STUDIES IN CHURCH HISTORY

SUBSIDIA 3

THE WORLD OF JOHN OF SALISBURY

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THE CONTENTS AND AFFILIATION OF THE SCIENTIFIC MANUSCRIPTS WRITTEN AT, OR BROUGHT TO, CHARTRES IN THE TIME OF JOHN OF SALISBURY

by CHARLES BURNETT

IN the debate over the state of cathedral schools and their displacement as centres of learning by the rising universities, the case of Chartres has, for nearly a century, excited the most attention.[1] Much has been written on, first, whether the activity of several prominent intellectuals of the twelfth century such as Thierry, William of Conches and Gilbert of Poitiers was primarily at Chartres or at Paris; and, secondly, whether the thought of 'Chartrian' masters is old-fashioned or open to the profound changes which effected twelfth-century scientific learning. These changes resulted largely from the introduction of works translated from Greek and Arabic during that century. In this paper I try to clarify the situation at Chartres itself by summing up the evidence from the manuscripts known to have been in the cathedral library in the twelfth century[2] of the degree to which this 'new science' was received there, and how it was assimilated.

As is well known, most of the manuscripts at Chartres were utterly destroyed during the last war, and few photographs survive. However, one relevant manuscript had been brought to Paris in 1793, where it is now Lat. 10257 in the Bibliothèque Nationale.[3] The *Heptateuchon*—that is, the collection of fundamental texts for teaching the seven liberal arts, selected by Thierry of Chartres and deposited in the cathedral library some time before his death in 1151—can be read in microfilm.[4] Of the

[1] Since Clerval's study, important recent articles are those of Schipperges, Southern, Dronke, and Häring (for full titles and expansions of abbreviations see Bibliography). I am grateful to Mr Peter Dronke, Dr Gillian Evans, Dr Margareta Fredborg and Dr Margaret Gibson for helpful comments on this paper. Dr Evans has kindly allowed me to consult in advance her article on 'The Uncompleted *Heptateuchon* of Thierry of Chartres' in the *History of Universities* 3 (1983).

[2] Manuscripts from other libraries extant in Chartres in the twelfth century (such as that of S. Père) yield no further information relevant to our subject.

[3] Delisle (vol 2, p 11) gives a list of the manuscripts brought from Paris to Chartres in 1793.

[4] See Jeauneau. I am grateful to Professor Jan Pinborg and Dr Margareta Fredborg of the Institut du Moyen-Age Grec et Latin at Copenhagen for permission to consult their microfilm of the *Heptateuchon*.

four other manuscripts that concern us–nos 160, 171, 213 and 214–I rely entirely on descriptions by those scholars who examined these manuscripts before they were destroyed. It is possible that some photographs exist, and also that some fragments of the manuscripts themselves might be discovered amongst the preserved but unsorted debris left from the destruction of the collection. This would facilitate our research. Nevertheless, most of the contents of the manuscripts can be identified from the printed descriptions and from comparisons with affiliated manuscripts. My reconstructions of the destroyed scientific manuscripts and descriptions of the extant ones follow this article.

In the field of medicine, as Wickersheimer has pointed out, Chartres possessed a larger number of manuscripts written before 1100 AD than any other centre in France outside Paris. There is little doubt that Chartres's importance as a medical centre waned in the twelfth century and this is reflected by the chronological distribution of the manuscripts: whereas there were at least five medical manuscripts at Chartres, written in the ninth century, five in the tenth, and four in the eleventh,[5] only two were written in the twelfth. However, these two are not without interest. At the turn of the eleventh and twelfth centuries an important change in the texts used for teaching medicine was inaugurated. During the eleventh century a number of translators working in Italy–of whom Constantine of Africa and Alfanus of Salerno were the chief–had been translating for the first time, or providing new translations of, Arabic and Greek medical works. Out of these translations a group of five works was brought together towards the end of the century, to form the corpus for introductory courses in medicine. This corpus consisted of the *Isagoge* of Johannicius (that is, the *Introduction to Galen's Ars Parva*, by Ḥunain ibn Ishāq), Hippocrates's *Aphorisms* and *Prognostics*, Theophilus's *Liber de Urinis* and Philaretus's *Liber de Pulsibus*. Another eleventh-century translation–Galen's *Ars Parva* (or *Microtegni*)–appears with these five works for the first time in manuscripts of the second half of the twelfth century, and the whole collection was to become known, in the Renaissance, as the *Articella*. Several sets of commentaries to the *Articella* are known, and the earliest

[5] These numbers are based on Wickersheimer's list and include Paris BN 9332 (Oribasius) taken to Paris in 1793. Paris BN 10233, another manuscript of Oribasius belonging to the 1793 hoard, is of the eighth century, but is interesting in that there are marginal notes in Arabic written in the maghrebī script (made at Chartres?). For medicine at Chartres see MacKinney (1937 and 1957).

sets, as one might expect, do not include a commentary on Galen's *Ars Parva*.[6]

Of the two twelfth-century Chartrian medical manuscripts, one, no 160, is a MS of the *Articella*, and the other, no 171, consists of a set of commentaries to the *Articella*. It is interesting to note that the Chartrian *Articella* does *not* include Galen's *Ars Parva*, but adds Constantine's *Pantegni*–a work of similar range–instead.[7] William of Conches, in his *Philosophia Mundi* (written in the second decade of the twelfth century), champions the authority of Constantine and rails against those who have never read him.[8] In addition to using Johannicius's *Isagoge* and referring to Theophilus's *Liber de Urinis*, he quotes extensively from Constantine's *Pantegni*.[9] It appears then, that he used a copy of the *Articella* of the same sort as Chartres 160. Hermann of Carinthia and Bernardus Silvestris, who both dedicated works to Thierry, also knew the *Pantegni* and apparently not Galen's *Ars Parva*.[10] This might suggest that these scholars read a manuscript at Chartres, or that an earlier form of the *Articella*, which included the *Pantegni*, existed in more than one centre.

The commentaries in Chartres 171 are an early set, in that they do not include a commentary to Galen's *Ars Parva*. Two of the commentaries recur in an Erfurt manuscript of the fourteenth century (Amplonian Folio 276), and two of the remaining commentaries are found in a British Library manuscript of the twelfth to thirteenth century (Royal 8.C.IV). The Erfurt and British Library manuscripts also have commentaries to the other texts of the *Articella*, which are clearly of different origins (see Table 1 below). All but one of the Chartres commentaries, however, begin with exactly the same form of *accessus*, consisting of six headings. This can be distinguished from the *accessus* of another set of commentaries which uses seven headings.[11] Kristeller has called the commentaries showing these two forms of *accessus* the 'Chartrian com-

[6] For the early development of the *Articella* see Kristeller and Hall.

[7] MS 160 does not include Hippocrates' *Prognostics*.

[8] *PL* 172.49-50, 'Sunt quidam qui neque Constantini scripta, neque alterius physici umquam legerunt, ex superbia ab aliquo discere indignantes . . . dicunt elementa esse proprietates . . .'

[9] Johannicius, *PL* 172.50 and 172.93; Theophilus, *PL* 172.93; *Pantegni*, *PL* 172.48-9 and *passim* (see Dronke p 124).

[10] Hermann, *De Essentiis*, Naples BN MS VIII.C.50, fols 60v, 71v, 76r *etc.*; Bernardus, *Commentary to Martianus Capella*, ed in part by Jeauneau, p 856.

[11] Since none of these prefaces have been edited I give examples of the two types in Texts 1(a) and (b), and of a third type in Text 1(c) below. See Hall for two photographs of the Digby MS.

mentary' and the 'Digby commentary' respectively. The form of the *accessus*, which does not correspond exactly with any of those classified by Hunt in his 'Introductions to the *Artes* in the Twelfth Century,' might indicate whether the commentaries were composed in Chartres itself or elsewhere.

