CHRONOGRAPHIA ET COMPUTUS

COMPUTUS EINSIDLENSIS

With the Fall of the Roman Empire, secular institutions of learning were gradually replaced by a rapidly growing monastic landscape. Education and knowledge production became decidedly Christian in character. In Ireland, a transformation of Roman antique into Christianised medieval learning was not necessary, as this island had not been exposed to Roman infrastructure. A fresh curriculum serving the needs of the new religion could be created without the baggage of Roman heritage. Three fundamental disciplines developed in this process: Latin grammar, the basis for engaging with the foundational document of this religion, the Bible; exegesis, the interpretation of the Bible and God's word; and computus, a calendrical science that, at its roots, explained the Roman calendar and the intricacies of Easter calculation, but soon developed into an umbrella discipline for the understanding of God's creation as manifested in the cosmos.

Computistical information was scattered in a variety of texts that reached Ireland mainly from Iberia: Isidore's *Etymologiae* provided definitions, excerpts of Macrobius' *Saturnalia* outlined the history of the Roman calendar; Easter letters contained important technical details, Easter tables bare numbers, their prologues some introductory remarks. What was lacking was a comprehensive overview, a textbook that ordered and classified this data, like Priscian or Donatus for Latin grammar. The insular world produced these in the early decades of the eighth century, one in Northumbria (Bede's *De temporum ratione* of 725) and three in Ireland: the *Computus Einsidlensis*, the Munich Computus, and *De ratione conputandi*.

The earliest of these insular computistical textbooks is the *Computus Einsidlensis*. Because the Einsiedeln author had no models for what he was explaining, he reverted back to his mother tongue, Irish, when technical details became complex, proving its Irish authorship[1]. Of the Irish texts, only the Munich Computus provides a dating clause to an *annus praesens* of 718/9 (cfr. in this volume, p. 126). The other two textbooks have to be dated relative to the Munich Computus. The *Computus Einsidlensis* contains many of the algorithms explained in the Munich Computus, but in an earlier phase

[1] J. Bisagni - I. Warntjes, *The Early Old Irish Material in the Newly Discovered Computus Einsidlensis (c. AD* 700*)*, «Ériu», 58 (2008), pp. 77-105.

La trasmissione dei testi latini del Medioevo / Mediaeval Latin Texts and Their Transmission. Te.Tra. 8. Opere anonime e pseudoepigrafe. A cura di L. Castaldi, Firenze, SISMEL - Edizioni del Galluzzo, 2023, pp. 119-25. (ISBN 978-88-9290-265-7

of their development[2]. The Easter reckoning propagated in the Einsiedeln text is the Alexandrian / Dionysiac one (invented in Alexandria in the early fourth century, and translated into Latin by Dionysius Exiguus in 525), which gained currency in Ireland only in the last quarter of the seventh century. The Victorian alternative (invented by Victorius of Aquitaine in 457), which was observed by southern – but not northern – Irish churches from the 630s to the very end of the seventh century, features prominently in the text. All this suggests that the *Computus Einsidlensis* was written in southern Ireland *ca*. 700 to promote the newly introduced Alexandrian / Dionysiac Easter reckoning, and to provide the author's monastic community with a comprehensive overview of this discipline.

In principle, Irish computistical textbooks of the early eighth century followed the same bipartite structure: the first major part concerns solar theory, following a set number of divisions of time from the smallest unit to the largest; here, the focus was quite naturally on the week (which features prominently in the Bible), the months, and especially the year (naturally divided by solstices and equinoxes, but also by convention into seasons): the Julian calendar structure, with its counter-intuitive backwards count from fixed marker days, Kalends, Nones, and Ides (e.g. Ides of March = 15 March; 2nd (day before the) Ides = 14 March; 3rd Ides = 13 March, etc.), posed some challenges to students of time-reckoning, as did the intercalated calendar day every four years (leap-day or *bissextus*). The second major part deals with lunar theory first, introducing key concepts like the lunar year and its structure, the 19-year lunar cycle and its structure (including intercalated months, called embolisms), epacts (the lunar age of a fixed Julian calendar date), and lunar calculations; this section also integrates the combination of solar and lunar theory in the form of the calculation of Easter and its dependent, the beginning of Lent; and it ends with the most complex feature, the omission of a lunar age at the end of the 19-year lunar cycle to ensure its cyclic character (*saltus lunae*).

