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THE *PANTEGNI, THEORICA* OF CONSTANTINE THE AFRICAN

A Text-Historical Study of the First Medical Compendium in the Latin West

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DOCTORAL DISSERTATION
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ABSTRACT

The *Pantegni* of Constantine the African (d. by 1098/9) was the first comprehensive medical textbook in Latin. The work is a translation and modification of an original Arabic text, the *Kitāb al-malakī* by Haly Abbas (d. after 978), combined with other Arabic medical treatises. Constantine compiled the work first, it appears, in Salerno and then in the monastery of Monte Cassino in southern Italy. The *Pantegni* achieved a position as the central textbook at the first medical schools in Latin Christendom. The work spread widely in the following centuries and it had a significant afterlife down to the nineteenth century. There are no modern, comprehensive editions or translations of the *Pantegni*.

The *Pantegni* consists of two parts, the *Theorica* and the *Practica*. This study concentrates on the textual history of the first part, the *Theorica*. There are around eighty extant manuscripts containing the *Theorica* (or parts of it), of which fifty-nine are examined in this study. Two sixteenth-century printed editions of the *Theorica* are also consulted. Additional material is gathered and analysed from the *Pantegni*'s Arabic original, the *Kitāb al-malakī*, and from its second Latin translation made in 1127, the *Regalis dispositio*. The methodologies employed are those of textual scholarship, chiefly textual criticism and philological close-reading. Several textual extracts in different witnesses are compared, focusing on language and content. Similarities and disparities, such as additions and omissions, provide information on the *Theorica*'s translation process, different versions, transmission, and transformation throughout the centuries.

The key manuscript is Codex E.ö.II.14, which belongs to the collections of the National Library of Finland, and which dates back to the third quarter of the twelfth century. Insertions in the manuscript's margins provide a unique and valuable set of passages for collation. This study demonstrates that Codex E.ö.II.14 amalgamates three early textual versions of the *Theorica*.

After collation, four main stages in the *Theorica*'s textual history emerge. The text which Constantine compiled in the monastery of Monte Cassino and which later became the standard version, was preceded by an earlier '*Ur*'-version of the fifth book. The *Ur*-version lacks passages which Constantine added to his text at a later stage, probably only after consulting other sources besides the *Kitāb al-malakī*. In the first half of the twelfth century at the latest, a completely new version of the *Theorica* was made, in which grammatical structures were systematically revised. It appears that the anonymous redactor also collated the *Theorica* anew with its original Arabic text and translated and added short passages which Constantine had originally omitted for the sake of concision. With the new version, a more approachable text was pursued. Its linguistic features suggest that the revision was intended for more effective pedagogical use. The new version also influenced the *Theorica*'s later transmission: many of its readings were merged with the readings of the standard version. I demonstrate that the first printed version of the *Pantegni* (Lyon, 1515) was based on such a combined version, whereas the second early printing (Basel, 1539) drew from the standard version.

In addition to three original articles, this study includes the first critical edition of *Theorica*'s Book IV, Chapters 9–10, based on eleven manuscripts and the two early printings. The edition illustrates the text's transformation from its earliest phase all the way to the early printings, displaying the textual strata deriving from different periods.

This research illustrates the early reception and transformation of medical texts to better meet the needs of their users. It also sheds a broader light on the history of medicine and on the transmission of Arabic medical works to the Latin West in the eleventh century. It is to be hoped that this research can form the basis for a future critical edition of the *Theorica*.

To Jussi, Eero, and Lassi

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Vantaa, on the 25th of March, 2023 Outi Kaltio

LIST OF ORIGINAL ARTICLES

This dissertation is based on the following articles, which are referred to throughout the text by capital letters, as follows:

A Outi Kaltio, 'The Textual History of Constantine the African's *Pantegni, Theorica* in Light of ms. Helsinki, National Library of Finland, E.ö.II.14', *Revue d'Histoire des Textes*, XV (2020), 289–319.

B Outi Kaltio, with the assistance of Ilkka Lindstedt, 'Constantine the African's *Pantegni*: The Evolution of *Theorica*, Book V', *The Journal of Medieval Latin*, 32 (2022), 155–208.

C Outi Kaltio, 'Switching Style towards Ease in a Medieval Textbook of Medicine: Revision of Constantine the African's *Pantegni, Theorica* in Twelfth-Century Manuscripts', accepted for publication in *The Library*, 7th ser. 24 (2023), forthcoming.

Note: In Article B, the contributions of the authors divide as follows. Outi Kaltio planned the work, chose the methods, carried out the collations of all the Latin manuscripts and the sixteenth-century editions, chose the passages to be considered and analysed them, and wrote the text of the article. Ilkka Lindstedt checked and translated all the Arabic passages under consideration from the *Kitāb al-malakī* and developed the ideas concerning the Arabic original text and its linguistic forms.

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INTRODUCTION

The topic of this study is the textual history of a medieval Latin compendium of medicine, the *Pantegni*. For this work, Constantine the African (d. by 1098/9), a monk of Monte Cassino in southern Italy, translated and modified the *Kitāb al-malakī* of Alī ibn al-'Abbās al-Maǧūsī (commonly Latinized as Haly Abbas, d. after 978) adding to it from other Arabic medical treatises. The *Pantegni* gained a pivotal status as the principal textbook at the first medical schools in Latin Christendom, and it was widely distributed in the next centuries; around 130 manuscript copies survive to this day. The work consists of two individual parts, *Theorica* and *Practica*, each containing ten books. This study concentrates on the *Theorica*, of which there are some eighty surviving manuscripts, whole or partial. The main objective is to investigate the formation and transmission of the *Theorica*: how the text took shape in the course of Constantine's translation process, in what form it was initially distributed, and how the text was later transformed in reception. I argue that besides the so-called standard textual version, the *Theorica* circulated in, at least, two early versions – hitherto not identified or thus studied in detail – and subsequently also in combined versions. It should be noted for the sake of convenience that in this study, the word 'version' denotes a textual form with distinct variation observable in more than one manuscript, altering the nature of the text at least a little. (It is evident that the text of each manuscript always deviates from others to some extent; such minor variation does not constitute a 'version' in the present study.)

Of the two parts of the *Pantegni*, the *Theorica* is the one whose formation and textual history can be described more straightforwardly than that of the *Practica*. Whereas the *Theorica* was translated by Constantine from the *Kitāb al-malakī*, the *Practica* was put together and translated by Constantine and his followers later, and in stages, from the *Kitāb al-malakī* and other Arabic sources. This was due to Constantine's lacking access to a complete text of the *Kitāb al-malakī*. The textual components and the construction of the *Practica* have received more scholarly attention than the formation of the first, theoretical part of the *Pantegni*. This study focuses on the *Theorica*'s compilation, and demonstrates that the text was revised at an early stage. I argue that the earliest observable textual form of the *Theorica* is in Book V, which Constantine had perhaps already translated before moving to Monte Cassino. This version, preserved in two manuscripts, antedated his final text, which he put together in Monte Cassino and which is preserved in the oldest known *Pantegni* manuscript. When giving the *Theorica* his finishing touches in Monte Cassino, Constantine also used, it appears, other sources besides the *Kitāb al-malakī*.

This study also demonstrates that by the first half of the twelfth century at the latest, Constantine's final version of the *Theorica* was accompanied by an anonymous editor's revised version. This version betrays systematic stylistic revision, targeted at simplification and clarification and, it would seem, intended for classroom use. What is more, the revised version incorporates short interpolations which are lacking from the standard version and which have their origin in the *Kitāb al-malakī*. In the following centuries,

many readings of the revised version made their way into other branches of the transmission. In effect, the tradition became strongly mixed, to a degree which varies from book to book and chapter to chapter. Ultimately, the *editio princeps* of the *Pantegni*, printed at Lyon in 1515, combines readings from several of the *Theorica*'s textual variants, as will be shown. In contrast, the second sixteenth-century edition, printed in Basel in 1539, reproduces what in large part was Constantine's own final version of the *Theorica*.

The data for this study are collected from fifty-nine medieval manuscripts and the two early printings of the *Pantegni*, *Theorica*, from which campaigns of collation have been conducted. In addition, collations were made with the *Kitāb al-malakī* (as transmitted in the Būlāq edition of 1877), and with its second Latin translation made by Stephen of Antioch in 1127, the *Regalis dispositio* (as transmitted in the edition of 1523). There are no modern, comprehensive editions of the *Pantegni*, the *Kitāb al-malakī*, or the *Regalis dispositio*. In identifying different versions of the *Theorica*, the study of one particular manuscript, and especially the additions in its margins, has been crucial. The manuscript in question is Helsinki, National Library, MS E.ö.II.14 (s. xii$^{3/4}$). I argue that this manuscript, together with one other, provides the earliest known version of *Theorica*, as embodied in Book V. In contrast, the insertions made by another, contemporary hand, with recourse to one or more different exemplars, originate partly in Constantine's final version and mostly in the anonymous editor's later, revised version. As a result, the Helsinki manuscript combines at least three different versions of the *Theorica*. Its insertions provide an applicable set of passages for collation, which evidence the *Theorica*'s textual evolution.

The broader goal of this study is to improve scholarly appreciation of the transmission of Arabic medical works to the Latin West. Constantine the African was the central figure of the first wave of translations, which took place in southern Italy in the eleventh century. This study sheds light on the translation work in practice: how Constantine approached the original Arabic text and how he advanced his translation in stages, depending on the resources available to him. The present study also illustrates the early reception of these medical works, new to the Latin West: in the course of time, medical texts could be, and indeed were, modified to meet the altered expectations and practical needs of their users. What is perhaps most important, this study paves the way for critical editions of the *Theorica*. Extensive collations between the *Theorica*'s witnesses and also with the *Kitāb al-malakī* and the *Regalis dispositio* have yielded results that can be used in choosing and eliminating manuscripts, and in defining which version or versions of the text it is most desirable to edit.

In what follows, I will first provide a survey of the historical background to Constantine and his *Pantegni* in eleventh-century Salerno and Monte Cassino. A survey of previous scholarship will then present the framework on which this study elaborates. The textual data gathered and methodologies employed are then set out. Finally, I shall discuss my results. The final chapter encapsulates the most important findings of my study. As an appendix to this study and preceding the original articles, a critical edition

is offered of *Theorica*, IV.9–10, *De virtute animata* and *De virtute sensum operante*, 'On the animal virtue' and 'On the virtue operating sense'. The edited text accounts for the different versions as defined in this study. The edition illustrates my results in that it demonstrates the different stages in the text's evolution under Constantine, and its later transformations. The edition is also the first, modern treatment of *Theor*. IV.9–10 and thus brings the content of these chapters to light for the first time.

BACKGROUND

In late antiquity and the early middle ages, knowledge of ancient Greek medicine was at best fragmentary in Latin-speaking Europe. In Byzantium this heritage was cherished, however. Importantly, the Alexandrian school of medicine, still active in the late fifth century to the seventh, engaged with Galenic and Hippocratic corpora in an encyclopaedic fashion, probably in the service of pedagogic purposes. Commentaries on Galenic and Hippocratic works were written by renowned philosophers.[1] From the seventh century onwards, the Arab conquerors came into contact with Greek science, which led to a large-scale translation of medical and other works into Syriac and Arabic, under the auspices of rulers. Ancient medicine, as digested in the Alexandrian tradition, was further developed and systematized by Arab scholars.[2] In this developed form, it reached Latin Europe from the eleventh century onwards. Arabic medical works were translated into Latin, and Constantine the African was the forerunner of this development.

Constantine the African, Salerno, and Monte Cassino

Constantine the African, a monk of Monte Cassino in southern Italy, was the first to translate several Arabic medical treatises into Latin. Little is known about his life. Medieval sources provide two accounts in Cassinese biographies, the older one dating back to the first years of the twelfth century and considered to be more reliable than Peter the Deacon's recension from around the middle of the century. Another source, of Salernitan origin, is preserved in a manuscript of Constantine's *Dietae universales et particulares*, embedded in a commentary on the work, also from the twelfth century, by 'Magister Matthaeus F.', identified as Matthaeus Ferrarius. A fourth source is an account in a thirteenth-century Salernitan medical manuscript.[3] The sources are somewhat contradic-

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1 Pormann and Savage-Smith 2007, 12–15; Horden 2011, 55; Garofalo 2019.

2 Pormann and Savage-Smith 2007, 17–20, 24–35. They note that 'it was late antique Alexandria that to a large extent shaped medieval Islamic medicine' (ibid., 12).

3 Glaze 2019, 1–2. See also Article A, 290 n. 2; Article B, 158 and n. 10. All the accounts have been translated (and the Salernitan account also transcribed) by Francis Newton in Kwakkel and Newton 2019, 195–203. The two accounts in Cassinese biographies were first edited by Bloch 1986, 127–9. The

tory in their accounts of Constantine and his career, and they also contain more or less fantastic elements. On the other hand, while confirming and correcting each other, they do 'create a coherent narrative'.[4] According to the Cassinese biographies, Constantine was born in Carthage (modern Tunis) and received his education in Old Cairo (Fusṭāṭ). Because of some personal difficulties or else general political instability, Constantine was forced to leave North Africa when tribes of nomads invaded his homeland.[5] He fled to southern Italy and arrived at Salerno just before or around the same time as the conquest of the city by the duke of Normandy, Robert Guiscard in 1076/7. In Italy, the modest state of medical knowledge and the scarcity of medical literature, when set against the situation prevailing in North Africa, quickly became apparent to Constantine. We read from Magister Matthaeus F[errarius] that Constantine travelled back to North Africa to acquire medical knowledge and books, and returned to southern Italy three years later. He managed to win the support of the Salernitan elite, which was a prerequisite for any major translation project. Constantine's patrons included Abbot Johannes de Curte, Robert Guiscard, and Prince Richard and his son, Jordan of Capua.[6] Constantine dedicated his treatise *De stomacho* to Archbishop Alfanus of Salerno, himself also a translator of Greek medical texts. Alfanus also funded Constantine towards the completion of the *Practica* of the *Pantegni*.[7]

Archbishop Alfanus was a friend of Desiderius, the abbot of Monte Cassino (and future Pope Victor III), which surely played a role in Constantine's relocation to the monastery sometime before April 1078.[8] The abbacy of Desiderius (1058–1087) is the period generally considered to represent the monastery's heyday, with a vast building programme and large-scale production of manuscripts.[9] Monica Green emphasizes the role of Monte Cassino in preserving, editing, and composing medical texts in particular.[10] In such circumstances and with such resources, Constantine was no doubt free to pursue his translating activities in a more efficient manner than in Salerno. In the Cassinese biography, Peter the Deacon lists twenty-three works that would have been translated by Constantine. These include several works by Ibn al-Jazzār, Isḥāq ibn Sulaymān al Isrāʾīlī

account of Magister Matthaeus F[errarius] was first published in part by Rose 1905, 1060; and in full by Creutz 1931, 40–43. The thirteenth-century account was first published by Singer 1917.

4 Glaze 2019, 3.

5 See Hettinger 1990, 522–6; Veit 2003b, 132–3.

6 See Glaze 2019, 8–16.

7 Erfurt, Universitätsbibliothek, CA 8° 62, fols. 49vb–50ra (the manuscript of Constantine's *Dietae universales et particulares*); see also the prologue of the *De stomacho* (edited by Montero Cartelle, 2016, 78); Kwakkel and Newton 2019, 199–200; Creutz 1931, 40–41; Green 1994, 122.

8 The *terminus ante quem* for Constantine's entering the monastery comes from the death of Prince Richard. He had donated to Constantine the revenues of the church of St Agatha in Aversa, which Constantine, in turn, presented to the abbey when entering (*Chronica monasterii Casinensis*; see Kwakkel and Newton 2019, 195–7; Glaze 2019, 15).

9 See, e.g., Cowdrey 1983; Newton 1999; also Article A, 290–1; Article B, 158–9.

10 Green 2018b, 279.

(Latinized as Isaac Israeli or Isaac Judaeus), and Isḥāq ibn Imrān, all active in Tunisia, Constantine's homeland, in the tenth century.[11] Peter also reports that Constantine died at Monte Cassino at an old age (*senex et plenus dierum*). This would not have happened later than 1099.[12]

The *Pantegni*

The largest and most important of Constantine's works is the *Pantegni*. It is a modified translation of the *Kitāb kāmil aṣ-Ṣinā ʿa aṭ-Ṭibbīya*, or the *Kitāb al-malakī*, a work of the Persian physician ʿAlī ibn al-ʿAbbās al-Maǧūsī (Haly Abbas; see below). The *Pantegni*, in its two parts of ten books each, follows the Arabic original in structure and in its division of medicine into the theoretical and the practical.[13] The second part, *Practica*, was in fact only partially translated by Constantine, reaching its full ten-book length only later and in stages. (We learn from Magister Matthaeus F[errarius] that when returning to southern Italy, Constantine was shipwrecked and he lost several of the books he had gathered; apparently this included the better part of the *Practica*.[14]) In this compilation, other sources besides the *Kitāb al-malakī* were used, including Constantine's own works.[15]

The first part of the *Pantegni*, i.e. the *Theorica*, is an introduction to medical theory and deals with the anatomy and physiology of the human body, the structure and tasks of the different organs, bodily functions, external factors (such as climate and diet) that can affect the health, diseases and their causes, and prognostics. The second part, *Practica*, discusses therapeutic strategies for the physician, including compound remedies and surgery. The underlying theoretical basis is humoral pathology, the elements of which go back to ancient medicine and which Arab scholars developed further and put at the centre of their medical theory.[16] The four humours were blood, phlegm, bile (yellow or red), and black bile, each of which was connected to two of the four primary qualities, hot, cold, dry, and moist. The balance of humours and qualities in the body, the complexion, was individual for everyone, and it defined the characteristics of a person. The balance was influenced by numerous factors both fundamental and situation-specific, such as

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11 Peter's list omits, e.g., the *Isagoge* by Ḥunayn ibn ʾIsḥāq, or Johannitius, *De stomacho* by Ibn al-Jazzār (see Montero Cartelle 2016, 21), and *De melancholia* by Isḥāq ibn Imrān. As Green notes, 'it is still unclear how much of the Constantinian corpus is really by Constantine' (Green 2005, 145). See also Article B, 164 and n. 27 for the authorship of the *Isagoge*, with references.

12 Constantine's death is listed for 22 December in a calendar of Leo Marscianus, dated to 1098/9; see Hoffmann 1965, 125, 133 and n. 36. The traditionally cited date of Constantine's death, in 1087, is not supported by the sources; see Newton 1994, 20–22 and n. 20.

13 For the division of medicine, see Jacquart 1992.

14 See Article A, 291 and n. 6.

15 For the gradual construction of the *Practica*, see Green 1994, 2017, and 2018a. See also Montero Cartelle and Martín Ferreira 1994; Wack 1994; Veit 2006; Ventura 2018.

16 For the early history of the concept of the four humours, see Hankinson 2017.

sex, age, and climate. Health resulted from a balanced complexion, whereas illnesses resulted from disturbances in this balance. The maintenance of health and the treatment of illnesses was pursued by influencing the complexion in different ways, for example with medicinal products, bloodletting, diet, or baths.[17]

Scholars in the circle of the archbishop and translator Alfanus held a preference for giving new medical translations a 'mantle of Greek', in which a work's Arabic origin was usually suppressed.[18] This is reflected in the title *Pantegni*, which derives from the Greek words *pan* and *technē*, meaning 'complete art'. This was the first time in the history of Western medicine that a large-scale, all-encompassing textbook of medical knowledge had become available in Latin. As noted above, Constantine's work became the most important medical compendium at the first medical schools and universities in Latin Europe. The work was widely copied, and it spread rapidly from southern Italy via Benedictine monastic networks and noble courts.[19] Salernitan medical authors and later encyclopaedists frequently cited and quoted the work, and it had influence on such writers as William of Conches (d. after 1154) and Adelard of Bath (d. *c*. 1150).[20] The *Pantegni* was gradually superseded from the thirteenth century onwards by a translation of another Arabic compendium of medicine, the masterwork of Ibn Sīnā, known in the West as Avicenna (980–1037), called in Latin *Liber canonis de medicina*. The *Pantegni* was still subject to revision in the thirteenth century, however (see below), and continued to be copied into the fourteenth and fifteenth centuries. In the sixteenth century the work was printed twice, first in Lyon and then in Basel. One of the central concepts of the *Pantegni*, the *res non naturales*, 'the non-natural things' which include diet, climate, and baths, had a significant afterlife down to the nineteenth century.[21] The most lasting influence of Constantine's translations, including the *Pantegni*, is perhaps the fact that they

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17 See, e.g., Pormann and Savage-Smith 2007, 43–4.