A wider spectrum is represented by the handful of mathematical (including astrological) manuscripts. Much of the relevant section of the *Heptateuchon* (MS 498, fols 86r-246r), and the first half of MS 214 still represent the older tradition of Boethius's translations and the Roman *agrimensores* ('land surveyors'), which had been revived and enlarged upon by the pope and mathematician, Gerbert of Aurillac at the end of the tenth century.[12] Gerbert was also instrumental in promoting the first translations of Arabic works into Latin, which concerned the use of the astrolabe and other measuring instruments. The translations (perhaps due to a certain Lupitus of Barcelona), and adaptations of the translated works, have been studied by Millás-Vallicrosa, and Chartres 214 is one of the several manuscripts which contain a corpus of these works. The manuscripts which are closest to Chartres 214 in content are a codex of the eleventh to twelfth century included in Corpus Christi College, Oxford, MS 283 (from St. Augustine's, Canterbury), and Avranches MS 235 (twelfth century, from Mont-St-Michel). These three manuscripts are the only known witnesses to the treatise on the astrolabe by Ascelin, bishop of Laon (lived 977-1030)—this work is based on one of the 'Lupitus' translations[13]—but the Oxford manuscript shares with Chartres 214 Ascelin's preface, omitted in the Avranches manuscript. Moreover, the Oxford and Chartres manuscripts also share the same selection of chapters from the *Geometria Incerti Auctoris* (part of the *agrimensores* tradition), and an unparalleled table of alphabets.[14] These two manuscripts are so closely related that it is

[12] This tradition has been investigated most fully by Bubnov, Thulin, Millás, Folkerts and Ullmann, and the subject-matter has been made comprehensible by Dilke; Ullmann (pp 278-9) suggests a plausible line of transmission from Gerbert to Thierry. The works of the *agrimensores* (or *gromatici veteres*) are the main vehicle for the fragments of the Greek-Latin translation of Euclid attributed to Boethius.

[13] See Kunitzsch p 27 and Text 2 below. Millás is inaccurate in his references to the contents of Avranches 235 and Oxford, Corpus Christi College 283. Bubnov did not know the latter.

[14] See Plate I. I am grateful to the Master and Fellows of Corpus Christi College, Oxford, for permission to reproduce the table here. For a compendious list of MSS containing sets of alphabets see Bischoff, pp 120-1. The study of the Hebrew word-list contained in the Oxford MS might yield interesting information. The runes are closest to the 'English' futhark except that the sign for *q* is taken over from the

probable that the additional material in Chartres 214 is missing in the Oxford manuscript merely because of the loss of some quires which has evidently taken place.[15] This additional material is found in Avranches 235 and includes a preface to an astronomical work not found elsewhere, which I edit below (Texts 3(a)). Evidence of an earlier Chartrian exemplar for these manuscripts is provided by the fact that one astronomical chapter included in the Oxford and Avranches manuscripts is the direct source of a poem on the fixed stars depicted on the face of the astrolabe by Fulbert, bishop of Chartres (d 1028).[16]

Associated with the Gerbertian material in both Chartres 214 and Corpus Christi College, Oxford, MS 283 are two translations of astronomical tables. The first is a translation of parts of what were originally two separate sets of astronomical tables, which first appeared in Latin MSS at the beginning of the eleventh century under the title *Preceptum Canonis Ptolomei*.[17] These tables were inaccurate and defective (the tables for planetary motion are missing) and it is not surprising that, when the flood-gates were open to Arabic science in the early twelfth century, an Arabic set of tables–that of al-Khwārizmī–was one of the first works to be translated. The translation of the Khwarizmian tables shows signs of the hands of both Pedro Alfonsi and Adelard of Bath, and was revised by Robert of Ketton and, perhaps, by Hermann of Carinthia.[18] It is these tables that appear in Corpus Christi College 283 and Chartres 214. Moreover both the *Preceptum Canonis* and the Khwarizmian tables also appear in the *Heptateuchon* (Chartres 498). Dr Lipton has compared for

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'Chaldean' alphabet (included in the table), as in the runes in the table of alphabets in Vat.Reg.MS 338 (late tenth century, see Derolez pp 238-40; this MS, in other respects also, is the closest–though still distant–relation to the Chartres and Oxford MSS that I have found). Bischoff, Derolez and Musset do not refer to either of our MSS.

[15] See Table 2.

[16] See Texts 3(b) and (c) and the article by McVaugh.

[17] The earliest manuscript is c1000 AD (British Library, Harley MS 2506), but internal evidence shows that the work had been translated from Greek in the sixth century (I owe this information to Professor David Pingree, who, together with Noel Swerdlow, is editing the *Preceptum Canonis*).

[18] For the complex situation of transmission of the tables see Millás 'Pedro Alfonsi', Neugebauer pp 132-234 and Beaumont pp 145-73. The seven known MSS of the tables are: 1. Bodleian MS Auct.F.1.9 (from Worcester); 2. Chartres MS 214; 3. Chartres MS 498; 4. Paris, Mazarine MS 3642 (apparently a copy of Chartres MS 214); 5. Madrid BN MS 10016 (Robert of Ketton's revision); 6. Corpus Christi College, Oxford, MS 283 (including references to Pedro Alfonsi); 7. London, Lambeth Palace cod 67 (discovered by Beaumont; similar to no 6). Suter used nos 1, 2, 4 and 5 in his edition; Neugebauer added a study of no 6.

me the variants of Chartres 214 with the text in Chartres 498, and it is clear that these two texts are very closely related and differ from the other versions. It is likely that Thierry copied the two sets of tables into his compendium on the liberal arts from a manuscript such as Chartres 214, if not from this very manuscript.

We have a clue as to how the tables might have arrived in Chartres. For Hermann of Carinthia addressed his translation of Ptolemy's *Planisphere* to Thierry in 1141 and, while advertising this work as 'a kind of key to celestial science', he also mentioned several other fundamental astronomical and astrological works, including 'Al-Khwārizmī, whom the Latins have as a result of my efforts.'[19] It is possible that the differences which the two Chartrian manuscripts share against the other manuscripts of the tables are due to Hermann, as Suter suggests.[20]

No evidence in the manuscripts of Chartres of the other works recommended by Hermann has come to light.[21] However, it does seem that, alongside the new tables, the other fundamental Arabic contribution to European mathematics–Euclid's *Elements*, translated by Adelard of Bath–was introduced there at an early date. One of the thirteen Chartrian manuscripts brought to Paris in 1793–now BN 10257–contains a version of the fifteen books of Euclid which Folkerts characterizes as representing the 'mixed text'; that is, a text in which Adelard's translation from Arabic was improved or altered soon after its appearance by being blended with the fragments of the old Greek-Latin translation surviving in the works of the *agrimensores* and the 'geometries' attributed to Boethius.[22] As we have seen, several works which included these Greek-Latin Euclid passages were brought together in the *Heptateuchon*. However, the new Arabic-Latin translation was also represented in Thierry's collection. The ancient pagination of Chartres 498 shows us that a hundred and four folios are missing between folios 140 and 141. Boethius' *De Institutione Musica* is interrupted in the middle of book two on folio 140^{v}. On folio 141^{r-v} there is the end of a work

[19] A note in the text of Hermann's translation of Ptolemy's *Planisphere: Albateni . . . et Alchoarismus quorum hunc quidem opera nostra Latium habet* (see Burnett (1977a) p 106).

[20] Suter p xiii.

[21] These works are: al-Battānī [*Opus Astronomicum*], Abū Maᶜshar, *Maius Introductorium in Astrologiam*, Ptolemy, *Almagest* and *Quadripartitum* and, of course, the *Planisphere* itself.

[22] Folkerts (1971). The other manuscripts which represent one form or other of a mixed text are: 1. Munich, Clm 13021, fols 164^{r}-186^{v}; 2. Munich, Clm 23511, fols 1^{r}-27^{r}; 3. Oxford, Bodleian MS Digby 98, fols 78^{r}-85^{v}; 4. Lüneburg, Ratsbibliothek MS misc. D 4° 48, fols 13^{r}-17^{v} (Folkerts (1971), p 7).

which has been identified as Euclid's *Elements* XIV.8-XV.5, that is, the last part of the Adelard II version of the *Elements*. Furthermore, Folkerts has identified the work on fols 122r-5v as *Elements* VII-IX in the same version.[23] It is possible that at least books VII-XV of this version was once contained in the *Heptateuchon*. The surviving fragments are without Euclid's proofs to his postulates, and are textually very close to the earliest manuscript of Adelard's translation (also without proofs for books seven to fifteen), a twelfth-century manuscript of unknown provenance, now Trinity College, Oxford, MS 47. Gibson has pointed out the similarity of this manuscript to the two manuscripts of the *Heptateuchon* (Chartres 497-8).[24] It consists of a selection from the *vetus logica*, Boethius' *De Institutione Arithmetica* and *De Institutione Musica* and the Adelard I and Adelard II versions of Euclid's *Elements*. Moreover, the manuscript is annotated throughout by an intelligent scholar who knew some Arabic and refers to the opinions of 'Manegold' and of Adelard himself.[25] It is probable that this manuscript and the *Heptateuchon* were written in the same milieu. The formation of Thierry's collection needs further investigation, but, as Table 3 demonstrates, at least four clear-cut sources can be proposed:

1 A manuscript of Latin cosmological works, such as British Library MS, Harley 2506 (c1000 AD).
2 A manuscript of Gerbertian material, including excerpts from the *agrimensores*, such as Vatican MS, Ottob.Lat. 1862 (twelfth century).
3 A manuscript including the Khwarizmian tables, perhaps Chartres MS 214.
4 A manuscript including the *vetus logica*, Boethius' works on arithmetic and music, and Euclid's *Elements*, as represented by Trinity College, Oxford, MS 47.