Both the *Computus Einsidlensis* and *De ratione conputandi* (cfr. in this volume, pp. 133-41) are explicit about this structure by clearly delineating where solar theory ends and lunar theory starts (Einsiedeln, Stiftsbibliothek 321 [Msc. 647; 4 Nr. 97], p. 108: «Hucusque de sole conputauimus;

---

[2] Bisagni - Warntjes, *Early Old Irish Material* cit., pp. 81-91; I. Warntjes (ed.), *The Munich Computus: Text and Translation. Irish Computistics between Isidore of Seville and the Venerable Bede and Its Reception in Carolingian Times*, Stuttgart 2010, pp. CXXXIII-CLII.

nunc autem de lunae cursu dicamus.»). Both of these texts (but not the Munich Computus) also prefix a section on numbers, which accounts for the title given to the *Computus Einsidlensis* in its *explicit* (*De numero*; cfr. below). What these Irish textbooks do not do, however, is numbering their chapters or providing a table of contents.

The division between the two main parts of these textbooks is also reflected in the choice of sources. The first part on the divisions of time and the Julian calendar draws principally on Isidore's *Etymologiae* and *De natura rerum*[3], and the excerpt of Macrobius' *Saturnalia* circulating under the title *Disputatio Chori et Praetextati* in seventh-century Ireland[4]. Generally noteworthy in this section is the use of Anatolius Latinus[5] for explaining the increase and decrease of daylight between the solstices. Specific to the Einsiedeln text, however, is a reference to a certain Theodore, which is unique in early Latin computistics. No doubt, Theodore of Tarsus is meant here, and therefore the Einsiedeln computist provides an interesting window into the teachings of the Canterbury school[6].

For the second part on lunar theory and Easter calculations, Irish computists had less and more scattered material to rely on. The Einsiedeln (and the Munich) computist struggled especially with explaining the 19-year lunar cycle, for which Dionysius Exiguus had provided only a skewed account[7]. In order to fully understand the intricacies of the 19-year cycle, one method applied was to compare the Victorian with the Dionysiac versions[8].

---

[3] For Isidore's *Etymologiae*, cfr. the book-by-book edition in the *Belles Lettres* series *Auteurs Latins du Moyen Âge*, here especially: G. Gasparotto - J.-Y. Guillaumin (edd.), *Isidore de Séville, Étymologies, Livre III: De mathematica*, Paris 2009; V. Yarza Urquiola - F. J. Andrés Santos (edd.), *Isidoro de Sevilla, Etimologías, Libro V: De legibus - De temporibus*, Paris 2013; C. Chaparro Gómez (ed.), *Isidoro de Sevilla, Etimologías, Libro VI: De las Sagradas Escrituras*, Paris 2012; G. Gasparotto (ed.), *Isidoro di Siviglia, Etimologie, Libro XIII: De mundo et partibus*, Paris 2004; for the transmission of the *Etymologiae*, cfr. now Evina Steinova's admirable website: <https://innovatingknowledge.nl/>. Isidore's *De natura rerum* is ed. and trans. in French by J. Fontaine, *Isidore de Séville, Traité de la nature*, Bordeaux 1960.

[4] Cfr. now the edition and translation by L. Holford-Strevens, *The Disputatio Chori et Praetextati: The Roman Calendar for Beginners*, Turnhout 2019.

[5] Anatolius Latinus, *De ratione paschali* is ed. and trans. by D. P. Mc Carthy - A. Breen, *The ante-Nicene Christian Pasch: De ratione paschali - the Paschal Tract of Anatolius, Bishop of Laodicea*, Dublin 2003.

[6] Cfr. now T. Loevenich - I. Warntjes, *Theodore of Tarsus and the Study of Computus at the Canterbury School*, «Ango-Saxon England», forthcoming.

[7] Warntjes, *Munich Computus* cit., pp. XLV n. 103, CXXXIV-CXXXVI, CXLIV-CXLV, CXCVI-CXCVII, 256-67; idem, *Seventh-century Ireland: the Cradle of Medieval Science?*, in *Music and the Stars: Mathematics in Medieval Ireland*, curr. M. Kelly - C. Doherty, Dublin 2013, pp. 44-72, at pp. 50-1, 65-6.

[8] Cfr. *ibidem*, pp. 58-9, 66-9.

For Easter calculation proper, Dionysius' algorithms were rejected outright, and Irish scholars developed their own methods based on their experiences with Easter calculation in older systems[9]. This led to Irish reconstructions, explanations, concepts, and algorithms that were distinctively different from contemporary Visigothic and Anglo-Saxon models, and also from subsequent Frankish solutions. Especially in the technical discussions, the Irish computistical textbooks are highly original.