18 Wallis 2011, 190; see also Jacquart 1986, 224; Article B, 160 and nn. 15–16; 165.

19 Green 2020, 369. One of the oldest *Pantegni* manuscripts, London, British Library, MS Add. 22719, was probably written in as far-flung a place as Bath abbey in Somerset in England, as early as *c*. 1100–1130 (Burnett 2002, 54), and Cambridge, Trinity College, MS R. 14. 34, datable to *c*. 1125–1150, was in the possession of Bury St Edmunds abbey (Suffolk) by the third quarter of the twelfth century; *English Benedictine Libraries* 1996, B13 (p. 51), B13.110 (p. 70); see also Thomson 1972, 634; Article C, 11. MS Hamburg, Staats- und Universitätsbibliothek, Cod. med. 228, datable to *c*. 1135–1165, was copied at St Pantaleon, Cologne (Glaze 2019, 27–8 and n. 65), and Hildesheim, Dombibliothek, MS 748 (*c*. 1125) was inventoried by Bishop Bruno of Hildesheim in 1161 (Sudhoff 1916, 348–9; Article A, 314 and n. 57). Helsinki, National Library, MS E.ö.II.14, was copied in the third quarter of the twelfth century in the modern-day border region of Belgium, Germany, and France (Merisalo 2022, 167–8; for the Helsinki manuscript, see below in more detail). At least two monasteries in that region, Affligem and St Amand, recorded copies of the *Pantegni* in their collections before 1168 (Glaze 2000, 282–3; Glaze 2019, 28 and n. 71).

20 See Article A, 292 and n. 7; Article C, 3 and n. 4, with references. See also Kwakkel and Newton 2019, 140.

21 For the concept of the *res non naturales* and its aftermath, see below and the references in Article A, 306 n. 39.

represent a pivotal step in the formation of medieval, and even modern, Latin medical terminology.[22]

PREVIOUS RESEARCH

The *Pantegni* in its entirety has not appeared in print since the sixteenth-century editions. There are no modern, comprehensive, critical editions or translations. The main reason for this is the work's massive proportions: for example, MS Helsinki has 210 folia bearing approximately 135,000 words, from the *Theorica* alone, and with much of the text missing. Secondly, the collation of dozens of surviving manuscripts would be a very laborious task. To these impediments it may be added that the textual history of especially the *Practica* is a very complex affair. This unfortunate situation hampers the study of the *Pantegni* and other Constantinian works in multiple ways. For example, a critical edition would provide a foundation for stylistic analyses which, in turn, would help in the attribution of different works or sections of them to Constantine or to other translators in his circle. The study of the *Pantegni*'s contents would also be much more easily achieved from a critical edition; so far, the enormous medical content of the work has not been systematically studied. Partial (non-critical) editions, transcriptions and translations of single books and chapters of both *Theorica* and *Practica* do exist, however.[23] In addition, a complete digital facsimile and transcription of MS Helsinki was published by me in 2011. This covers the *Theorica*, Books II to X.10, and amounts to the most comprehensive modern publication of the *Pantegni*.[24] Many of Constantine's shorter treatises (or those attributed to him) have been edited and translated.[25]

Moritz Steinschneider's study (1866) was the first in which the works attributed to Constantine as well as their sources were examined and analysed.[26] In the first decades of the twentieth century, several studies on Constantine and the medical school of Salerno were published by Karl Sudhoff.[27] The turn of the 1920s saw the various studies of Rudolf

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22 Baader 1967; Strohmaier 1994.

23 (Partial) editions of the *Pantegni* are listed in Article A, 293 n. 11; see also Veit 2003a, 317. To these may be added at least transcriptions of the *Theorica*'s prologue (or parts of it) in Jacquart 1994a, 83–9; and in Kwakkel and Newton 2019, 205–9 (with an English translation); also, a working edition of *Practica*, V.25, in Wack 1994, 195–6. For Charles Burnett's edition of *Theor*. IV.19 *De spiritibus* (Burnett 1994), see below in more detail, and Article C, 7–8.

24 Constantine the African, *Theorica Pantegni,* 2011.

25 Editions of Constantinian works besides the *Pantegni* are listed in Veit 2003a, 316–17. To these may be added at least Wack 1987 (*Liber de heros morbo*); Wack 1990 (*Viaticum*); Martín Ferreira 1996 (*De elephancia*); Montero Cartelle 2016 (*De stomacho*); and McVaugh 2022 (*Viaticum*).

26 Steinschneider 1866. For an overview of the very earliest mentions and assessments of Constantine, and for references to late nineteeth- and early twentieth-century research, see Creutz 1929, 24–44; Creutz 1931, 25–40; Schipperges 1964, 17–26.

27 See, e.g., Sudhoff 1916; 1922, 166–88; 1930; 1932.

Creutz, who examined Constantine's life, works, and his relations to other authors and their texts.[28] These are subjects that still stimulate fresh research. Constantine's relation to the medical school of Salerno was studied by Paul Kristeller in the 1940s.[29] In Heinrich Schipperges's studies, Constantine's role in the assimilation of Arabic medicine is discussed,[30] and Gerhard Baader's treatise on Constantine's medical terminology is still much referred to.[31] Herbert Bloch's study on Monte Cassino (1986) is pioneering in relation to Constantine and his oeuvre. Bloch discusses the medieval sources and previous scholarship, he edits the Cassinese accounts, and includes a list of twenty-three Constantinian works mentioned by Peter the Deacon.[32] Michael McVaugh's wide-ranging research over an extended period includes, for example, a biographical entry on Constantine (1971), and joint studies and editions of Arabic–Hebrew–Latin medical texts, the latest of which is a critical edition of Constantine's *Viaticum* (2022).[33]

In a conference held at the Warburg Institute in London in 1990, scholars gathered who were working on the life and works of Constantine the African and Haly Abbas. Their discussions led to the publication of a foundational collection of essays in 1994, edited by Charles Burnett and Danielle Jacquart.[34] Many of these essays have been much utilized in the present study, not least Mark Jordan's survey of the manuscripts and the early printings of the *Pantegni*, which guided my research especially in its earliest stages.[35] The volume also contains handlists of manuscripts of both the *Kitāb al-malakī* and the *Pantegni*, the latter of which has been an invaluable tool in the making of the present study. Both Burnett and Jacquart have published several other studies on Constantine, Haly Abbas, Stephen of Antioch, various Arabic–Latin medical translations, and their afterlives. Jacquart's comparisons between the Arabic originals and their Latin translations are of fundamental importance, all the more so in the absence of critical editions.[36] Several studies by Burnett have benefitted my research, from descriptions of single *Pantegni* manuscripts to strategies of revision in Arabic–Latin translations.[37] Above all, Burnett's collation and analysis of *Theor*. IV.19 *De spiritibus* plays an important role in my examination of *Theorica*'s revisions.[38] Burnett's observations are taken further and re-evaluated in the present study.

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28 See, e.g., Creutz 1929, 1931, and 1932.

29 Kristeller 1945.

30 Schipperges 1955, 62–7; 1964, 17–54.

31 Baader 1967.

32 Bloch 1986, 98–110, 127–34.

33 See, e.g., McVaugh 1971; McVaugh, Bos, and Shatzmiller 2019; Freudenthal, McVaugh, and Mesler 2020; McVaugh 2022.

34 Burnett and Jacquart 1994.

35 Jordan 1994; also Jordan 1987.

36 E.g. Jacquart 1986, 1994a, 1994b.

37 E.g. Burnett 2000, 2001, 2002, 2007, 2009.

38 Burnett 1994.

Raphaela Veit's research deals with Constantinian translations and their Arabic original texts, the *Kitāb al-malakī* among others, and the relationships between different texts associated with Constantine and his circle. Her monograph (2003) on Isaac Israeli's *Book on Fevers*, which was translated by Constantine, has been very useful, as well as her other studies comparing Arabic and Latin medical texts and investigating the source texts for the *Practica*.[39] Also Mary Wack has studied the mutual relationships between works traditionally attributed to Constantine, and the evolution of the *Practica*. Her studies on the *Viaticum* and on the *Liber de heros morbo* have been utilized in the present study in relation to the *Theorica*'s revision with possible recourse to the original Arabic text, and in relation to the purpose and authorship of the revision.[40] Erik Kwakkel and Francis Newton published an exhaustive study in 2019, with an introduction by Eliza Glaze, dealing with the the oldest known *Pantegni* manuscript, now in The Hague, and its production in the monastery of Monte Cassino.[41] Their work has been utilized here from several angles. One of their main theses, namely that the *Theorica* was gradually worked up and that there was an earlier stage of development, is elaborated upon in the present study. My vantage on the issue is different and I rely on different evidence, to identify what is the oldest observable stage in the *Theorica*'s composition.

Finally, Monica Green's research on Constantine's life, his works and his sources, as well as on medieval medicine and its transmission in general, has been ground-breaking, and pivotal to my studies.[42] She has dealt with the compilation of the *Pantegni, Practica* in many of her publications. For the *Theorica*, she edited a section (III.33–36) on the reproductive organs (1987). The list of *Pantegni* manuscripts she originally established has formed the basis of all subsequent research, augmented in the handlist published in Burnett and Jacquart's collection of essays (1994). Green's observations have influenced my study of Book V of the *Theorica* and its special status among the other books of the work (see below).

The present study seeks to understand the manuscripts and the textual history of the *Theorica* more comprehensively than has been done previously. The philological approach, with its emphasis on content and stylistic features, has not previously been exploited for this work to this degree. My results corroborate the earlier proposition on the relation between the *Kitāb al-malakī*, *Regalis dispositio*, and the *Pantegni* (namely that Stephen is very faithful to the letter of the original text, whereas Constantine was effective in compacting the often repetitious Arabic expression).[43] This study takes a new standpoint to the two early printings of the *Pantegni* (*Theorica*, to be more precise) and their reliability or lack of it. Above all, the present study engages in detail with an obser-

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39 Veit 2003a, 2003b, 2006, 2007, 2009.

40 Wack 1987, 1990, 1994.

41 Kwakkel and Newton 2019; also Newton 1994 and 1999.

42 E.g. Green 1987, 1994, 2005, 2017, 2018a, 2018b, 2019, 2020.

43 See, e.g., Jacquart 1986, 1994a; Green 1994; Wack 1994, 165; Veit 2003a, 190; Burnett 2007, 64.

vation by Burnett and Jacquart that 'even the *Theorica* is not stable'.[44] Focusing on that aspect in particular, the present study fills what is a gap in previous scholarship,[45] and provides information on the *Theorica*'s translation process, different versions, reception, and transmission.

DATA AND METHODS

This study analyses textual data collected from fifty-nine manuscripts containing the *Theorica* of the *Pantegni* (or parts of it), as well as from the two sixteenth-century editions. Additional data have been collected from Stephen of Antioch's *Regalis dispositio* and Haly Abbas's *Kitāb al-malakī*. The methodology of analysis was philological close reading, seeking to account for linguistic and substantive aspects. A large number of passages from the *Theorica* were collated from the said witnesses, with chief attention on agreements and disagreements, such as additions and omissions. As for evidence of substance, passages of significance were analysed in their textual context. The language, more precisely the stylistic and grammatical expression in different *Theorica* witnesses, was compared and analysed. The materiality of the manuscripts was taken into account in that palaeographical and codicological assessments on their dates (and sometimes, locations) can have significance for the argument. A relative chronology of witnesses, extant and lost, is naturally of crucial importance to any attempt to tackle a complex manuscript tradition.[46] What follows introduces in brief the manuscripts and editions used for this study and how their data were collected and investigated.

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44 Burnett and Jacquart 1994, vii–viii.

45 Note, however, Burnett's analysis (1994) of one *Theorica* chapter, Jordan's notions on textual variation in different *Theorica* manuscripts (1994), and Kwakkel and Newton's arguments on the accretive process in the *Theorica*'s making (2019).

46 As regards the datings of the manuscripts cited in this study, I follow those in the handlist of manuscripts of the *Pantegni* in Burnett and Jacquart 1994, 319–51. More recent assessments and information on the chief manuscripts cited in this study have been provided by Outi Merisalo, Monica Green, Charles Burnett, Samu Niskanen, Jesse Keskiaho, and James Willoughby; to them I express my gratitude. For the dates of MSS Hamburg, Staats- und Universitätsbibliothek, Cod. med. 228; Hildesheim, Dombibliothek, 748; Munich, Staatsbibliothek, Clm 9561; and Paris, BnF, lat. 6887, I follow the datings given in Kwakkel and Newton 2019.

Manuscripts and sixteenth-century editions of the *Pantegni, Theorica*

The surviving, whole or partial manuscripts of the *Pantegni* amount to some 130.[47] Because the *Theorica* and the *Practica* are individual works that also circulated separately, and because the *Practica* was compiled in stages over a longer time-span and not only from the *Kitāb al-malakī*, there is more than one '*Pantegni*', and the student of the work's transmission encounters several manuscript traditions.[48] First, there is the *Pantegni* as Constantine himself translated it, namely the *Theorica* and (parts of) Books I, II, and sometimes IX, of the *Practica*.[49] Manuscripts containing these components include such early copies as Paris, Bibliothèque nationale de France [hereafter BnF], MS lat. 6887 (*c.* 1100, Italy); London, British Library [hereafter BL], MS Add. 22719 (*c.* 1110–1130); and Hildesheim, Dombibliothek, MS 748 (*c.* 1125). Witnesses from the thirteenth century include Edinburgh, National Library, Advocates 18.2.5; and Paris, BnF, lat. 16180. Secondly, there is the full *Pantegni* with its ten books in both the *Theorica* and *Practica*. The oldest manuscript of this branch of transmission is BnF, lat. 6886 (s. xiii). The manuscript is central to the present study for being the only one besides MS Helsinki to preserve the earliest known version of the *Theorica*, namely, in Book V (see below). Other manuscripts containing the full *Pantegni* include, for example, MSS Berlin, Staatsbibliothek zu Berlin – Preussischer Kulturbesitz, lat. fol. 618 (s. xiii); BL, Sloane 3481 (s. xiii); and BnF, lat. 6885 (s. xiv^{1}).

The third tradition embraces manuscripts that only convey the *Theorica*. This is by far the most popular *Pantegni* text to have circulated. The very oldest known *Pantegni* manuscript and the most important witness to Constantine's work is The Hague, Koninklijke bibliotheek, MS 73 J 6, copied at Monte Cassino *c.* 1075–1085, and containing the *Theorica* alone.[50] Many other early copies, such as MSS Cambridge, Trinity College, R. 14. 34 (*c.* 1125–1150); Erfurt, Universitätsbibliothek, CA 4° 184 (1147, Italy); and BL, Harley 1676 (s. xii), also contain only the *Theorica*. The same applies to three twelfth-century manuscripts which preserve the stylistically revised version (see below). The fourth tradition is the *Practica* alone, either in the portions translated by Constantine (Books I, II, and/or IX), circulating from early in the twelfth century, or in several augmented versions, the earliest witness to which dates from the thirteenth century. To these may now be added a fifth manuscript tradition, namely, Book VI and part of Book VII of the *Practica*, attested in manuscripts dating from the mid-twelfth century on, and translated

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47 The handlist in Burnett and Jacquart 1994 lists 108 *Pantegni* manuscripts altogether. The number has been growing ever since, as new (partial) copies of the text have been identified by scholars, Monica Green in particular. See also Kwakkel and Newton 2019, 27 n. 65.

48 What follows in this and the next paragraph is based on Jordan 1994, 291–3. See also the handlist of manuscripts in the same volume (Burnett and Jacquart 1994, 319–51).

49 See n. 15 above for references.

50 For the Hague manuscript, see the exhaustive study by Kwakkel and Newton (2019). See also below and Article B, 159–62, 165, Table 1 (169), and passim; Article C, 10–11, and passim.

perhaps by Constantine himself.[51] Manuscripts containing (parts of) the *Practica* alone do not play any part in the present study, whose subject is the *Theorica*.

Manuscripts containing the *Theorica*, either with our without the *Practica*, amount to roughly eighty altogether.[52] Collations were made from a total of fifty-nine copies, displayed further below in Bibliography with their *sigla*. Fourty-one manuscripts were investigated and collated *in situ*, mainly between 2006 and 2010. Besides the Helsinki manuscript in the National Library of Finland, this number includes five copies in the British Library in London. Other collated witnesses in England include single copies in Cambridge and Gloucester, two in Worcester, and four in Oxford. Seven copies were collated in Paris, Bibliothèque nationale de France. Six manuscripts in the Vatican City were collated, as well as two in Rome, two in Florence, and one in Naples. In Germany, three copies in Leipzig, three in Berlin, two in Erfurt, and one in Hildesheim were collated. As to the remaining manuscript witnesses, collations were made from reproductions, microfilms or digital images. These include manuscripts that are today in The Hague, Basel, Munich, Madrid, and Paris, among others. Several *Pantegni* manuscripts have been digitized since the first decade of the twenty-first century, especially for the Bibliothéque nationale de France and in the Biblioteca Apostolica Vaticana, and these can be accessed via the libraries' websites.

Besides manuscript witnesses, the two sixteenth-century editions of the *Pantegni*, *Theorica* have also been collated for this study. The *editio princeps* of the *Pantegni* (*Theorica and Practica*) was by the scientific and medical printer Barthélemy Trot, on the presses of Jen de la Place, at Lyon in 1515 (USTC 144466).[53] The edition attributes the work not to Constantine but to Isaac Israeli, whose work Constantine is said to have claimed to himself. The editor was Andreas Turinus de Piscia (1473–1543), professor of medicine and court physician to popes and French monarchs. The second printing of the *Theorica* was undertaken at Basel in 1539 by the humanist printer and physician Henricus Petri (USTC 601473).[54] (Parts of the *Practica*, namely, Book II and the first part of Book IX, had already been printed in Basel by the same printer in 1536 (USTC 601472).) The manuscripts on which these editions relied remain unknown.[55] Mark Jordan observed

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51 Green 2015, 2017, 2018a.

52 The exact number is difficult to define; see n. 47 above.

53 *Pantegni*, in *Omnia opera Ysaac*, Lyon, 1515, vol. 2, fols. 1r–144r (*Theorica* and *Practica*); see von Gültlingen 1993, 32 no. 27. A copy of the Lyon edition in the Bayerische Staatsbibliothek in Munich is available online: http://daten.digitale-sammlungen.de/~db/0001/bsb00011439/images/. (USTC = *The Universal Short Title Catalogue*, https://www.ustc.ac.uk/.)

54 *Pantegni*, in *Constantini Africani Operum reliqua*, Basel, 1539, pp. [i]–346 (*Theorica*). Copies of the Basel edition are available online, for example via the Bibliothèque Inter-universitaire de Médecine (Paris): https://www.biusante.parisdescartes.fr/histmed/medica/cote?00128x02. For both editions, see Jordan 1994, 286–90.

55 The early printers tended not to care for manuscripts beyond their service as copy-texts, and it is therefore improbable that the actual exemplars would have been preserved to this day (Jordan 1994, 289–90).

in 1994 that the Basel edition descended 'from a more typical exemplar [than the Lyon edition]', whereas the Lyon edition depended 'more importantly on inferior and idiosyncratic manuscripts' and 'betray[s] systematic stylistic correction'.[56] The present study aligns with Jordan's opinion, especially in relation to the Basel edition, whereas new insights on the status of the Lyon edition will be provided. Both editions were collated from digital images.

The Helsinki manuscript

Helsinki, National Library of Finland, MS E.ö.II.14 is central to the present study, and so a description of the manuscript is offered here, before we turn to a consideration of what this witness can say to the matter of the text's transmission.[57]

Codicological data:
Parchment (flyleaves paper); s. xii$^{3/4}$; I+210+I
I–VII^{8} VIII$^{8+2(-1)}$ IX–XVIII^{8} XIX^{10} XX–XXVI^{8}
32–35 long lines
235 mm × 150 mm (written space of 200 mm × 99 mm)

MS Helsinki contains Constantine the African's *Pantegni, Theorica*, Books II to X.10. The manuscript was written principally by two contemporary hands in a protogothic script, datable to the third quarter of the twelfth century, as has been suggested by Outi Merisalo. A northern German origin was proposed for the manuscript by Paul Lehmann in the 1930s and by Anja Inkeri Lehtinen more recently. Merisalo suggests a production locale in the border region of modern-day Belgium, France, and Germany, in a Benedictine monastery or some other ecclesiastical institution.[58] The manuscript is a palimpsest: there are traces of Ovid's *Metamorphoses*, written in the early twelfth century, visible on, for example, fols. 196v and 197r. The codex is in very good condition, but the whole of Book I is missing. This is unfortunate, not least because the first folia could have provided information on provenance. The end of the work is also missing, and therefore it cannot

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56 Jordan 1994, 289–90, 301. See also Article A, 299; Article C, 7, 12.

