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BARBARA ZIPSER

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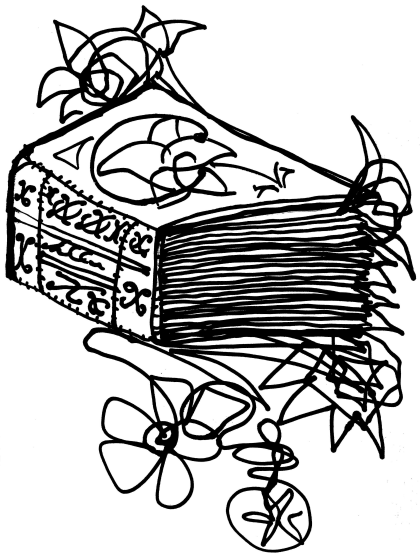

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In memoriam

David Bennett †

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Barbara Zipser, RHUL

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List of abbreviations

ANRW – Aufstieg und Niedergang der römischen Welt
APAW – Abh. d. Königl. Preuß. Akademie d. Wiss.
BECh – Bibliothèque de l'École des Chartes
BMCRev – Bryn Mawr Classical Review
BRL – Bulletin of the John Rylands University of Manchester Library
ByzZ – Byzantinische Zeitschrift
DOP – Dumbarton Oaks Papers
G&R – Greece and Rome
HR – History of Religions
JÖByz – Jahrbuch der Österreichischen Byzantinistik
JHS – Journal of Hellenic Studies
JRA – Journal of Roman Archaeology
JAOS – Journal of the American Oriental Society
JWI – Journal of the Warburg and Courtauld Institutes
M&S – Medicina e Storia
MedSec – Medicina nei Secoli
P&P – Past and Present
PAA – Πρακτ. Ἀκαδ. Ἀθ.
PG – Patrologia Graeca
REByz – Revue des Etudes Byzantines
RSO – Rivista degli Studi Orientali
StudMed – Studi Medievali
WO – Die Welt des Orients

Prefatory note: the uses of medical manuscripts

Much of this collection of articles concerns medical texts that seem eminently 'practical' or 'useful'.[1] But what does either of those adjectives mean? How can historians of medieval Greek medicine, usually working on writings that now lack contextual evidence of origins and application, establish criteria of usefulness or practicality? Those who study medical remedies of the pre-modern period are often asked – by 'lay', non-specialist audiences in particular – 'did they work?' The question usually presupposes a certain kind of effectiveness as the yardstick: that of modern, laboratory-based biomedicine with its high levels of pain relief – on which yardstick medieval remedies generally fall short, proving neutral at best.[2] In the same way, the question put (in effect) to scholars of medieval medical manuscripts – 'were they used?' – presupposes a certain vision of the texts' *Sitz im Leben* as providing the sole criterion.[3] In effect, if the text did not sit in the consulting room, and if it was not frequently in the doctor's hand, at least between patients and perhaps during a consultation, it was not practical or useful. What follows is a short statement of the obvious contrary position. Just as there are many kinds of effect and effectiveness that can be ascribed to remedies,[4] so there are many kinds of usefulness with respect to medical texts. In each case we need to

[1] The conference from which it derives was indeed conceived as a collective study of Byzantine medieval manuals, or *iatrosophia* (for the definition of which see Nutton's contribution in this volume). In what follows I am grateful throughout for advice from Barbara Zipser and Nigel Wilson.

[2] See e.g. B. Brennessel-M.D.C. Drout-R. Gravel, *A Reassessment of the Efficacy of Anglo-Saxon Medicine*, Cambridge 2006, 183-195.

[3] To borrow a term from Biblical form criticism.

[4] E. Hsu, *Medical Anthropology, Material Culture, and New Directions in Medical Archaeology*, in P.A. Baker-G. Carr (edd.), *Practitioners, Practices and Patients: New Approaches to Medical Archaeology and Anthropology*, Oxford 2002, 1-15,

separate out the different kinds to arrive at a suitable typology, and we need to try to arrive at criteria for each kind – ideally, in the case of texts, related to aspects of the manuscripts in which we find them.

The starting point must be that the production of a manuscript – either to create a text or texts for the first time or to copy an existing exemplar – had some perceived value in the Byzantine world. Nigel Wilson has shown that, in the middle Byzantine period, the cost of a manuscript of some 400 folios was the equivalent of several months' salary for a low-ranking civil servant. That cost included the production of the writing materials as well as the copyist's skill and time.[5] We need not worry here about the exact period or the exact salary. The point is the order of magnitude. In simple terms of price, the modern equivalent to producing or commissioning a manuscript was, shall we say, buying a small car. It was not the equivalent of buying a modern hardback volume. The best evidence of the preciousness of parchment or vellum is its re-use – the palimpsest. Witness, most strikingly for us today, the codex containing three 'new' texts of Archimedes.[6] Thus, a medical manual such as that of John the Physician, 90 folios including *pinax* in one quarto manuscript, might have cost our civil servant one month's salary.[7] Even such a *iatrosophion*, when copied on vellum, required a number of hides from sheep or goats (hardly more than four folia per animal)[8] and would have taken several months to write out. And when various types of paper became generally available as a substitute writing material from the eleventh to twelfth century onwards, it was not, at least to begin with, very much cheaper in the Byzantine empire.[9] So it can be taken as axiomatic in this context that no text was

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suggests that we substitute 'was it successful?' (in meeting patients' expectations) for 'did it work?' (in relieving symptoms or pain) as our main question.

[5] N. Wilson, *Books and Readers in Byzantium*, in *Byzantine Books and Bookmen*, Washington DC 1975, 3f., with C. Mango, *The Availability of Books in the Byzantine Empire, A.D. 750-850*, *ibid.* 38f.

[6] *The Archimedes Palimpsest*, ed. R. Netz *et al.*, I-II, Cambridge 2011.

[7] B. Zipser, *John the Physician's Therapeutics. A medical Handbook in vernacular Greek*, Leiden-Boston 2009, 18. This estimate is based on manuscript **M**, the only complete witness of the text.

[8] Wilson, *Books and Readers* cit. 2.

[9] R.S. Bagnall, *Early Christian Books in Egypt*, Princeton-Oxford 2009, ch. 3, for the costs of papyrus rolls and codices; J. Bloom, *Paper before Print: The History and Impact of Paper in the Islamic World*, New Haven-London 2001.

written out, no copy made, automatically – without some calculation, however rapid, however subconscious, of costs and benefits: the cost of the material, the benefit of the text or texts that it might already bear (in the case of a palimpsest), the benefit of the text or texts that might be written on it. With the Archimedes manuscript, the value of the writing material, the lack of alternative sources of parchment, and the Palestinian scribe-priest's need for a copy of a prayer book clearly trumped any need felt to preserve mathematics or philosophy from pagan antiquity. That is why, more generally, we find the filling up of blank pages or half pages in manuscripts: such spaces were a waste of a rare and costly medium.

Of course, we always have to bear in mind that we are generalising about what survives, not what once existed – about which we can only conjecture.[10] Crossings out, or other signs of editing, are unusual in the codices that have come down to us because for the most part only 'fair copies', finished products and their derivatives have been preserved.[11] (At least in the medical sphere, not even the ancient and late antique papyri have revealed anything much that could be identified as rough draft or working copy.)[12] We presume that authors or compilers, or those re-working some earlier material, roughed out their texts on papyrus off-cuts, slates, ostraca, or individual palimpsest sheets of parchment. These were ephemeral: they have not come down to us. Nor, we may guess, have the large majority of the more polished manuscripts that existed in the Byzantine period. (Think, for a non-literary parallel, of the 50,000 or so lead seals that have survived – without the documents they once authenticated.) That attrition strengthens the point that what was deliberately kept, as distinct from what was accidentally lost, or censored, or destroyed in violent circumstances (what one might call the *Name of the Rose* scenario) was what had some perceived value. We should take it as a working hypothesis that no writing was kept unthinkingly. If for example Byzantine scribes stopped copying Galen's longer and more theoretical works in the ninth to tenth centuries, so that they survive if at all only in Arabic, that was because these substantial treatises were no longer thought worth keeping, given the expense of the parchment and of the copyist's time that such works would require,

[10] See V. Nutton, *Ancient Medicine*, Abingdon-New York 2004, ch. 1.

[11] For a rare example of crossing out see B. Zipser, *Deleted Text in a Manuscript: Galen On the eye and the Marc. gr. 276*, «Galenos» III (2009) 107-112.

[12] R.S. Bagnall, *Everyday Writing in the Graeco-Roman East*, Berkeley 2011.

their unwieldy size, the perceived redundancy of some of their information, or the novel availability of more compact alternatives.[13]

Therefore, if we are trying to set out the possible reasons for creating or keeping a manuscript of medical writings in Byzantium, the simple preservation of the text for its own sake, or merely out of respect for the standing of its presumed author, is perhaps the least likely – even if that author was Galen. Pure antiquarianism as an explanation should be automatically suspect.

After r e s p e c t – in ascending order of usefulness – might come l u x u r y or d i s p l a y. Under this heading we could group those manuscripts commissioned by a patron to show off his (nearly always 'his') learning, or prepared by an author, compiler or scribe to attract or retain the interest of a patron. The copies of Galen in Greek that end up in Italy after the fall of Constantinople exemplify this category.[14] The 'usefulness' here is symbolic – of wealth, of taste, of learning. We should not underestimate the role of display copies in the Greek medical manuscript tradition.

Then, s c h o l a r s h i p. Medical manuscripts had their uses for scholars living in the Middle Ages that had nothing to do with medicine. These range from the literary – the text in the manuscript as a model of good style – to what in modern terms would be science, that is, information about the world: about the environment and the ways humanity is made up (reproduction, generation, anatomy, physiology). Perhaps a common mistake in hoping to establish the *Sitz im Leben* of many medical manuscripts has been to confuse the 'scientific' and the medical; to assume that the usefulness of medical texts lay only in therapy.

This is not of course to diminish some t h e r a p e u t i c application as a substantial category. But the place of a manuscript – a text or a collection of texts – in a doctor's practice can be just as variable as its non-medical uses. We must remain alert to the whole range of possibilities, rather than draw conclusions too hastily.

What are these possibilities? The first is broadly educational – to do with medical training, the making of a medical career (if only part-time). Does the codex in question suggest a school, an individual teacher, self-instruction?

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[13] V. Nutton, *Galen in Byzantium*, in M. Grünbart-E. Kislinger-A. Muthesius-D. Stathakopoulos (edd.), *Material Culture and Well-Being in Byzantium*, Vienna 2007, 174; see also N. Wilson, *Aspects of the Transmission of Galen*, in G. Cavallo (ed.), *Le strade del testo*, Bari 1987, 47-64.

[14] Nutton, *Galen in Byzantium* cit. 175.

Does it suggest display here too – self-validation, image-making? What does its size tell us about where it might have been kept and opened? Could it literally have been a *vade mecum* or would it have stayed on the shelf for only occasional reference? What can we infer from its contents about the possible circumstances of its application? Or from the way the text is laid out, and the ease with which it would have been possible to find one's way about it?

If that is the range of possibilities, then the task becomes one of trying to map features of surviving manuscripts on to it – not in any hope of precision but simply to establish a working framework that can be constantly revised as new evidence is considered. How much theory, of humours or complexions, do we take to be more redolent of medical training than of clinical practice? Are commentaries on standard texts a sign of an educational syllabus?[15] What can we infer from the apparent absence of such commentaries? What size of manuscript is portable – on foot, by pack animal? Quarto size or smaller is genuinely portable; but how would one preserve the precious book from water damage? How many such small volumes could one easily transport? What signs of discolouration from handling, even what density of fingerprinting, do particular folia display?[16] What, if anything, *a priori* (simply as starting point for investigation) might we infer from the presence of non-medical texts in a medical manuscript? Are there prefaces that yield any clues about intended use? What kind of anthology of abbreviated or excerpted material do we find in the manuscripts and are there any criteria by which we might distinguish their compilers' purposes? What is the significance of linguistic reworking – from 'classical' to 'demotic'?[17] What 'finding aids' are there (indexes, headings, spacing out, marginal marks of significant passages) and how comprehensive and how effective would they have been in facilitating ready reference in the 'consulting room', the *iatreion*, or at the bedside? Serious comparative work has begun on a number of the fronts bound up in that agenda; some of it is to be found in the chapters below. Yet much remains to be done before we

[15] The second version of *John the Physician* is in effect a commentary on the earlier one (Zipser, *John the Physician* cit. 38-41), made as an aid to translation, not education. Contrast the material mentioned by Nutton in his contribution to this volume at nn. 5-7.

[16] See for example K.M. Rudy, *Dirty Books: Quantifying Patterns of Use in Medieval Manuscripts Using a Densitometer*, ≪Journal of Historians of Netherlandish Art≫ II 1f. on-line (accessed 22 June 2012).

[17] Zipser, *John the Physician* cit. 28-30.

can pronounce with any confidence about when, in what circumstances, a text was 'useful'.[18]

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[18] G. Cavallo, *Il libro come oggetto d'uso nel mondo Bizantino*, ≪JÖByz≫ XXXI/2 (1981) 395-423, has only brief comments on medical texts, at p. 409.

Byzantine medicine, genres, and the ravages of time

Byzantine medicine has never enjoyed an enthusiastic press. Owsei Temkin's formulation, «tradition and empiricism», although accurate, cannot compare with the praise lavished upon the much earlier Galen and, still more, upon Hippocrates, «the father of medicine».[1] Although it was adopted by John Scarborough as one of the guiding threads in his introduction to what still remains the only collection of essays dedicated to the medicine of this period, its vagueness does not encourage one to go further, since it could describe almost any medical system.[2] There is also a worrying dichotomy between the views of scholars on the medicine in the Early Byzantine period, defined for convenience as ending with the conquest of Alexandria in 642, and on what followed. Much work has been done on the first period, which has become a focal point for recent research. By contrast, very little is known about medicine in Middle and Late Byzantium, which fits only with difficulty into a narrative of medical progress. A few new technical terms represent a meagre harvest, and even if pious Christians are credited with the invention of the hospital, the extent of that contribution, and its development within Byzantium alone, are both amply contested.[3] It is true, as Stephanos Geroulanos has argued, that all the basic principles of modern surgery can be found in writings preserved in Byzantine manuscripts, and that some of the recommendations included there

[1] O. Temkin, *Byzantine medicine: tradition and empiricism*, «DOP» XVI (1962) 97-115; cited from the republication in O. Temkin, *The double Face of Janus and other Essays in the History of Medicine*, Baltimore-London 1977, 202-222.

[2] J. Scarborough, *Symposium on Byzantine medicine*, «DOP» XXXVIII (1984) IV-XVI.

[3] P. Horden, *How medicalised were Byzantine hospitals?*, «M&S» X (2006) 45-74 (repr. in P. Horden, *Hospitals and Healing from Antiquity to the Later Middle Ages*, Aldershot 2008, I, 45-74).

can only have come from surgeons who had put them into practice.[4] But, at the same time, much of what is found in Paul of Aegina in the sixth century derives from surgeons of the time of Galen, four hundred years previously, if not from Hellenistic Alexandria half a millennium earlier. Preservation and continuity are both good things, but they cannot by themselves show that the practical advice, some of it clearly the result of experience, that could be found in a later book was actually followed.

Even if due allowance is made for the possible practical skills of Late Byzantine doctors and surgeons, they are often presented in ways that are calculated to deter all but the brave. Temkin's comments are not untypical.

> Greek medical manuscripts are replete with shorter or longer texts, badly composed, badly marked as to beginning or end and often transmitted anonymously or under pseudonyms [...] We encounter the work [of John the Archiatros] in many manuscripts, usually in such disarray that one cannot help feeling deep sympathy with its future critical editor.[5]

When the works of learned men are described so unflatteringly, while at the same time they are contrasted with a populace that preferred at times to put its faith in a variety of superstitions and deride doctors for choosing medicines and dietetic regimens over incantations and purifications, one may indeed contemplate dismissing the medical world of Late Byzantium as a degenerate descendant of a once brilliant family. Compared with the Islamic world, the late medieval West and, still more, the hellenising Renaissance of the sixteenth century, all of which were stimulated by the new reception of classical Greek medical ideas, Byzantium might seem to lie in torpor, and the post-Byzantine world still more so. Familiarity with its classical heritage had long since lost the power to stimulate new ideas. Almost all that was left was to transmit the old notions in a convenient form.

But while this verdict does have some truth in it, it is also based on a considerable ignorance of what material does survive from later Byzantium, much of it accessible only in manuscript, and on an equally skewed perception of the

[4] S. Geroulanos, *Byzantine surgery*, in M. Grünbart-E. Kislinger-A. Muthesius-D. Stathakopoulos (edd.), *Material Culture and Well-being in Byzantium (400-1453)*, Vienna 2007, 129-134.

[5] Temkin, *o.c.* 219f.

medical literature of earlier Antiquity. Medical historians' frequent concern with the onward march of progress often diverts attention from the context of medical discovery (or lack of discovery). Medical education, it should not be forgotten, was largely geared to the production of effective healers, to whom the theoretical concerns of Galen were not always as interesting or as relevant as they might seem to modern scholars. Very few European and American medical schools, down even into the twentieth century, were progressive in the sense of having a research imperative, and many saw little reason to introduce major changes into their curriculum for decades, if their graduates were regarded as competent and effective by their patients.

But it should also be admitted that what survives of later Byzantine medicine differs considerably in one respect from that in Western Europe and the Muslim world. Although there are a variety of teaching institutions in the Byzantine world, ranging from schools to hospitals, and although much of learned Byzantine medical writing depends on a confrontation with the traditional texts of Hippocrates and Galen, commentaries on these authors are few and far between. Sibylle Ihm, in her list of commentaries on ancient medical authors, cites only one commentary on or summary of a Galenic or Hippocratic text by a Byzantine author who lived after the tenth century.[6] This may be simply because texts like this have not been published in a modern edition, as Ihm's remark that she has seen some unedited and unstudied commentaries suggests.[7] The ancient writings were certainly copied and recopied, and the lecture was always the main means of instruction, but it remains striking that few, if any, of these manuscripts contain the type of marginalia derived from lectures that are so abundant in Western manuscripts from the thirteenth century onwards. There are no comments, no points singled out for further discussion, no exposition of the views of the lecturer, and no investigation of wider matters to give an appropriate context or to develop new ideas. It may be also significant that Ihm's sole example of a later commentary was produced in the mid-sixteenth century by a doctor who had studied and spent many years in Northern Italy before returning to teach at the Patriarchal School in Constantinople.[8] Another fragment of late Byzantine teaching, what

[6] S. Ihm, *Clavis Commentariorum der antiken medizinischen Texte*, Leiden-Boston-Cologne 2002, 223-258.

[7] *Ibid.* 27.

[8] *Ibid.* 234f. no. 288. See now P. Demont, *Le Tub. Mb 23 et quelques médecins grecs de Chios en relation avec le patriarcat de Constantinople dans les années 1560-*

appears to be the introduction to a commentary on Galen's *Art of medicine*, also reveals Italian influences on the part of its anonymous author, who is probably to be identified with John Argyropoulos, who taught medicine at the Kral Hospital in the years immediately before the fall of Constantinople.[9]

In place of lecture notes, we find the *iatrosophion*, a somewhat vague term that can encompass almost anything from a series of prescriptions to a medical compendium. It is primarily a collection of therapies, sometimes, like one of the versions of John the *archiatros*, written in a vernacular form of Greek, sometimes associated with a hospital, sometimes appealing to the great names of Antiquity, sometimes containing chants and charms, sometimes in the form of an exposition, sometimes in that of questions and answers.[10] Antonio Garzya, almost in desperation, describes it as a mixed genre in which different styles are mingled, if not entangled together.[11]

Such handbooks, common in the period of Turkish rule, have a long history. They can be traced back through Theophanes Chrysobalantes and

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1580, in S. David-E. Gély (edd.), *Troika. Parcours antiques.* ≪Mélanges offerts à Michel Woronoff≫, I, Besançon 2007, 323-330; *Le commentaire des c. 5 et 6 du traité hippocratique des Humeurs dans le Tub. Mb 23 (suite et fin: fol. 41v-57v)*, in V. Boudon-Millot-A. Garzya-J. Jouanna-A. Roselli (edd.), *Storia della tradizione e edizione dei medici greci.* ≪Atti del VI Colloquio internazionale, Paris 12-14 aprile 2008≫, Naples 2010, 353-412. For my purposes it does not matter whether Crusius' 'learned man from Chios' is to be identified with Hermodoros Lestarchos or not, *ibid.* 354-357, since both individuals spent much time in Italy.

[9] A.M. Ieraci Bio, *Giovanni Argiropoulo e un inedito commento anonimo a Galeno (Ars med. 1, 1a-b7) nel Vat. Gr. 285*, in Boudon-Millot cit. 271-290. The source of the manuscript goes back to the circle of doctors and students at the Kral hospital around 1450. It remains to be seen whether this so far unique late Byzantine commentary on the *Ars* represents a chance survivor of a long and continuous tradition of exegesis of this text, or the (re-) introduction into Constantinople of Italian methods of commentary.

[10] B. Zipser, *John the Physician's Therapeutics. A medical Handbook in vernacular Greek*, Leiden-Boston 2009.

[11] A. Garzya, *Pour l'édition des iatrosophia démotiques*, in A. Garzya-J. Jouanna (edd.), *Trasmissione e ecdotica dei testi medici greci.* ≪Atti del IV Convegno internazionalle, Parigi 17-19 maggio 2001≫, Naples 2003, 165-171. See also A. Touwaide, *Byzantine hospital manuals* (iatrosophia) *as a source for the study of therapeutics*, in B.S. Bowers (ed.), *The medieval Hospital and medical Practice*, Aldershot 2007, 147-173: 149-157; and Bennett in this volume.

Paul of Nicaea to the Greek authors who lie at the basis of the early medieval Latin versions of the *Liber Byzantii* and the so-called *Liber tertius* of Galen, and still further back to Paul of Aegina in the early seventh century, Alexander of Tralles a century earlier, and to Oribasius in the second half of fourth century.[12] Whether Galen's compressed *Art of medicine* should be counted as an early *iatrosophion* is doubtful, but his *Method of healing, for Glaucon*, would certainly fall under this heading, as would the *Introduction to Medicine*, preserved among the Galenic Corpus, despite their larger theoretical content. Other similar tracts survive only in the form of quotations or of fragments. Galen himself praised the Βοηθήματα, *Helpful advice*, of Athenaeus of Attaleia, who probably lived in the early years of the Roman Empire, as the best general treatise by a modern author, although its length, in at least 30 books, might seem too great for an *iatrosophion*.[13] The same may go for another fragmentary work of some fame, the long treatise, perhaps entitled *The layman*, by Rufus of Ephesus, which provides useful advice on a huge variety of conditions for those who did not wish or who were unable to gain access to a doctor. It was excerpted in Late Antiquity and, even more so, by the Arabs.[14] Its overall message, that it was in the interests of everyone to know at least the basics of medicine in case no expert help was at hand, was repeated by Latin writers in Late Antiquity. They, of course, had a Latin model at their disposal in the writings of Cornelius Celsus, who lived around the middle of the first century AD. His *On medicine* formed part of an encyclopaedia of *Artes* (Arts and Sciences), and was intended to introduce the best of earlier (and largely Greek) medicine to cultivated Roman readers who might at times themselves be re-

[12] J.A.M. Sonderkamp, *Untersuchungen zur Überlieferung der Schriften des Theophanes Chrysobalantes (sog. Theophanes Nonnos)*, Bonn 1987; *Paolo di Nicea, Manuale medico*, ed. A.M. Ieraci Bio, Naples 1996; K.-D. Fischer, *Der* Liber Byzantii*, ein unveröffentlichtes griechisches therapeutisches Handbuch in lateinischer Übersetzung*, in C. Deroux (ed.), *Maladie et maladies dans les textes latins antiques et médiévaux*, Brussels 1998, 276-294; *idem Galeni qui fertur* Ad Glauconem Liber *tertius ad fidem codicis Vindocinensis 109*, in I. Garofalo-A. Roselli (edd.), *Galenismo e medicina tardoantica. Fonti greche, latine e arabe*, Naples 2003, 285-346.

[13] Gal. *De elem.* I 6 (I 457 Kühn).

[14] An edition of the fragments of this treatise is a desideratum. They appear under different headings in the standard edition of Rufus by Daremberg and Ruelle, but much more is available in Arabic, see M. Ullmann, *Die arabischen Überlieferung der Schriften von Rufus von Ephesos*, *ANRW* II/37.2 (1994) 1293-1349.

quired to intervene directly or through a doctor to treat the ills of their *familia*. Like the sections of the work on oratory or agriculture, it made no claims to novelty, although that did not prevent Celsus from occasional comments that reveal his own acquaintance with diseases and treatment.[15]

A similar description might well be applied to the so-called Michigan medical codex, which contains the remains of 13 folios of recipes and prescriptions and which, although copied in the fourth century, seems to have been composed at least two centuries before that. Its owner added in his own hand in the margin a further twenty recipes, thus showing that this was a living collection intended for immediate practical use.[16] Similar personal additions can be found in another papyrus (whose fragments are split between Strasbourg and Manchester), but this time they appear to have been added at different times.[17]

Handbooks of this sort, focussing on recipes and practical advice, are thus not confined to Byzantium.[18] They can be found in Classical Antiquity, where they cover almost the whole stylistic spectrum. At one end, some writers preferred to use verse to make their technical message more palatable to a learned but non-technical audience who could appreciate the technical sophistication of a Servilius Damocrates, a Greek doctor in early imperial Rome, or the Hellenistic poet Nicander of Colophon.[19] The medical poems, alas now lost, by Heraclitus of Rhodiapolis (Southern Turkey) earned him honours from a variety of cultural institutions in the Greek world of the Roman Empire as

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[15] G. Sabbah-P. Mudry, *La medicine de Celse. Aspects historiques, scientifiques et littéraires*, Saint-Étienne 1994; C. Schulze, *Aulus Cornelius Celsus – Arzt oder Laie? Autor, Konzept und Addressaten der* De medicina libri octo, Trier 1999.