One of the most remarkable features of the Einsiedeln text in particular is its argumentative structure. The standard approach used is tripartite: research question, thesis, proof. The forthcoming *editio princeps* by Tobit Loevenich will provide more insights into this argumentative strategy that needs further investigation by scholars of debating culture and the scientific mind of the early Middle Ages.

It may well have been this exceptional feature that led to the *Computus Einsidlensis* being copied more than one-and-a-half centuries after its initial composition. It survives in only one manuscript: Einsiedeln, Stiftsbibliothek 321 (Msc. 647; 4 Nr. 97), pp. 83-125. There it is integrated into a larger computistical *florilegium* covering the entire codicological unit pp. 27-156. In fact, because this text was buried in a large miscellany, it has been overlooked by scholars like Charles Jones or Arno Borst who studied this codex for Bedan and Carolingian *computistica* respectively[10]. Only in 2006 was it identified as a cohesive text, and its Irish background revealed[11]. Part of the problem is that this text lacks any kind of *incipit*, let alone a title; this makes it debatable if the Greek and Hebrew numerical alphabets on pp. 82-3 were part of the original text, or whether it rather began with a passage headed *De variis nominibus numeri* (which now appears more likely)[12]. Fortunately, at least an *explicit* survives on p. 125 that identifies the preceding as an independent text, and suggests *De numero* as its

---

[9] Warntjes, *Munich Computus* cit., pp. LXXII-LXIII, CLX-CLXI; Id., *The Argumenta of Dionysius Exiguus and their Early Recensions*, in *Computus and its Cultural Context in the Latin West, AD 300-1200*, curr. I. Warntjes - D. Ó Cróinín, Turnhout 2010, pp. 40-111, at p. 93.

[10] Cfr. C. W. Jones, *Bedae Pseudepigrapha: Scientific Writings Falsely Attributed to Bede*, Ithaca 1939, p. 117; A. Borst, *Der karolingische Reichskalender*, 3 vols., Hannover 1998, pp. 152-3; Id., *Schriften zur Komputistik im Frankenreich von 721 bis 818*, 3 vols., Hannover 2006, pp. 227-8.

[11] I. Warntjes, *A Newly Discovered Irish Computus: Computus Einsidlensis*, «Peritia», 19 (2005), pp. 61-4.

[12] This is the conclusion drawn by the editor of this text, Tobit Loevenich; earlier assessments considered the alphabets as part of the text; cfr. the studies by I. Warntjes, and G. Meier, *Catalogus codicum manu scriptorium qui in biblioteca monasterii Einsidlensis O.S.B. servantur,* Leipzig 1899, p. 293.

title and therewith a discussion of numbers as an appropriate beginning: «Haec de numero sufficienter exposuimus. Finit».

If confirmation was needed that this beginning is on p. 83, this is not only provided by thematic considerations and a comparison of content with the other Irish computistical textbooks, but also by the fact that from this page onwards insular abbreviations start appearing heavily in the manuscript, for, e.g., *vel*, *con*, *per*, *est*, *haec* and *autem*[13]. These are particularly numerous on the first few pages, whereas afterwards only the fairly common *vel* abbreviation can be found. What clearly happened here is that a Continental scribe started copying this text as it lay before him, and only after a few pages realised that these unusual abbreviation symbols were inappropriate for Continental consumption. Equally remarkable are the source marks in the margins – for Isidore (*Is*-), Jerome (*Hi*-; *Hir*-), and Augustine (*Aug*-) only –, which occur at the beginning of the text on pp. 83-95, but nowhere else in the codex.

Various places of composition of this manuscript have been suggested, principally the Lake Constance region and Strasbourg, while Matthias Tischler argued for St Gall[14]. More clarity can be achieved concerning the date. The codicological unit pp. 27-157 contains various earlier dating clauses through copying Bede and an interesting computus of 751 with an earlier layer of 743[15]; indicative for the time of composition, however, is the Dionysiac Easter table, which covers the years 874-1101 and would therefore set the manuscript's date in its first 19 years, 874 × 892.

The St Gall context of the final third of the ninth century certainly is very suggestive for the copying of a fundamental Irish text on time-reckoning. Ekkehart IV of St Gall († late 1050s) informs us that during the abbacy of Grimald (841-72), probably in the late 840s, the Irish bishop Marcus and his sister's son Móengal / Marcellus stopped in St Gall on the return journey from Rome back to Ireland. The monastic community con-

---

[13] Cfr. B. Bischoff, *Katalog der festländischen Handschriften des neunten Jahrhunderts (mit Ausnahme der wisigothischen)*, 4 vols., Wiesbaden 1998-2017, vol. I, p. 242.