57 What follows in the next three paragraphs is based on Article A, 294–7; see also Article B, 156–7; Article C, 5–7. For more detailed codicological information on the Helsinki manuscript, see Merisalo 2022; Kaltio 2011, 7–8. As for the palaeographical and codicological aspects of MS Helsinki, I am very much indebted to Outi Merisalo. I also wish to experss my gratitude to Anja Inkeri Lehtinen, who kindly placed at my disposal her unpublished catalogue entry of MS Helsinki.

58 According to Merisalo, the form of *g*, 'the double-hunchback Tironic sign' for *et*, and the orange initials find similarities in manuscripts of the region of Ardennes in north-eastern France (i.e. manuscripts now at the Municipal Library of Charleville-Mézières), and in manuscripts of the monastery of Saint-Trond near Liège (Merisalo 2022, 167–8). For a possible late date for the Helsinki manuscript, see Article A, 294.

be known whether the manuscript carried only the *Theorica*, or also (parts of) the *Practica*, or even other texts.

The manuscript came to Finland from St Petersburg in 1832. It had belonged to the collection of Dr Joseph von Rehmann (1779–1831), Actual Councillor of State and personal physician to Tsar Nicholas I. After von Rehmann's death, the Tsar purchased the collection and donated it to the Imperial Alexander University Library in Helsinki, today the National Library of Finland. This donation, like many others, was made in order to augment the Library's collections after a catastrophic fire in 1827.

The manuscript was rebound in the early nineteenth century in Russia, and this was probably the point when its edges were ploughed. Such an operation could have been disastrous; insertions in the manuscript's margins, which have furnished the crucial evidence for the text's transmission, might have been cut away. Fortunately, the insertions were mostly spared, excepting only a letter or two at the beginnings or ends of the lines in passages written in the outer margins. Such lacunae do not present any major problems in interpreting the content of the insertions. The nature of these insertions will be dealt with in more detail below, when the collection and investigation of the data is set out.

The *Kitāb al-malakī* and the *Regalis dispositio*

The Arabic original text of the *Pantegni*, the *Kitāb al-malakī*, was written by the Persian physician ʿAlī ibn al-ʿAbbās al-Maǧūsī, known in the West as Haly Abbas, active in the tenth century in the province of Fars in south-western Iran.[59] Possibly of Zoroastrian origin, Haly studied under the famous Abū Māhir Mūsā ibn Sayyār and became a court physician to Prince ʿAḍud ad-Dawla in Shiraz. Haly composed the *Kitāb kāmil aṣ-Ṣināʿa aṭ-Ṭibbīya*, or the *Kitāb al-malakī* ('The Royal Book'), before 978. His ambition was to create a textbook containing 'everything a physician should know'. The *Kitāb al-malakī* complies with the division of medicine into the theoretical and the practical, as laid out in the Alexandrian commentaries of Galenic texts,[60] each section consisting of ten books. As already noted, the same division and structure was adopted by Constantine for his *Pantegni*. The *Kitāb al-malakī* spread widely in the Islamic world, but it was soon, from the eleventh century onwards, superseded by Ibn Sīnā's, or Avicenna's, *al-Qanūn*. A handlist of manuscripts from 1994 lists 128 extant copies of the *Kitāb al-malakī*.[61] For the present study, the work was collated mainly from the Būlāq edition of 1877, of which digital images are available online.[62]

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59 For Haly Abbas and his work, see Micheau 1994; Richter-Bernburg 2011; Veit 2006, 134.

60 See Palmieri 1997; Jacquart 1991, 157–9; 1992; 2008; and above, 12.

61 Troupeau 1994b; see also Troupeau 1994a.

62 *ʿAlī ibn al-ʿAbbās al-Maǧūsī, Kāmil aṣ-ṣināʿa aṭ-ṭibbīya (al-Kitāb al-malakī),* vol. 1, Cairo, 1294/1877, *Internet Archive*, https://ia801301.us.archive.org/10/items/b24905707_0001/b24905707_0001.pdf. Besides Ilkka Lindstedt's extensive collations for Article B, a few collations from the work were made

Stephen of Antioch's *Regalis dispositio*, or *Liber regalis* ('The Royal Book'), is the other Latin translation of the *Kitāb al-malakī*. Stephen was originally from Pisa but relocated to the Crusader state of Antioch where he compiled the *Regalis dispositio* in 1127. [63] In the preface to his work, Stephen heavily criticized Constantine for having abbreviated and handled Haly's work too freely.[64] He produced a complete and more literal, even slavish, translation of the original Arabic. In terms of manuscript tradition, Stephen's work was less successful than Constantine's *Pantegni*. For the present study, Stephen's work was collated from an edition of 1523,[65] from digital images.

Collection and investigation of the data

The first set of data consists of textual insertions in the Helsinki manuscript by its second scribe, and of their collation with relevant text from other witnesses (Articles A and B). The second set of data was gathered from a comprehensive collation and textual analysis of one *Theorica* chapter (V.34, *c*. 450 words), taken from six manuscripts and the two sixteenth-century editions (Article C). Additional textual data were collected from Chapter V.12[66] of the *Theorica* and of occasional sample passages elsewhere in the work.

The first scribe of MS Helsinki wrote the body of the text from where the manuscript begins (i.e. in Book II) to the first chapters of Book X (fol. 193r, l. 28). The second scribe took over from there, in the middle of a sentence in Bk X c. 4, and wrote to where the manuscript breaks off, i.e. in the middle of X.10.[67] Scribe 2 also made marginal additions here and there against Scribe 1's stint. Book X, which was mostly copied by Scribe 2, has no marginal additions. Book X also contains 'extra' passages, which emerge when the text is compared to other manuscripts; these are not given in the margins, however, but are

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by Lindstedt and Raphaela Veit for Article A. In addition, a facsimile of Istanbul, University Library, MS 6375 (s. xiii), printed in ʿAlī ibn al-ʿAbbās al-Majūsī, *The Complete Medical Art:* Kāmil al-ṣināʿa al-ṭibbīya, part 1 (Institute for the History of Arabic–Islamic Science at the Johann Wolfgang Goethe University), Frankfurt am Main, 1985, was used for collation of two passages for Article C by Charles Burnett. I express my warmest gratitude to Lindstedt, Veit, and Burnett for their invaluable help.

63 For Stephen of Antioch, see Burnett 2000, 4–19; Veit 2006; Talbot 2008.

64 *In libri prologo et in aliis multa pretermisit* [*Constantinus*] *pluribus necessaria locis multorumque ordines commutans nonnulla aliter protulit, hoc uno tamen obseruato: nihil prorsus ex suis addidit* ('In the prologue of the work and in several other places he [Constantine] omitted many necessary passages, he changed their order and wrote some of them in a different way, observing this sole principle: he added nothing at all of his own'); *Regalis dispositio*, Lyon, 1523, fol. 5rb, lines 11–15; translated by the present author.

65 See the previous note.

66 See Article A, 298.

67 The part that is missing from MS Helsinki is from the middle of X.10 to X.12, which is the very end of the *Theorica*. The missing part would occupy approximately four folia, perhaps a quaternion, in MS Helsinki.

carried in the body of the text. Thus, it is evident that when copying the remaining part of Book X and making the insertions elsewhere in the codex, Scribe 2 used a different exemplar (or exemplars) to Scribe 1's.[68]

The additions by Scribe 2 in the margins of MS Helsinki number 105 in total. (To these may be added the 'extra' passages in the body of the text in Book X. So far I have identified twenty-one such passages in Book X.) Their length varies from a single word to a passage longer than seventy words. Around twenty insertions can be labelled as mere corrections, as they seem to have resulted from Scribe 2's emendation of inadvertent omissions, such as by eyeskip, committed by Scribe 1 (see, for example, fols. 59r, 78r).[69] Around eighty insertions may be considered significant. The passages in question were presumably not included in the exemplar used by Scribe 1, and they are intended to enhance the content by clarifying the sense or bringing in new matter. It is evident that with the new exemplar(s), Scribe 2 aimed to improve the manuscript's text beyond merely correcting the obvious mistakes of Scribe 1.[70]

For this study, more than ninety insertions or other passages of MS Helsinki were collated with other witnesses in order to investigate the possibility of their occurrence elsewhere. It quickly became obvious that most of these passages are not found in most other manuscripts, and that they could be used as a tool by which different versions could be classified. Eighty-four insertions were collated systematically from at least fourteen other manuscripts and from the two sixteenth-century editions (Article A).[71] The insertions in Book V were studied more comprehensively: the number of manuscripts collated for each insertion varies from sixteen to fifty-two (Article B).[72]

Additional collations were made from Stephen of Antioch's *Regalis dispositio* and Haly Abbas's *Kitāb al-malakī*. Comprehensive comparisons between the Arabic original and Stephen's translation – any more than Constantine's – do not exist. Collations of smaller sections indicate, however, that Stephen is indeed very faithful to the original;[73] thus the *Regalis dispositio* helped to understand the *Kitāb al-malakī*'s relation to the insertions in the *Theorica*. Seventy-six insertions in the *Theorica*'s text were collated with the corresponding sections in the *Regalis dispositio* (Articles A, B, and C).[74] As for Book V, all the significant insertions were collated directly with the *Kitāb al-malakī* (Articles

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68 Article A, 295–7.

69 Such insertions (in Book V) are discussed in Article B, 201–3.

70 For the nature and content of the insertions, see Article A, 296–7. For a detailed analysis of the insertions in Book V, see Article B, 169–201.

71 For the collated manuscripts, see Article A, 298 and n. 25; 306 n. 41; and Table 1 (*sigla codicum*, 317–18). In addition, some ten passages were collated less systematically from occasional manuscripts.

72 For the collations of the insertions in Book V, Article B provides a detailed account (Article B, 169–203, and Appendix: *Sigla codicum*, 207–8). For the special status of Book V, see below.

73 Article B, 182, 184; Article C, 27–8; see also above, 18 and n. 43.

74 Article A, 309–12; Article B, 182, 186 nn. 96, 98; Article C, 27–8.

B and C).[75] In addition, two insertions to Book IX were collated directly with the Arabic (Article A).[76]

The analysis of the insertion's substance in relation to the surrounding textual context plays an important role in this study. Their examination in relation to the *Kitāb al-malakī*/*Regalis dispositio* provided information on why certain passages were originally left out from the *Theorica*, or brought in at a later stage. This, in turn, sheds light on Constantine's translating principles and methods, and on the early versions of the text that were circulating. The method also illustrated the *Theorica*'s transmission and transformation in the following centuries, according to the expectations and practical needs of the text's users.

Stylistic analysis, too, is central to the present study. Here the comprehensive collation of *Theor*. V.34 and additional collations of *Theor*. V.12 and other sample passages come into play. As it appeared that a small group of manuscripts share many distinctive variant readings against most witnesses, their stylistic and grammatical expression was given closer examination (Article C).[77] A significant insight into *Theorica*'s early reception and revision emerged. It became clear how the text was actively modified, and what the aim of these modifications was.

The collated passages from selected witnesses are usually displayed side by side in all three of my original articles.[78] Such presentation of the data illustrates the differences between the *Theorica* and the *Kitāb al-malakī*/*Regalis dispositio*, but also the differences between the *Theorica*'s versions, and the text's transformation throughout the centuries. The same mode of presentation is also applied to the edition of *Theor*. IV.9–10 (see Appendix), which provides access to the different versions.

It is necessary to point out some limitations inherent in the metholodogies of this study. We may begin with palaeograpical and codicological aspects. Because the work under consideraton, *Theorica*, is so extensive and the manuscripts so many, and because the present study is in essence a philological analysis, the materiality of individual manuscripts is given less attention. A more detailed study of the manuscripts would doubtless shed light on their processes of production as, for example, the choices and limitations of the scribes, aspects related to the available material, and other aspects that might have had some bearing on the content and the appearance of the text in different manuscripts. A study of the palaeographical and codicological aspects would provide more information on the manuscripts' provenance. This, in turn, would help us understand better the reception and transmission, where and when the *Theorica* was read, and what were the centres from which the text spread and where it was heavily revised. The aspect of active

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75 Article B, 169–200; Article C, 27–8. For Article B, the amount of the collated insertions is eleven. For Article C, two more passages were collated.

76 Article A, 311–12.

77 Also Article A, 301–2; Article B, 166–9.

78 Article A, 301, 304, 310; Article B, 170–99; Article C, 14–18.

reception in contrast to passive is central to this study, but my focus is on the earliest phases of transmission. Research into subsequent reception from a palaeographical and codicological point of view is certainly a desideratum for future work.

The special feature of MS Helsinki and its advantage to research is that its insertions help us discriminate between the many different versions of the text. It is a notable advantage of that manuscript that insertions in the margins are easily spotted and taken under closer examination. In other words, the Helsinki insertions provide such good evidence of early transmission that the full collation of all witnesses was simply not necessary at this stage. At the same time, it has to be noted that only full collations will enable final conclusions to be drawn about the different versions. Indeed, a comprehensive collation of *Theor*. V.34 proved that the revision of the *Theorica*, datable to the mid-twelfth century at the latest (see below), resulted also in other additions than those that appear in the margins of MS Helsinki.[79] Be that as it may, collations of new chapters or witnesses do support the functionality of my method: in most cases, textual disagreement fits into the scheme that has emerged from the analyses of insertions in the Helsinki MS and relevant text in other witnesses.

RESULTS

Introduction to articles

The results of my study recapitulated in this section come from the following three articles:

A Outi Kaltio, 'The Textual History of Constantine the African's *Pantegni, Theorica* in Light of ms. Helsinki, National Library of Finland, E.ö.II.14', *Revue d'Histoire des Textes*, XV (2020), 289–319.

B Outi Kaltio, with the assistance of Ilkka Lindstedt, 'Constantine the African's *Pantegni*: The Evolution of *Theorica*, Book V', *The Journal of Medieval Latin*, 32 (2022), 155–208.

C Outi Kaltio, 'Switching Style towards Ease in a Medieval Textbook of Medicine: Revision of Constantine the African's *Pantegni, Theorica* in Twelfth-Century Manuscripts', accepted for publication in *The Library*, 7th ser. 24 (2023), forthcoming.

Article **A** collates extracts from the Helsinki manuscript with a total of fifty-six other manuscripts and the two early printings of the *Pantegni*, *Theorica*, as well as with Stephen of Antioch's *Regalis dispositio,* in search of different textual versions. The collation is the most comprehensive ever published of the *Theorica* manuscripts. Eighty-four insertions

79 Article C, 27–8.

throughout the Helsinki manuscript are collated with the corresponding text in other *Theorica* witnesses.[80] Seventy-two insertions are collated also with the corresponding sections in the *Regalis dispositio*. Additional collations in Chapter V.12 *De diuersitate exercitiorum*, 'On the different types of exercise', and occasionally elsewhere in the *Theorica* are carried out. The result is that the manuscripts of the *Theorica* may be seen to fall into three main groups: Version 1, the most common, or the standard version; Version 2, the revised version, with interpolated passages and stylistic revision; and Version 3, the combined version(s) showing contamination[81] between Versions 1 and 2 and independent variant readings. The peculiarity and importance of the Helsinki manuscript in defining the different versions is demonstrated. The special status of Book V in the *Theorica*'s production is proposed. Article A also serves as the basis for Articles B and C, in which the different versions are studied in detail.

In Article **B**, the focus is on the textual evolution of Book V of the *Theorica*. This deals with *res non naturales*, the 'non-natural things' that can affect health, such as climate, food, and excercise. The evidence is collected from fifty-nine manuscripts and the two sixteenth-century editions of the *Pantegni*, as well as from the *Kitāb al-malakī*, as given in the Būlāq-edition of 1877. Eleven significant insertions in Book V of the Helsinki manuscript are collated with the corresponding sections in other witnesses and analyzed contextually.[82] As a result, the *Ur*-version, or Version 0, of Book V emerges in the body of the text of the Helsinki manuscript and in Paris, BnF, MS lat. 6886. It is argued that this is the earliest identifiable version of the *Pantegni*. The *Ur*-version still lacks elements that were later incorporated into Constantine's final version (Version 1). What is more, a number of the Helsinki insertions patently derive from a later revision of the *Theorica* (Version 2), compiled probably soon after Constantine's death. A detailed comparison of these insertions with the *Kitāb al-malakī* indicates that the new sentences in Version 2 were translated, and incorporated, from the Arabic original of the *Pantegni*.

Article **C** concentrates on the stylistic revision in Version 2 of the *Theorica.* This version is preserved in three twelfth-century manuscripts, not hitherto studied in detail. These are MSS Basel, Öffentliche Bibliothek der Universität, D.III.17; Paris, BnF, lat.

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80 See above, 25 and n. 71.

81 The term 'contamination' reflects the eugenic vision of the traditional genealogical method aiming at reconstructing a 'pure' original text and classifying 'all copyists as ingrorant vandals' (Chiesa 2020, 83). Despite its negative connotations, the term 'contamination' is used neutrally in the present study, to describe the copying of readings from more than one exemplar, resulting in combined textual versions and traditions. Terms used with the same meaning in the present study are 'combined' and 'mixture/mixed'. For the term 'contamination' and its preferable alternatives, see Heikkilä 2020, 255–7.

82 The number of manuscripts collated in each of the eleven cases varies from sixteen to fifty-two (see Article B, 172, 178, 180, 183, 186, 189, 192, 195, 198, and 200). In Article A, the number of significant insertions into Book V is said to be nine (Article A, 306–7). For Article B, one more insertion is labelled as significant (Addition no. 10, see Article B, 197–9), and another insertion is considered as two discrete units (Additions nos. 4 and 5, see Article B, 178–185), thus producing the total of eleven significant insertions into Book V.

7042; and Rome, Biblioteca Universitaria Alessandrina, 171. A comprehensive collation of *Theor.* V.34 *De somno et vigiliis*, 'On sleep and wakefulness', and of additional sample material is carried out between the said three manuscripts and three other early witnesses representing the standard version (Version 1), as well as with the two sixteenth-century editions. In addition, two sentences from the said chapter are collated directly with the *Kitāb al-malakī*. A detailed stylistic analysis of the central features in Version 2 is carried out. The article demonstrates that in the course of the first half of the twelfth century at the latest, an anonymous redactor made interpolations to the *Theorica* and also revised Constantine's text for style. The ambition of the redactor was to simplify and clarify Constantine's expression. It is suggested that the revision was carried out to serve pedagogical purposes.

The results are presented below in line with the four-fold division already suggested, beginning with Version 0 and ending with Version 3. The numbering of the different versions implies their chronological order, Version 0 being the earliest and Version 3 the latest. Such a presentation best illustrates the special features of Versions 0, 2, and 3 and their relation to Version 1, i.e. the standard version. My results provide an overall picture of the *Theorica*'s transformation from the earliest stages of the text's production all the way to the early printings.

It is possible, of course, that the *Theorica*'s transmission will prove to be characterized by more profound textual variance than is suggested here, encompassing more than four discrete versions. The limit on what degree of textual variation constitutes a separate 'version' is not a clear one. It is also evident that minor textual variation within each version – even within each manuscript – exists. These questions can be solved only after full collation. Nonetheless, I am confident that the chosen methods, i.e. collating primarily the insertions in the Helsinki manuscript (Articles A and B), and one full chapter (Article C), have generated solid results by which to define the main stages in the evolution of the *Theorica*. Indeed, the full collation of *Theor.* IV.9–10 that accompanies this study corroborates my results as to the different versions.