[16] L.C. Youtie, *P. Michigan XVII. The Michigan medical Codex (P.Mich. 758 = P.Mich. inv. 21)*, Atlanta 1996.

[17] M.H. Marganne, *L'ophthalmologie dans l'Égypte gréco-romaine d'après les papyrus littéraries grecs*, Leiden 1994, 133-146.

[18] For another example, the *Introduction* ascribed to Galen, see the discussion by Caroline Petit in this volume.

[19] For Nicander, see J.M. Jacques, *Nicandre, Oeuvres*, Paris 2002; *idem*, *Médecine et poésie : Nicandre de Colophon et ses poèmes iologiques*, in J. Jouanna-J. Leclant (edd.), *La médecine grecque antique. Cahiers de la Villa*, Paris 2004, 109-124; for Damocrates, see E. Samama, *Les médecins dans le monde grec. Sources épigraphiques sur la naissance d'un corps médical*, Geneva 2003, 362 n. 85. An edition of his poems is being prepared by Sabine Vogt.

well as the soubriquet of 'the Homer of medical poetry'.[20] They used standard medical and pharmacological sources. The only surviving poem in Latin from the Early Roman Empire, that of Q. Serenus, has been thought to represent a reworking of information from Celsus.[21] While these poems, like those of the Hadrianic doctor and litterateur, Marcellus of Side, display the technical virtuosity of their authors, some proponents also claimed a practical advantage.[22] Writing in verse reduced the (considerable) risk of mistakes in copying, for the rules of metre imposed a check on the intrusion of alien material or the accidental alteration of numbers and proportions of ingredients. That did not, however, prevent later scribes from writing out poems as if they were prose.[23]

But these elegant compositions stand at one end of a spectrum of medical writing.[24] They are meant to be appreciated for their literary quality as much as, if not more than, their medical efficacy. They demand an equally learned and literate audience who would appreciate them. Similarly, Galen's blend of medicine and philosophy, although far from unique to him, depends on both patients and practitioners believing that this type of theoretical training is essential for the would-be doctor, and, equally importantly, it requires institutions, as well as individuals, engaged in teaching others to follow the subtleties of Galen's argumentation. At the very least, it demands a cultured urban, if not a metropolitan, setting, a situation not everywhere to be found in the Late Byzantine Empire. The Galenic model of medical education did continue to be followed, and his writings to be copied, but it was far from ubiquitous.

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[20] Samama, *o.c.* 396f.

[21] J.H. Phillips, *The Liber medicinalis Quinti Sereni*, in P. Mudry-J. Pigeaud (edd.), *Les écoles médicales à Rome*, Geneva 1991, 179-186.

[22] V. Nutton, *Ancient Medicine*, London 2004, 211.

[23] Gal. *De comp. med. sec. gen.* VII 8 (XIV 988 Kühn). Leipzig, *UB* 1127, ff. 87r-97r and 1220, ff. 56r-77r contain the poems of Serenus written out as prose.

[24] The variety of medical writing and the fragile process of transmission are emphasized by Nutton, *o.c.* 1-6, 265-271, and by M.-H. Marganne, *Le livre medical dans le monde gréco-romain*, Liège 2004. For the medical texts on papyri, see I. Andorlini, *Prescriptions and practice in Greek medical papyri from Egypt*, in H. Froschauer-C. Römer (edd.), *Zwischen Magie und Wissenschaft. Ärzte und Heilkunst in den Papyri aus Ägypten*, Vienna 2007, 23-34.

However, while Galen often spent his time expounding theoretical questions of doubtful relevance to everyday medical practice, his drug books illustrate neatly the very different ways in which recipe collections were assembled and organised. His four surviving large-scale works deal with simples and with three differently arranged collections of recipes – one listing compound drugs by their types, one by the regions of the body they affected, and the third devoted solely to antidotes. A fourth tract, dealing with remedies that were easy to procure, *Euporista*, is lost except for quotations in Syriac and Arabic, and the treatise of the same name that goes under his name in Greek is a later pastiche. These are literary works, clearly organised and at times incorporating much personal and expository material. But at the same time they are all dependent on the writings of earlier pharmacologists, often copied out verbatim by Galen's assistants, to which he subsequently added other recipes as he found them. (The fact that later copies would have incorporated his additions makes any attempt at dating problematical.)[25] These earlier sources in their turn depend on a variety of sources and authors, not all of them identified as doctors or pharmacologists.

How Galen went about collecting his recipes is described at length in his treatise Περὶ ἀλυπίας:[26]

> I was convinced that I had in my possession more remarkable drug recipes than anyone in the whole of the Roman world, some put in my way by chance, others that I had added myself. Fate put both sorts in my path in two ways. Firstly, there was a rich man back home who wanted so much to acquire a knowledge of significant drugs that he was prepared to buy some recipes for over a hundred gold pieces. He succeeded so well that he could purchase recipes that were highly regarded not only by all the modern doctors in Asia, but also by the ancients. The recipes for all of these drugs were carefully preserved in two folded parchment volumes,[27] which

[25] S. Vogt, *Drugs and pharmacology*, in R.J. Hankinson (ed.), *The Cambridge Companion to Galen*, Cambridge 2008, 304-322.

[26] Gal. *Περὶ ἀλυπίας* 31-37: 11-13 ed. Jouanna. For an explanation of the text behind this translation, see my publication on this work in P.N. Singer (ed.), *Galen, Psychological writings*, Cambridge 2011.

[27] Although the words could mean two leather folders (into which the doctor could place slips of papyrus), it is more likely that this is an early example of a

> one of his heirs, a very close friend of mine, voluntarily handed over to me without being asked. This was my first piece of luck in acquiring an abundance of remedies, and now read of the second. When I first came to Rome in my thirty-third year [162 AD], I found a fellow-citizen and schoolmate of mine called Teuthras already living in the city. He had obtained the parchments belonging to a doctor called Eumenes,[28] who was himself also from Pergamum and was a particular connoisseur of many drugs among all doctors. These recipes had been collected in one place from all over the world during his travels before he settled in Rome until his death. Teuthras, who died in the first visitation of the plague, left them to me a little after what I have said was my first arrival in Rome. If someone had a remarkable drug, I could get hold of it without difficulty by drawing on these collections and offering two or three similar ones in exchange. Not only were all these parchments destroyed in the fire – and I still thought this

parchment (*charta pergamena*) book in codex form, used, like merchants' and lawyers' notebooks, for private reference purposes, and increasingly for wider circulation, M.C. Nicholls, *Parchment codices in a text of Galen*, ≪G&R≫ LVII (2010) 378-386. At *De comp. med. sec. loc.* I 1 (XIV 423 Kühn), Galen mentions receiving a recipe for early baldness from a friend, Claudianus, who had found it in a 'folded parchment' after the death of its owner. Claudianus had used it himself on patients and thought highly of it. The parallels between the two incidents suggest that Claudianus was Galen's anonymous friend.

[28] The sole manuscript of this treatise has 'Eumenes', but no doctor called Eumenes is recorded in Galen, whereas he cites a Eudemus of Pergamum, 'a skilled practitioner of this branch of medicine', several times in connection with remedies, *Methodus Medendi* VI 6 (X 454 Kühn); *De comp. med. sec. loc.* IX 5 (XIII 291 Kühn) and *Ant.* II 14 (XIV 185 Kühn), the last being a metrical reworking of a rare antidote. The name Eumenes could easily have slipped in through a reminiscence of Eumenes, the name of two famous rulers of Pergamum. But Galen's comments at *Methodus Medendi* VI 6 (X 454 Kühn) imply that he had known Eudemus in Pergamum before both of them left Asia Minor, i.e. around 150, before Galen left for Corinth and Alexandria, or, roughly ten years later, in the interval between Galen's return from Alexandria and his first move to Rome in 162. The latter date would be more suited to Galen's description of himself as a practitioner, but would permit only a short time to elapse between Eudemus' move to Rome and his death. Although emendation is tempting, this tight chronology advises caution.

> was no great loss – but so also was my treatise on the composition of drugs, which I had prepared with great precision and where I described how one might make up the most important drugs; only my prescriptions for a few drugs were preserved because they had been earlier given to others.

This remarkable description applies equally to the way in which prescription manuals were compiled and added to in Galen's day and in later Byzantium. It was a continuous process as new recipes were added in the margins or at the ends of manuscripts. Until the advent of printing fixed a particular form, these *iatrosophia* were preeminently fluid in character. Even afterwards, manuals of this sort, whether in East or West, might go through several reprintings and reissues, sometimes involving the addition of new material and sometimes not.

This paper has argued that a concentration on the major authors to survive from Classical Antiquity gives a misleading impression of the variety of genres of medical writing that existed then and obscures the continuity between the age of Galen and that of Late Byzantium. This impression is made even more erroneous if attention is paid only to the great names of the classical period, and still more if, as classicists have often done, pseudonymous and anonymous texts are largely disregarded. Two examples suffice to demonstrate the survival of different genres through the centuries. Texts that take the form of questions and answers, *erotapokrisis*, can be found in both papyri and manuscripts, covering surgery as well as general therapeutics.[29] They have a didactic purpose, although Napthali Lewis' suggestion that they bore some relation to a formal examination for practice, although attractive, cannot be substantiated on the present evidence.[30] This was a genre that passed into the world of Islam, for one of the most influential of the early textbooks was the *Questions and answers* of Hunain ibn Ishaq, fl. 860. This treatise, however, was redacted a little later into a more usual expository form, and, translated into Latin as the *Isagoge* of Iohannitius it became a standard introductory text in the later medieval Western universities.[31]

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[29] A.E. Hanson, *Text and context in papyrus catechisms on afflictions of the head*, in A. Garzya-J. Jouanna, *o.c.* 199-217.

[30] N. Lewis, *Exemption of physicians from liturgies*, «Bulletin of the American Papyrological Society» II (1965) 87-89.

[31] D. Jacquart, *A l'aube de la renaissance médicale des XIe-XIIe siècles: l' 'Isagoge Johannitii' et son traducteur*, «BECh» CXLIV (1986) 209-240 (repr. in *eadem*,

Secondly, students of Latin medical writings from Late Antiquity are also familiar with a group of short tracts praising the medicinal value of the vulture, the badger, and the *herba vettonica*, all of which are credited with a wide range of curative properties. Arsenio Ferraces Rodriguez has recently also edited another text of similar date, listing those of the peony.[32] But there is a much earlier Greek example, albeit one that survives today only through the medium of a word-for-word Latin translation.[33] The pseudo-Galenic treatise on the centaury is a rare survival of a treatise by a doctor sympathetic to Methodism, who enjoyed a career similar to that of Galen himself around 180 AD. The unknown author came to Rome from Asia Minor, where his brother Papias, also a doctor, still lived, and was instructed by one of the leading doctors in the city, from whom he heard of this remarkable panacea. The text is short, and may have owed its fortunate survival to the fact that it was written during Galen's lifetime and may have been found among his papers, but it is a reminder of a genre that has almost vanished from our sources.

Seen from the perspective of the wordy, theoretical Galen, or even the writers of the massive compilations of extracts, Oribasius, Aëtius and Paul, Byzantine medicine is a disappointment. The confusion over the meaning of *iatrosophion*, as well as the miscellaneous therapies that can be found there, only draws attention to the haphazard growth and development of this type of literature. But a wider focus suggests two reasons why this downgrading of later Byzantine medicine is unwise. Firstly, what survives intact from Antiquity is the result of a long process of selection and recopying, and fragments in manuscript or on papyrus, as well as quotations, reveal a much greater variety

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La science médicale occidentale entre deux renaissances (XIe s.-XVe s.), Aldershot 1997, I, 209-240).

[32] A. Ferraces Rodríguez, *Magia y terapia: edición, traducción y comentario de un fragmento tardoantiquo sobre la peonia*, in A. Ferraces Rodríguez (ed.), *Fitozooterapia antigua y altomedieval: textos y doctrinas*, A Coruña 2009, 147-170, with references to similar writings on plants. For animals, R. Möhler, *Epistula de vulture, Untersuchungen zu einer organotherapeutischen Drogenmonographie des Frühmittelalters*, Pattensen 1990.

[33] V. Nutton, *De virtute centaureae: a neglected Methodist text?*, in D. Langslow-B. Maire (edd.), *Body, Disease and Treatment in a changing World. Latin Texts and Contexts in ancient and medieval Medicine*, Lausanne 2010, 213-222.

of genres in the early Roman Empire than could be presumed simply from a glance at the major works of Galen.[34] Time has been a great eraser.

Secondly, Late Byzantine therapeutic texts are, on their own terms, far from dully repetitive. They are living texts, bringing together remedies that were believed to work, some even centuries old, and adding new material to the stock either within the text or in the margins. These marginal additions in turn might then be taken into the text when it was recopied. Analysing and appreciating such practical texts is much harder, and less often attempted, than examining more theoretical writings. Distinguishing one therapy from another is far from easy when both come with the same label 'proven by experience', but it is only by the minute comparison of details, rather than in a search for any new overarching theory, that one will in the end come to a judicious assessment of Late Byzantine medicine.

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[34] For iatromathematics, derided by Galen, see I. Andorlini, *Un anonimo del genere degli* Iatromathematika, Garzya-Jouanna (edd.), *o.c.* 1-23. Magical charms and spells co-exist with herbal or dietary remedies in the works of 'respectable' authors such as Marcellus of Side and Julius Africanus, and it is clear from the attack on such remedies by both Galen and, earlier, Scribonius Largus that not every doctor accepted their strictures. The whole question of borrowing from non-Greek sources, less visible in Classical Antiquity than in late Byzantine medical writings, as discussed in the contributions by Caroline Petit and David Bennett in this volume, requires much further study.

Disease and where to treat it: a Byzantine *vade mecum*

At an unknown time in Late Antiquity, probably in the late fifth-early-sixth century a man must have spent considerable time carving the following text on a column in the West façade of the Parthenon (by then a Christian church):

> Holy Mary full of grace command the one who is having intercourse with my bride to fall ill with hernia and let me be a physician so that I may find the opportunity to cut off his member (*rhombos*).[1]

Mary sends the disease, but a doctor is called to treat it. This little vignette suggests a number of features regarding the concepts of disease and their possible treatments in the Byzantine millennium. Plurality and the parallel existence and importance of seemingly opposing structures, both conceptual (and, as I will discuss below, actual ones – buildings – as well) are some of the key aspects of the following overview. Boundaries between high and lowbrow, sacred and secular are constantly put to question and require us to consider more inclusive categories.[2]

The question of what constitutes disease and the reasons that cause it is naturally one of great antiquity. Concepts and definitions received from

[1] A.K. Orlandos-L. Branouses, *Τα χαράγματα του Παρθενώνος*, Athens 1973, Nr 9, 5. See A. Kaldellis, *The Christian Parthenon. Classicism and Pilgrimage in Byzantine Athens*, Cambridge 2009, 78, who offers a slightly different interpretation of the inscription: he sees *rhombos* as «the bandage worn by hernia patients».

[2] The following is meant as a *tour d'horizon*. As a result footnotes are by no means exhaustive and only indicate some fundamental and/or recent works on the topics at hand.

Ancient Greece and the early Church Fathers remained valid throughout the Byzantine era; innovation in this field – if at all – came in the form of combination.

Disease aetiology can be divided in two broad categories: natural and supernatural. According to the first category, health and disease are manifestations of processes within the body: the former is a result of the balance of the four humours, substances that occur naturally in the body (blood, bile, black bile and phlegm) and disease is a manifestation of their imbalance. Health, the natural state of the body, can be restored with the help of exogenous actions, but disease is not understood or described as having any metaphysical aetiology or existence. This is a concept that ultimately goes back to the authors of the Hippocratic Corpus.[3] As elaborated on and expanded by Galen it became the dominant medical concept at the outset of Antiquity.[4] Its prevalence in Late Antique and Byzantine secular medical texts is expectedly absolute; it would be pointless to attempt to document it. However, the popularity and authority of this concept was not limited to medical authors as we can see by looking at a non-medical text, the twelfth century satire *Timarion*. Its protagonist is befallen by a violent fever followed by an inflammation of the liver and the most appalling dysentery, causing him to vomit up his elemental bile along with pure blood. Exhausted, he falls asleep, only to be snatched by two demonic spirits who whisper over his head:

> This is the man who lost the fourth of his constituent elements by vomiting up all his bile. He cannot be allowed to go on living on the strength of the remaining three. Asclepius and Hippocrates have said as much in the decree they wrote down and posted up in Hades whereby no man, even if his body be in good shape, shall go on living if he has been deprived of one of his four elements.[5]

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[3] V. Nutton, *Ancient Medicine*, London 2004, 53-102.

[4] O. Temkin, *Galenism: Rise and Decline of a Medical Philosophy*, Ithaca 1973; V. Nutton, *Galen in Byzantium*, in M. Grünbart-E. Kislinger-A. Muthesius-D. Stathakopoulos (edd.), *Material Culture and Well-Being in Byzantium*, Vienna 2007, 151-156.

[5] R. Romano, *Pseudo-Luciano, Timarione*, Napoli 1974, ch. 13, vv. 357-363. Translation: B. Baldwin, *Timarion*, Detroit 1984, 51.

This type of disease aetiology carried very positive connotations for the longest time; the fact that it is usually termed 'rational'[6] by historians of medicine suggests that alternatives to it are irrational and has somewhat skewed our understanding and appreciation of it in its favour. And yet, the most ancient ideas about disease – and perhaps the most popular throughout the pre-modern world at that – perceive it as having supernatural causes: a supernatural being sends a disease and is (often exclusively) capable of lifting it. This belief is common in, to name two of the most fundamental texts in Byzantium, both Homer and the Old Testament, but can be found in older, non-Greek texts, Egyptian as well as Babylonian.[7] The supernatural agent of disease can be (a) god, or a demon and the trigger for it is predominately human transgression against which the disease is sent as punishment, chastisement or purification of the pollution that the transgression has caused.[8] In the case of magically induced diseases, a demonic force is often manipulated into causing disease through the medium of a spell.[9] This religious view of disease has understandably little to do with medicine as such – physicians would be useless and only appeasing the supernatural being responsible for it (or in the case of magic countering the demonic manipulation) would help. Prayers, offerings, and in some cases exorcism were the means to counter disease. Nowhere is this clearer than in instances of epidemics causing massive mortality. Here is what the sixth-century author John Malalas reports on the outbreak of the first wave of the Justinianic Plague:

> The Lord God saw that man's transgressions had multiplied and he caused the overthrow of man on the earth, leading to his destruction in all cities and lands. [...] God's compassion (*eusplachnia*) lasted at Byzantion for two months.[10]

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[6] J. Longrigg, *Greek Rational Medicine: Philosophy and Medicine from Alcmaeon to the Alexandrians*, London 1993.

[7] W. von Siebenthal, *Krankheit als Folge der Sünde*, Hannover 1950; R. Parker, *Miasma: Pollution and Purification in Early Greek Religion*, Oxford 1996, 235-256.

[8] For a lexicological exploration see A. Willi, *νόσος and ὁσίη: etymological and sociocultural observations on the concept of disease and divine (dis)favour in ancient Greece*, ≪JHS≫ CXXVIII (2008) 153-171.

[9] G. Vican, *Art, Medicine, and Magic in Early Byzantium*, ≪DOP≫ XXXVIII (1984) 65-86.

[10] *John Malalas. Chronographia*, ed. I. Thurn, Berlin-New York 2000, XVIII

In the cases of demonic-induced diseases (whether the demons were conjured by a human or not) we can equally observe similar traits, although the system may not be as straightforward and clear. Demonic forces can plague humans with possession and disease simply as a result of their hatred for them; such instances of disease can only be countered through rituals – and in a Christian context – only through the agency of God, whether in person (as in the case of Christ's exorcisms in the New Testament)[11] or through the invocation of a sacred name or person. The case of the female demon Gyllou or Gellou or Abyzou (which derives from the Sumerian abzu, the primeval sea of chaos) is a telling example. This is what the widely popular Testament of Solomon (dated to 1-3rd centuries, but whose sources are much more ancient) records regarding the demon:

> There came before me [Solomon] one who had the shape of a woman but she possessed as one of her traits the form of one with dishevelled hair. I said to her, 'Who are you?'... She replied, 'Obyzouth. I do not rest at night, but travel around all the world visiting women and, divining the hour [when they give birth], I search [for them] and strangle their newborn infants'... I, Solomon, said to her, 'Tell me, evil spirit, by what angel are you thwarted?' She said to me, 'By the angel Raphael; and when women give birth, write my name on a piece of papyrus and I shall flee from them to the other world'.[12]

The belief in Gyllou spans a period from Sappho until the fifteenth century and well beyond.[13]

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92 (407); translation: *The Chronicle of John Malalas*, trans. E. Jeffreys-M. Jeffreys-R. Scott *et al.*, Melbourne 1986, 286f.; cf. D. Stathakopoulos, *Making Use of the Plague: Readings in Sixth Century History*, in K. Belke-E. Kislinger-A. Külzer-M.A. Stassinopoulou (edd.), *Byzantina Mediterranea. Festschrift für Johannes Koder zum 65. Geburtstag*, Vienna-Cologne-Weimar 2007, 633-639.

[11] The language of the miracles evokes older, mostly Hellenistic exorcisms with the preponderance of the verb ἐπιτιμῶ (to rebuke), see *Ev. Marc.* 1,25: (καὶ ἐπετίμησεν αὐτῷ ὁ Ἰησοῦς λέγων, Φιμώθητι καὶ ἔξελθε ἐξ αὐτοῦ); 4,39 (καὶ διεγερθεὶς ἐπετίμησεν τῷ ἀνέμῳ καὶ εἶπεν τῇ θαλάσσῃ, Σιώπα, πεφίμωσο); 9,25 (ἰδὼν δὲ ὁ Ἰησοῦς ὅτι ἐπισυντρέχει ὄχλος ἐπετίμησεν τῷ πνεύματι τῷ ἀκαθάρτῳ).

[12] J. Spier, *Medieval Byzantine Magical Amulets and Their Tradition*, ≪JWI≫ LVI (1993) 35.

[13] *Ibid.* 25-35.

To divide ideas on the perception of disease so neatly and rigidly into two opposing camps may appeal to the taxonomist in us, but in reality boundaries were always blurred. What resulted was not, however, a conceptual or medical syncretism, but the parallel existence of seemingly conflicting concepts. This may well have been connected to practice: a patient would seek healing from a secular physician professing a natural understanding of disease and offer prayers to a divinity asking to be rid of his/her affliction. John Duffy calls this a lack of contradiction between piety and practicality.[14]

At the same time, it is equally a question of sources and more specifically of genre. In hagiography, for instance, disease is on the heels of sin – the causality is never ambiguous. One example from the life of St Theodore of Sykeon will suffice: a certain priest called Paul was brought to the holy man with his right hip dislocated and suffering great pain. No medicine had helped up to that point. Theodore bade him to return to his country and make peace with the man he had angered. Paul initially denied this, but at Theodore's insistence he confessed that he had quarrelled with his abbot (sin of pride) – and was ultimately cured.[15]

In hagiography, classical aetiologies of disease were acknowledged, if only to be refuted in favour of a divine origin. This is what the sixth century archbishop of Thessalonica John writes regarding a recent outbreak of plague:

> Neither babies, nor women, nor the flower of youth, nor men of arm-bearing and city-service age were spared from the disease: only the elderly escaped. God had desired thus so that no one would be able to claim that the epidemic had been a natural phenomenon caused by the corruption of the air (*dyskrasia*), and not a divine punishment.[16]

Liturgical texts are also unambiguous about disease: here are some examples from Late Byzantine prayers against disease and plagues: «a tempest of sins

[14] J. Duy, *Byzantine médicine in the sixth and seventh centuries: aspects of teaching and practice*, «DOP» XXXVIII (1984) 25.

[15] *Vie de Théodore de Sykéon (= Vita S. Theodori Sykeota)*, ed. A.J. Festugière, «Subsidia Hagiographica» XLVIII (1970) I, Mir 81.

[16] P. Lemerle, *Les plus anciens recueils des miracles de Saint Démétrius et la pénétration des Slavs dans les Balkans*, I, Paris 1978, § 33, 77.

has pushed me into the depths of disease and constant pains, like storms, drive me forth» or in another prayer «These [diseases and plagues] are the salaries of our wickedness, this is the appropriate result of our evil and impure actions».[17]

We can assume then that while some genres favoured monocausal aetiologies of disease (secular medical texts, or hagiography to mention the proponents of the two opposite poles of the spectrum), other types of text allow for a more inclusive approach. It is to such cases that I would like to turn to at this point.

It has been recently argued that the New Testament displays such tendencies. Ferngren argues persuasively against current orthodoxy, which sees disease in the New Testament as largely ascribed to demonic actions, that the general underlying basis in the text is that disease has natural causes, or that it at least is neither a result of sin nor of demonic presence.[18] When asked whose sins caused a man to be born blind (*Ev. Io.* 9,1-7), Jesus answers: «Neither hath this man sinned, nor his parents: but that the works of God should be made manifest in him».