The final manuscript under consideration–Chartres MS 213–is the

[23] See Clagett, and Cunningham pp 12-33 for the distinction between Adelard's versions I, II and III, and the manuscripts in which they occur (Chartres 498 is not mentioned). I owe my information on Euclid in the *Heptateuchon* to a private communication with Dr Folkerts.

[24] Margaret Gibson kindly pointed out to me this similarity, which she has hinted at in Gibson p 46. A detailed comparison between the two manuscripts is needed.

[25] These annotations (and the less extensive annotations of at least one other scholar) need further investigation. The Arabic notes are translations of the terms *<numerus> pariter par* (Trinity 47, fol 50r): *zaug el zaug* (i.e. زوج زوج) and *pariter impar* (fol 51r): *zaug el fart* (i.e. زوج فرد). 'Manegaldus' (unidentified) and 'Adelardus' are mentioned in a gloss to Boethius, *De Institutione Musica* (fol 87v).

most difficult to analyse, and, in a way, the most tantalizing. No editor has used this manuscript in preparing a text, and the only descriptions we have are those of the cataloguers of the Chartrian collection, and a reference by Haskins who saw the manuscript before it was destroyed.[26] The contents are entirely astrological. One work is immediately identifiable: Alchabitius's *Isagoge in Astrologiam* (that is, al-Qabīṣī's 'Introduction to astrology'), which, according to the explicit in the printed version,[27] was translated by Johannes Hispalensis (John of Seville) in *gumedi secundi 12 anno arabum 530* (that is, 18 March 1135 AD). This is followed in the manuscript by a work beginning *Signorum alia sunt masculini generis, alia sunt feminini*, which apparently does not have any attribution in the manuscript. Two closely-related pseudepigraphic astrological works begin with these same words, and are called the *Iudicia* of Aristotle and the *Iudicia* of Ptolemy respectively.[28] Excerpts from the pseudo-Ptolemaic *Iudicia* are included in one manuscript of the *Experimentarius*, which is associated with the name of Bernardus Silvestris.[29] Given the wider currency of the pseudo-Ptolemaic *Iudicia*, it is possible that this is the work included in the Chartrian manuscript. Moreover, William of Conches, in his *Dragmaticon* (composed c1144 AD) inserts into a section otherwise unaltered from his earlier work, *Philosophia Mundi*, a round condemnation of astrological beliefs, calling them *omnia quasi falsa et nugatoria*, and he describes the doctrines themselves in words reminiscent of the opening passages of pseudo-Ptolemy's *Iudicia*.[30] Admittedly the *Iudicia* occurs in other twelfth-century manuscripts, but one wonders whether the recent appearance

[26] Haskins p 90.

[27] Pr Venice 1482, see also Carmody pp 144–9.

[28] See Burnett (1977b), pp 81–4. The complete list of MSS of ps.-Ptolemy's *Iudicia* is as follows: 1. Paris BN 16208, fols 59^{r}-65^{r}; 2. Wolfenbüttel 3549 I, fols 69-91; 3. London, British Library MS Cotton App. VI, fols 8^{r}-20^{v} (ascribed to Aristotle); 4. Cues 209, fols 1-26; 5. Florence S.Marco 194, fols 87^{v}-95^{v}; 6. Venice, Bibl. Marciana VIII.44, fols 31-45; 7. Vienna 3124, fols 1^{r}-11^{r}; 8. London, British Library, MS Harley 5402 (attributed to 'Alkandrinus'), fols 1^{r}-15^{r}; 9. Leningrad, Acad. XX. Ab-III, fols 173^{r}-180^{v}; 10. Catania, Bibl. Univ. 87, fols 89-101^{v}; 11. Erfurt, Ampl. Folio 395, fols 201^{r}-206^{r}; 12. Erfurt, Ampl. Quarto 374, fols 133^{r}-134^{v} (attributed to Aristotle). Pseudo-Aristotle's work occurs in: 1. London, British Library Add. MS 10362, fols 41^{r}-70^{v}; 2. Paris BN 16208, fols 76^{r}-83^{v}; 3. Oxford, Bodleian MS Digby 38, fols 78^{r}-82^{r}; 4. Madrid BN MS 10009, fols 109^{r}-117^{v} (attributed to Ptolemy). This list is revised, checked and augmented from TK 1504 and Van de Vyver, p 678 n 103.

[29] The *Experimentarius*, together with the preface by 'Bernardinus Silvestris', is found in British Library, Sloane 3554, fols 1^{r}-31^{v}. The opening of pseudo-Ptolemy's *Iudicia* is found on fols 2^{r}-5^{r}.

[30] See Texts 4(a) and (b).

of such a manuscript at Chartres might have prompted William's outburst. Could the following note in the *Experimentarius* manuscript be a rejoinder to William?

> *Nugas* sed subtiles hec arbitror. Quamvis habere et scire non estimo penitus inutile, ut eis alludatur, non fides adhibeatur.[31]

William of Conches' list of authorities in the science of the stars (Texts 5 below) may give some further idea of what works were available to him. Certainly he uses (together with Macrobius) Hyginus and Martianus, two sources also drawn on by Thierry in the *Heptateuchon*.[32]

The last work in Chartres 213–which takes up more than half the manuscript and is described in the catalogue as being composed in 1136–also attests to the topical interest of this astrological codex. Haskins writes that 'there are notes added from 1137 to 1141,' and he cites the mention of the date 1135 on fol 116: *In hoc anno quando erant anni a nativitate Christi MCXXXV in kal. iulii fuit Venus incensa in Cancro.* I have failed to identify the *incipit* given (*Incipit de planetarum coniunctione. Si Saturnus et Iuppiter*), and the circumspect way in which the cataloguers mention the author is perplexing. If a clear attribution was given in the manuscript then it is surprising that Haskins did not mention the author. It seems more likely that the name that the cataloguers pick out–Aben-Eyzor–is mentioned *within* the work rather than in the ascription or the explicit, and is, therefore, an authority used by the author rather than the author himself. The name Aben-Eyzor makes no sense in this form. It is curious, however, that Raymond of Marseilles, who is one of the earliest writers outside Spain to make use of the new Arabic astrological and astronomical translations of the twelfth century,[33] quotes from a certain 'Abenbeisor', who

[31] Sloane 3554, fol 12^{r} (see Burnett (1977b) p 124).

[32] Of the other authorities mentioned, Hipparchus appears, surely, only because he is quoted in Martianus (ed Dick, pp 430, 434 and 357). Nimrod, Aratus (tr. by Caesar Germanicus or Cicero) and Firmicus Maternus are found in several MSS prior to the mid.-twelfth century (for Nimrod, see Haskins pp 336-345 (plus MS added on p xv); for MSS of Aratus see Reeve, pp 508-18; Munich Clm 560 (11th cent.) includes Firmicus Maternus and glosses to Aratus and Gerbertian/*agrimensores* material; Firmicus might have been in the *Heptateuchon*, see p 142 below). Ptolemy would be included either as the supposed author of the *Preceptum Canonis* or as an authority mentioned in William's other sources.

[33] For Raymond of Marseilles see d'Alverny, pp 613-4, Poulle's article in DSB, and Lemay, pp 141-57.

can be identified as the Jewish-Arabic astrologer Sahl ibn Bishr.[34] Amongst Raymond's authorities are also Alchabitius, and both pseudo-Ptolemy's and pseudo-Aristotle's *Iudicia*. Since he was writing his astrological works and revising the tables of Toledo for the meridian of Marseilles in the 1130s and 1140s, the correspondence between Raymond's dates and authorities and the dates mentioned, and the works included, in Chartres 213 becomes all the more intriguing.

Chartres 213, as far as it can be reconstructed, seems to represent the private interest of an amateur (or even professional) astrologer. It is the other manuscripts, and in particular the manuscripts of the *Heptateuchon*, which are likely to be more representative of the general breadth of learning in the cathedral school. As we have seen, Chartres was quick to assimilate the Gerbertian scientific works in the eleventh century. It was responsive to the new trends in medical education at the end of the century, and accepted works giving greater precision to astronomical observation at the beginning of the twelfth. After this, the dynamism of the school dies down and the great bulk of twelfth-century translations pass Chartres by entirely. There is not one twelfth century manuscript of the translations of Gerard of Cremona or Gundissalinus, and very few from later periods.[35]

It is interesting too that there was clearly a reverence for the 'old science' at Chartres, and when new works were received, they were assimilated into the old. Thus, in the *Heptateuchon* and MS 214 the old-fashioned tables of the *Preceptum Canonis* were kept alongside the new tables of al-Khwārizmī; in the *Heptateuchon* the old Greek-Latin fragments of Euclid were preserved, but the new Arabic-Latin translation was put first; the mixed text of Euclid in Paris 10257, as Folkerts has pointed out,[36] assimilated more of the Greek-Latin translation than any other mixed-text version. And a similar desire to accommodate the new to the old can be seen, I think, in the intellectual products of Chartres–

[34] Lemay points out the similarity between Abenbeisor and Aben-Eyzor (p 144, n 1). A similar form for the name of Sahl ibn Bishr occurs in Erfurt, Amplonian Quarto MS 377, fol 1^{v} (the end of an astrological note entitled *Tabula Albumassar subtilissimi*): . . . *ab hiis non multum dissentit Abeneysar iudeus, cognominatus hebraice israhelita, quem in iudiciis . . . de premissis figuravit*. The more usual forms of the name are Chehel, Çael or Archechel (in early translations) and Zael or Zahel (in the majority of translations).