Version 0: the *Ur*-version

A recent study by Erik Kwakkel and Francis Newton argues that Constantine had already begun his translation programme in Salerno and had significantly advanced his *Pantegni* there, before entering the monastery of Monte Cassino sometime before April 1078 (see above). Their argument on the pre-Cassinese *Pantegni* is based on certain features' appearing mainly in the prologue to the *Theorica*. In their reading, these features suggest that a manuscript now in Erfurt (Universitätsbibliothek, CA 4° 184) preserves an early, Salernitan stage of the text.[83] However, their proposition seems only to work for the pro-

[83] Kwakkel and Newton 2019; see Article B, 159–62, for a summary of Kwakkel and Newton's argument.

logue: according to my sample collations, the text of the Erfurt manuscript otherwise represents the standard, Cassinese version.[84] Even so, my results resonate with Kwakkel and Newton's argument for a preliminary stage of composition and a gradual process of compilation of the *Theorica*, happening either in Salerno or Monte Cassino. The crucial point here is that there is a provisional stage of Book V's text. I would argue that this is the very oldest identifiable version (Version 0) of the *Theorica*. This version has come down to us in two manuscripts: MS Helsinki, in the body of the text written by Scribe 1, and MS Paris lat. 6886. Their version of Book V is earlier, I argue, than the text of the oldest known *Pantegni* manuscript, The Hague (*c.* 1075–1085), and also earlier than the version of Book V in the Erfurt manuscript.

I first observed traces of Version 0 when studying the insertions in the margins of the Helsinki manuscript.[85] As mentioned above, the second scribe made insertions into the first scribe's stint by recourse to a different exemplar than that available to the first scribe. There are, altogether, fourteen additions to Book V in the margins of MS Helsinki. Furthermore, an inserted leaf of different origin (fol. 58r) contains two separate textual units pertinent to the task. My collations showed that six of these sixteen passages appear in all the collated manuscripts, except for MSS Paris lat. 6886 and Helsinki, where they are missing from the body of the text copied by Scribe 1 (but inserted into the margins by Scribe 2). Five other passages appear in a few manuscripts only and derive from Version 2 (as will be discussed below). The remaining five passages are emendations of inadvertent omissions by Scribe 1. These are found in other copies, also in MS Paris lat. 6886. As such, they do not provide evidence of different versions.[86] In order to distinguish between the *Ur*-version and the standard version (Versions 0 and 1), the six passages that appear in all the other collated manuscripts, except for Helsinki and Paris, are essential. I argue that they are the sections not found in Constantine's preliminary version. The collation of these passages with the *Kitāb al-malakī* and the contextual analysis of their content provides insights into Constantine's translation process and his methods. It is possible to discern why certain sentences from the original Arabic text might initially have been left out, or why new material, such as a citation from Lucan, were brought in.

It remains a possibility, albeit a small one, that MSS Helsinki, as written by Scribe 1, and Paris lat. 6886 lack the six passages in Book V due to inadvertent omissions in early transmission; these errors would then have passed down to the said two manuscripts. In such a case, MSS Helsinki and Paris would not represent an *Ur*-version but constitute a corrupt sub-branch of the transmission. Another caveat is that I have not verified an *Ur*-version in the other books of the *Theorica* except the fifth; the text in the other books

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84 Article B, 162.

85 Article A, 295–8, 306–9; Article B. The idea of the possible *Ur*-version and the term itself originated in the course of an exchange between Monica Green and myself, in March 2018.

86 See Article B, 169–203, for a detailed analysis of all sixteen insertions.

in MSS Paris and Helsinki (Scribe 1) seem to represent the standard version.[87] None the less, a detailed analysis of the six passages in Book V does show that their character is that of having been inserted into a previously worked-up text. Also important is the concordance between MSS Helsinki and Paris in relation to the passages they omit — even more so, as passages clearly unintentionally omitted by Scribe 1 of the Helsinki manuscript do appear in the Paris manuscript.[88] Furthermore, a demonstrated process of continuous revision of another Constantinian translation, the *Isagoge*, constitutes a parallel case of a gradual process of translation done at approximately the same time. The production of Constantinian translations was a multi-stage procedure, in which different books could be separately translated and amended at different times. Moreover, it was not unusual to copy medieval manuscripts one part at a time, and possibly from multiple exemplars. Furthermore, copies could even be made from drafts containing premature versions; this kind of a scenario is seen in the *Isagoge*.[89] MSS Helsinki (Scribe 1) and Paris appear to derive from an exemplar, or exemplars, in which *Theorica*'s Book V was still in an unfinished state while the other books were complete.

Why was Book V the object of Constantine's intensive re-examination, more than the other books? The answer lies probably in its contents. Book V deals with the *res non naturales*, the 'non-natural things', one of the most important and far-reaching concepts in the whole *Pantegni*. The six non-naturals are the external or behavioural factors affecting the mixture of humours and qualities in the body: air and environment, food and drink, motion and rest, sleep and wakefulness, evacuation and repletion (e.g. baths, intercourse, and digestion), and emotions. The non-naturals were central in combining the theory of medicine with practice, as health could often be regained by their adjustment.[90] Peter Niebyl has traced the formulation of the concept of the six non-naturals from its beginnings in Galen's works on the pulse, advancing then to Philaretus, Theophilus, and Paul of Aegina. From there, via Alexandrian commentaries, the concept reached the *Isagoge* of Ḥunayn ibn ʾIsḥāq (or Johannitius) and the *Kitāb al-malakī* of Haly Abbas.[91] According to Eliza Glaze, the great Byzantine medical authorities known in Monte Cassino prior to Constantine's time, i.e. Oribasius, Alexander of Tralles, and Paul of Aegina, did not provide sufficient coverage of the concept of the non-naturals; this would help to explain Constantine's 'extraordinary undertaking' of his translating the *Pantegni,*

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87 Article A, 308–9; Article B, 162–3.

88 Article B, 163–5, 190, 201–3.

89 Kwakkel and Newton 2019, 35–6, 92–3, 118, 150–57, 208 n. 10; Newton 1994; Glaze, Glen, Han, Lee, and Newton 2022, 51–3; Article A, 308–9; Article B, 162–4 and n. 29.

90 Rather 1968; Niebyl 1971; García-Ballester 1993; Palmieri 1997, 92–3 n. 134; Pormann and Savage-Smith 2007, 44. Pormann and Savage-Smith note that the six non-naturals, combined with the humoral theory, 'provided the explanatory basis for the cause and nature of illness as well as the theoretical framework within which it was to be treated' (ibid., 45). See also Article B, 163 and n. 25.

91 Niebyl 1971, 486–9. See also García-Ballester 1993; Fitzpatrick 2022.

Theorica.[92] The works of Philaretus on the pulse, and Theophilus on urine, as well as the *Isagoge*, were translated into Latin and incorporated into the *Articella*, the foundational teaching collection of medicine. The key factor here is that the *Articella* was assembled, it appears, in Monte Cassino in the last third of the eleventh century, that is, in Constantine's time.[93] The new engagement with the texts of Philaretus and Theophilus, as well as Constantine's simultaneous efforts to translate the *Isagoge*, demonstrate that the concept of the *res non naturales* was a live issue at Monte Cassino. Fresh and lively interest in the non-naturals would have provided Constantine with the impetus to translate first the book from the *Kitāb al-malakī* on precisely that subject. Our textual evidence implies that Book V was the starting point for Constantine's work of translation.[94] The special interest in that particular book can be seen as connected to his larger ambitions to render a whole system of medicine into Latin, and to incorporate the six non-naturals into it. In my reading Constantine returned to, and revised, the earliest part of his translation at a later stage before the *Theorica* entered wider circulation.[95]

At first glance, it might seem there is no sort of pattern in either the placement or content of those passages that are absent from the conjectured *Ur*-version. They appear in four different chapters of Book V, dealing with diseases in summertime, the insalubrity of the air, movement and massage, and baths. It is striking, however, that four of the six passages quote, or make reference to, Hippocrates or Galen. Collations with the *Kitāb al-malakī* show that references to these authors in the *Theorica* go back to the Arabic original.[96] The inference is that Constantine initially omitted these passages. The reason was probably his preference for concision. For example, a citation from Galen on fevers in the chapter dealing with the insalubrity of the air (*Theor.* V.11) is absent from the *Ur*-version but found in witnesses to subsequent versions. An analysis of this citation in the context of its surrounding text, together with collation with the corresponding section in the *Kitāb al-malakī*, demonstrates that the citation is not needed for sense. Constantine shortened and streamlined the section in question; the citation from Galen,

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92 Glaze 2019, 20–22. It has to be noted that Glaze refers to 'natural things' instead of 'non-natural things' in this context. I am convinced, however, that non-natural things are precisely meant. It seems that the same confusion occurs elsewhere in the same volume (Kwakkel and Newton 2019, 146: 'Indeed, much of the early reception of Arabic medicine in the West, some scholars have stressed, was not focused on medical knowledge as such, but on the life-related information that medicine provided. Works like Constantine's *Isagoge* and *Pantegni* were read for the *res naturales* they discussed'). The confusion has probably arisen directly from the manuscripts, for example MSS The Hague and London, as well as the Basel edition; these confuse the non-natural things with the natural things in Chapter I.3, when the division is first time introduced in the *Theorica*. Later, in Chapter I.4 and beyond, the same things are correctly named as non-naturals (Article C, 26–7 and n. 165, citing the Latin text from manuscripts).

93 Green 2019, 326–7.

94 Article A, 308–9; Article B, 156–7, 162–5; Article C, 9–10 and n. 33.

95 I am indebted to Monica Green for emphasizing the emergence of the concept of the *res non naturales* in Constantine's milieu in connection with translation of the *Articella* texts (personal communication, 21 May 2022).

96 Article B, 171, 173–4, 177–181, 191–3, and Table 3 (201).

which is somewhat complex in the original Arabic, was considered unnecessary. Subsequently, however, Constantine decided to include the citation. This happened before the *Theorica* entered wider circulation, as is suggested by the paucity of manuscripts that evidence Version 0.[97]

Another reason why references to Hippocrates and Galen might have been cut down in the *Ur*-version is a technical one: they were initially skipped over to be further worked up and, probably, while other sources besides the *Kitāb al-malakī* were consulted. In Chapter V.4, dealing with different seasons and their respective diseases, the *Ur*-version omits a passage of some fifty words. The passage and the surrounding text paraphrases Hippocrates on diseases typically emerging in summer and its threshold times. It is hard to imagine that Constantine would have first decided to dispose of the material in question, since it is needed for the sake of narrative coherence. More likely, the section was originally left pending for later editing. Comparison with the *Kitāb al-malakī* showed that the fifty-word passage is more worked-up, so that it differs considerably from the original Arabic, more so than does the surrounding text. This indicates that the passage was worked up at a later stage than the rest.[98]

A section that suggests Constantine's use of additional sources besides the *Kitāb al-malakī* is found in *Theor*. V.13, dealing with different types of baths. The eighty-word-long extract is, again, missing only from the *Ur*-version, i.e. MSS Helsinki (Scribe 1) and Paris lat. 6886. In the middle of this somewhat complex section dealing with the effects of cold baths, there is a reference to Hippocrates, absent from the Arabic text (*Quod bene Ypocras preuidet* – 'Hippocrates forsees this rightly'). The fact that the discussion of cold baths was originally left unfinished and an 'extra' reference to Hippocrates was added indicates a gradual processing of the section with recourse to an additional source or sources. A gradual processing is also visible in the fact that the titles of Hippocrates's works (e.g. the *Aphorisms*) in this chapter are missing from Version 0, but found in Version 1.[99]

The above-mentioned citation from Lucan, from his *De bello civili*, or *Pharsalia*, appears in *Theor.* V.12 *De diversitate exercitiorum*, 'On the different types of exercise'. This was the first insertion in the Helsinki manuscript to catch my close attention, since a verse from Lucan stands out as somewhat bizarre in the context. Collations between fifty-two manuscripts and the two early printings showed, however, that the citation was an established part of the *Theorica*'s textual tradition: the only witnesses lacking the quotation are MSS Helsinki (Scribe 1) and Paris lat. 6886.[100] The original Arabic text and Stephen of Antioch's literal translation do not include the citation from the Roman poet, as one would expect. Yet the Arabic original seems to have prompted the citation. The

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97 Article B, 176–8.

98 Article B, 170–74; Article A, 308.

99 Article B, 190–93. Another extract showing signs of having been worked with reference to additional sources besides the *Kitāb al-malakī* is a schema, or 'tree', dividing different types of epidemics and with reference to Hippocrates; see Article B, 178–85, for a detailed analysis.

100 Article A, 307–8; Article B, 185–8.

Kitāb al-malakī has *al-mīdān*, 'racecourse' or 'hippodrome', which Constantine translates as *girari*, 'moving in circles', and *equitare*, 'riding'; the *Pharsalia* verse has *girum/gyrum*, 'circular movements of horses' or 'a pen'.[101] Thus, the Arabic source provided a context in which a classical quotation could be neatly inserted. That the verse is missing from MS Paris lat. 6886 and (originally) from MS Helsinki implies that it was not incorporated into the *Theorica* at the earliest stage of the translation but probably only at Monte Cassino. Given the strong pedagogical tradition in the monastery for reading Lucan, this would seem natural.[102] The quotation, an elegant touch, was perhaps a demonstration of Constantine's learning.

The rationale for my conjecturing Version 0 is as follows. When translating the *Kitāb al-malakī*, starting perhaps with Book V for its ground-breaking concept of the six non-naturals, Constantine might initially have regarded certain passages as superfluous, or difficult to understand, and skipped over them. The corresponding sections in the original Arabic text are often complicated and meandering, and the Latin passages, unfinished in Version 0, appear more worked-up than the surrounding text.[103] It is also a possibility that these sections were deficient in Constantine's copy of the *Kitāb al-malakī*, and that he obtained a second, better copy at a later stage. This would have allowed him the opportunity to return to these sections and revise them.[104] At Monte Cassino, Constantine also had better resources to support his translation work than what had been available to him in Salerno. In the monastery he had access to a team of scribes and collaborators to assist in his work of translation.[105] Indeed, the quotation from Lucan may not even have been included in the *Theorica* by Constantine's own initiative but by someone else's. That person could have been a scribe, a collaborator, or a colleague working in the abbey and wishing to give a fancy touch to the text of the *Theorica*. Furthermore, after Constantine had arrived at Monte Cassino and set out to survey the variety of medical treatises in the abbey's library, he could, and almost certainly would, have consulted these works when finishing the *Theorica*.[106]

Version 0 is important evidence of the translation process behind the *Theorica*. Constantine first drafted a translation of Book V and subsequently revised the text. It is, of course, possible that Version 0 lacked more passages than the six inserted into the margins of the Helsinki manuscript; if so, the early stage of Book V would have been less complete than our evidence suggests.[107] To determine this would require a systematic

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101 Article B, 185–6.

102 See Newton 1999, 109, 124, 262; Kwakkel and Newton 2019, 129–35; Anderson 1986; Article B, 185–8.

103 Article B, e.g. 173, 178, 190.

104 Monica Green has suggested that Constantine did obtain a second copy of the *Kitāb al-malakī* (Green 2018a; see also Article A, 312–13; Article B, 181–2).

105 Glaze 2019, 16; Kwakkel and Newton 2019, e.g. 94, 100–7, 116–18; Article B, 160.

106 Article B, 186–8, 193.

107 Article B, 169.

collation of Book V between the *Ur*-version and the standard version, that is, Versions 0 and 1. Such a laborious undertaking falls outside the remit of this study, but will be conducted in the future, when Book V will be comprehensively edited.

Version 1: the standard version

My approach is to situate the *Theorica*'s Versions 0, 2, and 3 in relation to the text's standard version (Version 1). Although the focus is on those other versions, it is appropriate to specify what is understood by the standard version, and how that version was transmitted. As stated above, my grouping of the *Theorica* manuscripts is based firstly on collations of the Helsinki manuscript insertions with other manuscript witnesses and the two early printings. As it appeared that most of the inserted passages in MS Helsinki are found in only a few other manuscripts, the passages could be used in discriminating between different textual versions. In addition, one chapter (V.12 *De diversitate exercitiorum*, *c.* 1,050 words), as well as occasional sample passages, was fully collated. By this method, I was able to divide the collated manuscripts into three groups, representing three different versions, 1, 2, and 3, and, for Book V, into one more group representing Version 0, the *Ur*-version (see above).[108] Group/Version 1 is admittedly a somewhat loose category. It embraces manuscripts that did not distinguish themselves sufficiently to be labelled in any other group. More comprehensive collations between the manuscripts of Group 1 would probably yield subgroups or cause manuscripts to be moved from Group 1 to Group 3, which represents a later tradition showing contamination to varying degrees (see below). On the other hand, these collations have already confirmed that manuscripts placed in Group 1 do not, at least, represent Versions 0 or 2, which are the most important to my study.

The Hague, Koninklijke bibliotheek, MS 73 J 6, the oldest known *Pantegni* manuscript, has a key position in defining what is to be taken as the *Theorica*'s standard textual version. The manuscript was made between *c.* 1075 and 1085 in the monastery of Monte Cassino, probably under Constantine's supervision, as has been persuasively argued by Erik Kwakkel and Francis Newton.[109] As such, the volume conveys Constantine's authorial voice more accurately than other manuscripts. The Hague manuscript is incomplete, probably 'a version of the text penultimate to the final, approved and completed copy'. The eleventh-century scribe had left the end uncopied, and the text (the last two folios) was completed only in the mid- and second half of the twelfth century. There are also missing rubrics and lacunae in the text, which were, it appears, supposed to be filled in the final

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108 For the collated manuscripts and the coverage of the collations, see Article A, 298–9 and n. 25; 306–7 n. 41; and Table 1 (*sigla codicum*, 317–18).

109 Kwakkel and Newton 2019.

copy, something that did not happen, to judge by other manuscripts.[110] As for the insertions discussed above, according to which I distinguish between different versions, The Hague MS can take its place in Group 1 without any reservations. It thus represents the standard version of the *Theorica*: while the manuscript includes all six passages missing from the *Ur*-version of Book V, it lacks all the new interpolations and stylistic features of Version 2. The same applies to other manuscripts representing Version 1.[111]

Most of the manuscripts that I have studied represent *Theorica*'s Version 1 (subject to the reservations set out above). The Hague MS is apparently our only extant eleventh-century witness. The other manuscripts come from the twelfth, thirteenth, and fourteenth centuries.[112] Many of the earliest manuscripts belong to this group, for example BnF, lat. 6887 (*c.* 1100); Hildesheim, Dombibliothek, 748 (*c.* 1125); BL, Add. 22719 (*c.* 1110–1130); and Cambridge, Trinity College, R. 14. 34 (*c.* 1125–1150).[113] A representative of the *Theorica*'s Version 1 is also the Basel edition (*a.* 1539; see above). Mark Jordan already noted in 1994 that the Basel edition 'agrees with readings in a much larger family of manuscripts [than the Lyon edition]', and that 'the Basel edition descends from a more typical exemplar'.[114] My collations corroborate Jordan's opinion on the status of the Basel edition. Its text follows, for example, MSS the Hague and BL Add. 22719 very closely.[115] It is also interesting to note that the title page of the Basel edition states that the volume was printed from a 'recently discovered, ancient and venerable codex' (*nuncque primum impressa ex venerandae antiquitatis exemplari, quod nunc demum est inventum*).[116] Although printers' claims for the quality of their examplars are something of a cliché of the trade, the characterization 'ancient and venerable' resonates with the fact that the text represents the early, standard version of the *Theorica* and not any later version. What is more, the oldest copies of the *Pantegni* usually include the *Theorica* alone, as does the Basel edition.[117] Going by the current state of knowledge, the Basel 1539 edition is a fairly reliable text to be used in representing Constantine's final textual form of the *Theorica* that left his desk in Monte Cassino.

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110 Kwakkel and Newton 2019, 69–72, 82–94 and n. 63.

111 There are, of course, some minor variations between manuscripts representing Group/Version 1. In order to get a sense of the differences and variants inside Group/Version 1 (as well as in relation to Version 2), see Article C, 14–18. The section contains a full collation of *Theor.* V.34, in both Versions 1 and 2. See also the edition of *Theor.* IV.9–10 (Appendix). In my editions, the witnesses representing Version 1 are always MSS The Hague, Cambridge, and London Add. 22719, and the 1539 Basel edition.

112 For the manuscript datings used in this study, see above, 19 n. 46.

113 For the London and Cambridge manuscripts, see Article C, 11–12, 14–18. For a detailed account of the contents of the London manuscript, see Burnett 2002, 54–5.