The early Christian period, however, was not characterized by the same conceptual openness or complexity. Perhaps as a result of the historical struggles of Christianity and its subsequent political and social domination or the focus on the charismatic holy men[19] – healers and exorcists par excellence – at least from the fourth century onwards we witness not so much the revival of the concept of illness as a result of sin, but its definite domination.

Yet this dominance created problems as well. Christian thinkers were faced with new questions as they elaborated on matters of faith. How could evil or disease and especially plagues be justified with the notion of the good and kind God? Basil of Caesarea devoted a whole homily to this topic aptly titled *That God is not the cause of evil*.[20] It is a complex text that vehemently denies that God is responsible for evil – a direct result of human sin. It is very interesting that Basil reverts quite often to medical metaphors to illustrate his point: As the physician must cut, burn or even mutilate an affected part

[17] J. Goar, *Euchologion sive rituale graecorum*, Venice 1730, reprint Graz 1960, 543, 554.

[18] G.B. Ferngren, *Medicine and Health Care in Early Christianity*, Baltimore 2009, 43-51.

[19] *Ibid.* 59-63.

[20] Bas. *Quod Deus non est auctor malorum PG* XXXI 329-354.

to prevent the disease from spreading to the rest of the body, so God inflicts disease as a *paideusis* (education), disease being the lesser evil compared to sin and its results, eternal damnation.

The persistence of questions on theodicy and by implication on the nature of disease can be traced by looking at the pastoral genre of Questions and Answers. One of the earliest and most influential of these texts, the *Quaestiones* of Anastasius of Sinai is fairly detailed on the subject. Question 28 concerns basically the question of random death:[21] why do certain evil men or pagans enjoy a long life while pious Christians die young – in sum, the faithful question the fair judgement of God. Anastasius begins by elaborately stating that the topic is difficult and that one should rather not probe into such matters, then he provides a long answer (in 26 chapters and some 9 printed pages) which, in my mind, can be seen as an effort to harmonize Greek ideas about the natural world and the patristic tradition.

According to Anastasius, God created heaven and earth, the sea and all visible creation out of four elements fire, water, air and earth – from which both the humans and animals were also made. The nature of these bodies was given to these four elements to govern, lead and administrate as generals or horse riders. As such all earthly bodies, plants, animals, all animate and inanimate beings are led and made and transformed and given life or destroyed by the mixture of the elements (5). The elements thus control the birth, growth, disease (6) and death of the body (17). The passage is replete with humoral terminology: natural life is governed by the good mixture (*eukrasia*) of the elements (7); infants die because they are warm beings (*thermotera onta*) and, spring brings an abundance of blood (an element connected to that season since Antiquity) (22). But God has given the knowledge of medicine to humans and has prepared all the herbs and all sorts of therapeutic things, with which physicians in many cases – with God's providence – save humans from death (15).[22]

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[21] Edition: *Anastasii Sinaitae, Queastiones et Responsiones*, edd. M. Richard-J. Munitiz, Turnhout-Leuven 2006, 42-48; See also J.A. Munitiz, *The Predetermination of Death: The Contribution of Anastasios of Sinai and Nikephoros Blemmydes to a Perennial Byzantine Problem*, ≪DOP≫ LV (2001) 9-20. On Anastasius' medical ideas see M.-H. Congourdeau, *Médecine et théologie chez Anastase le Sinaïte, médecin, moine et didascale*, in V. Boudon-Millot-B. Pouderon (edd.), *Les Pères de l'Eglise face à la science médicale de leur temps*, Paris 2005, 287-298.

[22] These questions naturally preoccupied Byzantine thinkers throughout the

The issue of plagues is touched upon, but a different question (66) is specifically devoted to it: Is it impossible to save oneself from a plague by fleeing, is the question. Again, Anastasius stresses the mysterious nature of such occurrences (*mystērion bathy*) and proceeds: if the plague is sent by God, it cannot be understood nor escaped; if, however, the mortality ensues as a result of (polluted) air, which often occurs at the beginning of spring especially in densely populated, wet and woody landscapes, it can be escaped through flight from the afflicted area. No-one should think that such a plague ensues merely from the air without God's agency, for the winds and all creation obey God's command.[23]

Such statements are, as perhaps expected, not entirely new: they are in fact quite evocative of stoic thought. Epictetus, for example, wrote the following:

> All things obey and serve the Cosmos [in other words, God], both earth and sea, and sun, and the other stars, and the plants and animals of earth; obedient to it also is our body, both in sickness and in health, when the Cosmos wishes, both in youth and in old age, and when passing through all the other changes.[24]

Similar instances of complexity can be found in secular medical texts suggesting if not the acceptance of alternative ideas on disease aetiology, at least the recognition that such ideas existed and were widely popular. Two of the most well-known medical authors of Late Antiquity, Aëtius of Amida and Alexander of Tralleis include magical recipes in their work.[25] The latter at least is quite apologetic about such inclusions: ≪There are persons incapable of adhering to a strict regimen or of tolerating drugs, and they therefore compel us to use

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entire period of the Empire. It will suffice here to point to H. Beck, *Vorsehung und Vorherbestimmung in der theologischen Literatur der Byzantiner*, Rome 1937, especially 219-253 and the edition of Nikephoros Blemmydes, *Gegen die Vorherbestimmung der Todesstunde*, Einleitung, Text, Übersetzung und Kommentar von W. Lackner, Athens-Leiden 1985, XLIII-XCIV.

[23] Anastasios, *o.c.* 118f.

[24] Epict. fr. 3: *Epictetus*, with an English transl. by W.A. Oldfather, II, Cambridge, Mass.-London 1928, 442-445.

[25] *Aëtius of Amida. Libri Medicinales I-VIII*, ed. A. Olivieri, ≪CMG≫ VIII/1, Berlin 1935, especially in book II.

occult remedies and amulets in gout.»[26] In another passage he writes that when digging for the dangerously poisonous plant hyoscyamus (henbane), the action has to be done before dawn, when the moon is in the sign of Aquarius or Pisces while chanting «I conjure you by the great name Iaoth, Sabaoth, the God who fixed the earth and stopped the sea» and so on.[27] If anything, such instances suggest a parallel world of supernatural causes of disease that could not be cured by rational means.[28]

In the liturgy of St Basil the brethren ask of God to grant winds of good temperance – the term used *eukratous* – evokes the balance of the humours (*eukrasia*) that is crucial for health in the Hippocratic system. Without wanting to overstretch this point, in my mind it is quite clear that ideas about disease in the Byzantine world suggest the co-existence of secular pre-Christian and Christian ideas – especially after – at the latest – the sixth century when physicians no longer were equated with paganism after the Justinianic purge of 545/6.[29]

It follows that the plurality of ideas about disease and the healers that represented them would mean a plurality of places in which such a healing would be sought. Class and financial means certainly played a crucial part in the choice of where to seek healing, but again a combination of ideas and practices emerges as the dominant pattern.

Whoever could afford it, would always seek a physician – this is by far the most widespread practice. In most cases this would mean to be visited by the physician at one's bedside and being tended for the duration of one's illness by him – or, in the case of wealthier and socially more important individuals, such as emperors and their kin – by a, at times heterogeneous, team

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[26] *Alexander von Tralles. Therapeutika*, ed. T. Puschmann, I-II, Vienna 1878. Translation: O. Temkin, *Hippocrates in a World of Pagans and Christians*, Baltimore-London 1991, 233.

[27] Alexander II 585 Puschmann; Temkin, *o.c.* 234.

[28] For further passages see: Puschmann II 319.4 ff., 473.30 ff. and Temkin, *o.c.* 232-236.

[29] John of Ephesus in *Pseudo-Dionysius of Tel-Mahre. Chronicle, Part III*, trans. with notes and introduction by W. Witakowski, Liverpool 1996, 71; see also M. Whitby, *John of Ephesus and the Pagans*, in M. Salamon (ed.), *Paganism in the Later Roman Empire and in Byzantium*, Cracow 1991, 111-131.

of physicians.[30] There is no need, I think to refer to such examples; they are abundant throughout the Byzantine period. It may only be important to stress that the patient could distinguish between the physicians summoned to attend him/her and that such gradations are important social markers, both for patients and professionals. For example, when the Venetian merchant Giacomo Badoer was suffering from a skin disease in 1436 he had a Greek doctor visit him (the *miedego* Panardo or Panarido, probably John Panaretos, who was possibly working at a hospital, the Kral Xenon at the time) and also another, Latin doctor, *maistro* Lucha, was also consulted and was paid more than the Byzantine practitioner.[31] When, however, a little later in the year Badoer's own apprentice, Antonio Bragadin, fell ill, only a barber was summoned to bleed him – not the distinguished physicians he had called for himself.[32] Renowned physicians, such as John Zacharias in the late thirteenth century, certainly made house calls[33] and we can expect that they constituted an important part of a physician's income.[34]

If a specific case made this necessary or possible, a patient could seek a physician at the latter's home – this does, however, suggest a difference in social status.[35] The physician's home is connected to the question of the *iatreion* (or its Latin counterpart, the *taberna medica*), which could designate just that or possibly also a clinic or a physician's private practice: patients

[30] On physician at the bedside of emperors: see A. Kazhdan, *The image of the medical doctor in Byzantine literature of the 10th to 12th centuries*, ≪DOP≫ XXXVIII (1984) 43-51; D. Bennett, *Medical practice and manuscripts in Byzantium*, ≪Social History of Medicine≫ XXXIII (2000) 279-291.

[31] *Il Libro dei conti di Giacomo Badoer (Constantinopoli, 1436-1140)*, edd. U. Dorini-T. Bertelè, Rome 1956, 82, 376.

[32] *Il libro dei conti*, *o.c.* 52; on Badoer and physicians see K.-P. Matschke, *Gesellschaft und Krankheit: Bewohner und Besucher Konstantinopels während und nach der Pest von 1436*, ≪Vizantijski Vremennik≫ LV (1998) 48-53.

[33] Zacharias' House calls: John Zacharias, *De Urinis* in *Physici et Medici Graeci Minores*, ed. J.L. Ideler, II, Berlin 1843, 50-52, 62f., 92f., 154-156, 162f., 165-167, 181-183, 186f. See A. Hohlweg, *Johannes Aktuarios: Leben - Bildung und Ausbildung - 'De Methodo Medendi'*, ≪ByzZ≫ LXXVI (1983) 302-321.

[34] T.S. Miller, *The birth of the Hospital in the Byzantine Empire*, Baltimore, 1997^2, 149.

[35] On this question I rely on G. Harig, *Zum Problem 'Krankenhaus' in der Antike*, ≪Klio≫ LIII (1971) 179-195: 179-188.

could stay there overnight or for a short period of time after their treatment.[36] But in the Byzantine period the situation is not quite as clear. Certainly in the case of John Zacharias, the *iatreion* he mentions seems to designate a clinic for ambulant treatment – not his own practice.[37]

There is admittedly very little evidence for the last possible type of healing associated with a private physician: treatment by correspondence as encountered in a short treatise on gout from the Palaiologan period sent to a patient.[38] This was a very popular method in the modern period, but the Byzantine case may be something different: a patient, who having consulted his physician asked for additional information, which was then sent in the form of a letter.

The place for seeking healing in Byzantium that has received most attention by scholars is the hospital. And again within this discussion the lion's share of the information we have (and on which a lot of the reconstructions are based) is taken up by one text, the Typikon of the Pantokrator monastery in Constantinople.[39] This is not the place to report the long debates over this question; I will only try to present some data on the specific topic of patients seeking healing in hospitals. First I must stress the enormous discrepancies between institutions that are called hospitals (*xenones* or *nosokomeia*) and those we can safely assume were medicalised philanthropic institutions that provided healing. P. Horden has scrutinized the evidence: very few from the large numbers of hospitals that populate the bibliography would seem to withstand that test.[40] Silence is of course not an argument against the presence of

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[36] Scholars await with great anticipation the publication of the findings of such an *iatreion*, the so-called 'Domus del chirurgo' in Rimini; see R.P.J. Jackson, *The Domus 'del chirurgo' at Rimini: an interim account of the medical assemblage*, ≪JRA≫ XVI (2003) 312-321.

[37] Zacharias, *De Urinis* IV 12,22 (as in n. 32), Ideler *o.c.* II 95f.; Hohlweg *o.c.* 309.

[38] G. Schmalzbauer, *Medizinish-diätetisches über die Podagra aus spätyzantinischer Zeit*, ≪Jahrbuch der Österreichischen Byzantinistik≫ XXIII (1974) 229-243.

[39] Typikon edition: P. Gautier, *Le typikon du Christ Sauveur Pantocrator*, ≪REByz≫ XXXII (1974) 1-125; Translation: *Byzantine Monastic Foundation Documents (thereafter BMFD): A Complete Translation of the Surviving Founders' Typika and Testaments*, edd. J.Ph. Thomas-A. Constantinides Hero, Washington, DC 2001, 725-781, with bibliography; see also Miller, *o.c.* chapters 2 and 8.

[40] P. Horden, *How Medicalised were Byzantine Hospitals?*, ≪M&S≫ X (2005)

doctors, nor, however, one in its favour. Second, cases of patients treated in hospitals are very rare; we almost never get a glimpse of patients being actually treated in hospitals: the Pantokrator Typikon designates what should be done; mentions in hagiography can be rightly questioned, as their objectives lay elsewhere and not with the documentation of what would be their competition. For those institutions over which we stand on firmer ground we can generally say that they were few, small in size and very often short-lived. For the late Byzantine period at least we can safely assume that such institutions were emergency hospitals: patients were meant to spend a short time therein (*brachy kairou*) and then return home cured and healthy.[41] So, who sought out healing in hospitals? Judging from the Pantokrator Typikon the poor, and perhaps, as we can reconstruct from some scattered mentions, some professionals with connections to the monasteries to which these hospitals were annexed;[42] probably not those who could afford private physicians.

The largest category regarding places of healing concerns healing shrines and churches. Mentions to them are expectedly abundant in hagiographic texts, as the accounts of miraculous healing were both a testimony to a shrine's popularity and at the same time a great means of augmenting it. The *anargyroi* miraculous healers had clear advantages over secular physicians: their healing was open to all, and in most cases instant and painless. As such their target audience knew no social boundaries. The burial sites of certain holy men (and some few women)[43] became places of pilgrimage for those seeking cure of (usually) chronic diseases, often after the patients had tried their luck (always unsuccessfully) with secular physicians: it will suffice to mention the collection of miracles of S. Artemius in the seventh century or those celebrating the healings at Zoodochos Pege at Constantinople in the late Byzantine

45-74.

[41] This is clearly the case in the xenon of Panteleemon in Constantineople. Edition: *Actes de Lavra III, De 1329 a 1500*, édition diplomatique par P. Lemerle *et al.*, ≪Archives de l'Athos≫ X, Paris 1979, doc. 123, 20-26. The same has been attributed to perhaps the last of the important xenones in Constantinople, the Kral from the fourteenth century onward; U.B. Birchler-Argyros, *Die Quellen zum Kral-Spital in Konstantinopel*, ≪Gesnerus≫ ILV (1988) 419-444: 424.

[42] See Miller, *o.c.* XXI-XXII, 147-152, 165f.

[43] G. Vikan, *Art, Medicine, and Magic in Early Byzantium*, ≪DOP≫ XXXVIII (1984) 65-86: 66 on St Thecla.

period.[44] Patients were healed through incubation or immersion in water, but predominately through their prayers and repentance. Such practices are typologically not new; they hark back to, say, healings at Asklepieia,[45] to name just one example and they enjoyed a long history of popularity – in some instances up to this day if we only think of Lourdes or Tenos in Greece.

But perhaps all the above constituted only a fraction – and even a small one at that – of the possible methods and places of healing to which the majority of the population turned to. These are not places of healing as such but objects or methods and means, which people used on their own – probably at their own home: spells, amulets and other means of white magic, as well as folk remedies or even remedies lifted from medical books.[46] To chart this, we need to link texts and artefacts: for example texts of ritual power (mostly from Egyptian papyri) and normative texts that chart out the disapproval and prohibition of magical practises (a process that can be observed up to the end of Byzantine empire) as well as objects (primarily, through not exclusively, amulets and rings) that evoke such practises.

The following example can illustrate this. Ammianus Marcellinus mentions that a young man was seen in the bath touching alternately with the fingers of either hand first the marble (of the wall or perhaps the floor) and then his breast, and to count the seven vowels (of the Greek alphabet) as a remedy for stomach ache.[47] This can be corroborated by a spell to be written

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[44] See A.-M. Talbot, *Pilgrimage to Healing Shrines: The Evidence of Miracle Accounts*, ≪DOP≫ LXI (2002) 153-173. The shrine is still in existence today as a place of pilgrimage for healing, albeit not without a possible interruption in the eighteenth century. On Artemius see: *The miracles of St. Artemios*, by V.S. Crisafulli-J.W. Nesbitt, Leiden-New York 1997.

[45] From the vast literature see: E.J. and L. Edelstein, *Asclepius: A Collection and Interpretation of the Testimonies*, I-II, Baltimore 1945; A. Petsalis-Diomidis, *The Body in Space: Visual Dynamics in Graeco-Roman Healing Pilgrimage*, in J. Elsner-I. Rutherford (edd.), *Pilgrimage in Graeco-Roman and Early Christian Antiquity. Seeing the Gods*, Oxford 2005, 183-218; I. Csepregi, *The miracles of Saints Cosmas and Damian: Characteristics of Dream Healing*, ≪Annual of Medieval Studies at CEU≫ VIII (2002) 89-121.

[46] See Bennett in this volume.

[47] Amm. Marc. XXIX 2,28; *Ammianus Marcellinus*, with an English transl. by J.C. Rolfe, III, Cambridge, Mass.-London 1939, 233; see M.Th. Fögen, *Balsamon on magic: from Roman secular law to Byzantine canon law*, in H. Maguire (ed.),

for an amulet against stomach ache and headache from the seventh century found in a Coptic manuscript.[48]

I've already mentioned the magical recipes included in the works of Aëtius and Alexander, which include amulets but such occurrences are of course not limited to the Late Antique world. Michael Psellos, who dabbled into esoteric and magical texts throughout his career, mentions in passing the manufacture of apotropaic figurines by Chaldaeans for the purpose of warding off diseases. But he refuses to divulge the method by which the various substances are to be mixed and the figurines made. He openly voices his concern that, if they lacked discretion, his students or readers might pick up the method, put it to use, and then, in the event of trouble, he would be held responsible.[49]

A similar case can be found among the writings of Michael Italikos. As he was known to possess a large collection of spells and incantations, including some for the relief of swellings and tumors, some friends consulted him about the recourse to a sorcerer for the treatment of an incurable malignant ulcer. He tried to dissuade them, but later wrote back to say he had found an ancient remedy which he will not write down, but will deliver to his friend orally when they next meet.[50] It is all the more remarkable then, when Italikos later presents a court physician friend of his with an amulet that can ward off the plague.[51]

But not all of these self-help remedies were necessarily magical or outlawed.

Byzantines regularly visited hot springs for curative reasons – for example the imperial mother and son couple Eirene and Constantine VI in Prussa/Bursa in 797.[52] Or they used drugs – that they could have obtained from a physician or another person with medical knowledge – or, although

Byzantine Magic, Washington, DC 1996, 99-115: 111f.

[48] Ancient Christian Magic. Coptic Texts of Ritual Power, edd. M. Meyer-R. Smith, New York 1994, 87, lines 126-32, with bibliography.

[49] See J. Duffy, *Reactions of Two Byzantine Intellectuals to the Theory and Practice of Magic*, in Maguire, *Byzantine Magic* cit. 83-97.

[50] Duffy, *ibid.*

[51] K.-H. Leven, *Gelehrter Aberglauben, abergläubische Gelehrte? Michael Italikos, ein Amulett gegen die 'Pest' und die Medizin in Byzanz*, «Das Mittelalter» X (2005) 33-63: 56-63.

[52] *Theophanes. Chronographia*, ed. C. De Boor, Leipzig 1883, 471.

this is not stated as such – that they could have put together following a medical recipe. Such cases can be found in the sources, ranging, for example, from the lives of early ascetics, who used any knowledge of drugs among them to help themselves (raw eggs against consumption, or vinegar for an aching spleen)[53] to the well-known fifteenth century intellectual (and hypochondriac) John Chortasmenos, who consumes a potion «prepared by specialists»[54] or Giacomo Badoer, whom we have seen above summoning physicians, and who records in his account book that he often bought drugs from Greek shops or occasionally used syrups on his own.[55]

This short and eclectic overview has hopefully highlighted the presence of different concepts and practices in understanding and treating disease. As the Byzantines themselves apparently saw no contradiction in seeking solace from illness from both physicians and holy men, we should also adopt more inclusive categories. From self-help to lofty trained physicians proficient in Galenism and from hospitals to healing shrines, diseases, whether brought on by an imbalance of the humours, God, or Gylou were understood and treated in a variety of ways.

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[53] H.J. Magoulias, *The Lives of Saints as Sources of Data for the History of Byzantine Medicine in the Sixth and Seventh Centuries*, «ByzZ» LVII (1964) 127-150: 145.

[54] H. Hunger, *Allzumenschliches aus dem Privatleben eines Byzantiners. Tagebuchnotizen des Hypochonders Johannes Chortasmenos*, in P. Wirth (ed.), *Polychronion, Festschrift Franz Dölger zum 75. Geburtstag*, Heidelberg 1966, 244-252: 245, lines 25f.

[55] *Il Libro dei conti* (as in n. 31), 280, 376.

Two Latin Pre-Salernitan medical manuals, the *Liber passionalis* and the *Tereoperica* (Ps. Petroncellus)

I. Should[1] you wish to produce a medical book, or any book for that matter, various choices present themselves. You might want to write it yourself, and start from scratch; or perhaps you prefer to use material produced by others, and then adapt it in a number of different ways; or you could also combine both methods by producing a book based on a copy already in circulation, but linking and arranging what you have found in a novel way.

The medical books which are the focus of our conference seem to belong in the category I mentioned last; but even here, there are more ways than one of going about your business. Your task will be much easier if you are just compiling a collection of recipes; after all, there is not much difference between recipes of the culinary and of the medical variety. Galen's two major collections of medical recipes were arranged either by kind (κατὰ γένη) or by place (κατὰ τόπους), and of course excerpts from both entered medieval Latin recipe collections.

Another type, different from these two Galenic examples, could be an innovation introduced by Roman writers. I at least cannot think of any Greek book, or work, in this category I will sketch briefly. Here, it is the main ingredient or, to give it its technical name, the chief and sometimes only simple or single drug that is the key for arranging the recipes or *curae*. The most important and most widely disseminated work of this type was the *Herbarius*

[1] This article forms part of my research undertaken in the context of the project *Textos médicos latinos de los siglos VI-XI: transmisión, edición crítica y estudio léxico* of the Spanish Ministerio de Educación y Ciencia-FEDER (HUM2006-13605-C02-01), directed by Arsenio Ferraces Rodríguez, Universidade da Coruña, Departamento de Filoloxía Española e Latina, Facultade de Filoloxía, A Coruña.

Apulei, the main item in a string of various shorter and longer treatises.[2] Its totally spurious association with the second-century Latin writer Apuleius of Madaura, author of a long novel known in English as *The Golden Ass*, but, more importantly for our purpose today, of a work called *De magia*, where Apuleius' main aim was denying any personal knowledge and practice of the magical arts. Nevertheless, the existence of *De magia* must have been the reason why a book listing recipes based on medicinal plants was attributed to him. Running to roughly 130 chapters and detailing the medical uses of as many plants, it forms the central core of a collection of treatises all arranged on the same principle, i.e. of listing recipes by one specific simple drug. This collection (its German name is *Herbariencorpus*) further comprises two shortish treatises on specific simples, one on the plant betony (*De herba Vettonica*) and the other on the beaver (*De taxone*), as well as a book on the medical properties of parts taken from other animals (including man), attributed to an otherwise unknown Sextus Placidus Papyriensis, 32 chapters in all. It is occasionally followed by a selection from Dioscorides' famous account on drugs in five books (Περὶ ὕλης ἰατρικῆς) in Latin translation, under the title *De herbis femininis*.[3] On the whole, I see the Elder Pliny's *Natural History* rather than Dioscorides as the ultimate source, or perhaps better inspiration, for this type of medical manual, as could be demonstrated if we compare the entries for particular plants in both works in detail.

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[2] All printed in *Antonii Musae de herba Vettonica liber, Pseudoapulei Herbarius, Anonymi de taxone liber, Sexti Placiti liber medicinae ex animalibus etc.*, edd. E. Howald-H.E. Sigerist, ≪CML≫ IV, Lipsiae-Berolini 1927. For Placitus, Ferraces Rodríguez suggests (very convincingly) Placidus. Parts of this corpus are currently being edited again.

[3] Arsenio Ferraces Rodríguez prepared a critical edition for the PhD thesis at the end of 2011 (her chapter and paragraph numbering and divisions differ from mine and De Renzi's) to replace that by Heinrich F. Kästner, *Pseudo-Dioscoridis De herbis femininis*, ≪Hermes≫ XXXI (1896) 578-636 and XXXII (1897) 160. For a fuller bibliography on this and other Latin texts, compare the entries in *Bibliographie des textes médicaux latins. Antiquité et haut moyen âge*, sous la dir. de G. Sabbah–P.-P. Corsetti–K.-D. Fischer, préf. de M.D. Grmek, Saint-Étienne 1987 [but really published in 1988], and my *Bibliographie des textes médicaux latins. Antiquité et haut moyen âge. Premier supplément 1986-1999*, Saint-Étienne 2000.