[14] M. M. Tischler, *Die ottonische Klosterschule in Einsiedeln zur Zeit Abt Gregors: zum Bildungsprofil des hl. Wolfgang*, «Studien und Mitteilungen zur Geschichte des Benediktinerordens und seiner Zweige», 107 (1996), pp. 93-181, at p. 120 n. 109, p. 161; Id., *Der ottonische Heilige und sein karolingischer Heiliger: St. Wolfgang, St. Otmar und das Problem der historischen Wahrnehmungsfähigkeit im Frühmittelalter*, «Studien und Mitteilungen zur Geschichte des Benediktinerordens und seiner Zweige», 112 (2001), pp. 7-52, at pp. 35, 37.

[15] I. Warntjes, *Isidore of Seville and the Formation of Medieval Computus*, in *A Companion to Isidore of Seville*, curr. A. Fear - J. Wood, Leiden 2020, pp. 457-523, at pp. 470-1.

vinced them to stay permanently, and with them remained their travel library. Marcellus became head of the monastic school, and taught the seven *artes liberales*[16].

Under Marcellus and his students and successors, computus received special attention. In 877, an as yet unpublished computistical textbook was produced by the St Gall school, entitled *Adbreviatio de pluribus compoti maioris necessitatibus*, which the St Gall monk Wichram cites in his own composition of only five years later (another unpublished text)[17]. This drive towards their own texts was underpinned by systematically revising the library holdings on the subject in the last third of the ninth century: The new texts were combined with computistical verses and Bede's *De temporum ratione* in Sankt Gallen, Stiftsbibliothek 459; a full edition of Bede's scientific works (*De natura rerum*, *De temporibus*, and *De temporum ratione*, this time with the chronicle)[18] was produced in Sankt Gallen, Stiftsbibliothek 250, including, interestingly, a recension of Ceolfrith's letter to the Pictish King Nechtan and the Irish pseudo-Columbanus *De saltu lunae*[19]; in this context, the Einsiedeln codex 321 appears principally as a volume of alternatives to Bede, with the *Computus Einsidlensis* at its centre as well as selected older material taken from Sankt Gallen, Stiftsbibliothek 225 (the computus of 751) and 251/902; the final piece in creating this computistical shelf in the St. Gall library was a collection of late-antique Easter tracts, which also includes the Irish Victorian Prologue of 699 (Bremen, Staats- und Universitätsbibliothek, msc 0046)[20]. Effectively, the St Gall librarians of the final third of the ninth century created a remarkable and very systematic collection of computistica from the fourth to the late ninth centuries. With two otherwise unattested Irish works included (*Computus Einsidlensis*, Victorian Prologue of 699), there can hardly be any doubt that Marcellus was instrumental in the conception of this collection, and that his uncle's travel library contributed to it.

---

[16] Ekkehart IV, *Casus sancti Galli* c. 2 and 33, ed. and trans. into German by H. F. Haefele - E. Tremp - F. Schnoor in MGH SS rer. Germ. 72, pp. 118-21, 224-5.

[17] For Wichram's Computus, cfr. A. Borst, *Die karolingische Kalenderreform*, Hannover 1998, p. 323 and now A. Borst - I. Warntjes, *Hermann der Lahme, Schriften zur Zeitrechnung, mit Vorläufern und Bearbeitern*, Wiesbaden 2024 (forthcoming), pp. 106, 115-8, 282-3, 660; for the *Adbreviatio de pluribus compoti maioris necessitatibus*, cfr. especially *ibidem*, pp. 282.

[18] Bede's scientific works are ed. by C. W. Jones in CCSL 123.

[19] For this text, cfr. now Borst - Warntjes, *Hermann der Lahme* cit., pp. 79-92.

[20] For this text, cfr. I. Warntjes, *A Newly Discovered Prologue of AD 699 to the Easter Table of Victorius of Aquitaine in an Unknown Sirmond Manuscript*, «Peritia», 21 (2010), pp. 255-84.

Tenth-century St Gall librarians did not share their predecessors' appreciation for the *Computus Einsidlensis*. When they helped stocking the library of the new foundation Einsiedeln, copies were made from the St Gall holdings (like Einsiedeln, Stiftsbibliothek 174 + 263 copied Sankt Gallen, Stiftsbibliothek 459); the codex containing the *Computus Einsidlensis* (Einsiedeln, Stiftsbibliothek 321), however, appears to not have been considered essential for the St Gall library anymore, so that it was simply handed to Einsiedeln.

IMMO WARNTJES