114 Jordan 1994, 290, 301.

115 See Article A, 299; Article B, 170–202; Article C, 11–12, 14–18; and Appendix.

116 The Basel edition 1539, [i]; Jordan 1994, 287.

117 The volume of the Basel edition that contains the *Theorica* is the second one; volume 1, printed in Basel in 1536, includes parts of the *Practica*. For the contents of the two Basel volumes, see the handlist entry in Burnett and Jacquart 1994, 318–19.

Version 2: the revised version

The next identifiable stage in the *Theorica*'s textual history is datable to the mid-twelfth century at the latest. An anonymous redactor engaged meticulously with Constantine's *Theorica* and produced a new version on the basis of an overarching stylistic revision of the Latin syntax. What is more, the new version incorporates numerous short interpolations absent from the standard version. Three manuscripts from the twelfth century, not studied in detail before my analysis, contain the revised version, or Version 2, of the *Theorica*: Paris, BnF, lat. 7042 (s. xii^{1}–xiii^{1}); Basel, Öffentliche Bibliothek der Universität, D.III.17 (s. xii$^{med.}$, Italy?); and Rome, Biblioteca Universitaria Alessandrina, 171 (s. xii$^{ex.}$).[118]

As was the case with Version 0, Version 2 revealed itself as I was studying the marginal insertions in MS Helsinki. As already stated, collations with several other *Theorica* witnesses showed that these passages are, for the most part, not found in the *Theorica*'s standard version.[119] Instead, most passages are found only in the said three twelfth-century manuscripts, i.e. Paris, Basel, and/or Rome, even if occasionally worded differently.[120] Further comparisons of these manuscripts with MS Helsinki and other witnesses revealed the large-scale revision of the syntax in the three.[121] The status of MS Helsinki became clearer. In Book V its text represents Version 0, and elsewhere Version 1. The insertions in the margins in the whole codex derive mostly from Version 2. We can thus conclude that the exemplar(s) used by the second scribe for making the insertions apparently represented Version 2 (or a contaminated version).[122] As a result, MS Helsinki amalgamates three, or more, different versions of the *Theorica*.

The revision of the syntax in *Theorica*'s Version 2 was examined in detail. A collation of Chapter V.34 *De somno et vigiliis*, 'On sleep and wakefulness', and of a sample of select passages was conducted. The collation of *Theor.* V.34 was based on three manuscripts rep-

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118 MS Paris lat. 7042 was written by at least four different hands, the earliest two of which set the *terminus ante quem* for the *Theorica*'s textual revision in the first half of the twelfth century. For the codicology of MSS Paris, Basel, and Rome and for the relations between the manuscripts, see Article C, 12–13. Textual variation between the three manuscripts implies that none of the witnesses descended directly from another.

119 Article A, 298–9. As for Book V, the situation is more complex, as some of the insertions derive from Version 1 whereas the rest derive from Version 2. Article B provides a detailed analysis.

120 The occurrence of these passages in the three manuscripts varies according to the different books of the *Theorica*: see Article A, 299–301, and Table 2 (319). In sum, all three manuscripts include the passages in the first half of the work, whereas the evidence begins to waver from Book VI onwards. In Books VII to IX, only MS Rome includes 'extra' passages (the manuscript is missing most of Book IX and Book X completely); see Article C, 9 and n. 30; 13 n. 48.

121 Article A, 301–2; Article C, 14–27; see also Appendix.

122 Article A, 300–01, 305; Article B, 167. The immediate exemplar used by Scribe 2 for emending MS Helsinki has not been identified and is likely to be lost. It is not likely that any of the three extant manuscripts representing Version 2 (MSS Paris, Basel, or Rome) would have acted as the exemplar: MSS Paris and Basel do not even contain the passages that are inserted into MS Helsinki in Books VII to X, whereas MS Rome is later than MS Helsinki (Article A, 305–6).

resenting Version 1, The Hague, London, and Cambridge, along with the Basel edition, and on the three manuscripts that represent Version 2, being Paris, Basel, and Rome, along with the Lyon edition.[123] The result shows that Version 2 is more verbose than Version 1: discourse connectives (such as *aut, autem, sed, vero*) abound, and compressed grammatical constructions (such as the use of participles) are loosened. These kinds of editorial strategies were targeted at clarifying the syntactical relations of the sentences and making Constantine's train of thought more lucid. For example, the use of subordinate clauses instead of participial constructions provides the sentences with markers (such as relative pronouns or conjunctives), which usually leads to an increase in the word count. At the same time, the result is a more streamlined style of Latin, making the sentences easier to receive.[124]

The redactor of Version 2 aimed at clarification and supplementation rather than changing the content of Constantine's *Theorica*. On occasion, he or she emended infelicities. Thus, Version 2 at times has better readings than the oldest *Pantegni* copy in The Hague MS, or other primary copies, or the Basel edition. At times changes in the wording in Version 2 amend incorrect readings in Version 1, restoring the text's internal logic. Such easily confused concepts as *naturalis virtus*, 'the natural virtue', as against *naturalis calor*, 'the innate heat', and *res non naturales*, 'the non-natural things', as against *res extra naturam*, 'the things outside the nature', are cases in point.[125] Scribal errors could account for some of these errors in the course of transmission. Yet it is significant that all three of the manuscripts representing Version 2 stand in agreement with each other and against the standard version in these changes. This indicates that the changes did indeed result from systematic emendation by a single redactor rather than from various layers of scribal interventions accumulating over time in the course of transmission.[126]

The other significant feature of *Theorica*'s Version 2 besides the revision of the syntax is the numerous interpolations that are lacking from Version 1. They occur here and there in the *Theorica*'s text.[127] There are some seventy in the margins of MS Helsinki,[128]

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123 Article C, 10–18. See also Article A, 301–2, for a few more collated sentences in Books III, IV, and V. In addition, Chapter IV.19 *De spiritibus* 'On the spirits' was collated from MSS Paris, Basel, and Rome (see further below and Article C, 7–8).

124 Article C, 19–23.

125 Article C, 24–7 and n. 165.

126 Article C, 13. For the only significant exception in the three manuscript's agreement, see Article C, 25 n. 163.

127 The evidence for the interpolations in Version 2 was originally collected from MS Helsinki, from the insertions in its margins. These were collated with a great number of other witnesses. The evidence covers the *Theorica*'s Books II to X: because MS Helsinki is missing Book I, that book was not collated (see Article A, 295 and Table 2, p. 319). A comprehensive collation of Book I between the standard version (e.g. The Hague MS or the Basel edition) and the revised version (MSS Paris, Basel, or Rome) could be expected to reveal interpolations in the revised version in Book I as well.

128 As stated above, the total number of marginal insertions in MS Helsinki is 105, of which around seventy appear to derive from Version 2. Six insertions, in Book V, derive already from the standard version

but comprehensive collations from MSS Paris, Basel, and Rome would probably reveal more interpolations in these three.[129] The length of the interpolations varies usually from one or two words to about ten; the longest run to some forty to fifty words. Most passages are explanatory in that they clarify the content, but, in so doing, they add no substantive information. Many passages are repetitive and redundant, sometimes even confusing, whereas some do add substance to the topic at hand.[130]

In order to investigate the origin of the interpolations in Version 2, seventy-six passages were further collated with the corresponding sections in Stephen of Antioch's *Regalis dispositio*, for its help in understanding the original Arabic text. Collations of the interpolations in Version 2/MS Helsinki with the *Regalis dispositio* showed more than fifty of the seventy-six passages occur within Stephen's work. Their subject matter and placement in the text correspond perfectly, but they are worded in a thoroughly different manner. This strongly suggests that the interpolations in *Theorica*'s Version 2 did not come from the *Regalis dispositio* (or vice versa), at least directly. Rather, they stem independently from a common Arabic ancestor.[131]

This observation, namely the Arabic origin of the interpolations in *Theorica*'s Version 2, was further corroborated when the interpolations in Book V were examined in a more detailed way and collated directly with the *Kitāb al-malakī.* Also, two interpolations in Book IX were collated with the Arabic text.[132] Collations showed most of the extracts have their counterparts in the *Kitāb al-malakī.* For example, in Chapter V.4, on summertime diseases, Version 2 incorporates a new sentence which is lacking from Version 1: *multa estiuorum* [*morborum*] *in autumno nasci* ('many diseases of summertime occur in autumn'). The *Kitāb al-malakī* has an exact counterpart in the corresponding place. The passage is redundant in both the *Kitāb al-malakī* and the *Theorica*, as it only repeats what has already been written a couple of lines previously.[133] An example of an interpolation which is more to the point is found in the above-mentioned chapter V.34 on sleep and wakefulness. Version 1 remarks that the extremities of the body cool in sleep, without further specification. Version 2 incorporates a new sentence, stating that this applies to those who sleep much (*in multum dormientibus*).[134] Collation with the *Kitāb al-malakī*

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and emend the incomplete Version 0 in that book (see Article B, Table 3, p. 201, and passim; also above). Around twenty insertions seem to be emendations of the first scribe's inadvertent omissions; as such, they do not play a part in defining different versions (Article A, 298; Article B, 201–03). The remaining ten or so insertions would require further research in order to be labelled properly.

129 The full collation of *Theor.* V.34 *De somno et vigiliis* already revealed two interpolations in Version 2 that are not inserted into the margins of MS Helsinki (Article C, 33–5).

130 See examples in Article A, 296, 310–11; Article B, 172–4, 183–4, 193–200; Article C, 27–8.

131 Article A, 309–12; Article C, 27–8.

132 Article B, 169–201; Article C, 27–8; Article A, 311–12.

133 Article B, 172–4.

134 Article C, 16, 27–8.

shows that the Arabic has a corresponding phrase 'when the sleep is prolonged'.[135] The interpolation clearly adds substance to the text.

It seems evident that most of the interpolations in *Theorica*'s Version 2 originate in the *Kitāb al-malakī*. (At least one interpolation seems to have its origin in another, anonymous source, whereas a few sentences appear to be the redactor's original formulations.[136]) As to the question of how these passages were transmitted to Version 2, one possibility is that Constantine initially translated them but cut them out from his final version. The passages may represent a 'work in progress', or Constantine's drafts, which he would have pruned at a later stage for being repetitious or otherwise expendable. A few copies would have been made from Constantine's unfinished work, however, a common enough feature of medieval publication (and something it is argued here happened to Book V, as in its Version 0; see above).[137] It is also possible that the sentences were not included in the exemplar of the *Kitāb al-malakī* which Constantine was initially using, but that he obtained a second copy later. This would have allowed him the opportunity to revise his own text.[138]

Another, perhaps a likelier, option would be that the interpolations were not by Constantine, but by a later redactor. Constantine's customary method of translation, known also from his other works, was to abbreviate and paraphrase; this was usually intended to avoid repetition and redundancies in the original Arabic (for which see the example above of *multa estiuorum in autumno nasci*).[139] Hence, Constantine would have left these passages out from his translation. The later redactor, were he or she capable in Arabic, would have recollated *Theorica*'s text anew with the *Kitāb al-malakī* and translated and incorporated passages that Constantine had left out. By restoring such passages to the text, the redactor aimed at bringing Constantine's *Theorica* more into line with its Arabic original and at offering clarification – even at the risk of repetition.[140] I find this option to be more likely, given the other significant aspect of the revision, namely, that of the syntax. It is not probable that Constantine himself would have created a parallel version

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135 *Al-nawm idhā ṭūla*, in the facsimile of Istanbul, University Library, MS 6375 (s. xiii) (ʿAlī ibn al-ʿAbbās al-Majūsī, *The Complete Medical Art*, 1985). I thank Charles Burnett for checking and translating this passage for me. A corresponding passage is included in the *Regalis dispositio* as well, which has *somnus si prolixior fiat*, 'if the sleep is prolonged' (see Article C, 27 and n. 168).

136 Article B, 178–84, 197–9; Article C, 28.

137 Recent work on publication in the middle ages has emphasized the contingent nature of the release of drafts and versions of authorial texts: see the contributions to the forthcoming work, *The Art of Publication from the Ninth to the Sixteenth Century*, ed. S. Niskanen, to be published in 2023.

138 Article A, 312–13; Article B, 181–2.

139 See also, for example, Jacquart 1986; Wack 1994, 165; Bos 1994; Veit 2003a, 190; Burnett 2007, 64; Montero Cartelle 2016, 21–26; McVaugh 2022, 668–9; Article A, 312; Article B, 170–200; Article C, 6–7, 27.

140 It would also be possible that these passages were not included in the exemplar of the *Kitāb al-malakī* Constantine was using and that the anonymous redactor had recourse to more than one version of the work in order to emend Constantine's text (Article A, 313; Article B, 167).

of his *magnum opus*; that he would have executed a systematic stylistic revision without major alterations to the content or terminology. At least, the revision of the syntax was probably executed by someone other than Constantine. Moreover, as the interpolations and the revision of the syntax go hand in hand in the early witnesses of Version 2 (MSS Paris, Basel, and Rome), it is probable that a single party was responsible for all these revisions. I am therefore inclined to think that the interpolations originated with someone other than Constantine.[141]

As to the redactor's possible competence in Arabic, Version 2, however, shows no signs thereof beyond the interpolated passages. Had the redactor had a good command of Arabic and consulted the *Kitāb al-malakī*, one might have expected more significant alterations to the vocabulary and content.[142] Such major alterations do not exist in *Theorica*'s Version 2; besides the interpolations and the differences in syntax, Version 2 diverges only a little from Version 1.[143] In principle, the incorporation of the passages would not have required recourse to the *Kitāb al-malakī*; the passages could have been picked from the *Regalis dispositio.* But if this were the case, then the redactor took considerable effort to rephrase Stephen's sentences; variation between the *Regalis dispositio* and Version 2 is notable. The redactor was clearly not willing to incorporate passages from the *Regalis dispositio* as such.

Whether the new passages in *Theorica*'s Version 2 were incorporated directly from the *Kitāb al-malakī* or via an intermediary, i.e. the *Regalis dispositio* (or perhaps even another text dealing with similar topics[144]), cannot be answered decisively at the current

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141 Article A, 313; Article B, 167.

142 Such emendations have indeed taken place in some other Arabic–Latin translations that appear in two or more different redactions. For example, Mary Wack has argued that the *Liber de heros morbo*, a text attributed to Constantine, is not only an adaptation of a chapter of Constantine's *Viaticum*, but a re-translation of the original Arabic text, the *Zād al-musāfir* by the North-African physician Ibn al-Jazzār. The re-engagement with the original Arabic text is indicated by the vocabulary, syntax and content of the *Liber*, all very distinct from the *Viaticum* (Wack 1987, 332–4, 341; Article C, 28–9). Another example is Abū Ma'shar's work, *On the Great Conjunctions*, which Charles Burnett has demonstrated was revised with reference to the Arabic text. The differences between the two versions can be observed on several levels, for example in terminology (Burnett 2001, 53 and passim). Yet another interesting example is Rhazes' *Kitāb al-Manṣūrī*, which Danielle Jacquart has demonstrated exists in two different Latin versions. The latter was revised with recourse to the original Arabic text by Gerard of Cremona (d. 1187), to whom the original translation had also normally been ascribed. Jacquart demonstrates that Gerard replaced some technical terms and used more transliterations of the Arabic words than the original translator (Jacquart 1994b, 363–5 and passim). Examples of the same kind of changes in terminology or content do not exist in *Theorica*'s Version 2. This could imply that the original Arabic text was *not* consulted in the revision process.

143 Versions 1 and 2 can best be compared from the chapters edited for the present study. See Article C, 14–18 for *Theor*. V.34, where Versions 1 and 2 appear side by side; and Appendix for *Theor*. IV.9–10, where Versions 1 (plus 0), 2, and 3 appear side by side.

144 For example, the first half of the twelfth century saw a rise of commentaries on the *Articella* collection of medical texts, in which especially the *res non naturales* – the theme of *Theorica*'s Book V – are discussed (see above). Based on my sample collations however, interpolations in other books besides the fifth also show strong correspondence with the *Kitāb al-malakī/Regalis dispositio.* This suggests that

state of research. Nor can the redactor's possible competence in Arabic be confirmed; this would have helped in investigating the identity of the redactor, since 'few were in the position of Stephen of Antioch to compare the Constantinian text with the Arabic original'.[145] Given the comprehensive and systematic nature of the revision and the redactor's sense of the wider contextual meaning, visible in their ability to emend incorrect readings of the standard version, the party in question was patently well versed in medicine and knew Constantine's works very well. Given the early date of the revision, the Cassinese monk Joannes Medicus, usually identified with Johannes Afflacius, would be a strong candidate.[146] Born sometime between 1055 and 1070 and dying in or after 1114, he was Constantine's pupil and a translator himself of Arabic medical texts. Johannes was probably one of the compilers of the *Practica*.[147] Stylistic analyses of works and writers associated with Constantine, including Johannes, would shed more light on the matter. Given the attested use of the *Theorica* and Constantine's other works within the medical school of Salerno from the first half of the twelfth century onwards,[148] the redactor, if not Johannes, was almost certainly someone who worked within the school or affiliated circles.[149]

It is more fruitful to consider the redactor's editorial aims than seek to identify this party. It may seem intriguing that the redactor should have engaged so meticulously with the *Theorica*, to which the comprehensive revision of the syntax and the interpolations are testimony, while at the same time not imposing any substantial changes to the terminology or content. The focus was the text's format. Many syntactic features of Version 2 are such that they render the text simpler for a reader to receive, and even more so for a listener. The new version of the *Theorica* was perhaps intended for use in the classroom. The abundant use of conjunctions and particles in Version 2 seems 'over-supplied' on occasion. In oral delivery and in a classroom context, however, frequent conjunctions and particles would have benefitted reception, which they do by clarifying the relations between various terms and sentences and by slowing down the pace of argumentation. For example, the very frequent use of *aut* ('or') in Version 2 alerts the reader or listener to lists or to the introduction of several alternatives. It also helps the auditor to arrange different aspects of a phenomenon into separate and countable units, which can assist when taking

these passages did indeed originate in the *Kitāb al-malakī*, with or without intermediaries. This could only be solved by recourse to critical editions of the *Kitāb al-malakī* and the *Articella* texts, and by their collation. I wish to express my gratitude to Monica Green for suggesting such a different origin for the interpolations. For the *Articella* collection, see Wallis 2011, 177–9 and n. 12, with literature. For the early commentaries on the *Articella*, see Jordan 1987.

145 Green 1994, 151–2 (on the possible compiler of the *Practica*).

146 Article C, 30–32; Article A, 313–14.

147 This was suggested already by Rose 1905, 1060, 1064; Creutz 1930, 310–13; and Schipperges 1964, 36–7; see also Wack 1987, 340–41; Wack 1994, 173; Green 1994, 125 and n. 16, 150–51; Veit 2003a, 285–7; Veit 2006, 149–51; Veit 2007, 458–60.

148 Jordan 1987, 137–44; Kwakkel and Newton 2019, 140; Article C, 3 n. 4; 37.

149 Article C, 30–32.

notes.[150] Also the interpolations in Version 2, which are often repetitious, would likewise have benefitted reception in a classroom context. *Theorica*'s Version 2 was a simplified and supplemented text, possibly designed for educational purposes. Such adaptation of medical texts for practical or pedagogical needs occasionally took place and sometimes resulted in the appearance of a 'new' text.[151]

It is significant that the revision of the *Theorica* was made around the same time that Stephen of Antioch put together his own translation of the *Kitāb al-malakī*, the *Regalis dispositio*, in 1127. These two undertakings demonstrate the significance of the *Pantegni* and the state of flux the text was in in the first half of the twelfth century. Interventions to complete the *Practica* of the *Pantegni* may also have already taken place.[152] The revised version is important evidence for the *Theorica*'s early reception: it indicates that an anonymous author felt the need to adapt the text – and felt free to do so – to meet altered expectations and the practical needs of the text's users. This study demonstrates that the desire for a simpler grammar and style was sufficient reason to undertake this large-scale yet fine-grained textual revision, even if the content and the appearance of the text remained much the same.

Version 3: the combined version(s)

As stated above, *Theorica*'s Version 2 did not gain any broad transmission as such. Many of its readings, especially the new, interpolated passages, made their way, however, into a subsequent branch of the transmission. Thirteenth- and fourteenth-century manuscripts carrying these readings to a greater or lesser extent represent Version 3 – or several versions subsequent to Version 2. The manuscripts show signs of cross-contamination between Versions 1 and 2, as well as the emergence of new variant readings.