But this is not the topic that I wish to address here. Rather, I will now turn to discussing medical manuals which were distinct from all those mentioned earlier by offering, in addition to recipes, an account of the signs and symptoms of a given disease, before they outline therapy and set forth various recipes and cures. The well-known prototype of this genre in Greek would be Oribasius in his Ἰατρικαὶ Συναγωγαί (*Collectiones medicae*), of whose seventy (or seventy-two) books only a fraction has survived, although the abbreviated versions deriving from them, the *Synopsis* in nine books for his son Eustathius, likewise a doctor, and the four books of *Euporista* for Oribasius's friend Eunapius, the famous fourth-century orator, are extant both in Greek and in at least two Latin translations.

Oribasius's *modus operandi* was twofold. He may (a) use a complete chapter[4] from one of his source texts, or (b) compose a chapter himself by excerpting a running text, as we can see for instance in his account of dietetics for children up to the age of fourteen (*coll. med. lib. inc.* 35). All of that chapter was taken from Galen's *De sanitate tuenda* I 10-12,[5] but Oribasius produced a new Galenic text by the process of cutting and pasting. His procedure becomes a little more intricate in the following ch. 36, which again relies on Galen alone.[6] The next two chapters, on dietetics for children (*lib. inc.* 37f.), are attributed to Mnesitheus and to Rufus of Ephesus, respectively. But since the original writings of both doctors are no longer extant, we are unable to discern whether Oribasius resorted once more to an extensive cut-and-paste job, as he did with Galen, or whether he lifted these chapters as complete units from the works of Mnesitheus and Rufus, still current and available to him in the fourth century AD.[7]

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[4] The important question, at what point a division into chapters was introduced in medical texts, cannot be considered here.

[5] Oribasius had, after all, compiled an anthology (now lost) from Galen alone before he started work on the *Collectiones*.

[6] The different chapter headings, either author (in the genitive) plus title, or 'from such-and-such an author' plus title, may indicate different techniques, but I am unaware of any pertinent studies addressing this question.

[7] There is a study on Oribasius' technique when dealing with Rufus' work on the diseases of the kidneys and the bladder by Alexander Sideras, *Aetius und Oribasius. Ihre gemeinsamen Exzerpte aus der Schrift des Rufus von Ephesos 'Über die Nieren- und Blasenkrankheiten' und ihr Abhängigkeitsverhältnis*, ≪ByzZ≫ LXVII (1974) 110-130; according to him, both depend on another writer, Philagrius.

But then, Oribasius was not the first writer to produce a medical anthology, and certainly not the last. I base my assertion, i.e. that Oribasius had forerunners about whom we know nothing, on a work that is rarely cited by medical historians, because it is, strictly speaking, veterinary rather than medical in content. The fourth-century Latin version of this work, preserved in two manuscripts from the second half of the fifteenth century, is commonly referred to as *Mulomedicina Chironis*,[8] and there we find indeed evidence for cutting and pasting very much along the lines seen in Oribasius. I consider it rather unlikely that the veterinary compiler of the *Mulomedicina Chironis* was the inventor of this procedure; rather, as we can observe more often than once, veterinary medicine took its lead, when it aspired to higher things and scientific prestige, from human medicine. Nevertheless, we shall probably never know which medical anthologies provided that model, because they have not reached us; this may well be because other, later anthologies, were considered more useful and of greater practical value.

Two of the Latin translations of Oribasius[9] contain additional material not included in the Greek, and this was in all likelihood excerpted from Latin sources. When it comes from authors who had written in Greek, we must assume that these excerpts were taken from Latin translations of their works, rather than translated on the spot for inclusion in the Latin Oribasius. Among authors represented there who had written their works in Latin, we find Celsus, Theodorus Priscianus, and Caelius Aurelianus. Paragraphs and chapters from their works were obviously incorporated in those places where the need was felt for a more extensive and detailed treatment not provided by Oribasius, since we are, after all, looking here at the shorter versions of the complete *Collectiones*, i.e. the *Synopsis* and the *Euporista*. I shall not dwell on the intriguing and, as far as I am aware, hitherto unexplored topic of Greek sources present in Latin translation in the Oribasius *Latinus*, apart from just mentioning the

[8] Cf. my *Bemerkungen zu den Autorennamen und zum Aufbau der Mulomedicina Chironis und anderer medizinischer Sammelwerke*, in V. Ortoleva-M.R. Petringa (edd.), *La veterinaria antica e medievale (testi greci, latini, arabi e romanzi).* ≪Atti del II Convegno internazionale, Catania 3-5 ottobre 2007≫, Lugano 2009, 109-117.

[9] Mainly in the **Aa** version, but there are also additions in the **La** version. The only complete edition can be found in volumes 5 and 6 of Œuvres d'Oribase, Paris 1876; for details and partial editions see the *Bibliographie des textes médicaux latins* (see n. 2).

overlap between some passages in the so-called *Eclogae* of Oribasius, found in additions to the Latin *Synopsis*.

The best-documented case of Greek authors surviving in Latin translations of other treatises are the long excerpts on diseases of the stomach, the bowels and the spleen occurring in the Latin translation of Alexander of Tralles. They could derive from more extensive Latin versions of the works of the two Greek physicians Philumenus and Philagrius. At least this seems to be the common opinion, which may be modified as David Langslow progresses with his study of the Latin text of Alexander of Tralles of which he will, for the first time, provide a critical edition.

II. With Alexander of Tralles, who lived in the sixth century and practised, as a Greek physician, mostly in Rome, we have moved from late antiquity to the early Middle Ages. The Latin medical texts, or compilations, or collections, that I am about to discuss could have been in circulation by this time, i.e. in the second half of the sixth century, but there is neither internal nor external evidence to help us with dating them.

A salient feature of the transmission of medical texts in the early Middle Ages, given currency by Gerhard Baader, is referred to in German as *Korpusüberlieferung*, which means that a number of (usually shorter) tracts occur in the same order and arrangement again and again in several manuscripts.[10] Augusto Beccaria had described an old canon of Hippocratic and Galenic works, which can serve as a good example. I want to mention, because we will return to this collection later, the series of six books consisting of Aurelius, Esculapius, two books of Galen, *Ad Glauconem*, followed by the spurious third book or *Liber tertius*, and chapters from book II of Theodorus Priscianus, to which sometimes Alexander of Tralles' *De podagra* was appended. This arrangement probably came about by chance rather than by intention. It must be called a conglomerate rather than a collection, and nobody has investigated so far why some chapters from Theodorus Priscianus' book II were included and others from the very same source were left out.

Although this collection was fairly successful, to judge by the number of surviving manuscripts, it was not the only type current in the early Middle Ages, which for the present purpose I will define as extending to the year 1000.

[10] Unlike an anthology, they were transmitted and copied together by chance and not by conscious choice.

When we focus specifically on medical manuscripts, the early Middle Ages begin more or less with the creation of the Carolingian minuscule just after 780, because only very few medical manuscripts written before that date[11] survive, and most of these (Oribasius being the exception)[12] are just limited to small scraps, perhaps a few stray leaves.

III. The two works I will now discuss in some detail both have their earliest manuscript witnesses in the ninth century. They are the *Liber passionalis* and the *Tereoperica*. The earliest manuscript, no longer complete, of the *Liber passionalis* is Berlin, Staatsbibliothek Preußischer Kulturbesitz, *Phillipp.* 1790.[13] It was written in France in the first half of the ninth century, and it may not be a coincidence that the earliest manuscript of the *Tereoperica*, Paris, *Bibl. Nat.*, lat. 11219,[14] is likewise of French origin; it was written just a little later, around the middle of the ninth century, perhaps at Saint-Denis, and came to be owned by the abbey of Echternach, today on the Luxembourg side of a little stream that marks the border between Germany and Luxembourg.

Both *Tereoperica* and *Liber passionalis* are rather bewildering titles that should be explained. *Tereoperica* is real genuine Greek; it represents the badly mangled form of *Therapeutica*. A *Liber passionalis* was usually one containing the lives of martyred saints; in our case, however, *passio* is not passion or martyrdom, but simply another word for disease. I have always found *Tereoperica* rather unwieldy and prefer making reference to this work by the name of its spurious Salernitan author Petroncellus, to whom it was attributed as *Practica Petroncelli* in the only edition published to date, that by Salvatore

[11] They are listed and described in the volumes of E.A. Lowe's *Codices Latini Antiquiores* (= *CLA*, the manuscripts are numbered consecutively), I-XI and Supplement, Oxford 1934-1971, where the chief interest is palaeographic.

[12] *Par.* lat. 10233, *CLA* 592, end of seventh century.

[13] Whenever feasible, I use this manuscript. Compare also my study *Die Quellen des* Liber passionalis, in Arsenio Ferraces Rodríguez (ed.), *Tradición griega y textos médicos latinos en el período presalernitano.* ≪Actas del VIII Coloquio internacional Textos Médicos Latinos Antiguos, A Coruña, 2-4 septiembre 2004≫, A Coruña 2007, 105-125, with further bibliography on this unpublished text.

[14] My quotations from *Tereoperica/Petroncellus* follow my own transcription of this manuscript (now accessible online at Gallica) rather than De Renzi's text; I have also introduced subdivisions of De Renzi's chapters. Laura López Figueroa, Universidade de Santiago de Compostela, is preparing a new edition of the Latin text, and Danielle Maion, Università di Udine, of the medieval English translation.

de Renzi in his *Collectio Salernitana* (IV, Bologna 1967). De Renzi used a much later Paris manuscript (*Bibl. Nat.*, lat. 14025) which contains not one but two books of Petroncellus; the earlier, ninth-century Paris manuscript lat. 11219 transmits only de Renzi's book 1 of Petroncellus. This was later to be translated into middle English as *Peri didaxeon*.[15]

The *Liber passionalis* relies on one particular text as a backbone for its structure. This text was, as I argued in a paper delivered in Oxford more than ten years ago,[16] the book of Esculapius on chronic diseases, because the *Liber passionalis* usually[17] follows the sequence of chapters in Esculapius and fleshes out this skeleton with material taken from other sources.[18] The book of Esculapius covers, in forty-six chapters, the same material as Caelius Aurelianus in his *Chronic Diseases*, so much so that Esculapius was believed to be a condensed version of Caelius Aurelianus' five books. Rather, their common source is Soranus's treatise on chronic diseases, in the case of Esculapius enriched with excerpts from other works, among which we can only identify *De speciali significatione diaeticarum passionum* by Caelius Aurelianus.

But to return to the *Liber passionalis*. For quite substantial portions of

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[15] The problem presented by the existence of a second book of Petroncellus in some later manuscripts and its authenticity cannot be discussed here. What De Renzi calls the third book of Petroncellus (≪Collectio Salernitana≫ IV, 290f.) is the surviving fragment of another Latin translation of the *Synopsis* of Oribasius, of which I am preparing an edition (Pseudo-Democritus). The edition by Max Löweneck, *Peri didaxeon. Eine Sammlung von Rezepten in englischer Sprache aus dem 11./12. Jahrhundert, nach einer Handschrift des Britischen Museums* [*Harley 6258b*] *herausgegeben*, Erlangen 1896, is the most recent one available; for ch. 36 and 37, see pp. 24-27 (Latin and English on facing pages). As far as I know, nobody has given any thought to the rationale behind the selections from Petroncellus that were, presumably, made by the translator, or the person responsible for his Latin exemplar. On Cassius Felix and the *Tereoperica*, see Anne Fraisse, *Cassius Felix, De medicina. Édition critique, traduction, recherches philologiques et historiques*, Paris 2002, LXXVf.

[16] *Dr Monk's Medical Digest*, ≪Social History of Medicine≫ XIII (2000) 239-251.

[17] I consider deviations from this as mainly due to mechanical problems in the transmission of the *Liber passionalis*.

[18] Cf. my article *Die Quellen des Liber passionalis*, 105-125 (see note 12). This supersedes Rose's analysis in *Die Meermann-Handschriften des Sir Thomas Phillipps*, Berlin 1893, 367-369.

its text, I have been unable to identify the source used by the excerptor. Even Valentin Rose was content in such cases with just referring to a hypothetical source he calls **Aa**, shorthand perhaps for *Auctor antiquus* or *antiquissimus* or *alter* -; but we should not despair. Our knowledge of early medieval medical texts continues to grow through first editions of works vaguely known but never printed before. On the Greek side, examples are the Byzantine medical manual attributed to an otherwise unknown Paul of Nicaea,[19] or the Anonymus Parisinus,[20] important especially because of its doxographical content; and while Barbara Zipser's edition of John the Physician is now well known to our readers,[21] the *Prontuario medico* attributed to Demetrios Pepagomenos,[22] short but belonging to the same genre, or the *Manuale della salute* of Ailios Promotos,[23] might not even have been heard of by everybody. In Latin, there is the pseudogalenic *Liber tertius*,[24] and some day in the not too distant future, I hope to publish an edition of the *Liber Byzantii*. The last two are Latin translations of Greek originals not extant in manuscripts, or at least not identified so far.

In a number of cases, Paul of Nicaea and the *Liber Byzantii* provide parallel material for the *Liber passionalis*; and we also notice some overlapping with Petroncellus. At present, we are rather at a loss whether these parallels should be seen as indicative of direct borrowing either way or are just indicative

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[19] *Paolo di Nicaea. Manuale medico*, testo edito per la prima volta, con introduzione, apparato critico, traduzione e note a c. di Anna Maria Ieraci Bio, Napoli 1996.

[20] *Anonymi medici De morbis acutis et chroniis*, ed. with comm. by Ivan Garofalo, transl. into English by Brian Fuchs, Leiden 1997.

[21] Barbara Zipser, *John the Physician's Therapeutics. A medical Handbook in vernacular Greek*, Leiden-Boston 2009. Cf. also Ioanna Oikonomu-Agorastu, *Kritische Erstausgabe des Rezeptbuchs des Cod. Par. gr. 2316, f. 348v-374v*, PhD thesis Köln 1981, Thessaloniki 1982, who lists some more editions of *iatrosophia*.

[22] *Demetrio Pepagomeno. Prontuario medico*, a.c. di Maria Capone Ciollaro, Napoli 2003.

[23] *Elio Promoto Alessandrino. Manuale della salute*, a.c. di Daria Crismani, Alessandria 2002.

[24] *Galeni qui fertur ad Glauconem. Liber tertius ad fidem codicis Vindocinensis 109*, editionem curavit Klaus-Dietrich Fischer, in I. Garofalo-A. Roselli (edd.), *Galenismo e Medicina tardoantica. Fonti greche, latine e arabe.* ≪Atti del Seminario Internazionale di Siena 2002≫, Napoli 2003, 283-346.

of the use of one or several common sources, sources which, sadly, still elude us. One source, however, that we are able to identify with confidence are the *Chronic Diseases* of Caelius Aurelianus. Since this work has not survived in any complete manuscript – only a few folios from the manuscript on which the Renaissance edition was based are still extant –, such excerpts acquire far greater importance and value than they would otherwise possess, since even in their mangled and debased state they may contain some clues which then allow us to correct Caelius Aurelianus' text.

For those portions of the *Liber passionalis* where a source remains unidentified, the conclusion must be that these represent fragments of medical works from antiquity, in most cases I would suggest Greek works not preserved elsewhere, and it is certainly surprising that the study of these fragments has not attracted more interest from scholars.

The structure of the *Liber passionalis* is usually simpler and more straightforward than that of Petroncellus. The *Liber passionalis* may be seen as a simpler kind of patchwork rather than a tapestry, if I may borrow a simile.

I would now like to examine one of the more difficult sections, chapter 56 of the *Liber passionalis*, which deals with an acute disease, or rather several, under the title *De spasmis et tetanicis, On spasm and tetanus*. The purpose is to (a) demonstrate the pattern of borrowings mentioned earlier, (b) to make you aware of the precarious state of the transmitted Latin text, which seriously interferes with our understanding and, as a consequence, the identification of underlying sources, and (c) to introduce you to those fragments of medical writings not preserved elsewhere. I have chosen a medical condition covered both in the *Liber passionalis* and in Petroncellus.

Since Esculapius' treatise, as I said earlier, dealt only with chronic diseases, all material for this chapter of the *Liber passionalis* must needs have come from somewhere else. As we observe, Theodorus Priscianus and Caelius Aurelianus were the main contributors for differential diagnosis of the condition, with Theodorus Priscianus providing not just the description or definition of spasm at the beginning of the chapter, but also a fair chunk of the therapy found in the second half of the chapter. Theodorus Priscianus refers to tetanus, with its subspecies *emprosthotonus* and *opisthotonus*, as *spasmus*, as does Aurelius. Other authors differentiate[25] and may make a distinction be-

[25] Leo *Syn.* 2,17f. (*Anecdota medica Graeca*, e Codicibus mss. expromsit F.Z.

tween spasm and tetanus with its subspecies as a sequela of trauma (surgical interventions are expressly mentioned here),[26] or arising without trauma.

We will now look at the two definitions of *spasmus* that we need for the beginning of the chapter in the *Liber passionalis*. Aurelius (20 p. 721 Dbg./*Gloss. med.* p. 82,8-12 Heiberg) defines spasm as follows:

> *Spasmus est tensio atque contractio partium corporis cum ualde acuta strictione atque dolore et a planta usque ceruicem recta tensio propter ualidam flegmonen. Hi ceruicem uix mouent, et si loqui uoluerint, ceruicis nerui illis dolebunt.*
>
> Spasm is a tension and contraction[27] of parts of the body with a very acute drawing together and pain, and a straight tension from the feet to the neck because of a strong inflammation. Such patients hardly move their neck, and whenever they want to say something, they feel a pain in the muscles of their neck.
>
> Theodorus Priscianus (II 30): *Spasmus appellatus est ex tensione uel protractione neruorum et uicinorum musculorum ceruicis quam maxime inpatienti dolore compatientis, ut etiam ad respondendum os facile aperire non possint. nam sub hoc titulo spasmi uariae sunt huius passionis figurae. spasmus per omne corpus extensionem rigidam temporalem quidem habet, sub qua ita tenduntur ut sub uno schemate iacentes tensione molesta et inflexibili teneantur.*
>
> Spasm has its name from a tension and contraction[28] of the sinews and neighbouring muscles of the neck with unbearable pain of the sufferer, so much so that the patient can only open his mouth with difficulty to give an answer. Moreover, spasm is the general name

Ermerins, Leiden 1840) deals first with spasms and thereafter with the three kinds of tetanic spasm, i.e. tetanus, emprosthotonus, and opisthotonus.

[26] See also *Anon. Par.* 7,3,22, see n. 20; Archigen. ap. Aët. VI 39 p. 181,12 Olivieri.

[27] Compare Scrib. Larg. 255, on *opisthotonus*, where we meet the same *tensio et contractio neruorum.*

[28] Theodorus Priscianus seems to be the only Latin writer to use *protractio* rather than *contractio*, so one would be tempted to correct his text rather than assume a meaning not attested elsewhere.

> of the condition which manifests itself in various ways. Spasm is a stiffening but temporary extension in the whole body, and patients suffer spasms in such a way that they lie in one position and are held in disagreeable and unbendable tension.

When examining the first section in the *Liber passionalis*, it becomes evident that its compiler will have borrowed the first six words of his text from Aurelius before continuing with Theodorus Priscianus. We are also acutely aware that we have great trouble to make sense of the words in our two manuscripts of the *Liber passionalis*, so much so that we will now turn to Petroncellus. We notice that both works present the same text with only insignificant variations, and these will most likely prove to be accidents of transmission. The decisive argument for linking these two texts is not that both start with Aurelius and shortly after continue with Theodorus Priscianus. If we keep reading, we see that the parallels continue right to the end of 56,4 of the *Liber passionalis*[29] and 36,4 of Petroncellus. Even more important is the fact that both share a lacuna which starts after *contractio habet* (*Lib. pass.* 56,2/*Petronc.* 36,2), and both continue with *atque*. Likewise, they share a portion of the recommendations for therapy, *Lib. pass.* 56,10-12 and *Petronc.* 36,5f.

To account for this strong resemblance, we may think of three different scenarios: A copies B, B copies A, or A and B both draw on the same source C. Copying from each other seems less likely in the present case, because then we would expect to see more material common to both works in the many other chapters of their text. This observation therefore bolsters the hypothesis that both the *Liber passionalis* and Petroncellus drew here on a common ancestor, where the lacuna I mentioned (*Lib. pass.* 56,3f., *Petronc.* 36,3f.) was present. This is also a fact to be taken into account when discussing possible dates for these three works, i.e. the *Liber passionalis*, the *Tereoperica*, and their (hypothetical) common ancestor.

I wish to exploit the text before and after the lacuna still further. We read at its end that this disease received its name from the heart. Here, a section in Isidore of Seville's *Etymologies* (*Orig.* IV 6,11) will come to our aid:[30]

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[29] Chapter numbers correspond to the manuscripts (there are a few variations between St. Gall and Berlin). I have divided the chapters further for ease of reference.

[30] Discussed earlier by Arsenio Ferraces Rodríguez, *Aspectos léxicos del Libro*

> *Spasmus Latine contractio subita partium aut neruorum cum dolore uehementi. Quam passionem a corde nominatam dixerunt, qui*[!] *in nobis principatum uigoris habet. Fit autem duobus modis, aut ex repletione, aut ex inanitione.*[31]
>
> Spasm, in Latin a sudden contraction of parts or muscles accompanied by violent pain. They claim that it received its name from the heart, being the chief centre of strength in our bodies. It (spasm) is produced in two ways, either by (excessive) fullness, or by (excessive) emptiness.

If you fail to see the connection between *spasmus* with the word for heart, be it Greek or Latin, I must confess that I am equally at a loss. Nevertheless, I remembered having read something similar before, in Caelius Aurelianus (*Diaet. pass.* 39):[32]

> *Unde nomen cardiaca passio*[33] *cepit? a corde quod Graeci καρδίαν appellant. hoc enim grauius ex ipsa passione uexari multi adseuerant, alii uero quod sit letalis passio, a corde nominatam dixerunt, quod in nobis principatum uigoris habet.*
>
> Where did the cardiac disease get its name from? From the heart, which the Greeks call *kardia*, because many authorities assert that it is affected by this condition rather badly, while others say that as a fatal condition it received its name from the heart, which is the chief source of strength in our bodies.

We might wonder if somebody got Isidore's file cards mixed up, which, however, need not have been the case,[34] since the same assertion appears in the *Glossarium Ansileubi* (*Gloss. med.* 82,13-19 Heiberg):

IV de las Etimologías en manoscritos médicos altomedievales, Apéndice: A vueltas con el espasmo, in Arsenio Ferraces Rodríguez (ed.), *Isidorus medicus. Isidoro de Sevilla y los textos de medicina*, A Coruña 2005, 95-127, at 97-99 and 124-127.

[31] *Fit–inanitione* derives from the commentary Lat-A on the Hippocratic aphorisms, *Aph.* 2,26. For πλήρωσις and κένωσις cf. also Orib. *Syn.* VIII 15,1 (with Gal. *Trem. palp.* 8. (VII 640f. Kühn).), Paul. Aeg. III 19 (166,21 and 24 Heiberg).

[32] Cf. Cael. Aur. *Cel.* II 30,62.

[33] *Cardiacae passionis* is the reading of the only manuscript, *Aug.* CXX, and printed by Rose, *Anecdota* cit. II 229.

[34] As argued by Ferraces Rodríguez, *Aspectos* cit. (see n. 29) 124.

> *Spasmus: est tensio atque contractio partium aut neruorum cum dolore uehementi atque acuto. Alii, quod sit letalis passio, a corde nominatam dixerunt, quod in nobis principatum uigoris habet. Hippocrates autem dicit, si* [*in*] *spasmo febris superueniat, signum esse salutis, si autem super febres spasmus, malum.*
>
> Spasm is the tension and contraction of parts or muscles with a sharp strong pain. Other authorities say that is was named after the heart, because it was a fatal condition, because the heart is the chief source of strength in our bodies. Hippocrates, however, says that fever arising after a spasm is a sign of improvement, but spasm occurring after fevers, a bad sign.

The *Glossarium Ansileubi* or *Liber glossarum*, to be dated no later than the eighth century, drew on a great variety of works for its glosses or definitions, and the manuscripts that were used for this project were often superior in quality to those available to us for the complete work. In many cases,[35] the *Glossarium* indicates its source or author by name. This, however, is frequently different from the name of the author we know; e.g. the excerpt on *spasmus* from Aurelius is introduced as *Galeni*,[36] other quotes are said to be taken *ex libris medicinalibus*, or come from *pandecti*[37] *medici*; both leave us completely in the dark and do not correspond to the title of any compilation known at present. The quote I just cited comes without an indication of the source, but you will have spotted the similarity of the first words with Aurelius. This is, as it turns out, no mere coincidence, because this passage in the *Glossarium* repeats the information found in Caelius Aurelianus (*Diaet. pass.* 32), and we know that both Aurelius and Caelius Aurelianus based their accounts on the lost Greek works of the second-century Methodist doctor Soranus:

> *Ex quibus adprehendis spasmo laborantem? ex non uoluntaria tensione atque conductione partium uel neruorum, cum dolore uehementi atque acuto et pulsu paruo.*
>
> How do you recognize that a patient suffers from a spasm? From the involuntary tension and contraction of the parts or the mus-

[35] At least for the medical material edited separately by Heiberg.