[35] There are manuscripts of medical works from the thirteenth century (no 284), fourteenth century (nos 278, 286, 287, 293, 313, 406) and fifteenth century (no 406). Mathematics and Arabic philosophy do not appear to be present at all in late medieval and renaissance manuscripts at Chartres.

[36] Folkerts (1971), p 19.

for example, in that pupil of Thierry who went to Spain to translate Arabic works for the benefit of the Latin schools, Hermann of Carinthia. In his original work, the *De Essentiis*, Hermann combines to an extraordinary degree the old philosophy of Calcidius, Macrobius, Boethius and Martianus Capella, with the new science of Abū Maᶜshar, Hermes, Ptolemy and al-Battānī, and sees no inconsistency in drawing from the two streams which both issued from the same font of ancient learning.

But if the dynamism of Chartres can be seen to wane from the middle of the twelfth century onwards, then it is in England that the new sciences took root and developed. As we have seen, the closest parallels to some of the scientific manuscripts at Chartres are manuscripts in English centres. The Khwarizmian tables in Corpus Christi College, Oxford, MS 283 have notes referring to Winchester and an English scholar from St Albans;[37] the tables, together with a corpus of Gerbertian material very close to that in Chartres 214, had arrived in St Augustine's, Canterbury sometime before the fourteenth century. Trinity College, Oxford, MS 47 was perhaps written in northern France, but it had arrived in England some time before the early fourteenth century when it was bequeathed to Merton College.[38] Is it possible that such manuscripts reached English centres partly through the close ties between Chartres and Canterbury to which the career of John of Salisbury bears witness?

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[37] See Neugebauer, pp 229-30.
[38] See Gibson, p 46.

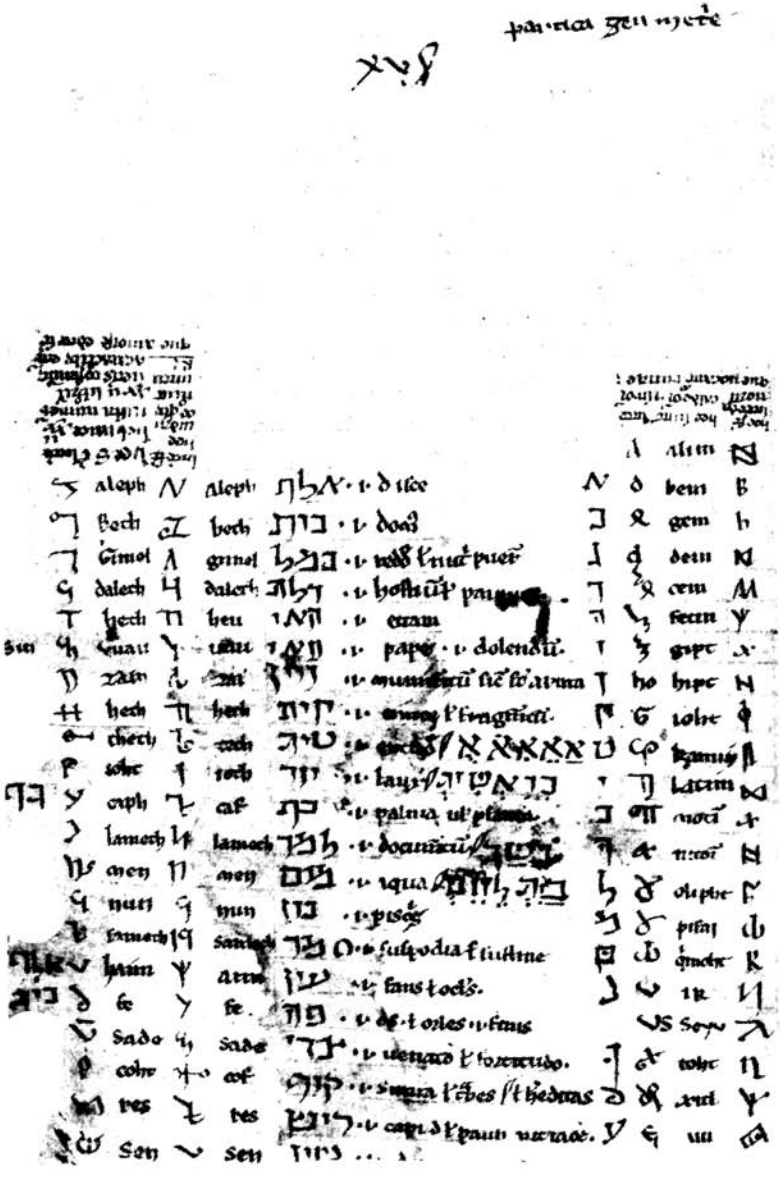

Plate 1: Oxford, Corpus Christi College MS 283, fol 97v.
Table of alphabets (see note 14).
Printed by kind permission of the President and Fellows of Corpus Christi College.

The Manuscripts

The *Catalogue Général des Manuscripts des Bibliothèques Publiques de France: Départements, XI Chartres* (Paris, 1890) has been used as the starting point for the following descriptions.

1 Chartres MS 160.
A manuscript of the twelfth to thirteenth century. Parchment. 209 folios in 2 columns, 358 × 275 mm. Delaporte adds (p 31) that at the head is an initial in blue and red; thereafter small initials in blue and red alternate.

1 fol 1. Ysagoge Johannicii: Medicina dividitur in duas partes . . .
2 fol 9. Aphorismi Hypocratis: Vita brevis, ars vero longa . . .
3 fol 23^{v}. Philaretus, Liber de Pulsibus: Intentionem habemus . . .
4 fol 26. Theophilus, Liber de Urinis: De urinarum differentia negocium . . .
5 fol 34^{v}. Constantini Africani Pantegni prima pars, seu Theorica: (*dedication to Didicus, abbot of Monte Cassino*) Cum totius, pater . . .; (*beginning of work*) Oportet eum qui medicinae vult obtinere . . . The end of book 8 is missing.
6 fol 160 *The Digest, books* 41–43. The end of the last book is missing.

2 Chartres MS 171.
A manuscript of the twelfth century. Parchment. 61 folios. 2 columns. 337 × 252 mm. Initials in colour.

1 fol 1. Commentarii in Ysagogas Iohannicii: Sex requiruntur in principio huius operis, scilicet materia . . .
No other MS.
2 fol 12. Commentarii in Aphorismos: Sex requiruntur in principio huius libri . . .
Erfurt, Amplonian Quarto MS 276, fols 19–36^{v}.
3 fol 41^{v}. Commentarii in Pronostica Ypocratis: Materia Ypocratis in hoc opere sunt signa . . .
London, British Library, Royal 8.C.IV, fols 157^{v}–62^{v}.
4 fol 49^{r}. Commentarii in librum urinarum qui dicitur a voce Theophili: In principio huius operis sex requiruntur, materia . . .
London, British Library, Royal 8.C.IV, fols 163^{r}–165^{v}.
5 fol 59^{r}. Commentarii in librum pulsuum qui est Phylareti: Intentio Philareti est in hoc opere pulsuum . . .

Oxford, MS Bodley 514, fols 54–55^{v}.
Erfurt, Amplonian Folio MS 276, fols 3^{v}-4.

3 Chartres MS 213.
A manuscript of the twelfth century. Parchment. 141 folios. In part written in two columns. 185 × 135 mm.

1 fols 2–13. '*Several notes and tables of astrology; movement and correlation of the stars, etc.*'
Impossible to identify.
2 fol 14. Incipit prologus Alcabizi: Postulata a Domino prolixitate vite.
Alchabitius, *Isagoge in astrologiam* (printed Venice, 1482).
3 fols 38–9. '*Other notes and tables of astrology; auspicious and inauspicious days.*'
Impossible to identify.
4 fol 41. Signorum alia sunt masculini generis, alia sunt feminini.
Pseudo-Ptolemy or Pseudo-Aristotle, *Iudicia* (see note 28 above).
5 fol 63. Incipit de planetarum coniunctione: Si Saturnus et Jupiter . . .', *with astrological tables.*
Perhaps associated with Raymond of Marseilles (see p 135 above).