Version 3 is found in MSS Frankfurt am Main, Stadt- und Universitätsbibliothek, Praed. 78 (s. xiii, Italy); Gloucester, Cathedral Library, 17 (s. xiii^2, England); and Vatican City, Biblioteca Apostolica Vaticana, Vat. lat. 2456 (s. xiii). They adopt some of the interpolations found in Version 2, the number of which varies from book to book and manuscript to manuscript. MSS Frankfurt and Vatican City contain these passages also in the last four books of the *Theorica*, that is, Books VII to X. MS Vat. Lat. 2456 contains several passages, in Book IX in particular, that are otherwise found only in the margins of MS Helsinki.[153] This makes MSS Frankfurt and Vatican City even more important as witnesses: they demonstrate that interpolations made to Books VII to X also passed into

150 Article C, 19–20, 30.

151 Wack 1987, 333–4; Ferre and Veit 2009, 330; Article C, 28–9.

152 Green 1994, 148–51; 2017; 2018a; Veit 2003a, 286; 2006, 149; Ventura 2018.

153 Article A, 302, and Table 2 (319). Collations from the *Regalis dispositio* indicate that, as with most others, these interpolations also have their origin in the Arabic text (Article A, 309–12).

later transmission, even though interpolations in the former half of the *Theorica* were more successful.[154]

Three more manuscripts, all now in Paris, convey Version 3: MSS BnF, lat. 6885 (s. xiv[1]); lat. 16180 (s. xiii); and nouv. acq. lat. 1485 (s. xiv). They are notably very consistent with each other with regard to Version 2's additional materials: while certain passages in Books II[155] to VI are included, all the added passages for Books VII to X are omitted. Significantly, the Lyon edition corresponds closely to the three Parisian manuscripts in this respect.[156] The evidence collected so far indicates that passages adding substance were adopted from Version 2, whereas repetitive or ambiguous material was omitted. As to the second aspect of the revision, namely, that pertaining to style and grammatical construction, the current evidence is less consistent. An entire, largely untouched chapter may follow the revised version in syntax and expression, whereas another chapter, even in the same witness, may adhere to the style of the standard version.[157]

On the basis of sample collations, six more manuscripts could potentially represent Version(s) 3. They show affinities with the above-mentioned manuscripts and with each other. These are Berlin, Staatsbibliothek zu Berlin – Preussischer Kulturbesitz, MSS Lat. 280 (s. xiv) and Lat. 618 (s. xiii); London, BL, MSS Sloane 3098 (s. xiv) and 3481 (s. xiii); Oxford, Merton College, MS 231 (s. xiv); and Paris, Bibliothèque de l'Arsenal, MS 750 (s. xiv).[158] Further collations would be needed to confirm this observation definitively. Likewise, more comprehensive collation of witnesses representing Version 1, i.e. the standard version of the *Theorica*, could potentially reveal more manuscripts incorporating occasional readings from Version 2. In that case, they ought to be labelled as representing Version 3 rather than Version 1.

The impact of Version 2 on subsequent transmission, including the Lyon edition, is clearly visible in Charles Burnett's edition of *Theor*. IV.19 *De spiritibus*, 'On the spirits'. The chapter deals with medical spirits arising in the liver, heart, and in the ventricles of the brain, and administering the different faculties (*virtutes*) in the body. Burnett's edition relies on manuscripts representing two major branches of transmission.[159] His first branch is modelled by four manuscripts representing the standard version (my Version 1), as well as by the Basel edition. His second branch is represented by three above-mentioned manuscripts conveying my Version 3 – London Sloane 3481; Paris lat. 6885 and Paris nouv. acq. lat. 1485 – and the Lyon edition. Burnett described the style of his second branch as a 'revised [. . .] more flowing and "open" style of Latin',

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154 See Article A, 300, 302, and Table 2 (319); Article C, 9.

155 Book I was not collated, as MS Helsinki is missing that book; see above, 38 n. 127.

156 Article A, 302–4, and Table 2 (319).

157 See Article C, 5 n. 14 (for the Lyon edition).

158 Article A, 303.

159 Burnett 1994, 113–17.

noting, for example, 'perfect passive participles [. . .] changed into finite verbs'.[160] This resonates strongly with the style that can be discerned in manuscripts of my Version 2.[161] I collated the same chapter, IV.19, from MSS Basel, Paris lat. 7042, and Rome Alessandrina. The result confirmed that the differences in Burnett's second branch against the standard version appear to a large extent already in those three twelfth-century manuscripts.[162]

However, Burnett's second branch is not identical with my Version 2. His second branch, i.e. my Version 3, sometimes prefers the word-choice of Version 1, a matter which corroborates my observations on the merging traditions.[163] Version 3 also cuts down the abundant use of *autem* and *vero*, the 'signature feature' of Version 2. Sometimes Version 3 abandons readings of both Versions 1 and 2 in favour of new ones: for example, *rugato vermi spiritus eum transilit*, 'as the worm [i.e. a worm-like corpuscule in the brain] shrinks, the spirit may jump over it' (Burnett's first branch/my Version 1), reads *rugatur vermis et ita spiritus transit* in my Version 2, and *rugatur vermis spiritus ut transierit*, in Burnett's second branch/my Version 3.[164]

Besides new variant readings, certain manuscripts representing Version 3 include material extracted from another work, not yet present in Version 2. Burnett pointed out a long passage from the *pseudo*-Galenic work *De spermate*, which his second branch inserts in *Theor*. IV.19. The sources in question were MSS London Sloane 3481; Paris lat. 6885 and Paris nouv. acq. lat. 1485; and the Lyon edition.[165] I checked the above-mentioned, third Parisian manuscript, lat. 16180; the same passage also occurs there, emphasizing concordance between the three Parisians and with the Lyon edition. Of the three, MS lat. 16180 is the oldest, dating perhaps from the thirteenth century (the same applies to MS Sloane 3481). The other two Parisian manuscripts are from the fourteenth century. In theory, the insertion from the *De spermate* could have been made at any time up to the thirteenth century.[166] The manuscript evidence hints, however, that the passage from *De spermate* was not incorporated before the thirteenth century, which also seems to be the time when Versions 1 and 2 began to merge into Version(s) 3. So far, my collations have not revealed other quotations of similar character that would have been incorporated

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160 Burnett 1994, 106; see also Article A, 303; Article C, 7–8.

161 For a detailed analysis of the style in Version 2, see Article C. See also Article A, 301–2.

162 Article C, 7–8. The collation of *Theor*. IV.19 was conducted from MS Basel, fols. 52v–53v; MS Paris lat. 7042, fols. 36r–36v; and MS Rome Alessandrina, fols. 55rb–55vb.

163 For example, ***vadens*** [*spiritualis spiritus*] *per arterias ad tocius corporis membra* (Burnett's first and second branch/my Versions 1 and 3), as against ***et vadit*** [*spiritualis spiritus*] *per arterias ad totius corporis menbra* (my Version 2); *per nervos* ***tendens*** [*spiritus animalis*] *ad membra tocius corporis* (Burnett's first and second branch/my Versions 1 and 3), as against *ad menbra totius corporis per nervos* [*spiritus animalis*] ***protenditur*** (my Version 2).

164 For more examples of Version 3's combining of readings and introduction of new ones, see Article C, 8 n. 27.

165 Burnett 1994; see also Article C, 8.

166 See Burnett 1994, 106–7.

into *Theorica*'s text at that late point in time. Systematic collation has the potential to reveal more such passages in the future, however.

It seems also that the Lyon edition introduced new variant readings, for sometimes its text deviates from all the collated manuscript witnesses, also from the three Parisians (lat. 6885, lat. 16180, and nouv. acq. lat. 1485). For example, *Theor*. V.4: *Si ergo tempora suas complexiones seruauerint naturales, priuatas generant*[167] ***infirmitates*** (Versions 0, 1, 2, and 3) / ***superfluitates*** (the Lyon edition).[168] It must be emphasized that in general, the Lyon edition's disagreements with the standard version (and the Basel edition) may be shown to be present in the manuscripts and do not belong to the editor, Andreas Turinus de Piscia.[169] The present study demonstrates that a large proportion of the discrepant readings have their origin in the twelfth-century revision;[170] yet, some of the variance is down to the combined version(s), or Version(s) 3, from the thirteenth to fourteenth centuries.

Version 3 embodies the twelfth-century revision's later transmission. It also witnesses the *Theorica*'s transformation, as the best parts of the revision were merged into the standard version and complemented with new readings. The manuscripts representing Version 3 would require separate study and more systematic collation, in order to appreciate the text's later developments with more confidence and in greater detail. The present study already demonstrates that the Lyon edition was based on one or several manuscripts that offered a more eclectic, 'mixed' text in terms of the transmission. The exemplar from which the Lyon edition was printed patently represented the same branch of transmission as the three Parisian manuscripts, lat. 6885, lat. 16180, and nouv. acq. lat. 1485.

Suggestions for future editing of the *Theorica*

It is a major deficiency that there is still no comprehensive, critical edition of the *Pantegni, Theorica*. Any attempt to produce one must wrestle with the *Pantegni*'s complex textual traditions, the great length of the work, and the very large number of extant manuscripts.

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167 Version 3 and the Lyon edition read *generabunt* instead of *generant*.

168 'Therefore, if the seasons follow their own natural complexions, they will cause particular **illnesses/ superfluities** [of humours in the body]'. See also the edition of *Theor*. IV.9–10 (Appendix), in which the Lyon text reads *Memoria format* ***intus*** *posita* [9.4] as against *Memoria format (in)* ***intellectu(m)*** *posita* in all the other collated witnesses.

169 Cf. Jordan 1994, who attributes the readings of the Lyon edition largely to the fifteenth-century editor (p. 289): '[The Lyon edition] . . . betray[s] systematic stylistic correction. Word order is adjusted; coordinating conjunctions are inserted; techical terms are altered and conversational repetitions eliminated.' On the other hand, Jordan notes (ibid., 290 and n. 14), that the Lyon edition corresponds 'quite closely' to some fourteenth-century manuscripts, mentioning MSS Paris lat. 6885 and nouv. acq. lat. 1485.

170 Of the three twelfth-century manuscripts containing the revised version, MS Paris lat. 7042 seems to be closest to the Lyon edition; see the edition of *Theor*. V.34 in Article C, 14–18.

One of the aims of the present study is to pave the way for modern, critical editions of the *Theorica*. Below I will make some suggestions as to how such an edition could be executed and on how to discriminate between the manuscripts.

It is evident that an edition cannot embrace all the surviving *Theorica* witnesses: even if most of the manuscripts could be eliminated at an early stage of work, it would still be 'an immense labour to collate even a dozen copies of the *Pantegni*', as Mark Jordan observed in 1994.[171] Discussing the reasonable, or possible, pre-conditions for an edition of the *Theorica*, he pointed to the limits of traditional stemmatology, particularly in relation to medieval texts extant in a large number of copies. He concluded that it is probably impossible ever to create a stemma for manuscripts of the *Theorica*. On the other hand, Jordan argued that full collations would also be unnecessary: while textual variants may help in sorting manuscripts, they are rarely significant in themselves. Jordan questioned the benefit of immense collations, even more so as it would be unclear what kind of a textual form would result from it. His advice was to undertake 'a reading edition' of the *Theorica*, based on six early manuscripts 'broadly representative of medieval readings'. These six manuscripts were Basel; Cambridge; Erfurt 184; The Hague; Hildesheim; and London Add. 22719. Five of them represent Version 1 as defined in this study, while MS Basel represents Version 2. We shall return to this selection below.

I agree with Jordan that the edition should display variation by transmission rather than to strive for a 'pure' original text, free of errors and later interventions. The limits of traditional stemmatology and of the genealogical method, which aims to reconstruct one 'original' authorial text, are profound, as has been pointed out in numerous discussions.[172] It was not unusual to copy from unpolished exemplars, and authorial texts might also include mistakes, phenomena which undermine traditional text-critical approaches. Furthermore, several authorial versions could exist. In manuscript cultures, writers might release the same work on different occasions, providing them with opportunities in between to tinker with their text. Another impediment to the application of traditional text-critical tools is contamination: a copyist could rely on multiple exemplars. This results in mixed textual traditions, which the genealogical method cannot effectively tackle. Finally, attentive copyists were able to amend errors found in their exemplars. All these aspects apply to the transmission of the *Theorica*. Version 0 of Book V is a draft. The Hague manuscript derives from Constantine's circle and can be said therefore to present his authorial voice; even so, it is neither a complete text nor free of errors. The redactor responsible for Version 2 corrected the infelicities of Version 1. At subsequent steps of the transmission, copyists resorted to various versions, resulting in textual hybrids.

Problems relating to the study and editing of lengthy works that have survived in a great number of copies can be addressed with computer-assisted stemmatological tools. Computational tools, when employed alongside and refined by the traditional methods

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171 Jordan 1994, 296–8, 301–2.

172 See Chiesa 2020, 82–5, to mention but one recent example.

of textual scholarship, such as palaeography, codicology, and philology, can help in the perception of the relationships between manuscripts that could otherwise go unobserved. They may also benefit attempts to reconstruct missing links between the survivors of a textual tradition. Contamination remains a problem but computer-assisted methods can alleviate it.[173] In 2009, a trial was commissioned on the *Theorica*'s textual tradition, applying the Compression-based method known as RHM, developed by Teemu Roos, Tuomas Heikkilä, and Petri Myllymäki. The tool generates a tree of witnesses, based on the degree of difference between them. The tree differs from a traditional stemma in that it is non-directional; in other words, it does not aim to suggest the direction in which copying proceeded from one manuscript to other.[174] An extract of around 460 to 490 words from *Theor*. V.12 *De diversitate exercitiorum*, 'On the different types of excercise', was transcribed from eight manuscripts and the Basel edition for the analysis. The selection included five manuscripts I had already examined to some extent; the remaining three manuscripts were new to me at that point.[175] The results corroborate my observations prior to the trial and also more recent ones on the transmission. They also helped me group the three manuscripts that I had not examined in detail.

Another promising approach that could be applied to *Pantegni*'s textual tradition is the Coherence-Based Genealogical Method, CBGM. Developed for, and exploited mostly by, New Testament scholars, the approach is designed to tackle heavily contaminated traditions witnessed by a multitude of manuscripts. Instead of striving for a stemma of all witnesses, the text is examined in numerous short passages, from the evidence of which multiple stemmata of more local application are constructed. If the stemmata point in the same direction, the likelihood is that the relationships thereby suggested are valid.[176] As such, CBGM could help to assess the status of various manuscripts of the *Pantegni* and their readings and, ultimately, locate the most promising manuscripts for fuller collation.

Returning to Mark Jordan's selection of six manuscripts for editing, the suggestion presents some problems in light of the present study. If the selected manuscripts were to be limited to such early copies from the eleventh century to the first half of the twelfth, our sources would not yield access to Version 0, preserved in MSS Helsinki and Paris lat. 6886. What is more, an edition based entirely on early manuscripts would perforce be silent about many subsequent, important textual developments, such as the combining of readings from Versions 1 and 2, a process that was carried all the way down to the Lyon edition. On the other hand, it is very difficult to display the different versions and

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173 For computer-assisted methods and tools, their advantages and shortcomings, as well as their application in practice, see, e.g., Roos and Heikkilä 2009; Heikkilä 2013, 114–26; Heikkilä 2020, 267–72.

174 The trial was carried out by Teemu Roos, to whom I express my warmest gratitude. For the RHM method, see Roos, Heikkilä, and Myllymäki 2006; Roos and Heikkilä 2009.

175 The manuscripts already examined were Basel; Cambridge; The Hague; Helsinki; and London Add. 22719, whereas the new manuscripts were Edinburgh, National Library of Scotland, Adv. 18.2.5; Madrid, Biblioteca Nacional, 1424; and München, Bayerische Staatsbibliothek, Clm 3513.

176 Heikkilä 2020, 270–2, with references.

all the significant features of transformation comprehensively and reasonably in a single editorial text. Considering, for example, Jordan's selection of six manuscripts alone, the inclusion of variant readings from MS Basel (Version 2) would disproportionately inflate and complicate the apparatus; without the Basel manuscript, the apparatus would be a straightforward affair, embracing variant readings related to Version 1 exclusively. Differences between Versions 1 and 2 are more profound; they concern style and expression. Even if an apparatus managed to account for Version 2, it would be a difficult task for readers to capture its contents. It is for this reason that I favour side-by-side editions of different versions in the present study. However, it is difficult to envisage that presentation serving any comprehensive printed edition of the *Theorica*. Choices will need to be made on which version, or versions, are to be favoured for a single editorial text.

First, in consideration of Version 0, it might be said that although MSS Helsinki and Paris lat. 6886 are very important witnesses in that they contain, in Book V, the earliest known textual stage of the *Theorica*, their inclusion in an edition is not absolutely necessary. Half-finished as it is, Version 0 was apparently not meant to enter widespread circulation, and it never did. The value of MSS Helsinki and Paris lat. 6886 is the light they shine on Constantine's translation processes and methods, as well as his use of the *Kitāb al-malakī* and other sources. These aspects have been discussed especially in Article B. In an edition, however, to include variant readings from these two manuscripts would overload the apparatus, especially because the text of MS Helsinki in particular contains many errors. Its Scribe 1 did not always understand what he or she was copying (or else relied on a bad exemplar, or perhaps one written in Beneventan script, with its unusual and sometimes difficult letter-forms).

While it is true in the main that MSS Helsinki and Paris need not be included in an edition, for Book V there is a stronger case to be made for their involvement. In case only Book V is edited – which I plan to do in the future – It would be important to demonstrate which passages were absent from Version 0 and incorporated into Constantine's final version, Version 1. The agreement of MSS Helsinki and Paris against other witnesses as regards their omissions and individual readings testifies to the earliest textual stage of Book V. Their mutual disagreements represent inadvertent omissions or misreadings (true especially of MS Helsinki). It should not be forgotten that MS Helsinki, with its insertions, is also an important witness to Version 2.

Perhaps the simplest and most persuasive choice would be to edit *Theorica*'s standard version, i.e. Version 1. However, this should be done with attention paid to the caveats that relate to the reconstruction of 'original' authorial texts in general (see above), and to the formation and different authorial versions of the *Theorica* in particular. The most natural choice of base text for such an edition would be The Hague mansucript. The codex emerged from Constantine's immediate milieu in Monte Cassino, so establishing the edition from that manuscript would anchor the text to its author more firmly than is possible in most cases from the same period. Secondly, the text transmitted in The Hague manuscript remained the standard version throughout the centuries. Thirdly, The

Hague MS is of fine textual quality. While it does bear obvious errors, these are very few. It should also be mentioned that the punctuation is consistent and sound, a veritable asset for textual scholars. Variant readings could be collected from select representatives of Version 1. As the present study has shown, the text of London, Add. 22719 is very close to The Hague MS (see Article C, for the edition of *Theor*. V.34, and Appendix, for the edition of *Theor*. IV.9–10). For that reason, a full collation of MS London is unlikely to be helpful in reconstructing the text's early transformation. Based on my sample collations, the same applies to MS Hildesheim. MS Cambridge is perhaps a more interesting witness, with its careful corrections above the lines. The text deviates from The Hague MS more than MS London does.[177] As to MS Erfurt 184, also included in Jordan's list of significant witnesses, this preserves an early stage of the *Theorica*'s prologue,[178] while elsewhere its text is less interesting. MS Paris lat. 6887 may be the second oldest *Theorica* manuscript to survive; it is datable to the early twelfth century and comes from Italy.[179] These are credentials deserving of an editor's attention.

Version 2 manifests early, active reception. Its text embodies practical needs among the *Pantegni*'s readers; a more approachable text was made. Reporting readings in the apparatus from Version 2 would be problematic, as noted above. The fact that Version 2 did not gain a firm foothold could speak against its inclusion in an edition, especially if one is to eliminate witnesses. Version 2 could, therefore, be subject to a separate, more limited textual examination, focusing, for example, on stylistic and grammatical aspects purposed in texts aimed at pedagogical use (as in Article C in the present study). Therein, comparisons of *Theorica*'s Versions 1 and 2 with each other and with other texts would be fruitful. It must be reiterated that the differences between Versions 1 and 2 are not in syntax alone; Version 2 carries interpolations, deriving, it would appear, from a re-reading of the Arabic text. It would be important to include at least these passages in any edition: they evidence some very practical concerns that *Pantegni*'s readers had in the first half of the twelfth century. An edition would, then, also benefit studies in which comparisons are made between the *Theorica* and its Arabic original, and between the different versions of the latter.