[36] He takes pride of place.

[37] The correct Latin plural is *pandectae* πανδέκται.

> cles, and at the same time strong and sharp pain and a small pulse.

And now we have, at long last, identified the text after the lacuna in both the *Liber passionalis* and Petroncellus as deriving from *Diaet. pass.*,[38] with the additional bonus of exonerating Isidore. Obviously, Isidore's enigmatic entry on spasm was taken from a text strongly resembling *Gloss. med.* p. 82,13-19, which included the quotation from Hippocrates' *Aph.* 2,26,[39] a quote present in the *Liber passionalis*, in Petroncellus,[40] and likewise in Aurelius, but paraphrased in Theodorus Priscianus without the name of Hippocrates.[41] As a consequence, we will conclude that this introductory section on spasm in the *Liber passionalis* and in Petroncellus was in existence before Isidore, who died in 636, finished compiling his *Etymologies*. Unfortunately, this is of no great help with dating either the *Liber passionalis* or Petroncellus, but it provides further evidence for the compilation of medical (and veterinary)[42] books in Latin. Should we look for additional corroboration beyond the *Libri medicinales* and the *Pandecti medici* used as source for the *Glossarium Ansileubi* mentioned above, then we can find it in Cassiodorus (*Inst.* I 31,2), who recommended it to his monks at Vivarium, the monastery in Southern Italy he founded in 552, if they had no access to Greek learning *(si uobis non fuerit Graecarum litterarum facundia), anonymum quendam, qui ex diuersis auctoribus probatur esse collectus.*

Now we return to our analysis of ch. 56 of the *Liber passionalis*. After a short distinction of the three kinds of spasm, tetanus of the neck, *opisthotonus*

[38] The origin of the error must be sought in an imperfect manuscript where Cael. Aur. *Diaet. pass.* 32 had been merged with the second half of *Diaet. pass.* 39.

[39] The wording is different from the so-called Ravenna version of the Latin translation of the Aphorisms.

[40] Same text, but placed before the first section on therapy in the *Liber passionalis* (56,9) and after it in Petroncellus (36,7).

[41] Theod. Prisc. II 30 *haec accidentia corporibus frequenter sine febribus euenire consuerunt. quae quibus superuenerint causam soluunt. superuenientes uero febribus uitae semper periculum minitantur.* The aphorism is also quoted in Paul. Nic. 125,22-24 Ieraci Bio, and in *Trattato delle cure*, p. 276 Giacosa (Piero Giacosa, *Magistri Salernitani nondum editi. Catalogo ragionato della esposizione di storia della medicina aperta in Torino nel 1898*, Torino 1901), in a garbled form: *quod super si uenerit (sc. febris), spasmum soluit, ut ypocras ait: spasmum in febrem etc.*

[42] Vegetius, *mulomedicina*.

and *emprosthotonus* (56,5), the description of patients suffering from these varieties is quoted in full (as far as we can tell) from Cael. Aur. *Diaet. pass.* 33-35 (= 56,6-8), for which the compiler must have had access to this work. If so, why did he not take the opportunity to fill the gap between *Lib. pass.* 56,3 and 56,4 and enter the complete text of *Diaet. pass.* 32 and 39? The compiler or redactor of Petroncellus would have felt no need for these passages here in ch. 36 because he was going to deal with these varieties in the following chapter (37), which is based largely on Cassius Felix ch. 38, and therefore he can omit at this point *Lib. pass.* 56,5-8 without any loss of information. Indeed, he will quote Cael. Aur. *Diaet. pass.* 33 at *Petronc.* 37,3 and 35 at *Petronc.* 37,5. In ch. 36, Petroncellus also locates the Hippocratic aphorism 2,26[43] after the section on therapy, which is again common to Petroncellus (36,5f.) and the *Liber passionalis* (56,10-12) and now follows.

The very wording of this aphorism deserves some attention. It is different from both the so-called Ravenna version, and from the so-called *translatio antiqua* (a version produced perhaps towards the end of the eleventh century); the former reads in Müller-Rohlfsen's first critical edition:

> *Febrem super spasmum fieri melius quam spasmum super febrem,*

which is a fairly literal rendering of the Greek text,[44] translated by Jones as follows:

> It is better for a fever to supervene on a convulsion than a convulsion on a fever.

If we compare the *Liber passionalis* (56,9),[45] the Latin there sounds more like a paraphrase:

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[43] De Renzi cit. 215 refers to 'Coaqu. sent. 156 e 157' rather than aphorisms. Certainly, Coac. 156 and 157 in Littré's edition deal with headaches and cannot be meant here.

[44] Πυρετὸν ἐπὶ σπασμῷ βέλτιον γενέσθαι, ἢ σπασμὸν ἐπὶ πυρετῷ. (*Hippocrates*, with an English translation by W.H.S. Jones, IV, London-Cambridge, Mass. 1931, 114)

[45] The second half is missing in Sang. 752, therefore I quote from *Phillipp.* 1790.

> *Yppocrates autem dicit quoniam si spasmum febris obuenerit,*[46] *signum est salutis; si autem febrae spasmus, malum est.*
>
> Hippocrates, however, says that if fever arises after a spasm, it is a sign of improvement; if, on the other hand, spasm after a fever, it is bad.

Petroncellus is hardly different (36,7):

> *Ippocras auctor dixit si in pasmum febris obuenerit, signum salutis est; si autem super febrem spasmus euenit, malum est.*

An interesting difference between both texts is *Yppocrates autem* and *Ippocras auctor*. While *autem*, or rather an abbreviation for this word, could perhaps be misread as *auctor*, this is less likely to have happened the other way round, and this leads to the conclusion that the *Liber passionalis* cannot, in this instance, derive from Petroncellus. Again, *autem* and not *auctor* is the reading of the *Glossae medicinales* (p. 82,17 Hbg.). It is badly placed or rather not required by the context in the *Liber passionalis*, and in my opinion shows the imperfect manner of excerpting.

Autem is furthermore attested by Aurelius (20):[47]

yppocras autem dicit quoniam si spasmo febris superueniat, signum esse salutis; quod si spasmus febri[*s*] *superueniat, contra periculi signum est.*

Similarly, it may be significant that both Aurelius and *Liber passionalis* introduce the declarative sentence after *dicit* with the same conjunction *quoniam*, rather than *quod, quia* or choosing the classical a.c.i. construction.

Let me proceed to one final point in our comparison, the section on therapy that is shared by the *Liber passionalis* (56,10-12) and Petroncellus (36,5f.). In both works, the Latin text is in such a bad state that it is not easy to follow the recommendation for therapy. The mention of *causa constricta*[48] must indicate that the source for this passage is Methodist. This limits our search to Caelius Aurelianus and Aurelius, neither of whom provides a close parallel.

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[46] *Obuenire* for *superuenire* probably had its origin in the faulty reading *subuen-*; FEBRISUBUENERIT in *scriptio continua* was then changed to *febris obuenerit*.

[47] Replaced by *enim* in Gariopontus 5,2 (citing the Basel 1536 ed.).

[48] Perhaps to be corrected in *constrictiua*.

Therapy starts with fomentations, anointing with Sicyonian oil, and cataplasms, in order to bring about relaxation. The Latin adjective *laxatibilis*, attested twice by both witnesses, is not known from anywhere else,[49] which suggests to me that the passage is indeed a fragment taken from an unknown Methodist work in Latin translation. Also recommended is a rinsing of the mouth (*collutiones oris*),[50] with warm water, as we learn from Cael. Aur. *Cel.* III 8,77.[51] Moreover, defecation is to be encouraged with an enema containing oil in which rue and castoreum have been boiled, and more fomentations are applied, for which roasted salt immersed in hot water is specified,[52] and likewise warming ointments, among them one prepared from the plaster made with plant juices (διὰ χυλῶν), and with oils made from seeds with relaxing and warming properties.

The next four paragraphs, *Lib. pass.* 56,12-15, were incorporated by the compiler of Petroncellus in his next chapter, 37 (37,8; 37,11; 37,14; 37,19). It is surprising to see that the same excerpts from Theodorus Priscianus that are drawn on twice in Petroncellus 36 and 37 show some variation in their phrasing. All this makes it abundantly clear how much more work will be needed before we have sufficiently analysed and understood what went on in these medical compilations, how they are related, and what additional material for the study of ancient and medieval medicine they may yield.

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[49] It is still found in the late manuscript that de Renzi prints in his edition of Petroncellus, cit. 215.

[50] The *ThlL s.v. collutio* cites Aurelius (as Cael. Aur. *Acut. exc.*) for the spelling *colluitio* found in both our sources.

[51] He uses <*os*> *colluere aqua calida* in this passage, but the noun *collutio* is not rare. Rinsing the mouth is not found in Aurelius.

[52] Paul. Nic. 125,59 says that the sacks containing the salt should be immersed in hot water, which seems more reasonable.

Appendix:

Liber passionalis (*Berol. Phillipp.* 1790; *Sang.* 752)

LVII de spasmis et taetanicis dicit [Aurel. 20; Theod. Prisc. II 30 p. 127,11-15]
56,1 *spasmus est tensio atque contractationem parci neruorum uel uicinorum musculorum ceruicis cum dolore uehementi quam maxime inpatienti dolore cum patientur ut etiam in respondendum os facile aperire non possunt. Nam sub hoc titulo sparmis uariae sunt hui<u>s passiones figurae.*
[Theod. Prisc. II 30 p. 127,15-128,1] **56,2** *Spasmus per omne corpus tensionem frigida temporalem quidem habet ita tenduntur ut sub uno scismate iacentis tensionem molesta et inflexa simile teneatur aut uirum pronus contractio habet* <...>
[Cael. Aur. *Diaet. pass.* 32] **56,3** < ... > atque acuti ex pulei paruo
[Cael. Aur. *Diaet. pass.* 39] **56,4** < ... > Ali[a] uero quod si<t> [il] litalis passio a[d] corde nominata dixerunt quod nobis praecibato uigoris addebit
56,5 Titanice uero passionis sunt tres ceruices titanus opystotonus inprostotonus;

Petroncellus (*Par.* lat. 11219; de Renzi, Coll. Sal. IV)

XXXVIII Ad <s>pasmos uel ceruicis dolorem

36,1 Spasmus est tensio et contractio partium neruorum uel uicinarum musculorum. ceruices cum dolore uehementi maxime contigit patiente dolore· os facile aperire non possunt sub hec titulum uarie sunt passiones·

36,2 Spasmus enim per omne corpus frigidam habet temperantiam. Ita adtendunt ut sub uno scemate iacentis tensionem molestam et inflexam simile teneatur· Aut uerum prunus contractio habet <...>
36,3 < ... > et quae acuta ex pulso paruo·

36,4 Alia uero si talis passio ad corde nominata dixerunt quod nobis principato figuris addebent·

Liber passionalis (*Berol. Phillipp.* 1790; *Sang.* 752)

[Cael. Aur. *Diaet. pass.* 33] **56,6** Quomodo titonicum adpraehendis ex gutture in longitudinem extensum aut inflexibile positione clura cum dolore uehementi et oluria musculorum qui buccis insunt robore uultus densio conpraehensione ut mutus aperire non possunt contradictionem neruorum impetus ciborum

[Cael. Aur. *Diaet. pass.* 34] **56,7** ex quibus opistotonicum adprehendis ex supinis aptum hoc est contractum a posteriore parte conducta ceruice ad dorsum cum nimia tensione atque uehementi dolore dorsi et clunum surarum quoque contracto et manum et digitorum

[Cael. Aur. *Diaet. pass.* 35] **56,8** ex quibus enprosto-tonicum adprehendis ex conductione gutturis in anterioris partis effecta atque mento pectore adiuncto tensione ill<i>orum et precordiorum continuam ictum de certo et digitorum inplexibile flexionem quæ supradicta est passionis si ex uulnere fuerint effecti in periculo in sanitate difficilis iudicantur.

Petroncellus (*Par.* lat. 11219; de Renzi, Coll. Sal. IV)

37,3 < . . . > bucca et gutture inflectibile po<si>tione dura ut mutus· os aperire non possunt ex contradictione neruorum.

37,5 Enprostotonum sic intellegis ex conductione gutturis in anterioris parte effecta. Ad quam mento pectore adiuncto tensione illiorum et praecordiarum contigit si < . . . > in supra dicta passione uulnera euenirent effecta periculosam et insanabilem sanitatem demonstrat·

Liber passionalis (*Berol. Phillipp.* 1790; *Sang.* 752)

56,9 Yppocrates autem dicit [*aph.* 2.26] quoniam si <per> spasmum febris obuenerit signum est salutis si autem super febrae spasmus malum est
56,10 De cura dicit quomodo hi curantur horum <i>storum ergo uaporationem opponendum laxatibilis adiutoriis quoniam causa constrict<iu>a est nimio et unguere siccion<i>o oleo et cataplasmatis utimus laxatibilis et colu[i]tionis oris
[cf. Paul. Nic. 125, 55?] **56,11** et post c<ol>luitione probis <s>cybellarum prouocationem in c<list>ere oleo rutatio cum castorio et uaporationis adhibendum maxime ex salibus uaporationem utimur ex salibus tostis in sacello inmissi calid// feruenti locis extensis uel contractis opponendum est uel locis dolentibus p//tio opponimus medicamen diacilon et olei semilibus laxaturiis et calidis
56,12 contra autem contractionem ceruicis hoc est tetanus tensionem et in rectum uel opistotonum contractus ad spina dorsi si uiris uel aetas permiserit et sine febrae fuerit fleotomia adhibitus
56,13 Quod si improstotonicus fuerit et mentum pectore infigat deinter scapulas cucurbitare cum escarificationem fieri oportebat et tapsie sucum unguentum extensarum partium

Petroncellus (*Par.* lat. 11219; de Renzi, Coll. Sal. IV)

<s>pasmum febris obuenerit signum salutis est· Si autem super febrem spasmus euenit malum est·

36,5 Cura spasmus Id est uapora-tionis laxatibilis adiutoriis ubi causa constricta est nimis· et ungere oleo sicionio et cataplasma· laxatibilis et coluitionis auris et dabis

36,6 preter coluitionem clisteriabis oleo rutatio cum casturio propter scibellarum prouocationem et uaporationes ex salibus tussis in sacellis missi calidis feruenti locis dolentibus opponentis et unguere debes fortiter cum ipsa uaporatione ex unguentis calidis in his locis ponemus medicamen deaquilon et oleo laxatiuo et calido·

37,8 Si aetas uel uires permiserint et febris non est fleotomandi sunt de uena mediana. et si[i]n minus praeualuerint inter scapulas sanguinem detrahendum est per scarificationes·

37,11 si enprostotonicus fuerit et mentum pectore infricatus inter scapulas cocurbitare cum excalefactione fieri oportet· et tapsie sucum extensura perunguis·

Liber passionalis (*Berol. Phillipp.* 1790; *Sang.* 752)

56,14 et castorium datum cum mulsa et modicum piperis mixtum
[cf. Theod. Prisc. II 31 p. 128,16-129,4] **56,15** *Cybos autem damus digestibilis sucus apula buccellas canditas in aqua calida muturatae etiam frequent<er> mellegratum infusum fouendi erunt*
56,16 *Et si adiutoriis supradictis releuatis etiam oris coperit inpedimentu cadere maluas sicoctas et minuto speciculis anetino iuscello coctus plenam iam confidentiam suam ministrabo frequenter etiam cum membribus pticmata ex inomelle temperato lactis his negandus copia*
[Theod. Prisc. II 31 p. 129,4-8] **56,17** *Omnibus uero tensionibus post fomenta calastica ex oleo sitionio unctione adhibebis et acoba calidiora et cataplasmata calastica loca diutius mitigabo post clisteris uero calastico expositis exquibalis aut uti nos conuenit*
[Theod. Prisc. II 31 p. 129,10-13] **56,18** *Nam et carbonibus proximis calentibus lectus et strami<n>a calidiora procurabis Cyrotaria uel acoba ex oleo cyprino his frequenter adhibenda sunt et adipem leonis aut galbano cummixtis par[s] beneficium procurauerunt*

Petroncellus (*Par.* lat. 11219; de Renzi, Coll. Sal. IV)

37,14 Castorium cum mulsa modice piper potui da

37,19 talem cibum accipiat degestibilem. Sucus apola bucellas candidas in aqua calida maturate frequenter accipiat.

36,14 Item post fumenta unguis loca dolentia et acoba calidiora adhibebis· **37,15** unguento acobi calidiora et cataplasma calastice loca dolentia medicabis

Liber passionalis (*Berol. Phillipp.* 1790; *Sang.* 752)

[Theod. Prisc. II 31 p. 129,13-130,5] **56,19** *dabis etiam interea potionis huiusmodi castorio puluerem cum melle gratro similiter dabis aliquoties piperis intermisces dabis silu<i>o cum piper et mellegrato similiter dabis diuriticis potionis dabo †sopure† < . . . > earum beneficiis consueuerunt*

Petroncellus (*Par.* lat. 11219; de Renzi, Coll. Sal. IV)

36,15 dabis etiam inter eas potiones castorie puluis cum mell. grato aliquotiens dabis silfio cum piper et melgrato. Aliquotiens dabis diuriticas potiones· **37,16** Puluera ex casturio cum mell. grato dabis aliquotiens. silfio cum piper et mell. grato dabis Similiter diuriticam potionem dabis

Key to fonts and colours:

Bittersweet: Change of sequence

Emerald: Theod. Prisc.

RubineRed: Cael. Aur.

Slanted: Same as Theod. Prisc.

`Typewriter: Same as Cael. Aur.`

The fate of a Greek medical handbook in the medieval West: the *Introduction, or the Physician* ascribed to Galen

Along with genuine Galenic works, several pseudo-Galenic treatises made it through the Middle Ages as reference books for the purpose of teaching medicine.[1] They were in fact deemed inauthentic much later, during the Renaissance;[2] in late antiquity and the Middle Ages, by contrast, they were usually perceived as genuine works by Galen and formed the basis of medical learning. Among them, *the Introduction, or the Physician*, ascribed to Galen,[3] had a most interesting fate. The aim of this paper is to examine several moments in the history of this text, in order to highlight the malleable nature of ancient medical texts in the hands of medieval readers, especially the Byzantines.

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[1] Medieval doctors, in order to teach medical students, used the Galenic material. As a result, some of his works were 'updated' to adapt to the increasing knowledge (e.g. remedies, operations) of the Byzantines. Naturally, all the material ascribed to Galen was subject to such changes. By contrast, Hippocratic works were transmitted with limited changes and adaptations for teaching purposes: in fact, Hippocrates' texts were much revered, but of little use. Rather, Hippocrates' opinions were studied through Galen's texts. Among the pseudo-Galenic works that were popular in the Middle Ages is the collection of medical definitions called *Definitiones Medicae* (XIX 346-462 Kühn), about which see J. Kollesch, *Untersuchungen zu den pseudogalenischen Definitiones Medicae*, Berlin 1973.

[2] The *editio princeps* of Galen's works in Greek, the 1525 Aldine is the first collection to set apart the *notha biblia* (in volume IV). The editors did not make any statement about the reasons for their selection, but the issue became an object of interest among scholars, though without any systematic method of discrimination: Jacobus Sylvius (Jacques Dubois)'s work, *Ordo et ordinis ratio in legendis Hippocratis et Galeni libris* (1538) is a landmark in the discussion of authenticity.

[3] *Introductio sive medicus* (XIV 674-797 Kühn), about which now see my edition (*Galien. Oeuvres,* III. *Introduction; Médecin*, Paris 2009).

Let us state immediately that this undermines the common assumption that the key medical works to be read, and thus transmitted through time, were the sixteen Galenic works of the Alexandrian Canon. In fact, as the history of a text like the *Introduction, or the Physician* shows, the material available to doctors was more diverse than this limited collection of works, and the perception of which medical texts should 'count for something' was different from ours. Thus, the West apparently displayed distinctive interests in medical books; in the East, the physicians of Alexandria, and later prominent translators such as Hunain ibn Ishaq imposed a rather different view of the corpus, based partly on authenticity, partly on the contents of the available treatises – and, definitely, the so-called Alexandrian canon had more relevance there than in the West.

The so-called Galenic corpus[4] is everything but definite – in fact, the very term of 'corpus' could be deemed inappropriate, since Galen himself did not control the publication and the diffusion of his works, and, in turn, many works not by him were transmitted under his name. Galen also thought that some of his works were lost after the fire,[5] such as *On Prognosis*, which was in fact transmitted to us. Therefore, it seems more adequate to talk of an open tradition, a basic collection to which elements were successively added, each with a specific textual transmission and a chaotic fate.

The pseudo-Galenic *Introduction, or the Physician* is a medical handbook of disputed date and authorship.[6] It could be contemporary with Galen or of later provenance; the *terminus ante quem* is a partial late antique Latin

[4] About which see V. Boudon-Millot's general presentation in her introduction to *Galien. Oeuvres,* I, Paris 2007.

[5] As we learn from his commentary to Hippocrates' *Epidemics* VI (edited by Pfaff in ≪CMG≫ V/10,2,2, p. 495,2-12), Galen believed that his work titled *On Prognosis*, written in 178 AD, was lost, after his own copy was burnt in the great fire of 192 AD in Rome, with most of his other works, his library, and his precious stock of medicines and instruments (about the extent of his loss now see the newly rediscovered *On the Avoidance of Grief*). As Galen fails to mention *On Prognosis* in the catalogue of his own works (*On my Own Books*) that he wrote at the end of the century, it is likely, as V. Nutton convincingly argues in his 1979 edition (Galen *On Prognosis* ≪CMG≫ V/8,1, pp. 49-51), that he had not by that time recovered a copy of the treatise and believed it to be lost forever.

[6] On this matter, see my edition XXXVIs. and my forthcoming article *What does Pseudo-Galen tell us that Galen does not? Medical schools in the Roman Empire*,

translation of which I shall say more in a moment. The *Introduction* is one of the very few ancient texts, together with the *Definitiones Medicae* (spurious as well, and equally popular), that provide us with an introduction to medicine dealing with virtually every aspect of medicine.[7] The text begins with eight chapters on the history, the nature and the parts of medicine that sum up most of the assumptions of the time on the origins and the merits of the art, with some elements of mythology that embellish the history, and happen to be common place in ancient encomiums of arts: medicine, according to Pseudo-Galen, is an art, not a science, but it is a noble art, that was discovered and practised by gods and heroes before it was brought to perfection by Hippocrates. The text then proceeds with a relatively brief discussion of physiology and anatomy (chapter 9-12), before turning to more practical aspects of medicine, about the names, descriptions and treatments of various diseases, including eye diseases (chapter 16) and general as well as bone surgery (chapter 17-20).

The text is remarkable not only for its comprehensiveness, but also for a variety of features, linguistic and historical, and for its distinctive elements of doxography. It was transmitted rather early on under the name of Galen: all forty Greek manuscripts display the *epigraphe*: *Galenou Iatros: Eisagoge*, and, although the oldest manuscript is not earlier than the twelfth century AD, the *epigraphe* must be older, for the text appears in two separate families of Greek manuscripts that hint at a much earlier (perhaps ninth century) archetype. Moreover, a Latin manuscript of the tenth century AD transmits a small bit of the text (in Latin) under the name of Galen.[8] It is thus likely that the text was considered authentic at an early date. In Galen's time, however, things may have been different: at the beginning of *On my own books*, Galen mentions a book with the same *epigraphe* (thus circulating under his name), about which two friends argue at the books market in Rome.[9] One of them, whom Galen describes as thoroughly educated, dismisses the book as being a fake, on grounds of striking differences in style with genuine Galenic texts. If the story is true, it may well be that the *Introduction, or the Physician* that

in P. Adamson-J. Wilberding (edd.), *Galen and Philosophy*, to appear as a ≪BICS Supplement≫.

[7] One of the key absent topics being gynaecology.

[8] The Latin manuscript is *Vindobonensis* lat. 68, about which see below.

[9] There is a discussion about the exact form of the *epigraphe* in Galen's text: only two manuscripts have *Galenos Iatros*, corrected by Hermann Schöne into *Galenou Iatros*.

we possess is in fact the forgery that circulated in Galen's own lifetime with the same *epigraphe*. At any rate, for Galen and some of his educated fellow citizens, it was a fake – but it may well have been considered authentic in other circles; that would explain its later incorporation in the collection(s) of Galen's works.

The *Introduction, or the Physician* remained virtually unknown in the East: the oriental tradition has nothing to tell us about this text, although there is a faint possibility that it was part of the Alexandrian material used by the Arabs.[10] The book, by contrast, has a long history of being read in the West. Due to the usual gaps in our understanding of the transmission of ancient Greek texts, the evidence I have gathered may look a bit patchy, as it takes us straight from late antiquity to Constantinople in the late Palaeologan period and then in turn to medieval and Renaissance Italy. But each of those highlights gives us an insight into the life of medical texts through places and time; in each of the following cases, we find evidence that an ancient medical text was copied, used, translated or adapted with transformations of varying extent that reveal the plasticity of ancient medical knowledge in the Middle Ages.