4 Chartres MS 214.
A manuscript of the twelfth century. Parchment. 103 folios. 2 columns. 260 × 182 mm. Coloured initials.

1 fol 7. Incipit Preceptum Canonis Ptolomei: Intellectus climatum poli sepissime requires . . .; *explicit*: W. finivit et dedit grates.
Edition in preparation by David Pingree and Noel Swerdlow, Brown University.
2 fol 14. *Several alphabets, Hebrew, Greek, Chaldean and* Heae sunt litterae Danaorum quae vocantur rune.
Corpus Christi College, Oxford, MS 283, fol 97^{v}.
See Plate I.
3 fol 14^{v}. De nominibus mensium Egyptiorum et in quibus terminis incipiunt (*two columns*).
4 fol 15^{r}. Liber de scientia vel labore astrolapsus, de arabico in latinum translatus: Quicumque astronomicae disciplinae peritiam et caelestium sperarum . . .

Lupitus(?), *De Utilitatibus Astrolabii*, edited as a work of Gerbert of Aurillac by Bubnov, pp 109-13.

5 (a) fol 21r. De Probanda Profunditate.
From *Geometria Incerti Auctoris*, ed Millás, p 303.

(b) fol 21r. Cuiuslibet quantitatis de ligno aut eramine construe quadratum . . .
An addition to *Geometria Incerti Auctoris*, ed Bubnov, p 365, Millás pp 302-3.

(c) Si per speculum aut per concham . . .
Geometria incerti auctoris, iii.23, ed Bubnov p 333, Millás p 304.

6 fol 21v. Incipiunt sententie astrolabii: Quicumque vult . . .
Ed Millás, pp 275f.

7 fol 32r. Ad altum cum sagitta et filo metiendum: Dum geometricis figuris intenti . . .
Geometria Incerti Auctoris, iii.26, ed Bubnov, p 334.

8 fol 32v. Gerbertus papa Constantino, abbati Miciacensi, Spera, mi frater, de qua queris . . .
Gerbert, *Epistola de Sphaera*, ed Bubnov, pp 24–8.

9 fol 33. Artium septem ultima sede . . .
Preface to a series of astronomical chapters, ed below Text 3(a).

10 fol 34v. Incipiunt figurae excerptae de geometria: Geometricales tractanti diversitates . . .
Excerpts from *Geometria Incerti Auctoris*, book iv prologue, book iii, chapters 18, 2, 8, 1, 16, 17, a chapter beginning *Est etiam alia altitudinis metiendae*, 12, 13, 10, 14, 4, 11, 5, 15, 19, 3, 24, 25 (see Bubnov p 315).
Ed Bubnov, pp 317f.
This order of excerpts follows that in Corpus Christi College, Oxford, MS 283 fols 90v–4v.

11 fol 38v. Ascelinus Teutonicus, civis Augustae civitatis, Sabili Aurelianensi, Miciacensi monacho, salutem: Quantam in amministrandis negociis . . .
Ascelinus Teutonicus, *De Astrolapsu*, ed of preface, Text 2 below. Corpus Christi College, Oxford, MS 283, fols 95v–7r. Avranches 235, fol 71v (lacks preface).

12 fol 41. Liber iste septem planetarum atque draconis statum continet, a meridie quarte usque ad meridiem quinte ferie determinatum . . .
Tables of al-Khwārizmī, translated by Adelard of Bath (and

perhaps revised by Hermann of Carinthia).
Ed Suter.

5 Chartres MS 498 (the second part of Thierry's *Heptateuchon*). A manuscript of the twelfth century. Parchment. 246 folios. 2 columns. 430 × 365 mm.

1 fols 86r-114r. Boethius, *De Institutione Arithmetica*. Ed Friedlein.
1(a) Gerbert of Aurillac, *Scholium* in *De Inst. Arith.* ii.1. Ed Bubnov, pp 31-5.
2 fols 114v-122r. Martianus Capella, *De Nuptiis Mercurii et Philologiae*, book 7.
Ed Dick, pp 363-421.
3 fols 122r-4v. Euclid, *Elements*, bks 7-9, trans. Adelard of Bath (Adelard II version) without proofs.
(This identification was made by Folkerts (private communication). The opening differs slightly from Adelard II, and perhaps was meant to read, after rubrication: <Unitas est> cuius multiplicatio numerum gignit. Numerus vero est unitatum collectio cuius species/fol 122v/ sunt par atque impar).
4 fols 125r-40v. Boethius, *De Institutione Musica*, bks 1-2.21 (breaks off in the middle of the chapter).
Ed Friedlein, pp 177-254.
Between fols 140 and 141, 104 folios are missing. These may have contained:
a) The rest of Boethius, *De Institutione Musica*.
b) Firmicus Maternus, *Mathesis* (a work mentioned in the skeleton list of contents on fol 1v of this manuscript: *matematica iulii firmici materni iunioris*).
c) Euclid, *Elements*, trans. Adelard of Bath (Adelard II version), bks 1-6, 10-14.7.
5 fols 141r-v. Euclid, *Elements*, bks 14.8-15.5 (the end), trans. Adelard of Bath (Adelard II version), without proofs.
6 fols 141v-3. 'Boethius', *Geometry I*, bk 5, chapters 1, 6, 7 and 8 (the 'Altercatio').
Ed Folkerts (1982).
Also in Bern 299 (11th cent.), fols 1r-14r (see 7 below).
Folkerts notes that 'there exist many corrections in the Bern MS which correspond to the corrected text of Thierry's MS' (private communication).

7 fols 143r-53r. *Mensura sunt tria genera . . .*
Chapters from the *agrimensores*, the *Geometria Incerti Auctoris* and *Columella* (see Bubnov pp xxvi-xxvii) which occur in the same order in Bern 299, pp 27b-57a and Vat Ottob Lat 1862 (12th cent.), fols 44v-52v; sometimes called, as a whole, *Liber Podismi Boetii* (see Thulin, p 18, pp 15-16).
Ed Bubnov, pp 510-6, 518-48, 360-1.

8 fol 153r. Excerpt from Euclid, *Elements*, translated from the Greek and included in the *agrimensores*, ed Lachmann, 1, 378.5-379.7.

9 fols 155r-66r. 'Boethius', *Geometry 2*.
Ed Folkerts (1970).

10 fols 166v-167r. Diagram of an abacus.

11 fol 167v. *Omnis numerus aut ex digito . . .*
Anonymous work on the abacus (also in St John's College, Oxford, MS 178 (13th cent.), fol 265r-v).

12 fol 167v. *Cribrum Boetii de Multiplicatione*.
Also in St John's College, Oxford, MS 17 (c1111 AD), fol 56v.

13 fol 167v. Another fraction table.

14 fol 168r. *Si igitur vis scire . . .*
Unidentified treatise, including a set of Arabic numerals and a set of fraction symbols.

15 fol 168v. The fraction-table of Hermannus Contractus. Also in St John's College, Oxford, MS 17, fol 49r (repeated fol 58r); once on a sheet of parchment in Durham Cathedral, now lost, but partially edited, with a photograph, by Yeldham.

16 fol 169r. Another fraction-table, also by Hermannus Contractus. Also in St John's College, Oxford, MS 17, fol 48v (repeated fol 57v) and on a sheet of parchment in Durham Cathedral (MS C.III.24) which is apparently a companion-piece to the missing sheet referred to in 15 (see Ker, II, pp 490-1, and Evans. I am grateful to Dr Evans for clarifying the identity of items 10-16).
fols 169v-70r blank.

17 fols 170v-3v. Hyginus, *Astronomicon*, bk 1-2.4.
Ed Bunte pp 19-35.

18 fols 174r-84r. *Preceptum Canonis Ptolomei*, text.

19 fols 184v-97v. *Preceptum Canonis Ptolomei* tables. Edition in preparation by David Pingree and Noel Swerdlow.

20 fols 198r-246r. al-Khwārizmī, *Tables*, translated by Adelard of Bath (and perhaps revised by Hermann of Carinthia).