There is a strong argument that Version 3 should be included in the edition, to demonstrate subsequent engagement with *Theorica*'s text. Version 3 is a reworking of Version 1, seasoned with readings picked and merged from Version 2, as well as with new readings. A manuscript, or manuscripts, representing Version 3 should be included as a 'bridge' to the Lyon edition, which represents the apotheosis of the combined textual tradition. The three Parisian manuscripts, BnF, lat. 6885, 16180, and nouv. acq. lat. 1485, are

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177 Article C, 10–12.

178 Kwakkel and Newton 2019, 171–83; Article B, 161–2.

179 For MS Paris lat. 6887, see Kwakkel and Newton 2019, 105–8, 160; see also Jacquart 1994a, 83–9 (parts of the *Theorica*'s prologue transcribed from MS Paris lat. 6887); Burnett 1994, 113–15 (edition of *Theor*. IV.19, with variant readings from MS Paris lat. 6887, among others); and the handlist entry in Burnett and Jacquart 1994, 347.

very close textually to the Lyon edition; they represent Version 3 in the specimen edition of Book IV.9–10 in the present study (see Appendix). MSS Vat. Lat. 2456 and Frankfurt are interesting as representing, it would seem, an early stage in the process of merging various traditions.[180] A problem related to the editing of Version 3 is that it is bound to Version 2. The inclusion of readings from Version 3 without citing the same from Version 2 would cause confusion, since Version 3 also contains new readings not attested in Version 2. If Version 2 were skipped, it would not be possible to distinguish which readings go back to Version 2 and which have a later origin, namely, in Version 3.

The inescapable conclusion is that all four versions have individual value. Unless we aim for an edition of Book V alone, or for editing Version 1 of the whole *Theorica*, the remaining option would be a reading edition broadly representative of the text's transformation throughout the centuries. In order to keep the collation of manuscripts within reasonable limits, one to three manuscripts representing each version should be selected. On the basis of my results, the best manuscripts would be as follows. For Version 0, MSS Helsinki E.ö.II.14 and Paris lat. 6886; for Version 1, MSS The Hague 73 J 6, Cambridge, Trinity College, R. 14. 34, and Paris lat. 6887; for Version 2, MSS Basel D.III.17, Paris lat. 7042, and Rome Alessandrina 171; and for Version 3, MSS Paris lat. 16180; Frankfurt am Main Praed. 78; and Vatican City Vat. lat. 2456. In addition, the Basel and the Lyon editions would be included. Quoting Mark Jordan's pessimistic but realistic words, 'if we are to have an edition in my lifetime',[181] it would be wise to let go of the aim of editing the entirety of *Theorica* at once, and instead to concentrate on editing single books. In that way, the labour could be divided between several scholars or, preferably, teams of scholars. I would not necessarily find it inappropriate if different books were edited from different sets of manuscripts, according to what seemed to be the best solution for each individual book, on the basis of additional examination.

SUMMARY

Constantine the African's *Pantegni* played a central role in disseminating ancient Greek medicine, as developed by Arab scholars, to Latin Europe, a movement that began in the late eleventh century. The main output of the present study is that it identifies and discusses crucial stages in the textual history of the *Pantegni, Theorica.* What began with the text's formation on Constantine's desk was changed in transmission down to its sixteenth-century editions. Firstly, I have identified an *Ur*-version of Book V, shedding light on Constantine's translation process and methods. He probably started his massive undertaking from the fifth book of the *Kitāb al-malakī*, for its topic, the 'six non-natural

180 The assessment of other Version 3 manuscripts is currently difficult because the *recensio* still largely waits to be done.

181 Jordan 1994, 302.

things', was a trending concept in Constantine's circle and would have demanded treatment in Latin. Passages absent from the *Ur*-version and later incorporated into Constantine's final version – which became the text's standard version – indicate gradual processing with recourse to sources in addition to the *Kitāb al-malakī*. Passages that were left pending, as well as the use of additional sources in the finishing stage of the *Theorica*, suggest that Constantine did not have these sources to hand when he started translating the *Theorica*, probably already in Salerno. He would have consulted these sources later in Monte Cassino. Evidence of the monastic pedagogical tradition and perhaps assistance by Cassinese monks is detectable in Constantine's final version. A case in point is the citation from Lucan, not found in the *Ur*-version.

Secondly, I have identified an early, non-authored recension of the *Theorica*. Probably soon after Constantine's death, in the first half of the twelfth century at the latest, an anonymous redactor engaged meticulously with the *Theorica*, resulting in a new version with a large-scale stylistic revision of the Latin syntax and with interpolations taken, it would seem, directly from the original Arabic text. The fact that someone went to the effort of rephrasing and recollating Constantine's *magnum opus*, without modifying the content or terminology, indicates that the motive for revision lay in the text's format. Compared with the standard version, the revision's expression is more verbose throughout, with compressed grammatical constructions made lighter and discourse connectives inserted to clarify syntactical relations. The features of the revision are such that they render the text easier to comprehend, especially for a listener. The revision was probably intended for classroom use.

As for the interpolations, the redactor's aim was clearly to bring Constantine's *Theorica* closer to the *Kitāb al-malakī*. Stephen of Antioch had criticized Constantine for having abbreviated and altered Haly's work too liberally, and he made a new, literal translation in 1127, known as the *Regalis dispositio*. Stephen's critique may have motivated the anonymous redactor of the *Theorica* to add materials that Constantine had left out of his translation. The close correspondence of the interpolations with the original Arabic, in terms of both content and their placement in the text, suggests that they were picked and translated directly from the *Kitāb al-malakī*. (While it is also possible that the passages could have come from the *Regalis dispositio*, there are so few verbal reminiscences in the Latin that this seems less likely.) As for the substance, the interpolations are usually repetitive and redundant. They often change Constantine's considered, compact expression back to what is found in the original Arabic text. The aim of such revising may again have been to benefit oral delivery and use in the classroom.

Thirdly, I have demonstrated the combining and editing of readings from different versions in a later branch of the transmission. On the basis of the manuscript evidence, the twelfth-century revision did not gain any broad transmission as such. Its influence was more piecemeal: many individual readings from the revision made their way into later manuscripts. This phenomenon is evidence for active engagement with the *Theorica*'s text in the thirteenth and possibly still in the fourteenth century, with copyists compar-

ing different manuscripts and choosing preferred readings. The evidence, not exhaustive, shows that substantive additions were received later in the transmission, whereas repetitive passages were in general not transmitted. As for the reception of the new syntactic and stylistic features, the evidence so far collected indicates that they were not similarly merged in the later transmission in the way that the interpolations were, except for some particular chapters. The combined versions also introduce new readings, another testimony to continuous, lively scholarly interest in the work. The final instance of the twelfth-century revision's transmission is the Lyon edition (1515), in which the merging of readings from earlier versions is visible to a varying degree from book to book and chapter to chapter.

Another aim of this study is to pave the way for a modern, critical edition of the *Theorica*. The present study cannot, naturally, solve all the dilemmas that will present themselves to the editor. Above all, the immense undertaking of collating ten or so manuscripts of such a lengthy work remains to be done. The present study offers some tools to help decide the parameters of how the *Theorica* should be edited. The main question that an editor must answer first is what are the benefits and drawbacks of her or his approach. I hope that my results can help in the selection of manuscripts for collation. Some light has also been shed on the *Kitāb al-malakī*'s textual history, its different versions, and which version(s) Constantine, Stephen, or the later redactor of the *Theorica* used when engaging with Haly Abbas's work. My study promotes stylistic analyses of works associated with Constantine, which, in turn, can help in attributing different texts to Constantine or other authors in his circle. Finally, it is to be hoped that my study will stimulate subsequent work on the first comprehensive Latin textbook of medicine, the *Pantegni* of Constantine the African.

APPENDIX: CRITICAL EDITION OF *THEOR*. IV.9–10

A critical edition of *Theor*. IV.9–10, *De virtute animata* and *De virtute sensum operante*, 'On the animal virtue' and 'On the virtue operating sense', is given below. The chapters relate to the concept of the different spirits and virtues that control the processes of life, the topic of *Theorica*'s Book IV.[1] The animal virtue is located in the brain and has three types, each of which control different functions: the mind (divided into imagination, memory, and reason), voluntary motion, and senses. Chapter 9 deals with the functioning of mind, Chapter 10 with voluntary motion and senses.

Three variant texts, i.e. Versions 1, 2, and 3, are given in parallel columns. Version 0 is reported in the apparatus for Version 1. The parallel editions illustrate the differences between versions and demonstrate the evolution of the text from its earliest stages in the last quarter of the eleventh century to the sixteenth-century printed editions.

The two chapters from Book IV were selected for editing firstly because in these chapters, Version 2 deviates in a marked way from Version 1. It has to be noted that differences between the two versions in other books or chapters are not always so numerous. (For textual variation in a different chapter, see Article C, pp. 14–18, with an edition of *Theor*. V.34 *De somno et vigiliis*, from Versions 1 and 2.) The two chapters in question are also of a suitable extent to be edited within the compass of the present study, and, what is more, they seem originally to have been one, as discussed below, and have a discrete thematic unity.

The relations between the versions

As to Version 0 and its differences in relation to Version 1, I have examined the matter systematically for Book V exclusively (see Article B). However, features in the witnesses of Version 0, MS Helsinki in particular, suggest a preliminary status for the chapters of Book IV edited here. These features include certain choices of words and mistakes not found in Version 1. For example, for *prora cerebri*, 'the front of the brain', Version 0 only has *prora*, whereas Version 1 (and 2 and 3) adds the clarifying word *cerebri* [10.2]. MS Helsinki also reads *necessaria uel propria*, 'essential or specific [to humans]' [9.2], suggesting that the final choice between the two words had not yet been made; in Version 1 (and 2 and 3), the choice is made for *propria*.[2] Another explanation is, naturally, that this instance belongs to reception: a copyist or reader could have considered *necessaria* preferable to *propria* for some reason and added it to the exemplar, after which the copyist of MS Helsinki (or of its ancestor) conjectured both options. In addition, MS Helsinki does

1 See Burnett 1994.

2 It is also of interest that MS Paris lat. 16180 (P_4), representing Version 3, originally read *necessaria uel propria*. The reading is corrected to *propria*, however.

not start a new chapter at IV.10 *De virtute sensum operante*, but instead the text of Chapter 9 continues without a pause. This also may indicate a preliminary stage of the text: the chapter in question was divided into two only at a later stage.[3] However, the above-mentioned caveat as to *propria* and *necessaria* applies here *mutatis mutandis*.

Versions 1 and 2 disagree with each other in almost every sentence. A frequent type of disgression is Version 2's tendency to add discourse connectives and particles, such as *autem, enim, ergo, quoque, sed, vero, id est, scilicet*, and relative pronouns and clauses. Another 'signature feature' of Version 2, i.e. the *aut–aut* construction,[4] is included in our edited section as well [10.1]. A gerundive construction is changed to a subordinate clause, and a participial construction is replaced with a finite verb [9.4]. Many features of Version 2 that are observed and analysed in connection with *Theor*. V.34 *De somno et vigiliis* (see Article C) can also be observed in the edited chapters below. As in Book V, in these chapters too the aim of the revision is to clarify the syntactical relations of the sentences and to make Constantine's train of thought as lucid as possible. In my opinion, the redactor succeeded in this: Version 2 conveys the complicated concept of *virtus animata/animalis* in a clearer way than does Version 1.

It has been argued above that Version 3 combines readings from both the standard and the revised version, Versions 1 and 2 respectively, to a varying degree from book to book and chapter to chapter.[5] In the chapters edited below, Version 3 – including the Lyon edition – follows mainly Version 1, but it adopts individual readings from Version 2. These include one additional passage (see below) and a few conjunctions and particles aiming at clarification (*quod*, 9.1; *scilicet*, 9.2). The combining of two versions is clearly visible in a passage in which the result is an obvious error, namely, a corrupted text with an overlap [9.4]: *Memoria format intellectu posita custodiens ea, sicque uirtus illa, qui format in intellectu posita et custodit, donec ad actum ducat.* The passage is emended in the Lyon edition. It omits the words deriving from Version 2 in the middle of the sentence, conveying rather what is found in Version 1 (*Memoria format intus posita custodiens ea, donec ad actum ducat*, 'Memory forms the things placed inside [the brain or reason] and preserves them, until it puts them into action').

In the edited chapters, there are two additional passages in Version 2 that are missing from Version 1 [9.3, 10.5]. The first is about the location of imagination (*fantasia/imaginatio*) and reason (*intellectus/ratio*) in the brain. Version 1 mentions the location of imagination alone, this being *ventriculi in **puppi** cerebri* ('ventricles in the **back** of the brain'). Version 2 adds a statement that the imagination is located in *ventriculis **prore** cerebri* ('ventricles in the **front** of the brain') and that it is the location of *intellectus* that is in *ventriculis puppis cerebri* (the additional passage in Version 2 is highlighted in boldface):

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3 It is interesting that MS Basel, representing Version 2, is similar to MS Helsinki in that it does not start a new chapter here either.

4 See Article C, 19–20.

5 See above, 43–6; Article A, 302–4; Article C, 5 and n. 14; 8 n. 27.

locus imaginationis uentriculi sunt ***prorę cerebri, locus uero intellectus siue rationis sunt uentriculi, qui sunt*** *in puppi cerebri* [9.3]. As the words *ventriculi* and *sunt* occur twice, the additional passage in Version 2 would seem only to emend an unintended omission, probably an eyeskip. None of the collated witnesses of Version 1, including The Hague MS, prepared in Constantine's workshop, includes the passage on the location of *intellectus*, however. The earliest manuscripts pointing out the location of *intellectus* are Paris, Basel, and Rome, representing Version 2, as well as MS Helsinki (the passage is added to the margin by Scribe 2). As to Version 3, it also adopts the additional passage from Version 2. This goes hand in hand with what is said above, that Version 3 adopts those readings from Version 2 that clearly improve the text.[6]

The second addition in Version 2 relates to the sense of touch, the last on the list of the five senses. Each sense is connected with one or two of the elements, i.e. fire, air, water, and earth. Being of earthly nature, the sense of touch is the least subtle of the five senses. Version 2 adds a passage *et eius sensus totus est in terrestribus* ('and the sense [of touch] is entirely in earthly matters') [10.5]. The passage is somewhat ambiguous, meaning perhaps that the sense of touch is connected with one element alone, i.e. earth, and not with two elements as the sense of smell (i.e. earth and water). Another possible interpretation is that the sense of touch operates in sensing 'earthly qualities alone', like 'hard and soft, gentle and rough, and warmth and coldness' (*sicut durorum et mollium sensus, lenium et asperorum, caloris quoque et frigoris*). The passage comes out as a stray remark and its meaning is ambiguous.[7] Version 3 does not include the passage, although it adopts the other addition from Version 2, *in puppi/prore cerebri* (mentioned above). Version 3 was selective in its engagement with Version 2.

Manuscripts collated

For Version 0, the two witnesses, MSS Helsinki (He) and Paris lat. 6886 (P_2) were collated.[8] For Version 1, the same representatives were selected as in the edition of *Theor*. V.34

6 See above, 44, 46; and Article A, 303–4. A comparison with Stephen of Antioch's *Regalis dispositio* indicates that Version 2 is indeed closer to the original Arabic text than Version 1. Even Version 2 does not fully correspond with Stephen's literal translation, however. In the *Regalis dispositio*, the location of imagination (*phantasia* in the *Regalis dispositio*) is *prore cerebri*, as in Version 2 of the *Theorica*. The location of *intellectus* (*cogitatio* in the *Regalis dispositio*) is *medium cerebri* however, and not *puppis*; the latter is said to be the location of *memoria*, which *Theorica* does not mention at all in this connection (*memoria* is, however, mentioned at the beginning of the chapter); see *Regalis dispositio* (Lyon, 1523), fol. 47vb, from the fourth line from the bottom. (For the locations of these same faculties of sensation in the brain in William of Conches and William of Saint-Thierry, see Jacquart 2011, 98–100.)

7 The same passage in the *Regalis dispositio* (Lyon, 1523, fol. 48ra, lines 7–9): *Omnibus spissior tactus est sensus, qui et terre comparatur, eiusque sensus terra, ipsiusque accidentia durum scilicet et molle, calor et frigus*. For the ambiguous passage in the *Theorica*, *et eius sensus totus est in terrestribus*, the correspondent in the *Regalis dispositio* is *eiusque sensus terra*, which seems equally ambiguous to me.

8 Codicological information on the Helsinki manuscript can be found in the present study above, 22–3.

in Article C; these are The Hague (Ha); Cambridge (C); London Add. 22719 (L); and the Basel edition (*ba*). For Version 2, all known three witnesses were collated, namely, MSS Basel (B); Paris lat. 7042 (P); and Rome Alessandrina (R). The witnesses of both Versions 1 and 2 and their relations inside each version are discussed in Article C.[9]

Version 3 is represented by MSS Paris, lat. 16180 (P_4); lat. 6885 (P_1); and nouv. acq. lat. 1485 (P_5). These were chosen because they are relatively consistent with each other and with the Lyon edition (*lu*). In other words, the selection of manuscripts reflects the transmission that culminated in the Lyon edition.[10] The three manuscripts also adopt more readings from Version 2 than, for example, do MSS Frankfurt and Gloucester. P_4 appears to be the oldest of the three Parisians, dating back perhaps to the thirteenth century.[11] It includes the *Theorica* and Books I and II of the *Practica*. To my knowledge, P_4 – along with MS London Sloane 3481 – is the earliest manuscript containing the long quotation from the pseudo-Galenic work *De spermate*.[12] P_1, from the fourteenth century, includes the full *Pantegni* with ten books for both the *Theorica* and *Practica*. P_5, likewise from the fourteenth century, carries the *Theorica*. It also includes Ioannes de Sancto Amando's *Super antidotarium Nicolai,* and the *Antidotarium* itself.

For relationships between $P_1P_4P_5$*lu*, it suffices to state the following. P_1 is the least original in its readings, agreeing always with at least one other witness. P_4 stands alone against all the other witnesses on seven occasions. P_5 is the most original: it repositions words idiosyncratically and commits mistakes of which the other collated witnesses are free. *Lu* sometimes deviates from all its three manuscript companions, introducing new readings. Only one of these changes amounts to a genuine improvement: *lu* amends the above-mentioned overlapping passage that amalgamates readings from Versions 1 and 2. The Lyon text omits the reading of Version 2 while retaining that of Version 1.

Guidelines to the edition

Version 1 is given from Ha in the left-hand column, with variant readings supplied from C, L, and *ba*. Variant readings are also given from He and P_2, representing Version 0. In cases where He and P_2 agree, siglum α is used in the apparatus. Version 2 is given from B in the middle column, with variant readings from P and R. Version 3 is given from P_4 in the right-hand column, with variant readings from P_1, P_5 and *lu*. In each case,

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For MS Paris lat. 6886, see Article A, 307–8 and nn. 42, 45; Article B, 162–4 and passim.

9 Article C, 10–13. Note that for *Theor*. V.34, the Lyon text is collated with Version 2, whereas for *Theor*. IV.9–10 below, it is collated with Version 3.

10 See above, 44–6; also Article A, 302–3; Article B, 198–9.

11 For the three Parisian manuscripts, I use the datings of the manuscript catalogue in Burnett and Jacquart 1994, 327, 346, 349. All the three manuscripts are available online via Bibliothèque nationale de France's websites.

12 See Burnett 1994; also above, 45.

the orthography of the base text has been followed. Obvious errors have been corrected with recourse to the other witnesses; such interventions are indicated in the apparatus. Differences in word order are noted, whereas orthographical variation goes unrecorded. For punctuation and capital letters indicating new sentences, the practice of Ha has been the guide. On occasion, I have slightly modified these to improve the flow, at least in the eyes of a modern reader. For Versions 2 and 3, such modification has been more frequent. Section numbers have been added to facilitate navigation and to provide for referencing.

The principal differences in Version 2 compared to Version 1 are highlighted in **boldface**. Version 3 mainly follows Version 1. The new readings in Version 3 are indicated in *italics*. The portions where Version 3 follows Version 2 instead of Version 1, are highlighted in **boldface**.