[10] See P. Pormann, *Jean le Grammairien et le De Sectis dans la littérature médicale d'Alexandrie*, in I. Garofalo-A. Roselli (edd.), *Galenismo e medicina tardoantica: fonti greche, latine e arabe*, Napoli 2003, 240; *The Alexandrian summary (Jawami) of Galen's* On the sects for beginners*: commentary or abridgment?*, in P. Adamson *et al.* (edd.), *Philosophy, Science and Exegesis in Greek, Arabic and Latin Commentaries*, London 2004, 26. Some Arabic manuscripts are listed in F. Sezgin, *Geschichte des Arabischen Schrifttums. Band III. Medizin, Pharmazie, Zoologie und Tierheilkunde*, Leiden 1970, 139, n. 154; and *Nachtrag I*, 1974, 408, but only one could be checked (*Dar-al-kutub tibb.* 1103): it contains in fact Hunain ibn Ishaq's *Questions and answers on medicine*, and, from what the catalogues have to say (for it was impossible to make contact with the relevant libraries), it is likely that the two manuscripts of Rampur and Hayderabad have the same text and not an Arabic translation of the pseudo-Galenic work. Earlier on, Diels in Hermann Diels, *Die Handschriften der griechischen Ärzte*, 1905 (based on Ackermann) mentioned yet another manuscript, but the enigma of the unusual shelfmark (Norfolk 3383) has not been resolved yet. As suggested by A. Touwaide, this collection could be related to a gift of the Duke of Norfolk to Gresham College, London (A. Touwaide, *Byzantine Medical Manuscripts: Towards a New Catalogue*, ≪ByzZ≫ CI, 2008, 206).

A late antique (?) adaptation in Latin

First, we have evidence of an early Latin translation of part of the *Introduction, or the Physician*, with no mention of authorship (neither for the original, nor for the translation). This translation concerns chapters 16 to 20 of the original Greek text and appears in an otherwise well-known Latin manuscript of the ninth century (*Augiensis* 120): this manuscript has preserved almost everything that we know about surgery in the early Middle Ages. The translation of chapters 17-20 of our pseudo-Galenic text was painstakingly edited by Daniel de Moulin in 1964; unfortunately, it could be argued that the edition is not of a highly satisfactory standard; besides, De Moulin failed to recognise chapter 16 in the same section of the manuscript, thus providing an incomplete text.[11] Another manuscript (*Vindobonensis* lat. 68) of the tenth century bears traces of the same translation, but it has only the very beginning of chapter 16, and adds little to what we know through the main manuscript. Klaus-Dietrich Fischer identified both the *Vindobonensis* manuscript and the presence of chapter 16 in the *Augiensis*.[12] Naturally, the facts are intriguing and raise a number of questions: who wrote this translation, where and when? How did this section end up in this manuscript? Was the rest of the text translated as well, and, if so, was it by the same person or at least in the same milieu? Could this translation be related to the so-called Ravenna school? Most of these questions might well remain unanswered. Some facts, however, are indisputable: the Latin version of the text is not only a translation, but also bears traces of some sort of adaptation for a new audience; the Latin is poor (it must be partly the responsibility of the translator, partly that of the copyist); the translator shows some awareness of a potential audience, thus suggesting that the Latin text may have had some teaching purpose; the comparison with our extant Greek manuscripts demonstrates that the Latin version is earlier than the archetype of the Greek manuscripts. Finally, bits and pieces of the

[11] Daniel de Moulin, *De heelkunde en de vroege middeleeuwen*, Leiden 1964; the edition, with translation and notes appear at pp. 53-82.

[12] I owe Cloudy Fischer not only the information, but also his own transcription of chapter 16; in addition, Arsenio Ferraces Rodríguez has shared with me his draft new edition of the Latin text. I used their material extensively for my edition of the Greek text.

text appear in late antique Latin medical texts, thus suggesting that a full translation circulated at some point.[13]

For our purpose here, the main issues are those related with the reading and potential use of the text for teaching purposes – the problem of the date, however, makes this investigation frustrating, as the only certain fact is the date of the manuscript (ninth century), which means that the translation and/or its subsequent rewriting could be relatively late, too. The date problem is thus double: when was the text translated? Is the text in its current shape (that is, rewritten) of the same period or later, and if later, could it be thoroughly medieval? The assumed date of the translation is around the fifth century according to Klaus-Dietrich Fischer, who, however, rightly points out the inherent difficulty to such enquiries. Moreover, the late antique and early medieval material is scanty, and subsequently our knowledge of medicine in that period is far from extensive. If the translation and/or its rewriting were clearly datable from late antiquity, then this could point to the so-called school of Ravenna, in which several translations and commentaries of Galen's works were made. But in recent years, scholars have grown more cautious about ascribing every late Latin translation to this milieu: indeed, the evidence for it is usually inconclusive or, as in the case of the pseudo-Galenic *Introductio*, merely absent.[14]

Among the many changes made in the Latin version of the text, the first striking difference lies in a number of additions to the text, combined with suppressions of other sections. While some bits and pieces may have disappeared because of the usual problems of textual transmission, the 'adapter' of

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[13] I have discussed the differences between the Greek original and the Latin version in my article *L'Introductio sive medicus du Pseudo-Galien dans le haut moyen âge latin: problèmes d'édition posés par la tradition indirecte*, in Arsenio Ferraces-Rodríguez (ed.), *Tradición griega y textos medicos latinos en el periodo presalernitano.* ≪Actas del VIII Colloquio Internacional Textos Medicos Antiguos (A Coruña, 2-4 Septiembre 2004)≫, Universidade da Coruña 2007, 249-270. Of course, the Latin translation of the pseudo-Galenic *Introductio* is but one among quite a few ancient translations (of Hippocrates, Soranos, Oribasios and of course Galen) studied by other scholars. Some traits are to be found in several translations, but the Latin of pseudo-Galen's version is too disturbed to allow any stylistic comparison.

[14] On this matter see the enlightening piece by M.E. Vázquez Bújan, *Problemas generales de las antiguas traducciones medicas latinas*, ≪StudMed≫ XXV (1984) 641-680.

the text clearly made some conscious interventions, such as removing remarks that were not directly useful, and adding sentences meant to clarify a number of issues – thus adding definitions of diseases (skin diseases, scrotal hernias), glosses of Greek terms, of which the mere transliteration could be obscure, and meta-textual remarks. Examples of rewriting also exist, such as changing the third-person indicative verbs into imperative forms, which suggests an adaptation of the text in a more practical fashion, for students.[15] In the case of treating dislocations of the hip, the Latin has squarely moved away from the Greek, which deems all forms of hip dislocations incurable, and inserted instead a healing procedure that necessarily comes from another (unidentified) source.[16] Thus, it appears that the text was re-used in a different context, by Latin speakers, for practical purposes and perhaps teaching.

At any rate, this episode in the textual history of Pseudo-Galen's *Introductio* suggests that is was popular rather early on in the West among physicians and perhaps used in medical teaching. Whatever the place this translation was made, the Greek original had already been transferred to the Latin-speaking part of the world, at the cost of minor changes directed at a new readership. The early Latin translation did not really have any influence on the later journey of the text, but it hints at some form of continuous teaching use from antiquity onwards; the fate of the Greek manuscripts in Constantinople seems to confirm this tendency.

The Greek manuscripts of the *Introductio* and Constantinople

Before coming to the use of the *Introductio* in Byzantine teaching in Constantinople, I intend to outline the key facts of its textual transmission in Greek.

The pseudo-Galenic *Introductio* has survived, either in full or in part, in forty Greek manuscripts, dating back from the twelfth to the eighteenth

[15] It is tempting to connect this feature with the numerous imperative forms that occur in Galen's practical opus on anatomy, the *Anatomical Procedures* intended for students aiming at performing dissections and vivisections (by contrast with the more intellectual *On the usefulness of the parts of the body*).

[16] See my 2007 article (cited n. 12) for extensive discussion of the passages and comparison with other texts, 261-267.

century.[17] The large majority are fifteenth to sixteenth century items; they can be divided into two groups: the bulk of the manuscripts, about three quarters of the total number, descend in a more or less direct way from a twelfth century manuscript that is well-known among editors of Galenic treatises, the *Vaticanus* gr. 1845 (= **V**). Apparently, no copy of the pseudo-Galenic *Introductio* as preserved in **V** was made before the fourteenth century, and the large majority of copies were made later, in the mid- and late fifteenth century; to these, one should add the subsequent copies made in the early Renaissance, in part for editorial purposes, such as the 1525 editio princeps of Galen's complete works in Greek. I call this family of manuscripts the **A** family.

The second, smaller group of manuscripts (family **B**) has no such prestigious ancestor; the oldest manuscript is from the mid-fifteenth century (*Urbinas* gr. 67 = **U**). More interestingly, this family is in turn divided into two groups each of which transmits only part of the text. If one divides the text according to the sections outlined in the manuscripts (three sections, which I call **a**, **b** and **c**), it appears that there is a neat break corresponding to these sections – in other words, it seems that the breaks correspond to mechanical accidents in the textual transmission. Presumably, the loss of quires is responsible for the fact that part of family **B** has sections **a** and **b**, while the other part of family **B** has sections **a** and **c**. Section **a** serves as a basis for comparing both sets of manuscripts – it is obvious that they all belong to the same family, a family that shows a number of differences with **V** and its copies.[18]

While family **A** is not relevant to this discussion, family **B** on the other hand has several intriguing features. First of all, the initial *pinax* (a table of contents preceding the main text) looks different from the one that we find in **V** (and its copies, which barely alter the original, albeit for a few copy mistakes): it is shorter, and yet it has additional words.[19] After the first two, identical lines, the family **B** manuscripts have the following words:

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[17] I am summarizing here the data presented and analysed in my edition LXXXI-CVI.

[18] Regarding the classification of the manuscripts of family **B** against **V**, see my edition XCIV-CVI.

[19] I append the complete *pinax* of each family in the appendix.

> ἔστι δὲ ἡ πραγματεία ἀρίστη καὶ μάλιστα τοῖς εἰσαγωμένοις. δεῖ οὖν αὐτήν, μετὰ τὸ περὶ τέχνης ἤτοι τὴν ὁρικήν, ἀναγνῶναι.
>
> This book is excellent, especially for beginners; thus it should be read right after the *Ars Medica*.

The summary goes on briefly with the first few chapter headings, then breaks off and adds this slightly rhetorical exhortation: "well, let us start from chapter One (or: from the beginning)".

Thus a mysterious reader added his judgement on the text, which he deemed worth reading, and indeed "excellent"; he added: "especially for beginners". When and where could such an addition have been inserted? For it is tempting to see it as an addition rather than an original feature that would have been lost in **V**. Indeed, family **B** is distinctive in that it has a number of other additions or alterations that could hardly have featured in the original. At any rate, the hypothesis of an omission in **V** is not supported by palaeography. Conversely, however, the relatively recent date of the manuscripts of family **B** makes it difficult to be conclusive on this matter. The oldest one is a mid-fifteenth century manuscript, and we have to be content with this late *terminus*: how early can be this passage? Well, the mention of the *Ars medica* with its common medieval title (*he tekhne etoi ten horiken*) does not give us a precise indication, nor does the language or the style of this very short bit. We need to look at the whole text and its complete (as we know it) textual tradition in order to gather a few more elements. I shall come back to the analysis of the **B** family text as a whole.

At any rate, the purpose of this 'commentator' (in a weak sense) was presumably medical teaching. Now, while the *Ars medica* has a continuous history of teaching use in the Latin West (it features in the *Articella*), the *Introductio* on the contrary disappears from our records in late medieval medical training. Hence, it is likely that this judgement, whether or not it was followed by immediate strong student interest, had no immediate posterity beyond the Greek Byzantine world.[20]

Several elements hint at a starting point in Constantinople. If we consider the origin of our manuscripts (of both families), they all come from

[20] It was nevertheless rediscovered in the Renaissance for its qualities as a book for beginners.

Constantinople (rather than Southern Italy, for instance); hence first hand knowledge of the *Introductio* was most likely restricted to Constantinople. While the context in which **V**, the twelfth-century and oldest manuscript, was written is very obscure, the bulk of our fifteenth-century copies point towards one and the same scholarly *milieu*: that of the Xenon of the Kral, where a considerable *scriptorium*, acquainted with medicine, worked, learned and (presumably) taught. Those were the pupils of John Argyropoulos that carried on with their activities even after he left Constantinople, and after the fall of the city in 1453.[21] One of the key actors was Demetrios Angelos, who is known to us through numerous copies of manuscripts and some notes. Another important character was Michel Apostolis, who, along with many other Galenic texts, copied one of the key manuscripts of family **B** of the *Introductio*, the *Scorialensis* Sigma II, 11 and succeeded Argyropoulos at the Xenon of the Kral in 1452. Demetrios Angelos had copied the *Introductio* several times, and had access to manuscripts of both families (interestingly, no contamination can be established – Demetrios did not use any **B** family manuscript to correct the **A** family items, although the latter have obvious lacunae that could have been filled with the help of the former). The textual transmission of the *Introductio* is closely linked to Constantinople's scribes and scholars.

John Argyropoulos is not particularly well-known for his medical knowledge (and, potentially, teaching), but rather (rightly) perceived as a philosopher, who played a major role in spreading Greek and the humanities in Renaissance Italy, through his various trips and later, during his exile after the fall of Constantinople. This is all perfectly right. The fact, however, that his students copied a number of Galenic works, and some of them several times,

[21] I am passing a bit rapidly on a subject that has been carefully and painstakingly studied by Brigitte Mondrain in a number of articles, and followed up by others. See for instance B. Mondrain, *Jean Argyropoulos professeur à Constantinople et ses auditeurs médecins, d'Andronic Eparque à Démétrios Angelos*, in C. Scholz-G. Makris (edd.), *Polypleuros nous. Miscellanea für Peter Schreiner zu seinem 60. Geburtstag*, Munich-Leipzig 2000, 223-250. B. Mondrain, *Comment était lu Galien à Byzance dans la première moitié du XVe s. ?*, in A. Garzya-J. Jouanna (edd.), *Trasmissione e ecdotica dei testi medici greci.* ≪Actes du IIIe colloque international sur l'ecdotique des textes médicaux grecs≫, Paris-Naples 2003, 361-384. B. Mondrain, *Démétrios Angelos et la médecine: contribution nouvelle au dossier*, in V. Boudon-Millot-A. Garzya-J. Jouanna-A. Roselli (edd.), *Storia della tradizione e edizione dei medici greci.* ≪Atti del VI Colloquio Internazionale Paris 12-14 Aprile 2008≫, Naples 2010, 293-322.

with annotations of medical content, suggests a strong interest in medicine. Not all texts seem to have interested John's group: rather, they showed some interest for theoretical medicine (issues of epistemology and method), as displayed in the *Ars medica*, in the *Introductio*, and in Galen's *Simple Drugs* books I-V (in contrast to books VI-XI, which were perhaps neglected for their mere practical use).[22] But there may be some reasonable distance between reading medical texts (especially those of theoretical content) and practising as well as teaching medicine. Rather, I think that the interest shown by Argyropoulos and his friends in some theoretical, classificatory Galenic texts is to be connected with their commitment to Aristotelian scholarship. In terms of concept, logical articulation, theoretical tools and vocabulary, few Galenic texts display more Aristotelian features in a medical account than books I-V of *Simple Drugs*: it is thus difficult not to see a link between Argyropoulos' pet topic, Aristotle, and the peripatetic feel of Galen's texts copied by his pupils. But this path, of course, should be explored in more depth in Argyropoulos' preserved works, in order to assess the importance of Galen in his intellectual constructions.

Going back to Pseudo-Galen: one clue makes Argyropoulos and friends truly strong candidates for the anonymous comment in the *Introductio's pinax*: as a matter of fact, several manuscripts produced by this circle have the *Introductio* following the *Ars medica* – just like the anonymous commentator stated it should be in his second sentence of the prologue.[23] If we accept this hypothesis as plausible, then we should consider that the circle of Argyropoulos (with or without him) was trying to build their own collection of Galenic works for the purpose of study and, perhaps, of teaching.

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[22] I suggested this in an article on the textual transmission of Galen's XI books *On Simple Drugs*: *Théorie et pratique: connaissance et diffusion du traité des* Simples *de Galien au Moyen Age*, in Arsenio Ferraces Rodríguez (ed.), «IIIe Seminario internacional (Fito-zooterapia antigua y altomedieval: textos y doctrinas), La Coruña, 21-22 Oct. 2005», La Coruña 2009, esp. 93-95. While Demetrios and his colleagues duly copied and at times annotated books I-V (which emphasize method and principles), they did not bother with copying books VI-XI (which contain the catalogue of simple medicines). In the *Urbinas* gr. 67, a key witness for the text, books VI-XI were simply added in the form of an old manuscript of the fourteenth century.

[23] Those manuscripts have close relationships with one another; they are *Marcianus* gr. App. V 9; *Vaticanus* gr. 285 and *Parisinus* gr. 2271.

It may well be that the real instigator of this programme was in fact not Argyropoulos himself, whose celebrity may misleadingly overshadow his colleagues to our eyes, but his successor in Constantinople. Indeed, Argyropoulos left Constantinople in 1453, but the manuscripts that have the *Ars medica* and the *Introductio* in a sequel are all later than that – probably from the third quarter of the century. The most studied one, the *Marcianus* gr. App. V 9 (in two volumes), containing an impressive Galenic collection, in great part copied by Demetrios Angelos, is known to have remained in Demetrios' possession (thus, in Constantinople) until 1473: an autograph note by Demetrios states this very clearly, as observed by Brigitte Mondrain.[24] The other two are also likely to be later than 1453, especially the *Vaticanus* gr. 285, which is considered to be from the very end of the fifteenth century and perhaps a copy of *Parisinus* gr. 2271 (made by Demetrios): Agallon Moschos, another pupil of Argyropoulos, could have been the scribe of this manuscript (again, according to Brigitte Mondrain). Our evidence thus points towards a later date than 1453. In this case, it might be that either Michel Apostolis (who, as already stated, succeeded Argyropoulos at the Xenon of the Kral in 1452) or Demetrios Angelos, or both, bore the responsibility for this medical programme.

In turn, however, it could be argued that the archetype[25] of the abovementioned manuscripts is the key to the mystery, and that manuscript could well have been old enough to have been made in Argyropoulos' time, or even before.

Since the bigger picture is so blurred, it might be useful to turn to the exact contents and differences between the two families of manuscripts. The facts, once again, are intriguing. I shall first explain about the most striking differences (number and order of chapters), before turning to smaller (in appearance) details such as additional words.

The rewriting of the *pinax* in the family **B** manuscripts is not the only distinctive feature of this group of manuscripts: they also display two additional chapters, inserted in the body of the text. The first one is a section on leprosy, the second one a chapter on purgatives.

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[24] B. Mondrain, *Comment était lu Galien à Byzance dans la première moitié du XVe s. ?*, in A. Garzya-J. Jouanna (edd.), *Trasmissione e ecdotica,* ≪Actes du IIIe colloque international sur l'ecdotique des textes médicaux grecs≫, Paris-Naples 2003, 284.

[25] I call this archetype **z**. It is not possible to attribute a precise date to its completion. See my partial stemma of family **A** in my edition XCIV.

Pseudo-Galen on leprosy *(elephantiasis)*

I have discussed this issue at some length in previous work; it is a difficult question both for historians of medicine and philologists, for the terminology of leprosy, its symptoms (current and previous, in ancient times and in the Middle Ages), the alleged causes of the disease and its treatment form a nebulous body of texts, not all being accessible to scholars, especially Arabic and Greek medieval medical works.[26] I have argued in favour of a Byzantine interpolation in the pseudo-Galenic treatise for three reasons, based on textual criticism, literary analysis, and terminology and medical historical problems.[27] I want to make it clear, however, that additional elements of explanation might chip in at some point and change the picture.

The original section on leprosy (in Greek *elephantiasis*: 13, 43) follows the standard pattern of the presentation of diseases in the whole chapter 13 (name of the disease, cause, treatment); in the family **B** manuscripts, however, it was completed with an additional development on six forms of leprosy, classified according to four animal forms (the elephant/*elephantiasis*; the lion/*leontiasis*; the snake/*ophiasis*; the fox/*alopecy*) and two other categories, called *lobe* (mutilation) and *lepra*. Discussing each of these terms in the context of ancient and medieval pathology would take up a whole article.[28] Indeed,

[26] See my edition LXIX-LXXVI.

[27] Firstly, the passage does not fit within the context: it brings in redundant remarks on such diseases as 'alopecy' and 'lepra' which appear anyway in the body of the original Greek chapter and it does not correspond to the standard pattern operating in the text (and especially in chapter 13). Secondly, the manuscripts that preserve this section are all late medieval items (the earliest being of the mid-fifteenth century), and they have undergone a number of changes that make such supplementary passages look suspicious. Finally, the wording of the passage brings in some technical terms and ideas that are barely or not at all known in the rest of our ancient sources.

[28] Such ideas on 'animal' forms of leprosy spread rapidly from the Islamic world to Byzantium (see below the discussion of Al-Jazzar's *Viaticum*), and to Western Europe via several Latin translations from the Arabic, such as Abu-l-Qasim's *Liber Practicae* and the *De elephancia* ascribed to Constantinus Africanus. I have consulted the translation of the former by P. Ricci, 1519: *Liber Theoricae necnon Practicae Alsaharavii in prisco Arabum medicorum conventu facile principis: qui vulgo Açararius dicitur: jam summa diligentia et cura depromptus in lucem*, f. CXXXV: *Quando vero generantur ex corruptione ciborum in quatuor modos dividitur, uno modo quae generatur ex dominio colerae rubeae et appellatur leonina, secundus modus est quae gen-*

each of them, with their accompanying definitions (based on appearance: for each 'form' of leprosy makes parts of the body look like animal parts; and the last two also correspond to conspicuous transformations of the body and the skin), deserves extensive discussion. There is in fact some uncertainty about the origin of each of them, and we do not necessarily know when, and in what context, each term was used – *leontiasis*, for example, is attested as an ancient medical term (Rufus of Ephesus, apud Oribasius *Coll. Med.* XLV, 28). Its pertinence in the study of leprosy is demonstrated by the fact that the concept of 'leonine facies' to describe the tumefaction of the face in some lepers is still used in modern times. It is, however, an excessively rare term in ancient Greek and, if both texts of Rufus and Pseudo-Galen echo one another through a few rare terms, they do not give the same account at all of the disease: Rufus explains that *leontiasis* is the name given to an initial stage of leprosy, while Pseudo-Galen gives a static typology of the existing kinds of the disease. The progressive deliquescence of the body in leprosy was probably observed at an early date: Rufus' source is the Hellenistic physician Strato of the third century BC, and Celsus, though ignoring any specific terms labelling the stages of the disease, shows clear awareness of the visible progress of the disease.[29] Galen himself is of little help when it comes to the description of the symptoms (it is likely that, in his time, the understanding of leprosy had

eratur ex dominio colerae nigrae et appellatur elephantia, tercius est quae generatur ex dominio flegmatis et appellatur serpentina, quartus modus est quae generatur ex dominio sanguinis et appellatur vulpina. About the *De elephancia*, which is thought to be inspired by Al-Jazzar's lost treatise on leprosy and conveys roughly the same text, see A.I. Martin Ferreira's edition (Valladolid 1996) and A.I. Martin Ferreira-E. Montero Cartelle, *Le* De elephancia *de Constantin l'Africain et ses rapports avec le* Pantegni, in Ch. Burnett-D. Jacquart (edd.), *Constantine the African and ʿAli ibn al-Abbas al-Majusi. The* Pantegni *and related texts*, Leiden 1994, 233-246. The *De elephancia* uses the same terminology, with slight variations such as *alopicia* for *vulpina*, and *tyria* (= *tiria*) for *serpentina*, albeit with the same meaning. On the discussion of similar ideas and terms in Salerno, see A.M. Ieraci Bio, *La relazione greca inedita di una* 'quaestio' salernitana, in V. Boudon-Millot-A. Guardasole-C. Magdelaine (edd.), *La science médicale antique. Nouveaux regards.* ≪Études réunies en l'honneur de Jacques Jouanna≫, Paris 2007, 249-274.

[29] Cels. III 25. Celsus passes rapidly over this disease, which, he says, is barely known in Italy. Indeed, it was usually assumed that leprosy flourished in Egypt.

not really advanced since the early days). At any rate, the key to the problem lies in the global description of the disease rather than in individual terms.

Why should Pseudo-Galen ignore the facts that earlier physicians knew very well, while displaying such a puzzling description of the forms of leprosy, as though he would tell us of several species of cabbage? Pseudo-Galen explicitly refers to 'the Ancients' as the source of such names for the forms of leprosy; but several ones are either not attested as such in antiquity (*ophiasis* and *alopecy*, both being separate skin diseases in ancient texts)[30] or attested at a relatively late date: the term *lobe* ('mutilation'; surviving in modern Greek *loba*), and the matching passive perfect participle *lelobemenos* (mutilated) were used as euphemistic/apotropaic denominations of the disease and of the ill in Roman Egypt around the fourth century AD (the facts hint only at the participle, though).[31]

My theory is that the passage is in fact inspired by much later influences: as it happens, a fourfold presentation of leprosy, according to animal shapes (precisely the elephant, the lion, the snake and the fox) appears in a popular medieval Arabic work, Ibn al-Jazzar's *Viaticum* (*Zad al-musafir*), book VII.[32] In Al-Jazzar's theory, each of the animal-inspired forms corresponds to one of the four predominant humours. Of course, it is striking that that humoral element should be absent from Pseudo-Galen's account if al-Jazzar were to be the direct source of our controversial passage. And the passage lists six forms of leprosy, not four. But the popularity of that work in Byzantium is even more striking, since the ninth century text was translated as early as the tenth century into Greek; besides, the translation appears in some fifty manuscripts, several of which date back to the tenth and eleventh centuries. Thus the *Viaticum* enjoyed considerable success in the Greek medieval world, including Constantinople. It may therefore have influenced a number of Greek medical

[30] They appear later in chapter 17 of the *Introductio*; the author specifies that he is talking about diseases that he has not mentioned earlier in the book (well, that is a clue against the authenticity of the passage on *elephantiasis*).