(continued on p 147)

Table 1
Twelfth-century commentaries to the Articella

Articella Texts	Commentaries with 6-part *accessus*	Commentaries with 7-part *accessus*	Another set of Commentaries	Chartres 171	Erfurt, Ampl. F° 276	London BL Royal 8.C.IV	Oxford, Bod. Bodley 514	Oxford, Bod. Digby 108
Johannicius, *Isagoge*	Sex requiruntur in principio huius operis	Cum inter omnia animalia		1–11			57^{v}-62^{v}	4^{r}-26^{r}
Hippocrates, *Aphorisms*	Sex requiruntur in principio huius libri	Temporibus Ipocratis doctissimi viri		12-41	19-36^{v}	186^{r}-		26^{r}-76^{r}

Hippocrates, *Prognostics*	Materia Ypocratis in hoc opere sunt signa	Quoniam humana corpora		41v-8v		157v-62v		91r-106v
Theophilus, *De Urinis*	In principio huius operis sex requiruntur	Sicut in humano corpore non simpliciter	Intentio Theophili est in hoc opere urinalis effusionis	49-58	1-3v	163r-165v 177v-85v		76r-91r
Philaretus, *De Pulsibus*		Humana corpora tribus subiacent qualitatibus	Intentio Philareti est in hoc opere pulsuum essentiam	59-61	3v-4	166r-76v	54r-5v	106v-12r

Table 2

The Affiliation of Chartres MS 214

The manuscript closest in content to Chartres 214 is a two-part manuscript incorporated into Corpus Christi College, Oxford, MS 283. The first part of this manuscript is fols 66r-113v (A) of the late eleventh or early twelfth century, and apparently of continental origin; the second part is fols 114r-45v, of the early twelfth century, and apparently English. After the incorporation of this manuscript into Corpus Christi 283, the quires were marked alphabetically, so that A (entirely quaternions) consists of quires *h* to *n*, B (also quaternions) quires *o* to *r*. It is clear that some quires of A are missing. Moreover, at one stage before it was incorporated fol 66r (the first folio of quire *h*) and fol 97v (the last folio of quire *l*) were the front and back covers. There were marks (perhaps of ownership or provenance) on both these covers, which have either been obliterated or cut out, but there still remain the designation *partica geumetrie* (that is, *practica geometrie*) and *xvi* on fol 97v. So much of the sequence of material is the same in Chartres 214 and this manuscript that it is possible to conjecture that the original order of quires in A was *h, j, k, m, n, l*, and that there were quires lost between *j* and *k*, and *n* and *l*. The material contained on these missing quires can possibly be inferred from what is common to Avranches 235 and Chartres 214 but missing in A. It is my conjecture that B joined A in Chartres. Beaumont has stated (p 166) that 'an early owner [of the tables in Corpus Christi 283] corrected the text using a copy of Adelard's tables similar to a MS which was preserved in Chartres [i.e. Chartres 214]'. Both A and B were incorporated into a codex which has a fourteenth-century *ex libris* of St. Augustine's, Canterbury.

		Chartres 214	Avranches 235	Oxford CCC 283
1	Preceptum Canonis Ptolomaei	7r-13	1r-26r	66r-81v
2	Alphabets	14	–	97v
4	Quicumque astronomicae disciplinae	15r-21r	58r-66r	85r-88v, 105r-v, 110v-112v
5(a)	De Probanda Profunditate	21r	36r	87v
(b)	Cuiuslibet quantitatis de ligno aut eramine	21r	34r	88v
(c)	Si per speculum vel concham	21r	–	89v
6	Quicumque vult	21v-31	26v-7v (in part)	98r
7	Ad altum cum sagitta et filo metiendum	32r	32v	–
8	Gerbertus papa Constantino	32v	–	–
9	Artium septem ultima sede	33r	27v-28r	–
10	Chapters from *Geometria Incerti Auctoris*	34v-38r	32r-8r (order changed)	90v-4v
11	Ascelinus Teutonicus	38v-41	71v-3v (om. preface)	95v-97r
12	Al-Khwārizmī, *Tables*	41-103	–	114r-142r

Table 3

The kinds of source-manuscripts used in the scientific section of the *Heptateuchon*, Chartres 498, fols 86-246

	Harley 2506	Vat.Ott.Lat. 1862	Chartres 214	Oxford, Trinity College 47
1 Boethius, *De Institutione Arithmetica*				48^{r}-71^{r}
1a The *saltus Gerberti*				58^{v}
2 Martianus Capella, bk 7	76^{r}-85^{v} (bk 8)			
3 Anonymous, *De Arithmetica*				
4 Boethius, *De Institutione Musica*				71^{v}-104^{r}
5 Euclid, *Elements* (Adelard II)		1^{r}-19^{r}		104^{v}-138^{r}
6 'Boethius,' *Geometry* I		37^{r}-44^{v}		
7 'Boethius,' *Liber Podismi*		44^{v}-52^{v}		
7a Excerpt from Euclid *Elements*, tr Boethius		26^{r}		
8 Gerbert, *Geometry*		19^{v}-25^{r}		
9 'Boethius,' *Geometry* II		26^{v}-33^{v}		
10–16 Gerlandus, *De Abaco*				
17 Hyginus, *Astronomicon*	1^{r}-30^{r}			
18–19 'Ptolemy', *Praeceptum Canonis*	56^{v}-70^{r}		7-13	
20 Al-Khwārizmī, *Tables*			41-103	

Ed Suter (The calendric tables are missing (Suter, tables nos 1-3) and there is a return to the tables of *Preceptum Canonis* at one point).

6 Paris BN Lat. 10257 (brought from Chartres in 1793).
A manuscript of the twelfth century. Parchment. 88 folios. Single columns. 205 × 125 mm.

1 fols 1^{r}-88^{r}. Euclid, *Elements*, translated by Adelard of Bath and blended with the older Greek-Latin translation (edited from this manuscript by G. D. Goldat, 'The Early Medieval Traditions of Euclid's *Elements*,' Ph.D dissertation, University of Wisconsin, 1956, pp 190-401).

The Texts

1(a) *Articella* dommentary with six-part *accessus*: the beginning of *Glose super librum Theophili de Urinis* in London, British Library MS Royal 8.C.IV, fol 163^{r}.

Glose super Theophilum de Urinis.

Sex requiruntur in principio huius operis: MATERIA, MODUS TRACTANDI, INTENTIO, UTILITAS, CUI PARTI PHILOSOPHIE SUPPONATUR, CAUSA OPERIS. MATERIA est urina, color urine et ypostasis. MODUS TRACTANDI est talis: Diffinit urinam in primis secundum diversos auctores. Ostendit postea locum generationis et formationis. Deinde dividit eam in grossam, tenuem et mediocrem. Agit postea de coloribus, docendo quomodo unus nascitur ex alio. Ostendit etiam qui colores cum quibus substantiis urine habeant iungi. Ad ultimum agit de ypostasi diffiniendo eam et dividendo, et sic finit tractatum suum. INTENTIO vero Theophili est essentiam urinalis effusionis cum loco generationis ipsius et formationis ostendere, eiusdemque differentias in substantia, colore et sedimine cum suis significationibus demonstrare. UTILITAS vero est firma cognitio sanitatis, egritudinis et neutralitatis, cum causis eorum. PHISICE SUPPONITUR, tantum per theoricam. In hac enim scientia sola contemplatio operatur. CAUSA OPERIS est prolixus et inordinatus tractatus Ypocratis, Galieni Magni et aliorum philosophorum. A voce Theophili ideo intitulatur quia Theophilus huius artis non fuit inventor, sed quasi aliorum inventorum vox fuit quorum dicta compendiose excerpsit, obscura patefecit, indeterminata determinavit, non illos redarguens, sed ex dictis eorum quasi mediocrem quandam temperantiam faciens. Theophilus tractaturus de urina, priusquam de illa agat, premittit prologum more recte scribentium in quo preponit CAUSAM INTENTIONIS, et INTENTIONEM subiungit, MODUM etiam TRACTANDI supponit. CAUSA INTENTIONIS habens a primo versu usque illuc *Igitur oportunum nobis*, INTENTIONEM vero ponit in eodem versu dicens *de urinis volentibus tractare* etc. MODUM autem habens ubi dicit *Oportet igitur diffinire nos* etc. Reddit et lectorem attentum ubi dicit *multi veterum agressi sunt*. Benivolentiam captat cum hoc opus *in vita utile* dicit. Ubi autem *nuntius* dicit *non fallax*, urinarum docilitatem precat, tangendo materiam.

1(b) *Articella* commentary with seven-part *accessus*: the beginning of *Glose super librum Theophili de Urinis* in Bodleian Library, Oxford, MS Digby 108, fol 76[r].

