrosiana, H 150 inf., 18v (north-eastern France?, 810?) = Bobbio *Computus* c. 43 (ed. PL 129, col. 1294)
  - 6a. Angers, Bibliothèque municipale, 476, 10v–11r (Brittany, 926?)
7. Karlsruhe, Badische Landesbibliothek, Aug. perg. 229, 30v–31v (St Stefano in Lucana or Italian scribe on the Reichenau, 821)

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8. Munich, Bayerische Staatsbibliothek, Clm 14456, 65v–66r (St Emmeram in Regensburg, 823)
  9. Einsiedeln, Stiftsbibliothek, 321 (647), p. 146 (St Gall?, 874?; partly)  
Later:
    10. Madrid, Biblioteca Nacional de España, 9605, 68ra-b (Provence, 1026)
    11. Vatican, Biblioteca Apostolica Vaticana, Barb. lat. 477, 106v (Avignon, s. xi<sup>in</sup>)
- G. *Computus Fardulfi* A (derivative of A)
1. Vatican, Biblioteca Apostolica Vaticana, Reg. lat. 141, 157v (St Denis, 804)
  2. St Gall, Stiftsbibliothek, Cod. Sang. 902, p. 162 (St Gall, 815)
  3. St Gall, Stiftsbibliothek, Cod. Sang. 251, p. 10–11 (St Gall, 816)
  4. Paris, Bibliothèque nationale de France, Lat. 2796, 54v, 106v–107r (northern France, c. AD 815 × 818)
  5. Vatican, Biblioteca Apostolica Vaticana, Reg. lat. 309, 15r–15v (Saint-Denis, 859) = *Lib. comp.* i. 3f (ed. Borst, *Schriften*, p. 1106)
  6. Berlin, Staatsbibliothek Preußischer Kulturbesitz, Philipps 1830, 2v (Reims or Laon?, 874; partly)
- H. *Computus Fardulfi* B (derivative of G)
1. Milan, Biblioteca Ambrosiana, H 150 inf., 18v (north-eastern France?, 810?) = Bobbio *Computus* c. 39 (ed. PL 129, col. 1293)
  2. Brussels, Koninklijke Bibliotheek van België/Bibliothèque royale de Belgique, 8654-72, 205r–v (northeastern France, s. ix<sup>1/3</sup>)
  3. Paris, Bibliothèque nationale de France, Lat. 894, 33v (Loire?, s. ix<sup>3/4</sup>)
  4. Padua, Biblioteca Antoniana, I 27, 49r (Verona?, s. ix/x)  
later:
    5. Vatican, Biblioteca Apostolica Vaticana, Pal. lat. 235, 65r (Gandersheim? s. x<sup>1</sup>)
    6. Paris, Bibliothèque nationale de France, Lat. 6400B, 271r (Fleury?, 931?);
    7. Paris, Bibliothèque nationale de France, Lat. 2183, 114v (France, s. xi);
    8. Vatican, Biblioteca Apostolica Vaticana, Ross. 247, 30r (St Chaffre, c. 1020)
    9. Vatican, Biblioteca Apostolica Vaticana, Reg. lat. 1263, 13v (Micy-Saint-Mesmin, 1007?)
    10. Vatican, Biblioteca Apostolica Vaticana, Barb. lat. 477, 103v, 106v (Avignon, s. xi<sup>in</sup>)
    11. Madrid, Biblioteca Nacional de España, 9605, 67rb–67va (Provence, 1026)
    12. Vatican, Biblioteca Apostolica Vaticana, Reg. lat. 1530, 38vb–39ra (southern France?, 1054?; with noteworthy variation, arriving at a *bissexus* of 24 hours rather than the 12 hours common to this algorithm)
- I. Fleury version I (variation of H and G)
1. Paris, Bibliothèque nationale de France, Lat. 5543, 118v–119r (Fleury, 847)
  2. Paris, Bibliothèque nationale de France, Lat. 5239, 111r (Limoges, s. x<sup>1/3</sup>)
  3. Strasbourg, Bibliothèque nationale et universitaire, 326, 154r (Limoges/Angoulême?, c. 1000?)

J. Fleury version II (variation of H and G, with Visigothic additions)

1. London, British Library, Harley 3017, 46r–46v (Fleury?, 864)

K. Austrasian version

1. St Gall, Stiftsbibliothek, 225, p. 122 (St Gall, 773?)
2. Milan, Biblioteca Ambrosiana, H 150 inf., 18r (north-eastern France?, 810?) = Bobbio *Computus* c. 40 (ed. PL 129, col. 1293–4)
3. Wolfenbüttel, Herzog-August-Bibliothek, Cod. Guelf. 91 Weiss., 95r, (Worms?, s. ix<sup>in</sup>)
4. Angers, Bibliothèque municipale, 476, 10v (Brittany, 926?)
5. Madrid, Biblioteca Nacional de España, 9605, 67v (Provence, 1026)
6. Rouen, Bibliothèque municipale, Y 6 (274), 23r (England, s. xi<sup>in</sup>).<sup>100</sup>

#### CONCLUSION

The ascriptions to Theodore in *CE* of c. 700 and to ‘the Greeks’ in *MC* of 718/9, combined with the fact that the earliest occurrences are the *Computus Digbaeanus* of 675 and *Computus Cottonianus* of 689, point to a Greek origin of the *bissextus* algorithm introduced into Latin computistics by Theodore of Tarsus. This is corroborated by later occurrences of the algorithm in Byzantine *computi*, whose phrasing and transmission suggest these to be younger witnesses of a long tradition that may well go back to the seventh century. Theodore would have learned the argumentum himself either at one of his Eastern stations or in the Greek milieu of Italy before teaching it at Canterbury. His Irish students brought it to the *regiones Scottorum*. From there it then moved in Willibrord’s bags to the Continent, where it enjoyed a wide transmission in written form from the mid-eighth century onwards.

These results obviously raise the question of how much more Theodorean teaching may be found in Insular computistics of the late-seventh and early-eighth centuries. As this study suggests, the answer can only be found by a full-scale comparison of the Insular corpus (especially the major texts: *CE*, *MC*, *DRC*, *Computus Digbaeanus* and *Computus Cottonianus*, and Bede’s *DT* and *DTR*) with eastern *computi*, especially Georgios Presbyter and Maximus Confessor, but also the *Anonymi* of 830 and 892. This will place on a more solid footing the few scattered suggestions concerning the Canterbury school’s and its pupils’ astronomical/computistical material,<sup>101</sup> and may lead to some more surprising results. Here, the Anglo-Saxon evidence may actually prove more promising than the Irish corpus. The algorithms found in Bede and the *Digbaeanus* and *Cottonianus* are based on Dionysius’ calculations, which, being translations from Greek, will have featured prominently in Theodore’s teaching. The Irish, on the other hand,

<sup>100</sup> Ed. by H. A. Wilson, *The Missal of Robert of Jumièges* (London, 1896), p. 41.

<sup>101</sup> See pp. 5–7 above.

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remained suspicious of the incarnation era, and employed calendrical methods that already worked for earlier Easter reckonings before the introduction of the Alexandrian/Dionysiac system. The focus should move away from trying to connect full-scale texts to Theodore to a more fine-grained study of individual ideas (like the *bissextus* algorithm in this study), for instance, to seriously and systematically consider how much of Bede may actually be Canterbury thought.