[31] Jean Gascou, *L'éléphantiasis en Egypte gréco-romaine. Faits, représentations, institutions*, in F. Baratte (ed.), ≪Mélanges Jean-Pierre Sodini≫, Paris 2005, 261-285.

[32] Al-Jazzar wrote a monograph on leprosy, but that treatise is lost. The *Viaticum* was also extremely popular and influential in the Latin-speaking world, especially Spain. I owe Peter Pormann the information about, and the translation of the relevant section in the *Viaticum*.

works. Last but not least, there is at least one manuscript that displays both the *Viaticum* and the pseudo-Galenic *Introductio*: the *Lavrae* Omega 72 (family **A**) of the fifteenth century. That manuscript does not show evidence of interaction; but the fact that both texts appear in the same book corroborates the possibility that both were read by the same people, and potentially used to annotate, if not correct one another at some point in history.[33] Given their respective popularity and accessibility, one can reasonably speculate that both texts were part of the background of medical scholars of Palaeologan Constantinople. The content of the section on leprosy, however, does not provide us with much information about the identity of the person who appropriated the pseudo-Galenic text, nor does it help us to settle on a more accurate date of intervention; but it gives us an insight of how wide-ranging and diverse the Byzantine medical culture was in the Palaeologan period, and how problematic our conception of the early history of leprosy is. As is already known from studies on other ancient works (such as Galen's and Dioscorides' pharmacological works), medieval interventions in texts seem to reflect cross reading of medical works either transmitted in Greek from antiquity, or produced in the East and translated into Greek in the Middle Ages, or indeed written by Byzantine scholars. The rest of the specific features that we find in the family **B** manuscripts further confirms this.

Indeed, an additional chapter appears after what is now chapter 15 (*peri pharmakeias*) in the text (in our modern editions, the additional chapter features before that one): it is a chapter on 'the preparation of the best purgative' (a heading that barely does justice to the content of the chapter, which deals with many categories of medicines), and its situation (textual history, vocabulary and problems of overall consistency with the rest of the book) makes it exactly parallel to the leprosy section. I shall pass more rapidly over this case. Apart from the main issue regarding textual transmission, which is of course common with the section on leprosy, two main problems, in my view, suggest that this chapter was not part of the original text: firstly, the chapter displays some evidence of first-person discourse which contrasts sharply with

[33] It was a common habit in Byzantium to mix ancient and 'modern' works in the manuscripts, on the basis of theme and usefulness. Several manuscripts of the pseudo-Galenic *Introductio* also display some medieval Greek medical works, for example the *Parisinus* gr. 2153 (fifteenth century), the *Mutinensis* gr. 213 (sixteenth century) and the *Vaticanus* gr. 292 (fourteenth century).

the plain third-person account of the rest of the book;[34] secondly, a few technical terms, such as sandalwood (*santala*) and camphor (*kaphoura*), hint at medieval medical knowledge rather than ancient material.[35]

Yet another set of variant readings of smaller scale deserve attention in the family **B** manuscripts. As a preliminary remark, I should state straightaway that these specific features appear in a fourteenth century Latin translation once ascribed to Niccolò da Reggio,[36] which gives us a *terminus* later than that of the above studied additional sections; such variant readings can only be prior to the time of the translation, and there is no question here that

[34] The text refers to two books of fairly common title (*On simple drugs* and *On the best way to compound drugs*) in the first person.

[35] Neither sandalwood nor camphor is attested in our texts before the Middle Ages, in works by Symeon Seth and Nicolas Myrepsos, according to G. Helmreich, *Handschriftliche Studien zu Galen III*, ≪Program des k. humanistischen Gymnasiums in Ansbach 1913/1914≫ (1914) 25. In fact, the history of those products is not very clear. The Arabs most likely brought them both to the West from the East through various routes (via Constantinople and via North Africa and Spain). Both words appear in Simon of Genoa's *Clavis* (see the edition of the text on the Simon Online website under www.simonofgenoa.org) and in quite a few other medieval Greek and Latin texts. But camphor, in particular, may have been known earlier than is commonly assumed, according to R.A. Donkin, *Dragon's Brain Perfume: an Historical Geography of Camphor*, Leiden 1999, chapter 4. The evidence from late antique texts is fragile and questionable, so that all suggestions that camphor and sandalwood were known in the West in pre-Islamic times are inconclusive. Camphor, like several expensive oriental products, was a privilege remedy of the Western elite and not widely used by physicians before the fourteenth century. Its properties were known and praised, especially as a means to fight the Black Death, but every single variety of camphor was too costly to use on a common basis. Sandalwood may have been known before the Arab conquest, but, similarly, evidence of its spread across the West is mostly of medieval date (R.A. Donkin, *Between East and West. The Moluccas and the Traffic in Spices Up to the Arrival of Europeans*, Philadelphia 2003, chapter 4).

[36] About the authorship problem of this translation, see Galen *On Prognosis*, edited and translated by V. Nutton, ≪CMG≫ V/8,1, Berlin 1979; on the Latin translation generally my edition CIX-CXV for further literature. There is a possibility that we find other sections of what may have been a complete translation of the *Introductio*; indeed, some quotations, notably one from chapter 13, appear in Latin medieval texts. See Galen. *On My Own Opinions*, ed. V. Nutton, ≪CMG≫ V/3,2, Berlin 1999; and my edition CXII and nn. 164 and 165.

they could have been made at the time of John Argyropoulos. But there are limitations to this comparison between the Greek original (of the family **B**) and the Latin translation; since the Latin translation has no matching *pinax*, and since it only concerns chapters 1-10 of the *Introductio*, it is impossible to develop a full-scale comparison between the family **B** manuscripts and the Latin translation. The date and origin of the elements that I have just studied are to remain beyond our grasp, or rather, they are to remain datable of say the fifteenth century at the latest.

The Latin translation was clearly made on a Greek model, and dates back to an earlier archetype of the family **B** Greek manuscripts than that of our fifteen-century manuscripts: indeed, the Latin translation has some specific additional features of family **B**, but it is also exempt from omissions of the family **B** Greek manuscripts; besides, it is at times in agreement with manuscript **V** (the family **A** prototype) against them. Finally, it bears traces of at least one reading that has not survived in Greek apart from a marginal note in a sixteenth-century edition.[37] Among the additional features appearing in both the family **B** manuscripts and the medieval Latin translation, some, I believe, merely correspond to mistakes in the mainstream tradition as represented by manuscript **V** (omissions); others are more controversial, such as the insertion of a gloss, poorly transmitted in the family **B** manuscripts and reflected in the Latin (*Introductio* 9,5). Whether or not such features should be connected with the above-mentioned more significant additions is unlikely, but the hypothesis cannot be ruled out. In the latter case, John Argyropoulos and his friends would have less than nothing to do with the adaptation of the Greek text; rather, the modifications should be attributed to a much earlier scholar. Indeed, it is even possible that the Latin translation was made after a Greek exemplar earlier than **V** itself, thus from the early or high Middle Ages.

Conclusion

Surprisingly, the pseudo-Galenic *Introductio* owes much of its look in the Kühn edition to the Byzantine scholars who read, copied and annotated it in Constantinople in the late Middle Ages. This is in great part due to the work of René Chartier, who, in the early seventeenth century, discovered part

[37] Here I am summarizing the data presented in my edition CXIII-CXV. The Renaissance edition that has the reading otherwise lost in Greek is the 1556 Juntine edition curated by Agostino Gadaldini.

of the family **B** manuscripts and inserted the additional chapters into the text inherited from Renaissance erudition. Then Kühn had only to reproduce the resulting Greek and Latin texts. But Chartier was not the only one to harvest the benefits of the family **B**: as early as the 1550's, Agostino Gadaldini and his colleagues gained some knowledge of part of the Greek manuscripts that remained hidden (or unused) from the Aldine editors, and they also used some of the alternative evidence at hand in the Latin medieval tradition.[38] Hence the Constantinople milieu that edited the text, be it that of Argyropoulos and his pupils or not, played a crucial role in the formation of the text as it has been known, used and perceived since the nineteenth century. The very additions dating back to the Byzantine period were assumed to be part of the original text and were commented upon as such; in turn, those passages, with their unusual contents, laid the ground for further misunderstandings, just like many other texts of troubled textual transmission, such as the pseudo-Galenic *Definitiones Medicae*.[39] The most remarkable discussion arose from Mirko D. Grmek about the passage on leprosy in chapter 13: far from suspecting the

[38] C. Petit, *Les manuscrits médicaux de Modène et la tradition de l'Introductio sive medicus pseudo-galénique*, in A. Roselli *et al.*, ≪V Convegno Internazionale Trasmissione e ecdotica dei testi medici greci, Napoli, 1-2 Oct. 2004≫, Napoli 2005, 167-187.

[39] Jutta Kollesch has shown that the text of the *Medical Definitions* underwent a multiple interpolating and rewriting process that started early in the Middle Ages with Monk Meletius, and ended with René Chartier's own manipulations. In the manuscript *Palatinus* gr. 297, the text of the *Medical Definitions* was rearranged and interwoven with extracts from Meletius' *De natura hominis* (ninth century) in order to produce a new, up-to-date medical work that could be useful to the readers of the time. But a considerable part of the Greek manuscripts that transmitted the text is in fact interpolated. Later on, René Chartier in turn was concerned with offering the most useful collection to medical students in Paris, and altered the text considerably by adding around seventy definitions of various origins. The very form of a collection of definitions is of course particularly vulnerable to such changes, as the flow of the text needs not be broken. It is also one of the most popular text-types in medical literature. About the successive transformations of the text, see J. Kollesch, *Untersuchungen zu den pseudogalenischen Definitiones Medicae*, Berlin 1973, 143; and *René Chartier als Herausgeber der Werke Galens*, in J. Burian-L. Vidman (edd.), *Antiquitas Graeco-Romana.* ≪Acta congressus internationalis habiti Brunae diebus 12-16 mensis Aprilis MCMLXVI≫, Prague 1968, 525-530; *René Chartier, Herausgeber und Fälscher der Werke Galens*, ≪Klio≫ XLVIII (1967) 183-198.

dubious nature of the section, Grmek commented upon the originality of the pseudo-Galenic account in the context of (poor) ancient medical knowledge on leprosy.[40] If, as Grmek suggests, the pseudo-Galenic text has contributed to confuse the conceptual distinctions between *elephantiasis* (leprosy) and *lepra* (a benign skin disease) in the West throughout ages, it is in fact because the passage under examination did not belong to the original but was added at some point by some Constantinople scholar who was well acquainted with Islamic scholarship on the subject. Thus, the Byzantines' readings and textual manipulations of ancient texts echo in modern times in the most unexpected ways.

Medical texts for beginners like the *Introductio*, and the *Definitiones Medicae*, became influential under the name of Galen, while conveying somewhat different ideas than those of the prestigious physician. This bothered neither Greek medieval physicians, nor their Latin counterparts from late antiquity till the end of the fifteenth century at least. It is likely than the criterion of usefulness was much stronger than that of authenticity. For even in the case of major (authentic) Galenic works, textual manipulations were common practice: the altered and augmented recipes of Galen's treatises *On compound medicines* as transmitted in medieval manuscripts testify to it; so does the *Vaticanus* gr. 284, offering a mixed text of Galen's *Simple Drugs* and of Dioscorides' *Materia Medica*. The categories that divide medical texts for us now were at the time blurred, to the extent that one could mix together in the same book, or even in the same text, several bits from various authors, ancient and not, Christian and Islamic.

East and West of the Adriatic, the pseudo-Galenic *Introductio* has raised interest and incurred changes to the text, with the purpose of appropriation as well as adaptation to new audiences. It is, in many ways, representative of the fate of Galenic works beyond antiquity, and this should stimulate further investigation into the Byzantine reception of Galenic material.

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[40] M.D. Grmek, *Les maladies à l'aube de la civilisation occidentale. Recherches sur la réalité pathologique dans le monde grec préhistorique, archaïque et classique*, Paris 1983, 250.

Appendix:

Pinax of the family **A** manuscripts (as appearing in the prototype **V** = *Vaticanus* gr. 1845)

γαληνοῦ ἰατρός· εἰσαγωγή

ἐπιγράφεται μὲν τὸ βιβλίον ἰατρός· περιέχει δὲ τάδε· τὰ περὶ ἰατρικῆς τεχνολογούμενα καὶ τὰ ἴδια τῆς ἰατρικῆς· ἔστι δὲ τὰ περὶ ἰατρικῆς τεχνολογούμενα τάδε· πρῶτον, πῶς εὕρηται ἡ ἰατρική· τίνες ἀρχαὶ ἰατρικῆς· πόσαι αἱρέσεις ἐν ἰατρικῇ καὶ τίνα τὰ χαρακτηριζόντα αὐτάς· τίνες προέστησαν τῶν αἱρέσεων· τίνα τὰ ἴδια τῆς ἰατρικῆς· τί ἐστιν ἰατρική· εἰ ἐπιστήμη ἡ ἰατρικὴ ἢ τέχνη· πόσα μέρη ἰατρικῆς· εἰ ἀναγκαία ἡ εἰς τὰ πέντε μέρη διαίρεσις· περὶ στοιχείων ἐξ ὧν ὁ ἄνθρωπος συνέστηκε· περὶ φυσικῶν ἐνεργειῶν· ὀνομασία τῶν ἐκτὸς μέρων τοῦ σώματος· ἀνατομὴ τῶν ἐντὸς· ὀστεολογία· τῶν παρὰ φύσιν ὀξέων παθῶν σημείωσις καὶ θεραπεία· αἰτιολογία παθῶν χρονίων σημείωσις καὶ αἰτιολογία καὶ θεραπεία· τῶν περὶ ὀφθαλμοῦ παθῶν διαίρεσις τῶν κατὰ μέρος καὶ σημείωσις καὶ θεραπεία· πόσα εἴδη κολλυρίων καὶ τῶν ἄλλων φαρμάκων τῶν πρὸς ἄλλα πάθη· ὀνομασία τῶν περὶ ὅλον τὸ σῶμα φυμάτων καὶ ε...μάτων καὶ πάσης διαθέσεως ἑλκωδοῦς ἢ ἀνεῦ ἑλκώσεως καὶ θεραπεία αὐτῶν καὶ διαίρεσις καὶ κατὰ τοῦ σώματος μόρια καὶ μέρη· καὶ περὶ τῶν ἐν χειρουργίᾳ ὑπαγομένων, τίνα τε καὶ πόσα ἐστι· τίνες οἱ ἐν χειρουργίᾳ σκόποι· καίτοι δύο τὰ πρῶτα εἴδη τῶν κατὰ χειρουργίαν ἐνεργειῶν τούτων· καὶ σημείωσις καὶ θεραπεία πάντων τῶν κατὰ χειρουργίαν.

Pinax of the family **B** manuscripts (as appearing in manuscript **U** = *Urbinas* gr. 67)

+ γαληνοῦ ἰατρός· εἰσαγωγή·

ἐπιγράφεται μὲν τὸ βιβλίον ἰατρός· περιέχει δὲ τάδε· τὰ περὶ ἰατρικῆς τεχνολογούμενα καὶ τὰ ἴδια τῆς ἰατρικῆς· ἔστι δὲ ἡ πραγματεία ἀρίστη καὶ μάλιστα τοῖς εἰσαγομένοις· δεῖ οὖν αὐτὴν, μετὰ τὸ περὶ τέχνης ἤτοι τὴν ὁρικήν, ἀναγνῶναι· ἔστι δὲ τὰ περὶ ἰατρικῆς τεχνολογούμενα τάδε· πρῶτον, πῶς εὕρηται ἡ ἰατρική· εἶτα, τίνες ἀρχαὶ ἰατρικῆς· καὶ τὰ ἑξῆς μέχρι θεραπείας τῶν τῆς ἰατρικῆς ἰδίων. ἀρξώμεθα οὖν ἀπὸ τοῦ πρώτου.

Aristotle and the caliph's dream. Aspects of medical translations

> The caliph al-Ma'mun welcomed Greek medicine [...](and) believed that it had obvious and practical advantages.[1]
>
> Scientific tradition needs more than the mere copying of texts.[2]

That «drugs are the hands of the gods» is a familiar aphorism.[3] Wholly mortal was the transmission of Byzantine medical and scientific texts to the east and their subsequent passage westwards. The history of these events spans five centuries and is familiar enough not to need here anything but a brief factual summary of its principal aspects. There follows this summary an outline of the last sixty folios of a fifteenth century codex containing, *inter alia*, Byzantine translations of Persian *antidotaria*. The first theme, the major Graeco-Arabic translation movement and the second, the subsequent Persian influence in Byzantine medicine, are then examined in the context of the translator and his medium, the manuscript.

The single-mindedness of an early Abassid caliph in the Islamic East, al-Ma'mun, instigator of the Herculean labour of copying and translating Graeco-Byzantine medical and scientific texts has served medical historians well. In contrast, the later and less well-known Byzantine reception of remedies from Persia is usually seen as of less significance. Gutas calls the Graeco-Arabic translation movement a social phenomenon and dismisses theories that it was based on scholarly zeal or the wisdom and single mindedness of enlightened rulers, if only because of its complexity and deep-rooted nature.[4] From the

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1 S. Vryonis, *The Medical Unity of the Mediterranean World in Antiquity and the Middle Ages*, Crete 1991, 27. The caliph ruled from 813-833.

2 R. Browning, *Byzantine Scholarship*, «P&P» XXVIII (July 1964) 3-20.

3 Attributed to Herophilos of Alexandria.

4 D. Gutas, *Greek Thought, Arabic Culture*, London-New York 1998, 3-6.

time of the Byzantine writer Symeon Seth to the fall of Constantinople, the Persian strain in Byzantine medicine is less well understood.

The Manuscript: *Par.* gr. 2194

The last sixty folios of codex *Par.* gr. 2194 (ff. 400v–464v), a fifteenth century manuscript on paper, are the foundations of the discussion that follows in parts I and II below. These folios include translations into Greek of Persian remedies, including that of Constantine Meliteniotes whose single work is briefly discussed here; almost nothing is known of his life, and even his dates are uncertain, perhaps mid-fourteenth century. The same folios also contain two Byzantine hospital remedy texts copied in a poor and almost illegible hand, perhaps hastily scrawled for personal use. These two texts are respectively headed *Dynameron xenonikon dia peiras* and *Xenonika*. The *Xenonika* has several references to a hitherto unrecorded Mauraganos Hospital and its unnamed *aktouarios*. Of the two texts, however, the *fons et origo* of this paper is the first, the *Dynameron*. Throughout its seventy-six remedies, a number of drug ingredients, almost certainly of eastern origin, are included in recipes, suggesting an early exemplar of this emerging eastern influence in Byzantine medicine and pharmacy.

Part I below considers aspects of the Graeco-Arabic translation movement, and Part II Persian influences in late Byzantine medicine and pharmaceutics.

I. Aristotle and the caliph

The story goes that the ninth century Caliph Al-Ma'mun dreamed that Aristotle appeared to him and told him that Greek reasoning and Islamic revelation were not incompatible. The next morning, the caliph gave orders that all of Aristotle's works be translated into Arabic. Whether or not there is a grain of truth in this anecdote, there seems little doubt that Hellenised Syrian Christians, who some five hundred years earlier had made their own translations from Greek scientific and philosophical works, were a source for the caliph's translators. Scholars of the movement have estimated that it continued for a century and a half to two centuries. Clearly it was not a sharply defined movement that ended on an appointed date. It took place at a caliph's pleasure and on his initiative, and continued for many years

after the close of his reign. By the twelfth century many Greek scientific and philosophical works that otherwise would be lost reached Europe, by way of Islamic Spain and consequently were preserved for later ages.

To put the Graeco-Arabic translation movement in a wider perspective calls for an initial reflection on Greek medicine, its inheritance and development in Byzantium, and its subsequent transmission to the Arab peoples, chiefly through the instigation of the Caliph al-Ma'mun. At this time, the preparation of medicines was the privilege of physicians; a separate discipline of pharmacology did not yet exist. That was to come in the eleventh century at the time of Avicenna who is regarded as having separated the art of medicine from the skills of compounding drugs, thus earning the sobriquet of the 'father of modern pharmacology'.

The Arabic language was to become the *lingua franca* of the Arabic world, but Arab technical advances were yet to be made. Amongst neighbouring lands, knowledge of and skills in medicines were generally most advanced in Persia at the time of its Arabic conquest in the mid-seventh century.[5] Translations of Greek medical works had been made into Pahlavi, or middle Persian, and their pharmacopeia was based on Greek herbals. The language used by the Persians for their treatises was none the less Arabic in which equivalent technical terms necessary in translation were often lacking. In consequence, transliteration of source words, here Greek, was often adopted, sometimes being filtered through Syriac translations, but not always with comprehensible results.[6] Ullmann observes that ≪many Greek words were translated into Arabic from Syriac and not directly from the Greek≫.[7]

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5 The Sassanid empire came to an end in 644.

6 For useful examples, see H.D. Isaacs, *Medieval Judaeo-Arabic medicine as described in the Cairo Geniza*, ≪Journal of the Royal Society of Medicine≫ LXXXIII (November 1990) 735.

7 Ullmann, *Islamic Medicine*, Edinburgh 1978, 15f.

The Graeco-Arabic translation movement

The Iliad and Odyssey are held up as examples of works handed down by word of mouth until the Athenians committed them to the page, a small task compared with that of translating and transcribing the principal Graeco-Byzantine medical and pharmaceutical texts into the Arabic tongue, on the orders of the caliph. Customarily referred to as the Graeco-Arabic translation movement, it occupied numerous scribes and translators for some 150 years or more. The scope of the work and the will that drove it are remarkable. Many Greek and Byzantine scientific works might have been lost to later ages if it had not been for their Arabic preservation in translation. The total number of Greek works translated is estimated to be some 149, including among that number most of the works of Aristotle, Hippocrates, Galen, Euclid, Ptolemy, Dioscorides, Oribasius, and Paul of Aegina.[8]

The term 'movement' suggests a neat and tidy process that began and ended within a given timescale, but that is too simple a view. The task took place against a background of problematic military and diplomatic relations between Byzantium and the Arab Empire. It could have been an undertaking that never happened if the story is to be believed of the response of the Ummayad Caliph ʿOmar (regn. 634-644) to his field commander at the time of the Arab invasion of Alexandria.[9] Asked what to do with the library at Alexandria, ʿOmar is said to have replied in terms that authorised the destruction of books that accorded with the Book of Allah, which alone was sufficient for the people; for those books that did not so accord, destruction was also good enough for them. One hundred years later Caliph al-Ma'mun, who, unlike ʿOmar, was an ʿAbbasid of Persian stock with an appreciation of the value of knowledge and scholarship, advanced the scholarly translation of Greek scientific and medical works with the energy and perseverance alluded to earlier.

By the thirteenth century, the movement's momentum had dwindled. In the middle of that century, however, two major events took place within a few years of each other, the first affecting the remaining centuries of the Byzantine *imperium* whose seat had been in Nicaea since the Latin occupation

[8] Said Faiq, *Culture and the Medieval Arab Translator*, ≪Perspectives≫ VIII/2 (2000) 91. Other works were translated from Hindi, Persian, Syrian and Sanskrit.

[9] With acknowledgements to Dr. Richard Stoneman who made reference to this apparent paradox in his Presidential Address to the Classical Association in 2010.

of Constantinople and its territories; the second, the destruction of Baghdad and the Arabic ʿAbbasid dynasty in 1258 at the hands of the Mongols who sacked and razed the city with great loss of life.

As for Byzantium, in the early morning of 25 July 1261, Emperor Michael VIII's forces took possession of Constantinople without striking a blow. It was to prove the effective end of the Latin occupation. The Empire of Nicaea had returned to its home. Byzantium survived, a ghost of its former self, until 1453 when the Ottoman Mehmed in turn razed Constantinople, so ending over a thousand years of the Byzantine Empire. The fate of the population of the Queen of Cities can only be imagined; among those who had the resources, many scholars made their way to Italy and shared their scholarly traditions.

It has been suggested that following the destruction of Baghdad Arab scholars may have fled Baghdad, and come to Byzantium, but this is impossible to prove. An exodus of this kind might have been of common benefit, for despite Byzantium's now reduced military strength, its creative faculties and scholarship flourished, not least those of the practice of, and developments in, medicine. Baghdad's destruction and Constantinople's recapture took place so close together that Touwaide has suggested that the subsequent presence of, for example, Arabic physicians in the Byzantine lands was owed to the fall of Baghdad.[10] He calls in evidence those instances in Byzantine medical manuscripts of this period in which there is an indication, albeit minor, of Arabic collaboration or influence, for example in bilingual lexica of plant names. Whether or not this conjecture can be substantiated, the fall of Baghdad effectively ended the Graeco-Arabic translation movement.

It was a time in which numerous remedy texts were produced, usually of no known provenance, but found chiefly in medical manuscripts, and occasionally elsewhere, even in the midst of a theological codex. They undoubtedly had utility, not least for those distant from a Byzantine metropolis without easy recourse to doctors. Many remedies are practical even if their medical logic is now unclear; others are patently nonsensical or magical. There were also major remedy texts, such as that of the twelfth century Nicolaos Myrepsos,[11]

[10] A. Touwaide, *More than the Sex of Angels*, ≪History of Science Society Newsletter≫ XXXVII/2 (April 2008) on-line.