Version 1 (+ Version 0)	Version 2	Version 3
The Hague, 73 J 6 (Ha), fol. 24r Cambridge, Trinity College, R.14.34 (C), fol. 39r–v London, BL, Add. 22719 (L), fols. 45v–46r The Basel edition (*ba*), pp. 91–2 Version 0 (the agreement of both representatives is marked by siglum α): Helsinki, National Library, E.ö.II.14 (He), fol. 45r–v Paris, BnF, lat. 6886 (P_2), fol. 24rb–vb	Basel, D.III.17 (B), fols. 49r–50r Paris, BnF, lat. 7042 (P), fols. 34v–35r Rome, Alessandrina, 171 (R), fols. 52r–53r	Paris, BnF, lat. 16180 (P_4), fols. 29vb–30ra Paris, BnF, lat. 6885 (P_1), fol. 23v Paris, BnF, nouv. acq. lat. 1485 (P_5), fol. 22v The Lyon edition (*lu*), fols. 16vb–17ra
VIIII De uirtute animata[1]	De uirtute animata[1]	IX De virtute animata
[1] Virtutis animalis habitationem et fundamentum constat esse cerebrum. Est autem trium generum. Vnum per se solum explet cerebrum. Duo neruis tamen[2] mediantibus	[1] Virtutis animalis fundamentum et habitatio **est cerebrum**, **et est** trium generum. **Quorum est** unum **quod** solum per se explet cerebrum. Duo **uero**[2] **sunt que** mediantibus	[1] Virtutis animalis[1] habitationem et fundamentum constat esse cerebrum. Est autem trium generum. Vnum **quod**[2] per se solum explet cerebrum, duo[3] tamen neruis mediantibus
1 *om.* CL 2 tamen nervis α	1 De uirtute animata P] *om.* BR 2 uero *om.* P	1 animalis] animata uel animalis P_5 2 quid P_5 3 duo $P_{4p.c.}P_5$] duobus $P_1P_{4a.c.}$ *lu*

ab eodem conficiuntur. Quod a solo cerebro efficitur, ordinatio est[3], quę[4] in tria diuiditur: fantasiam, rationem et[5] memoriam. Sensus et motus uoluntarius neruis conficiuntur mediantibus. Nos primitus[6] dicemus de uirtute ordinationem[7] faciente.

[2] Hæ tres uirtutes[8], fantasia[9], ratio et memoria, mens uocantur, quibus[10] ab[11] irrationalibus[12] differimus animalibus, et maxime intellectu, quia[13] alie duæ ex intellectu[14] prodeunt. Homini hec fuere propria[15], quem omnibus animalibus digniorem esse constat.

neruis **faciunt**[3] **idem cerebrum**. Quod **per se facit**[4], ordinatio est, que in tria diuiditur, **id est** fantasiam[5], rationem et memoriam. **Que uero** conficiuntur neruis mediantibus, **sunt**[6] sensus et uoluntarius motus. **Sed** nos **prius** dicemus de uirtute ordinationem faciente.

[2] Hę tres, **inquam**, uirtutes, fantasia, memoria et ratio **scilicet**, mens uocantur, **et per hec**[7] ab inrationabilibus **homo differt** animalibus, et maxime **ex**[8] intellectu. Alie **enim** due ex intellectu **processere**. Homini propria hec fuere, **quia** omnibus animalibus digniorem **palam est**[9] esse.

ab *eo*[4] conficiuntur[5]. Quod a solo cerebro efficitur[6], ordinatio est, que in tria diuiditur, *scilicet in* fantasiam, rationem et memoriam. Sensus et uoluntarius motus[7] mediantibus neruis[8] conficiuntur. Nos **prius** dicemus de uirtute ordinationem faciente.

[2] Hee tres uirtutes, **scilicet** fantasia, ratio et memoria, mens uocatur, quibus ab irrationabilibus[9] differimus animalibus, et maxime intellectu, *quibus* alie due ex intellectu prodeunt[10]. Homini hec fuere propria[11], *quoniam* omnibus animalibus digniorem esse constat.

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3 ordinatio est] ordinatione αC

4 quia α

5 et *supra lineam add.* C

6 prius $C_{a.c.}$L

7 odationem $C_{a.c.}$

8 uirtutes tres α

9 fantasia ... uocantur] fantasia, mens et memoria, ratio uocatur He

10 quia P_2

11 ab] et L *supra lineam* C

12 irrationalibus HaP_2] irrationabilibus HeCL*ba*

13 que α

14 intellectu] ipso α

15 propria] necessaria uel propria He

---

3 facit P

4 facit PR] *om.* B

5 fantasiam PR] fansasiam B

6 sunt R] *om.* BP

7 hec PR] hoc B

8 ab P

9 eum *add.* R

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4 eodem P_5

5 conficiuntur P_1P_5] conficitur P_4*lu* III *supra lineam add.* P_4

6 conficiuntur P_5

7 motus uoluntarius P_1P_5*lu*

8 neruis mediantibus P_1P_5*lu*

9 irratiolibus P_5

10 prodeunt P_1P_5*lu*] *om.* P_4

11 propria] necessaria uel propria $P_{4a.c.}$

Animal enim irrationale[16] quicquid agit naturaliter facit[17], et sine discretione ulla.

[3] Vnumquodque trium in cerebro locum habet proprium[18], ubi sedent[19] et unde[20] exeunt. Locus enim ymaginationis[21] uentriculi sunt[22] in puppi cerebri. In quibus est spiritus animatus, qui has actiones exequitur.

[4] Harum unaqueque propriam habet actionem. Virtus enim ymaginationis[23] quod[24] format[25] et imaginatur mittit[26] intellectui[27]. Intellectus iudex et

Animal enim irrationale[10] quicquid agit naturaliter facit, et **non discretione administrante**.

[3] Vnumquodque **uero**[11] trium a cerebro **operatorum in eodem** proprium habet[12] locum **et** ubi sedent et unde[13] exeunt; **quia** locus imaginationis uentriculi sunt **prorę cerebri, locus**[14] **uero intellectus siue rationis sunt uentriculi, qui sunt** in pupi[15] cerebri. In quibus est spiritus animatus, qui has actiones exequitur.

[4] **Quarum** unaquęque propriam habet actionem. Virtus imaginationis quod[16] format et immaginatur mittit intellectui, **et** intellectus iudex et

Animal enim irrationale quicquid agit naturaliter facit[12], et sine discretione ulla.

[3] Vnumquodque trium in cerebro locum habet proprium,[13] ubi sedent et unde exeunt. Locus enim ymaginationis ventriculi[14] **in prora est cerebri**. **Locus uero intellectus siue rationis uentriculi sunt** *puppis* cerebri. In quibus est spiritus animatus, qui has actiones *consequitur*.

[4] Harum unaqueque propriam actionem habet[15]. Virtus enim ymaginationis *est qui*[16] format et *post*[17] imaginatur, *et* mittit *ad intellectum*. Intellectus iudex est et

16 irrationabile C
17 facit] agit L
18 proprium *om*. *ba*
19 sedet *ba*
20 et unde] et $C_{a.c.}$ unde et $C_{p.c.}$
21 quę *add*. P_2
22 prore cerebri, locus uero intellectus siue rationis sunt uentriculi q[ui] sunt *add*. *in margine* He
23 imaginationes $C_{p.c.}$
24 que α
25 formatur He
26 et *add*. α
27 intellectum *ba*

10 rationale $P_{a.c.}$
11 uero] horum P
12 habet $B_{p.c.}$] habent $B_{a.c.}$PR
13 inde R
14 locus ... in pupi cerebri *om*. P
15 pipi $B_{a.c.}$
16 quod PR] qui B

12 facit] agit P_5
13 proprium *om*. P_1
14 uentriculi *om*. *lu*
15 propriam habet actionem P_1*lu* proprias habet actiones P_5
16 que P_5
17 post *om*. P_1P_5*lu*

discretor est rerum, quas[28] ab imaginatione realiter siue solo intellectu suscipit. Ad operanda manualia[29] spiritus animatus illa petit[30] menbra, quę operi[31] sunt habilia, ut motum expleant[32] uoluntarium. Quę in[33] solo sunt intellectu, memorię tantum mandantur. Memoria format[34] in intellectu[35] posita custodiens[36] ea, donec ad actum[37] ducat[38].

X De uirtute sensum operante[39]

[1] Virtutes sensibiles[40] et motum uoluntarium[41], [42]prout diximus, cerebrum

28 rerum, quas] rei, quam α
29 manualia] in anualia $C_{a.c.}$
30 illa petit] ille aperit α
31 opera $C_{a.c.}$
32 explent $L_{a.c.}$
33 in *supra lineam* C
34 forma L
35 in intellectu CL] intellectu Ha*ba* intellectum α
36 custodiens] ad custodiendum α
37 actum] altum He
38 ducat] uoluntarium *ba*
39 *novum capitulum non incipit* He
40 sensiles P_2
41 uoluntarium motum C
42 facientes *add.* P_2

discretor est rerum, ab immaginatione **operatione**, siue solo intellectu **susceptarum**. **Si autem est de operatione manuali**, spiritus animatus **ad membrum**[17] **procedit eidem aptata operi**, ut **scilicet** uoluntarium[18] expleant motum[19]. **Si quid**[20] in solo est intellectu, memorie tantum mandatur. Memoria **est uirtus illa**, **que**[21] format in intellectu[22] posita **et custodit**, **quousque**[23] ad actum ducat.

De uirtute sensum operante[24]

[1] **Dixisse nos**[25] **meminimus**, **quia** uirtutes sensibiles et uoluntarium motum cerebrum

17 membra PR
18 uoluntarium PR] uoluptarium B
19 motum PR] motu B
20 Si quid] Sique PR
21 que R] qui BP
22 in intellectu PR] intellectum B
23 quousque PR] quoad usque B
24 *novum capitulum non incipt* B
25 superius *add.* R

discretor rerum, quas ab ymaginatione *rationabiliter* siue[18] solo intellectu suscipit. Ad operanda manualia spiritus animatus illa petit menbra, que *operari* sunt habilia, ut motum expleant[19] uoluntarium. Que in solo intellectu sunt, *et* memorie *commendantur*. Memoria format intellectu[20] posita custodiens ea, *sicque*[21] **uirtus illa, qui** format in intellectu posita **et custodit**, donec ad actum ducat[22].

X De uirtute sensum operante[23]

[1] Virtutes sensibiles et uoluntarium motum[24] [25]cerebrum

18 siue *om.* P_5
19 impleant P_5
20 intellectu] intus *lu*
21 sicque ... et custodit *om. lu*
22 ducas *lu*
23 sensum operante] sensibili *lu*
24 motum uoluntarium *lu*
25 facientes *add.* $P_{5a.c.}$

facit neruis mediantibus. Qui[43] eorum instrumenta esse[44] comprobantur[45], cum spiritus animatus a uentriculis cerebri ad menbra per neruos exeat. Vnde intelligitur, quia si neruus incidatur, sensus et[46] uoluntarius motus[47] menbro[48], cuius erat, auferantur. Solus sensus uel motus uoluntarius[49] sicut nerui fuerat uirtus.

[2] In tractatu neruorum diximus a prora cerebri[50] egredi neruos facientes sensus, ut mollitiem sentiant facilius. Quibus motus efficitur uoluntarius, a puppi egrediuntur, ne[51] propter motum[52] facile rumpantur. De sensibus et uoluntario motu satis iam[53] diximus. Non ergo

facit neruis mediantibus. Et[26] qui eorum **sunt** instrumenta, **quia** spiritus animatus exit a uentriculis cerebri per neruos ad menbra. Vnde **manifestatur**, quia si **quis** neruus[27] incidatur, **et** sensus et[28] uoluntarius motus **ei**, cuius erat, aufertur. **Aut** solus sensus **aut solus** uoluntarius motus sicut nerui **est** uirtus.

[2] In tractatu **autem** neruorum diximus a prora cerebri **procedere** neruos facientes sensum[29], ut molliciem facilius **sentirent**. **Voluntarium motum facientes** a puppi **sunt procedentes**[30], ne **ex motu** facile rumpentur. De sensibus et uoluntario motu satis diximus. Non ergo

facit, prout diximus, mediantibus neruis, qui *earum* instrumenta esse comprobantur, cum spiritus *animalis* a uentriculis cerebri[26] ad menbra per neruos exeat. Vnde intelligitur, quia[27] si neruus incidatur, sensus et uoluntarius motus menbro, cuius erat, auferuntur. Solus *enim* sensus uel motus uoluntarius *est*[28] sicut nerui uirtus fuerat.

[2] In tractatu neruorum diximus a prora cerebri neruos *progredi* facientes sensus, ut molliciem facilius sentiant. Quibus uoluntarius motus efficitur, a puppi *cerebri* egrediuntur[29], ne propter motum facile rumpantur. De sensibus et uoluntario motu[30] satis[31] diximus. Non ergo

43 quibus α quod L
44 esse] etiam P_2
45 probantur $C_{a.c.}$
46 et] uel $C_{a.c.}$
47 uoluntarius motus αCL*ba*] motus *om*. Ha
48 menbro *om*. C
49 uoluntarius motus C
50 cerebri *om*. α
51 nec He
52 motum *supra lineam* C
53 iam satis C

26 et *om*. PR
27 neruus PR] neruis B
28 et *om*. R
29 facientes sensum] facientes sensus R uoluntarium motum facientes sensus P
30 procedentes sunt P

26 cerebri *om*. *lu*
27 quod P_1
28 est] sunt P_1P_5*lu*
29 progrediuntur P_5
30 motu uoluntario P_1P_5*lu*
31 satis *om*. P_5

repetendum[54], ne legentibus faciamus fastidium[55]. Tantummodo tamen[56] hoc dicetur[57], quomodo operentur[58].

[3] Virtutes sensuum quinque sunt: uisus, auditus, gustus, odoratus, et tactus. Virtus[59] uisus subtilior est aliis omnibus[60], quippe cum eius natura sit ignea. Ignis autem tres qualitates habet[61], flammam, ruborem[62] et[63] splendorem. Oculi solum splendorem de igni[64] habent. Lumen ergo et rubores[65] quę sentiunt, diei erunt[66] solum, unde colores discernunt[67].

repetendum[31], ne legentibus **generet** fastidium. **Sed** hoc **tantum** dicetur, quomodo operentur.

[3] Virtutes **ergo** sensuum sunt .v.: uisus **scilicet** et[32] auditus[33], gustus, odoratus, et tactus[34]. **Sed** uirtus uisus subtilior est omnibus; **est enim** ignea eius natura. Ignis autem tres qualitates habet[35], **id est** flammam, ruborem **atque** splendorem. **Sed** oculi solum splendorem habent de igne. **Quod** ergo sentiunt, lumen et **splendor**[36] diei est solum, **per que** colores discernuntur[37].

repetendum est, ne legentibus fastidium faciamus. Tantummodo *hic* dicetur, quomodo operentur.

[3] Virtutes sensuum .v. sunt: uisus, auditus, gustus[32], odoratus, et[33] tactus[34]. Virtus uisus est subtilior[35] omnibus aliis, quippe cum eius natura[36] sit ignea. Ignis autem tres qualitates habet, *scilicet* flammam, ruborem et splendorem. Oculi solum de igne splendorem[37] habent. Lumen ergo et *colores* que sentiunt, diei erunt solum, unde colores discernuntur.

54 est *add.* αCL
55 fastidium faciamus α
56 tamen *om.* αCL*ba*
57 diceretur *ba*
58 operientur $C_{a.c.}$
59 Virtus *om.* P_2
60 aliis omnibus HaLP_2] omnibus aliis C*ba* aliis humoribus He
61 habet α$C_{a.c.}$L] habeat $C_{p.c.}$Ha*ba*
62 rurborem $He_{a.c.}$
63 et *om.* α
64 igne αCL*ba*
65 ruborem α
66 erunt] erit C extra *ba*
67 discernuntur C

31 repetendum PR] repetentus B
32 et *om.* P
33 auditus PR] tactus B
34 et tactus PR] auditus B
35 qualitates habet BR] habet naturas P
36 splendor R] splendor est B splendorem P
37 discernunt PR

32 gustus] tactus P_5
33 et *om.* P_5
34 tactus] gustus P_5
35 subtilior est P_5
36 natura eius P_5
37 splendorem de igne P_5

[4] Post uisum maior subtilitas[68] sequitur auditum[69]. Cuius sensus est aereus[70] et percussi[71] aeris sonitus, quod[72] uox est[73] esse intelligitur. Vox enim nichil est aliud quam aeris tactus[74]. Post auditum maior[75] subtilitas sequitur odoratum, cum eius[76] natura sit fumea. Fumus uero[77] inter[78] terrestria et aquosa se[79] habet[80].

[5] Post odoratum subtilior est gustus[81]. Cuius natura aquosa est[82], ad quem[83] omnes pertinent liquores. Tactus crossior est omnibus, quia natura sua est terrena[84], utpote habenda

68 sublimitas P_2

69 auditu *ba*

70 aereus HaP_2] aeris CHe aerius L*ba*

71 percussio α

72 qui C

73 est *om.* αCL*ba*

74 tractus $C_{a.c.}$

75 maior *om.* α

76 enim He

77 uero] quid $C_{a.c.}$

78 inter *om.* He

79 se habet. Post odoratum] habet pectus. Odoratus α

80 habet $C_{a.c.}$L] habeat α$C_{p.c.}$Ha*ba*

81 gustus est C

82 est aquosa He

83 quę He

84 terrena est *ba*

[4] Post uisum maior subtilitas sequitur auditum. Cuius sensus est aeris, et **quod percussionis in aere habetur**, quod uox esse[38] intelligitur. Vox enim nichil est aliud quam aeris tactus. Post auditum maior subtilitas sequitur odoratum. **Cuius est** natura fumea, **fumi quoque natura** inter terrestria se habet et aquosa.

[5] Post odoratum subtilior est gustus. **Eius enim** natura est[39] aquosa, et[40] ad **hunc** omnes pertinent liquores. **Sensus tactuali** grossior est **aliis**.

38 esse PR] est B

39 est natura R

40 et PR] *om.* B

[4] Post uisum maior subtilitas sequitur auditum. Cuius sensus est aerius[38] et percussi aeris sonitus, *qui* uox esse intelligitur. Vox enim nichil aliud est quam aeris tactus[39]. Post auditum maior subtilitas sequitur odoratum, cum natura eius[40] sit fumea. Fumus uero[41] inter terrestria et aquosa se habet.

[5] Post odoratum subtilior est gustus. Cuius natura est aquosa, ad quem omnes pertinent liquores. Tactus crossior est omnibus, quia natura sua terrena[42] est, utpote habenda[43]

38 Cuius sensus est aerius (aarius P_5 aereus *lu*) P_1P_5*lu*] Cum eius natura sit fumea $P_{4a.c.}$ Cum eius sit sensus aerius $P_{4p.c.}$

39 tractus P_5

40 natura eius] eius natura P_1*lu* enim natura P_5

41 odoratum *add.* $P_{5a.c.}$

42 terrea P_5

43 habenda] habenda est $P_{4a.c.}$ humida *lu*

in duris et mollibus, asperis et lenibus, calidis et frigidis.

Eius enim natura est **terrestris, et eius sensus totus est in terrestribus, sicut durorum et mollium sensus, lenium**[41] **et asperorum**[42]**, caloris quoque**[43] **et frigoris.**

in duris et mollibus, asperis et lenibus, calidis et frigidis.

[6] Horum singula sic sua explent officia[85], [86]ut mutent[87] et aptent se in naturas rerum, quas sentiunt. Quas cum tandem mens sentiat, intellectui preparat.

[6] **Vnde quisque** horum[44] sic suum explet officium, ut mutet et aptet se in naturam **rei sense**. **Quam mutationem** tandem sentit mens. **Que**[45] **quod sentit**, preparat[46] intellectui.

[6] Horum singula sua sic *implent* officia, ut mutent et aptent[44] se in naturas rerum, quas sentiunt. Quas cum tandem mens sentiat, intellectui preparat.

85 explent sic sua officia α

86 ubi *add.* He

87 mutentur α

41 quoque *add.* P

42 asperorum] molporum P

43 quoque] etiam P

44 Vnde quisque horum $B_{p.c.}$] Vnde quisque quorum $B_{a.c.}$R Vnusquisque istorum P

45 que PR] quas B

46 perarat P

44 et aptent *om. lu*

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