Glose Urinarum

Sicut in humano corpore non simpliciter sed multiformiter fit operatio, ita eius operationis non unum sed multa signa apparent. Quorum quedam in egrestionibus, quedam in pulsibus, quedam in urinis ceterorumque signorum subiectis constituta sunt. Item sicut aliquando sanitati, aliquando egritudini, aliquando neutralitati subiacet, ita eius alterationis diverse significationes reperiuntur. Merito igitur quisquis humani corporis status regendos vel conservandos susceperit diligens inquisitor insudet ut per quasdam superfluitates a corpore egredientes quid interius elaboretur sagaci coniectura perpendat. Quorum Theophilus non ignarus hunc libellum de significationibus urine ad communem omnium medicorum utilitatem composuit. In principio cuius .vii. requiruntur: MATERIA, INTENCIO, CAUSA INTENTIONIS, UTILITAS, CUI PARTI PHILOSOPHIE SUPPONATUR, DIVISIO et TITULUS. MATERIA sua est substantia, color et sedimen urine. INTENTIO est diffinitionem urine cum loco in quo generatur vel discernitur, ostendere eiusque differentias in substantia, colore, sedimine, cum suis significationibus apponere. CAUSA INTENTIONIS est tractatus diffusus et infectus aliorum, id est Galieni, Ypocratis et aliorum[1] de eisdem. UTILITAS est maxima, scilicet significationis urine /fol 76[v]/ in sanis, egris et neutris perfecta noticia. PHISICE hunc libellum SUPPONI nemo dubitat, cum de rerum complexionibus agat. DIVISIO, id est modus tractandi, talis est: Prius urine diffinitionem ponit. Deinde locum generationis et formationis. Deinde secundum genera et species agit, dividendo substantiam in tenuem, spissam et mediocrem, diversitates colorum et originis[2] et sediminis ostendendo. Ad ultimum qui colores[3] cum quibus substantiis vel ypostasibus coniungi possint vel non, suasque significationes addendo. Vel hic est modus, prius agit de urinis humorum distemperantiam vel temperantiam significantibus,[4] postremo de illis que solidorum membrorum dissolutionem portendunt. TITULUS incipit liber urine a voce Theophili, eo quod Theophilus non fuit huius artis inventor, sed aliorum inventorum quasi vox extitit, quorum dicta compendiose excerpsit, obscura

patefecit, indeterminata determinavit, non illos redarguens, sed ex dictis eorum quasi mediocrem[5] quandam temperantiam faciens. Premittit prologum in quo INTENTIONEM et CAUSAM INTENTIONIS MODUMque TRACTANDI exponit. CAUSAM INTENTIONIS habemus a primo versu usque illuc *Igitur oportunum*. INTENTIONEM vero in eodem versu dicens *de urinis volentibus tractare* etc. < > Reddit etiam lectorem attentum ubi dicit *multi veterum agressi sunt*. Benivolentiam captat, cum hoc opus *in vita utile* dicit. Ubi autem dicit *nuntius non fallax urina*, docilitatem captat tangendo materiam.

[1] aliorum: magni.
[2] origines.
[3] coloribus.
[4] significationibus.
[5] mediocritatem.

1(c) A third early *Articella* commentary: the beginning of *Glose super librum Philareti de Pulsibus* in Oxford, MS Bodley 514, fol 54[r].

INTENTIO PHILARETI est in hoc opere pulsuum essentiam cum utilitate ostendere, eorumque secundum diastolem et sistolem motiones ex rebus naturalibus vel non naturalibus vel a rebus contra naturam effectas demonstrare, quod per sequentia ostendemus. CAUSA /54[v]/ INTENTIONIS est prolixus tractatus aliorum tedium inferens legentibus nec tamen determinans diversitate pulsuum. UTILITAS est recta inspectio organice, id est arteriarum forme ipsius corporis, id est ostendentium formam et compositionem corporum compositorum secundum sanitatem vel egritudinem et neutrum. PHISICE SUPPONITUR. Pulsus est motio, sed quia hec convenit pluribus motionibus que pulsus non sunt, sicut oculorum et musculorum motioni que sola ventositate fit, additur cordis. Sed quia non omnis motio cordis est pulsus, sicut conclusio et apertio cordis et auricularum, apponitur que motio fit secundum diastolem et sistolem, id est elevationem et depressionem. Diastole enim est quando in superficie digitis tangentium occurrit. Sistole quando digitis tangentium se subtrahit, et vocatur unus pulsus illa elevatio et[1] depressio.

[1] et *om.*

2 Preface to Ascelinus Teutonicus, *De Astrolapsu*; Corpus Christi College, Oxford, MS 283, fol 95[v].

Ascelinus Teutonicus civis Augustę Civitatis Stabili Aurenlianensi Miciacensi monacho salutem.

Quantam in administrandis negotiis valentiam et in virtutibus ornatum firma gerat amicicia, multi veterum doctorum /96r/ et eorum primi litterarum monimentis tradidere. Ut quod ipsi vigilanti studio dediti, rationis etiam semitam sine deviatione insistentes, haut temerario iudicio de re tam precipua sensere,[1] nostram informandi gratia et futuram mundi prosequeretur ętatem. Ergo quid possit amicicia, quanta etiam fulgedo[2] maximarum virtutum irradiata comitatu sese efferat rationis ab aula, a compluribus veterum summę auctoritatis viris, maxime autem a Cicerone et Simaco, accepta sententia, statui totius facultatis meę operam voluntati amicorum benigne semper responsuram, non quod omnimodis arbitrer amicicię decorem moribus meis ornamento plenum et integrum obtigisse, verum ut cuius rei estuans appetentia integram modo quoque habitus nequeo attingere naturam, affectu tamen quodam illam amplectar vel per imaginariam formam. Quoniam igitur te dilectum utpote incontaminatę honestatis virum, nomine proprio simulque vere moribus pariterque verbo veritatis 'Stabilem', legibus amicicię non imparem existere consideravi, voluntatis tuę affectionibus pro posse meo inservire, ratione iubente, animum induxi. Huiusmodi namque animi inductione a Tulliana sententia non videor recedere, qua dignos refert amicicia quibus ipsis inesse perspicitur, propter quod iure diligantur. Simachi etiam rationi hoc tenens propositum non possum reclamare, qui, scribens amico suo de lege amicicię, in capite suę epistolę convenienter hoc apposuit: 'Amicorum est honesta petere et honesta concedere.' Te autem, dum honesta petas, Simachi sententiam non refellere perspicua docet ratio. Ego vero, ut evidenter re ipsa demonstrabitur, quem rogas uti concedam ad modum facultatis meę, preter iudicium laboris laboro, ultra quamlibet negantibus viribus efficientiam voluntate aspiro. Accipe igitur quod desiderabas opusculum, non indiligenter elaboratum, ad componendum instrumentum astrolapsus.

[1] sensenre
[2] fulgido

Opening of the treatise:
Componas circulum ęquinoctialem . . .

Work ends:
(fol 97[r]) . . . terminet in medio centri. Explicit (*the last chapter in Avranches 235 is entirely different from the last chapter in Corpus Christi 283*).

3.(a) The preface to a collection of chapters on the construction and use of the astrolabe in Avranches MS 235, fol 27[v].

De Astronomia quare sit ultima artium

Artium septem ultima sede posteriori collocata a suis inventoribus astronomia est nominata. Que, quia de ultimis loquitur, harum artium ulteriorem recipiens numerum per quem etiam eius significatur domina, earumque finem, terminationemque includit ultima. Quod autem alicuius finis est atque terminatio, id eius perfectio ac completio dicitur sine dubio. Si quid enim operis incipitur ab aliquo, tunc id perfectum ac completum probatur cum ipsi inceptioni finis ac terminatio additur. Si ergo hec est ceterarum finis atque terminatio, tunc sine ea septem artium nequaquam videtur esse perfectio. Hec est enim ars difficilis, quodammodo tamen scibilis, quod in ea multo sudore laboraverint atque subtiliter eius subtilitates indagaverint, et indagando ac comprobando acuto mentis corporisque visu eas perspexerunt. Que utilitatis ac commoditatis quantum afferat ex hoc approbari potest, ut preter aliud incommodum sine ea rationalis temporis discrecio fieret quedam fatualis confusio. Ergo ex incommoditate que accidit sine astronomia, agnoscitur que proveniat commoditas cum ea. Proinde quisque studeat ne eum lateat /28[r]/ tam utilis commoditas. Nec hoc quemquam terreat quod artem esse dictum est difficilem. Nichil enim magnum sine difficultate adquiritur. Nunc vero ut huius artis commoditas que in hoc utroque viget, scilicet ratione atque instrumento, melius patere possit, aliquid ut possumus de ratione ac plus aliquid de instrumento explicamus.

De Ratione Instrumenti
Nunc vero de huius artis instrumento precipuo quod astrolabium nominant, disserendum est. . . .

3(b) The chapter on the fixed stars on the face of the astrolabe in Avranches MS 235 [Av], Paris BN 11248 [P], Rome, Vat Reg 1661 [R] and Corpus Christi College, Oxford, MS 283 [C] (see Millás, p 292).

In quibus signis sint stelle horarum[1]

Notandum etiam quod non in omnibus duodenis signis stelle horarum habentur.[2] In Ariete enim non habetur.[3] In Tauro habetur scilicet[4] una que dicitur Abdebaran,[5] lucida posita post Plyadas,[6] et est in astrolapsu. In Geminis quoque due habentur, ita nominate: Menkehaliuze,[7] id est humerus dexter Geminorum, et Rygelaliuze, id est pes dexter, et est in astrolapsu. In Cancro nulla. In Leone due, Kalbalazet,[8] id est cor Leonis, et est in astrolapsu,[9] et altera lucida que dicitur[10] frons Leonis, et est in astrolapsu. In[11] Virgine et Libra nulla. In Scorpione, una lucidior que dicitur Kalbalagrab, id est cor Scorpionis, et est in astrolapsu. In Sagittario nulla. In Capricornio una que dicitur Deneb, id est cauda Capricornii, et est in astrolapsu.[11] In Aquario nulla. In Piscibus una que dicitur Batanalhaut, id est venter Piscis, et est in astrolapsu.[12]

1 De stellis horarum PR, De horis stellarum C.
2 Notandum . . . habentur Av. *om.*
3 In Ariete nulla horarum stella habetur Av.
4 scilicet Av. *om.*
5 Aldevaran P, Abdevaran RC.
6 Plyades PR.
7 In Geminis due, id est Menkelhaliuze Av.
8 Halbalazet C.
9 et est in astrolapsu PRC *om.*
10 quam dicunt PRC.
11 . . . 11 In Virgine . . . et est in astrolapsu C Av *om.*
12 Et est in astrolapsu PR *om.*

3(c) Fulbert of Chartres' notes and poetic adaptation of 3(b), ed McVaugh, p 176.

In Ariete	nil
In Tauro	Abdebaran
In Geminis	Menke halihuze et Rigel alihuze
In Cancro	nil
In Leone	Calbalazet et altera
Virgo	
Libra	
In Scorpio	Galbalagrab
In Sagittario	nil
In Capricornio	Denep
In Aquario	nil
In Piscibus	Batanalhaut

Abdebaran Tauro, Geminis Menkeque Rigelque,
Frons et Calbalazet prestant insigne Leoni;

Scorpie Galbalagrab, tua sit Capricornie Deneb,
Tu Batanalhaut Piscibus satis una duobus.

4(a) The beginning of peudo-Ptolemy, *Iudicia*, in Paris BN 16208, fol 59r [P], London, British Library, Harley MS 5402, fol 1r ('Alkandrinus'; A) and Sloane 3554 (*Experimentarius* MS; Ex).

Iudiciorum Ptolomei ad Aristonem filium suum liber incipit[1]

Signorum alia sunt masculini generis, alia sunt feminini; feminini ut Taurus, Cancer, Virgo, Scorpius, Capricornus, Pisces; masculini ut Aries, Gemini, Leo, Libra, Sagittarius, Aquarius.[2] Alia sunt stabilia, alia instabilia, alia mediocria. Stabilia ut Taurus, Leo, Scorpius, Aquarius . . .
Nomina igitur turrium apte positarum hec sunt: Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpio, Sagittarius, Capricornus, Aquarius, Pisces. Quarum alia sunt calida et sicca et vigent in oriente, ut Aries, Leo, et Sagittarius; alia frigida et sicca ut Taurus, Virgo et Capricornus; alia calida et humida, ut Gemini, Libra et[3] Aquarius. Et vigere supradicta in[4] meridie non dubitamus, hec vero in occidente vim[5] suam exercere affirmamus.[6] Alia frigida et humida, ut Cancer, Scorpio et Pisces, suumque esse fore in septentrione, fili mi Eriston, non dubites.[7]

1 *No title* in A Ex.
2 masculini ut . . . Aquarius P *om.*
3 et P *om.*
4 in P *om.*
5 viam H Ex.
6 affirmamus P *om.*
7 dubites: titubes H Ex.

4(b) A possible echo of pseudo-Ptolemy, *Iudicia* in William of Conches, *Dragmaticon*, Montpellier, Ecole de Médecine MS 145, fol 17r and ed Gratarolus p 92.

Hec duodecim signa iuxta qualitates elementorum quidam astrologi in quatuor diviserunt, asserentes Arietem, Leonem et Sagittarium calidos esse et siccos, Taurum, Virginem et Capricornum, frigidos et siccos, Geminos, Libram et Aquarium calidos et humidos, Cancrum, Scorpionem et Pisces, frigidos et humidos. Quedam etiam masculini sexus, quedam feminini esse dixerunt, que omnia quasi falsa et nugatoria preterire dignum diximus.

5 William of Conches' authorities in the science of the stars. The text is

the same in *Philosophia Mundi* ii.5 (MSS Munich Clm 18918, fol 12[r] [T], Vatican Vat Pal 1357 [V]) and *Dragmaticon* (MS Montpellier, Ecole de Médecine 145, fol 12[v] (M): ed Gratarolus, pp 70-1).

> Tribus modis loquuntur auctores[1] de superioribus, videlicet[2] fabulose, astrologice, astronomice. Fabulose inde loquuntur Nemroth, Eginus,[3] Aratus, taurum illuc[4] esse translatum et in signum mutatum asserentes,[5] et similia.[6] Quod genus tractandi maxime est necessarium. Eo enim[7] scimus de unoquoque signo in qua parte celi sit situm, et quot stelle in eo sint et qualiter disposite. Astrologice vero de eisdem[8] tractare est ea que in eis[9] videntur sive ita sit[10] sive non, dicere. Multa enim in superioribus[11] videntur esse que ibi non sunt, quia fallitur visus. Sic de eis tractant Marcianus, Hyparchus.[12] Astronomice autem de eisdem[13] tractare est ea que de stellis vera[14] sunt sive ita videatur sive non, pronuntiare, qualiter inde tractant Iulius Firmicus Maternus, Ptholomeus.

1 auctoritas loquitur TV.
2 videlicet TV *om.*
3 egimus T.
4 illum TV.
5 dicentes TV.
6 sic de aliis TV.
7 Et enim T.
8 de eisdem TV *om.*
9 in superioribus TV.
10 sint TV.
11 ibi nempe TV.
12 Sic tractat inde Marcianus Hiparcus T.
13 de eisdem TV *om.*
14 vera TV *om.*

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POSTSCRIPT

Since the above article was sent off to print further information concerning Chartrian scientific manuscripts has come to light. This information does not alter the general picture outlined in the article. It does however fill in some lacunae and should open the way to further research.

Dr. Brian Lawn of London and Professor Mark Jordan of the University of Dallas, Texas, have now discovered what appears to be another text of the commentary on the *Isagoge* of Johannicius which, up to now, has been thought to have been represented only in the lost MS, Chartres 171, fols 1-11. This text occurs on fols 76-84 of a MS in the private collection of P. Robinson (formerly MS Helmingham 58, s.xiii, from Bury St. Edmunds; see N. R. Ker, *Medieval Libraries of Great Britain* (London, 1964), p 21). Dr. Lawn has kindly provided the incipit and explicit of the Helmingham text: *Sex requiruntur in principio huius operis, scilicet materia, modus tractandi, intentio auctoris, utilitas audiendi, cui parti philosophie supponatur, causa operis et titulus. Materiae sunt res naturales et non naturales. . . . Rerum cognitio .v. modis fit, qualitatis, quantitatis, temporis, ordinis, secundum* [. . .] *discretionem.*

A photograph of the first page of the copy of Hippocrates' *Aphorisms* (fol 9r) in Chartres MS 160 is reproduced in the otherwise disappointing book by J. Tribalet (*Histoire Médicale de Chartres jusqu'au XII^e^ siècle* (Paris, 1936), p 68; the plate is erroneously described as being from MS no. 170).

A Chartres provenance for the second part of Paris BN Lat. 14754 (fols 92-255) has been recognized on the evidence of its decorative motifs (see S. J. Livesey and R. H. Rouse, 'Nimrod the Astronomer,' *Traditio* 37 (1981), pp 203-66; see p 224: the authors refer to the research of François Avril). This MS, written in the mid-twelfth century, and in St-Victor in Paris by the late thirteenth century, includes the *Preceptum*

Canonis Ptolomei (which we also find in Chartres MSS 214 and 498), alongside Martianus Capella, *De Nuptiis Mercurii et Philologiae,* bks. I–IX, *Liber Nimrod,* Ps.-Bede, *De Signis Caeli* and a curious table for predicting future activities from the position of the planets in the signs of the Zodiac, in which every Latin phrase is accompanied by its Arabic equivalent (see P. Kunitzsch, 'Eine bilingue arabisch-lateinische Lostafel,' *Revue d'Histoire des Textes* 6 (1976), pp 267–304).