[11] On Myrepsos, see Anna Maria Ieraci Bio, *Testi ginecologici tra Oriente ed Occidente: 1. Metrodora ed il Dynameron di Nicola Mirepso*, in Danielle Jacquart-A. Paravicini Bagliani (edd.), *La Scuola medica salernitana. Gli autori e i testi*, Firenze 2007, 283-314.

which recorded some 2676 remedies from near and far, and were to gain sufficient credence to become the principal pharmaceutical code of the Parisian medical faculty until 1651 (see II).

Linguistic Difficulties

Values and scholarship are of little use if the work of the copyists and translators is too easily subject to scribal error and carelessness, or even distortion and inaccuracy. In the early years of the translation movement first drafts in Arabic needed revisions interpreting both sense and underlying meaning. In mitigation, rendering Greek texts into a tongue of another linguistic family was an undertaking more easily prone to scribal error, problems of sense and of translation of the names of ingredients.[12] Differing syntax was perhaps the chief difficulty; solutions may have lain in paraphrase and summaries. Often in the early stages, transliteration of botanic names was the translator's only resort, especially in the matter of equivalent plant names. But these difficulties were not insuperable as a translator of ability and renown, Hunayn ibn Ishaq (808-873) also known in Latin as Johannitius, was to demonstrate. An Arab Nestorian scholar physician, he mastered four languages, Arabic, Syriac, Greek and Persian. It was said that his ability was such that his translations combined accuracy and sense in such a way as to convey meaning in his translations of Greek medical and scientific works. Tadhari ibn Basil Akhi Istifan, a working colleague of Hunayn, translated Dioscorides' *De materia medica* but Hunayn was obliged to revise Istifan's translation because of the unsatisfactory nature of the transliterations of Greek words.

In short, translation offers every opportunity for error. Poorly understood terminology, lack of an adequate medical vocabulary, false or erroneous translations of plant names or lack of equivalent names in Arabic lands opened the way to confuse and corrupt the original text. Linguistic problems associated with translation included conceptual complications; consequently, the relative merits of literal or free translation were disputed. Where accuracy was not easily attainable, it was open to a translator to add explanations or additions.

[12] Müller's theory of a family relationship between the Indo-European and Semitic languages (of which Arabic was then a minor branch) has long been supplanted.

As medical texts require clarity, their translator needs not only an understanding of diagnostics but also of pharmacognosy. While this appears to impose today's standards on another age and on the limits of its knowledge, a translator of medical texts needs an element of medical learning. Thus, understanding the terminology of medicine and drugs becomes a necessary requirement for the translator from a different language.[13] A reading of Constantine Meliteniotes' Greek translation of Persian remedies shows, as Kousis observes, that a large number of medical plants is cited with their Persian, Arabic or Syriac name written in Greek characters (see II).[14] He adds that transcription in Greek characters brings about the alteration of words for ingredients and makes their rendering difficult today. None the less, the outcome in practice was the creation of an Arabic medical and pharmaceutical terminology that subsequently was, in turn, to loan not a few of its words to the European family of languages.

The history of translations of Dioscorides' *De materia medica* makes a useful background to the foregoing observations on the art of translation. Among the earliest attested translations into Arabic of the ninth century was one from the uncial Greek text of Dioscorides.[15] Early translation into Arabic of his *De materia medica* was to stimulate pharmaceutical research in the Islamic world. The gift of an illustrated codex of the Dioscorides manuscript by Constantine VII to the Caliph ʿAbd al-Rahman was valuable for its illustrations that furthered translation into Arabic, and contributed to establishing a common recognition of plants and their names.[16]

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[13] P.E. Pormann–E. Savage-Smith, *Medieval Islamic Medicine*, Edinburgh 2007, 31f.

[14] A.P. Kousis, *Quelques considérations sur les traductions en grec des oeuvres médicales orientales et principalement sur les deux manuscrits de la traduction d'un traité persan par Constantin Melitiniotis*, «PAA» XIV (1939) 205-220.

[15] D. Gutas, *o.c.* 182. See also passim J.M. Riddle, *Dioscorides on Pharmacy and Medicine*, Austin 1985, xxv and the admirable translation of his *De materia medica* by Lily Y. Beck (see below).

[16] Translations of so influential a text as the *De materia medica* did not cease with its Arabic reception. Editions in Latin, Spanish, Dutch, French and Italian are known in the fifteenth and sixteenth centuries; in 1655 Goodyer translated the text into English. The most recent and valuable translation into English is that of Lily Y. Beck, *Dioscorides' De materia medica*, Hildesheim 2005.

The Manuscript as Custodian of Knowledge

However accustomed peoples have been to disease in every age and country, as well as to promised cures, the upper hand has rested with disease. All too often in earlier medicine the source of a disease has been hidden; as the unknown writer of *The art* in the Hippocratic corpus observed:

> Some, but only a few diseases have their seat where they can be seen: others, and they are many, have a seat where they cannot be perceived.[17]

The Byzantine physician was therefore faced in his time with more than one dilemma, the nature of the presenting symptoms, what course of treatment to embark upon and what drugs might be helpful. Some drugs were recognised as valuable if the diagnoses were broadly correct and this herb or those ingredients had worked in similar circumstances in past experience. In later centuries some medicines might have anything up to a hundred ingredients in an attempt to meet every recognisable aspect of a patient's presenting symptoms, but recipes of that kind were impractical in daily life.[18] Diagnosis in turn was dependent on the doctor's prognosis; if, in simplest terms, he saw that recovery was impossible (the patently 'hopeless case') he was unlikely to try any treatment and might cease attendance.

With time the number of potential medicaments and ingredients had increased in the continual search for cures. For example, it has been claimed of Symeon Seth (fl. around 1050), philosopher and scientist, that sixty percent of the drugs referred to in his texts are not to be found in Galen.[19] Arabic medicine, in turn, had access to numerous ingredients, not always familiar to Byzantium. Small markers of Arabic influence in Byzantine manuscripts of these centuries are in evidence; for example, the use of transliterated Arabic words and the introduction of glossaries in Byzantine manuscripts.[20] In the

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17 Hippocr. *De arte* 9; translation quoted from: *Hippocrates*, II, with an English transl. by W.H.S. Jones, London-New York 1923, 206f.

18 See J.M. Riddle, *Theory and Practice in Medieval Medicine*, ≪Viator≫ V (1974) 157-184. Remedies are none the less amenable to explanation, ingredient by ingredient. See also J. Scarborough, review of V. Nutton, *Ancient Medicine*, London-New York 2004, ≪BMCRev≫ (2005.07.74) on-line.

19 T.S. Miller, *The Birth of the Hospital in the Byzantine Empire*, Baltimore 1997, 165 n. 157.

20 See for instance Serikoff's contribution in this volume.

tenth- or eleventh-century *Vat.* gr. 284 containing texts from Galen, Dioscorides, pseudo-Dioscorides and Philumenos, there are folios with coloured illustrations of noxious herbs and animal life, against which are written their names in Arabic script. Glosses or marginal notes also occur, as in the eleventh or twelfth century *Vat.* gr. 300 that has a marginal note at f. 273r that reads:

> The unseen pores (are) in Arabic *ettou chalchoul*; others (are called) *elmesem*.[21]

Probably just as useful to one owner of *Vat.* gr. 298 (dated between 1385-1389) was the Περσικαί, a glossary of almost forty Greek medical words translated into Arabic (f. 590v).[22]

At the same time, these fragments suggest receptiveness to knowledge. The knowledge of pharmacy and medicine in Byzantium has, in the past, been portrayed as static. That view is now obsolete, as Nutton makes clear.[23] Aristotle Eutychiades summarises changes in drug therapy in Byzantium over the centuries in terms, first of the introduction of new substances and then of new uses of known substances; to these he adds, quoting Aëtios, the modification of the composition of traditional preparations.[24] There follow these changes the addition of a now increasingly developed Arabic pharmacology fortified by the more advanced knowledge of Persia and Syria. At this time, 'technical' translation from Greek into Arabic and contrariwise presented not a few difficulties, particularly in plant names (see above). Nor were all their names either adequately identified or rendered; some were simply transcribed or had more than one name. It takes, however, more than fragments of correspondence and anecdotes of this kind to portray aspects of transmission of knowledge in a language other than the indigenous one.

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[21] Οἱ ἄδηλοι πόροι, σαρακινστή. ἔττου χάλχουλ. ἄλλοι δὲ ἐλμεσέμ.

[22] Elsewhere in this codex is a remedy described as διὰ πείρας τὸ τοῦ Σύρου Νικολάου τοῦ Οὐλέλη πρὸς ἕδραν ἐξερχομένην παιδίων.

[23] V. Nutton, *From Galen to Alexander, Aspects of Medicine and Medical Practice in Late Antiquity*, ≪DOP≫ XXXVIII (1984) 1f.

[24] A.C. Eutychiades, *Εἰσαγωγὴ εἰς τὴν Βυζαντινὴν Θεραπευτικήν*, Athens 1983, 257f.: 258 (d) in respect of the modification of preparations. For a discussion of pharmacodynamics in Hippocrates, see J. Stannard, *Hippocratic Pharmacology*, ≪Bulletin of the History of Medicine≫ XXXV (1961) 497-518: 510-514.

Towards a Summary

The separation of the disciplines of medicine and pharmacy is now taken for granted; it was not always so. The writings of the Arabic doctors from the eleventh century disclosed a conceptual understanding of the role of pharmacy in medicine. The effective separation of the two disciplines is usually attributed to the time of Avicenna (980-1063); pharmacy made advances within Arabic medical science as both disciplines came to be recognised further afield. For example, Abram Sarakenos was *aktouarios* or court physician at the Mangana Hospital in Constantinople, arguably in the last century and a half before the Latin conquest of the city.[25] It is possible to suppose he was from the Near East (Abram equating to Ibrahim in Arabic).[26] Abram Sarakenos, however, brought with him remedies from his homeland; one of them is given in *Vat.* gr. 299. Each ingredient of this remedy is transliterated from Arabic into Greek letters and a Greek translation is then added, preceded by "that is to say", thus rendering the text effectively bi-lingual and of use to Arabic and Greek speaker alike. The contents begin: "*Alilekch*, that is to say, Arabic balsam; (add) two measures of indigo..."[27] The number of extant remedy lists, anonymous or bearing the author's name, are numerous; equally numerous must be the lost texts. If a census of Byzantine remedy texts could be undertaken, a continuous repetition of particular remedies, usually with minor variations, would become evident. The same supposition is likely to hold for Arab medicine. Ullmann observes that ≪Arabic bibliographers recognise more than a hundred authors who wrote about *materia medica*. But only a few of these works are original independent achievements≫.[28] In other words, there were repetition, variation and signs of individual preferences, contributions, perhaps, to the dynamic of

[25] *Vat.* gr. 299, ff. 373f. There appears to be no evidence that the Mangana Xenon survived the Latin occupation.

[26] In the same manuscript, Stephen wrote to John Chale (most probably Khaled) about stomach, spleen and liver affections. Khaled, a pre-Islamic Arabic name has a meaning of 'immortal'.

[27] *Vat.* gr. 299 f. 374r, l. 22, in chapter ϑμα΄ (641). τοῦ Σαρακηνοῦ τοῦ Ἀβραμ. καὶ ἀκτ(ου)αρίου τῶν Μαγγάνων καὶ βασιλικοῦ ἀρχιατροῦ. βοήϑημα καϑαρτικόν. ἐπί τε ἡπατικῶν ἰκτερικῶν καὶ σπληνικῶν καὶ ἰσχιδιακῶν. ἀλιλέκχ. ἤγουν χρυσοβάλανον μέλαν ἰνδικὸν ἑξάγια β΄. βελιλέκτου ἤτοι χρυσοβαλάνου δέρματος κιτρίνου. ἐλίλκης ἤτοι χρυσοβαλάνου κιτρίνου ἀνὰ ἑξαγίας β΄. ἐλιλικίβουλ. τουτέστι χρυσοβαλάνον μέγα ἑξάγια β΄... κτλ.

[28] Ullmann, *o.c.* 103.

pharmacy until overtaken by the pharmaceutics of bio-medicine.

Arabic pharmacy effectively came into being under Umayyad rule in the guise of alchemy. The Prophet is often quoted as saying that for every malady, he has appointed a suitable remedy. Under the subsequent ʿAbbasid caliphs, initially under Caliph al-Mansur (754-775), founder of Baghdad, and later Al-Ma'mun, began the acquisition of knowledge of sciences from other cultures. It was in the Arab lands that pharmacology came to be seen as a separate profession from medicine that itself developed from the study of *materia medica*. Little by little the emphasis changed from alchemy (as now understood) to the pursuit of pharmacy through Arab study of Greek and eastern sources. It was underpinned at this stage by translations from Greek medicine, first made into Syriac, then translated into Arabic; a third phase was the revision of the earlier translations of Dioscorides.[29] The Persians saw themselves as stewards of knowledge that combined, in the case of medicine and pharmacology, knowledge from not only Greek, but also Hindu and Islamic practice. If stewards they were, they combined not only a thirst for knowledge, but an accompanying search for means of healing. Had Aristotle appeared to the Syrians in a dream, he might have reminded them of his observation that "All human beings by nature desire to know".[30] Happily, all Aristotle's works, save one, were to be translated in the movement.

Revisiting the *Par.* gr. 2194

In the last centuries of their shrinking *imperium*, the Byzantine reception of Persian remedy texts is something of an enigma. Little has been written about it; its extent is traceable in a few extant Byzantine texts including the one text of Symeon Seth in the eleventh century (the *Syntagma*) and one of Nikolaos Myrepsos (the *Dynameron*) in the following century. The four minor remedy texts from Persia in the *Par.* gr. 2194 is fortuitous. Explanations of this Persian transmission may be several, for example as a kind of 'cosmopolitanism', a search for new medical knowledge, the pursuit of new cures, traveller's remedies from afar. Yet, Greek medical works had been translated

[29] Touwaide in J.W. Meri, *Medieval Islamic Civilisation: an Encyclopaedia*, I-II, New York 2006, I 607-609. He also sets out an analysis of this process in *L'integration de la Pharmacologie Grecque dans le Monde Arabe. Une Vue d'Ensemble*, ≪MedSec≫ VII/1 (1995) 159-189.

[30] Arist. *Metaph.* 980a 21.

into Pahlavi in earlier centuries; perhaps Persian medicine now had something to offer Byzantium.[31] Persia was strategically located between Byzantium and India and links between these lands existed before Islam became the regional influence and conqueror of Persia. The presence of several Persian texts in a single Byzantine codex suggests that other texts of this kind had been 'exported' to Byzantium, some now lost, some with no hint of their Eastern origin. Others may have succumbed to loss and destruction of manuscripts in the following centuries.[32]

II. Persia and Byzantium: Translators and Borrowers

A few centuries after the Graeco-Arabic translation movement made so great a contribution to Arabic medical lore, remedies of Persian origin were imported into the Byzantine pharmacopoeia. In earlier centuries the Byzantine Empire was in constant conflict with the rise of Islam, yet at the same time Islam valued Byzantine learning, including that in the medical sciences. Browne, in his lectures on Arabian medicine in 1921, observes that medical doctrine was "only in a very small degree the product of the Arabian mind" and continues, "the general history of medicine can only be studied in connection with the general history of Islam".[33] Fifty years later, Ullmann remarks on the quantity of Arabic pharmaceutical compilations by more than a hundred eastern authors.[34] His observation is not necessarily a criticism; it is equally arguable that extensive dissemination of the new knowledge gave rise to a desire to spread this acquisition. Persia, and before her, Syria, had also been bound up in the transmission of Greek medical works to the Arabic lands in Syriac, an Aramaic language or dialect, both written and spoken until the seventh to eighth centuries. That al-Razi was Persian is often overlooked in the study of Arabic medicine.

In the later medieval centuries of Byzantium, Hunger has suggested, pharmacology became the main focus of therapeutics.[35] Of the more familiar,

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[31] P. Prioreschi, *A History of Medicine*, IV, Omaha 2001, 211 and Ullmann, *o.c.* 16-19.

[32] *Par.* gr. 2194, § 2-4 and 8.

[33] E.G. Browne, *Arabian Medicine*, Cambridge 1921, 2 and 4.

[34] See n. 29.

[35] H. Hunger, *Die hochsprachliche profane Literatur der Byzantiner*, I-II, Munich 1978, 308. Of his *Syntagma de alimentorum facultatibus*, nearly 87% of the

if less studied writers, Symeon Seth was an eleventh century Jewish Byzantine doctor from Antioch whom Temkin has described as ≪the great Orientalist of Byzantine medicine≫.[36] He wrote, among other works, *On the properties of foods*, using not only Greek, but also Persian, Arabic and Indian sources.[37]

In the thirteenth century, Nikolaos Myrepsos (fl. mid to late thirteenth century) in his great compilation of 2676 recipes for remedies, the *Dynameron*, recorded recipes, not only those accessible to him in Greek medical texts from Galen onwards, but also from Italian, Persian and Arabic lands. For this thirteenth century court physician of Emperor Ioannes III Dukas Batatzes, Myrepsos, 'preparer of ointments', is an apt epithet. His work has been compared with the shorter *Dynameron* of Nikolaos Salernitatus, despite the Salernitan's fewer recipes (150) and its compilation two centuries earlier. Nicolaos is also said to have been influenced by Synesios, an eleventh century physician who introduced new types of drugs, including *heiligma* and *zoulapia* as well as ingredients including camphor and Arabic *kokkidion*. A study of the Persian and Arabic remedies in the largest section of the *Dynameron*, *sub voce* A (for *Antidotoi*) discloses three recipes attributed to the Persians, one to the Saracens and one described as *Arabike*.[38]

John *aktouarios* (1275 to around 1328) was the last practising physician of note in Byzantium and chief physician at the court of Andronikos II Palaiologos. He wrote *De methodo medendi*, subdivided into six books; he studied different forms of preparations, introduced new drugs and also wrote a work on urology (this latter work is said to be a translation of Avicenna's treatise improved by John).[39] So brief a summary does little justice to him either for

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foodstuffs he records may be found in the works of Arabic physicians.

[36] O. Temkin, *The Double Face of Janus and other Essays*, Baltimore 1977, 214.

[37] See Hunger, *o.c.* 303.

[38] Of these five remedies, recipe 66 is among a cluster of five (63-66) under the broad classification *he dia saturion*. (that is, using the herb satyrion of which Dioscorides says (III 128) it must be drunk "in black harsh wine for tetanic recurvation or lockjaw; and they say it is aphrodisiac"). The second, recipe 301, is for all debility, headache, strokes and the sensation of ants running up and down the body. The Saracen recipe (recipe 221) is a Tryphera for excessive melancholy, every affection of the head and the stomach and abdomen.

[39] See A. Hohlweg, *John Actuarius' De Methodo Medendi. On the New Edition*, ≪DOP≫ XXXVIII (1984) 121-133: 131 n. 81. Some have held that he lived in

his medical achievements or those in pharmacology.[40] He wrote, however, as a doctor for doctors, reflecting his practical experience at that time, as Hohlweg notes.[41] Whether or how far he was influenced by Persian medicine is a matter for further research, but if his work on urology were founded on Avicenna it would be safe to assume a Persian influence.

Other medical writers and translators of this period included Georgios Choniates whose name is associated with the *Antidotoi*, translated from Persian into Greek, and Georgios Chrysokokkos of whose work some fragments remain. Some seventy years ago Kousis discussed the *Antidotoi* of Constantine Meliteniotes, a native of Melitene and near contemporary of Chrysokokkos and Choniates.[42] Whether he was a member of the well known Byzantine Meliteniotes family is uncertain, in concert with a doubt about the attribution of the translation of fifty-three prescriptions in codex *Par.* gr. 2194. A flavour of these Persian remedies is evident in the examples below. All have fairly simple titles but claim to be preparations for complex or unusual symptoms, for example:

> Recipe 46 Matzoun, the phalasipha: Phlegm disperser, appetite stimulant, an effective discutient; it is useful for forgetfulness, stimulates the elderly and renews and arouses the libido; it fortifies the kidneys. 13 ingr.

The final remedy closes, as many such do, with what may only be termed a *tour de force* on paper if not in practice. This example has only five more ingredients than the first but casts its net more widely:

> Recipe 53 Antidote: Beneficial for sufferers from epilepsy and stroke, for sciatic indurations (πωρισμούς) of the sinews, for (sufferers) from trembling, for pains in the shoulder joints, for sufferers

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the eleventh century, but if he translated a treatise of Avicenna it is more likely that he lived in the last years of the thirteenth and first years of the fourteenth century between 1275 and 1328.

40 See Eftychiades, *Εἰσαγωγή* cit. 297 for fuller details.

41 Hohlweg, *o.c.* 132

42 A.P. Kousis, *Quelques considerations*, *passim*. For the two manuscripts, see H. Diels, *Die Handschriften der antiken Ärzte. Griechische Abteilung*, ≪APAW≫ (1905/1906), Berlin 1906, 24 and Suppl. 1, 47.

> from gout; also for throbbing and rheums of the teeth; for sufferers from melancholia, first signs of cataracts, those diseased in the spleen and with pains in the ribs; also for stomach pains that come from (μετὰ) fennel juice; effective for chest pains; also for splenic jaundice sufferers; a purge for kidneys and bladder, stimulant of the libido; and for chronic diseases; for gnawing pains in the intestines; beneficial also if introduced by a clyster and also for wild beast bites. 18 ingr.

Space does not allow a reading of the ingredients of the recipes in Constantine's Greek translation from the Persian, but, as Kousis observes, a large number of medical plants is cited with their Persian, Arab or Syriac name written in Greek characters. He adds that transcription in Greek characters brings about the alteration of words for ingredients and makes their rendering difficult today, although some cited in Dioscorides' *De materia medica* are more easily recognisable.

Byzantium as Intermediary

Hunger wrote at the close of his chapter on Medicine in his *Handbuch der Altertumswissenschaft* that:

> ... the Byzantines of the middle and late centuries played, time and again, the part of intermediaries (*Vermittler*) between Oriental and Occidental medicine, and in their turn, received new impulses from both East and West. During the late period, this is particularly true of pharmacology which from the thirteenth century onwards came increasingly to the fore.[43]

This leads the reader to assume that before the thirteenth century there were indeed merits that Byzantium saw in Persian medicine that may be glimpsed in surviving Byzantine medicine. Hunger discussed Seth in some detail, from his works on dietetics to his *Refutation of Galen.* More importantly, Seth introduced into Byzantine medicine Arab and Indian *materia medica*, but his Arab sources remain unknown.

Persian pharmacology had a long history, both pre-Islamic and subsequently; at the time Hunger speaks of, Persian medicine had consolidated its

[43] H. Hunger, *o.c.* 315.

foundations, not least in Rhazes in the early tenth century and Avicenna in the early eleventh century.[44] Rhazes (865-925), physician and scholar remains, in the words of Browne, «probably the greatest and most original of all the Muslim physicians, and one of the most prolific as an author.»[45] Persian medicine before the Arab conquest of 642 has been described as an honourable profession, the doctor «a counsellor of kings».[46] One of its earliest notable writers on drugs was ibn Sahl (obit. 869) whose *Dispensatory* was first compiled in the ninth century and in the following centuries appeared in several recensions one of which was compiled in the mid-eleventh century by the physicians of the Adudi hospital in Baghdad.[47] The last three centuries of the early Middle Ages saw both Persian and Byzantine medical writers placing on record *materia medica* and remedy recipes of general practicality and orderliness.

In summary, there is a commonality in the practice of humoral medicine (the heritage of Galen), and the pharmacological principles embodied therein. Arabic medicine was to make advances in pharmacy, particularly in the use of chemical compounds, and in clinical pharmacology, that is, the effect of drugs on the body. In short, Byzantium was Hunger's intermediary, albeit that in turn Byzantium was also amenable to reception of Persian medical lore.

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[44] Three volumes of Rhazes medical encyclopaedia were devoted to pharmacology. Books II and V of Avicenna's Canon were similarly on this topic.

[45] Browne, *o.c.* 44.

[46] C. Elgood, *Persian Science*, ch. 11, § iv, in A.J. Arberry (ed.), *The Legacy of Persia*, Oxford 1953, 310.

[47] O. Kahl, *Sabur ibn Sahl's Dispensatory in the Recension of the Adudi Hospital*, Leiden-Boston 2009; a companion volume is Kahl's *The Dispensatory of Ibn at-Tilmid*, Leiden-Boston 2007.

Without the Manuscript...

If there is no one prince to whom this prosaic *envoi* might be addressed, the early Abassid caliphs, al-Mansur and al-Ma'mun, have credit for the initiation and impetus they gave to the Graeco-Arabic translation movement; the renowned translator Hunayn ibn-Ishaq was their prime instrument for this end. The movement's subsequent influence has an historical importance beside which the later Byzantine reception of Persian medicine and pharmacy over a far shorter period is of lesser consequence, but indicative of a certain vitality in these disciplines in the last Byzantine centuries. A Byzantine openness to new knowledge and, so far as the nature of that knowledge allowed, means of healing at so late a stage of the empire.

Temkin's observation that «Byzantine medicine [...] represents the formation as well as the continuation of a tradition, broken and unbroken» comes to mind. It is arguable that the Arabic world inherited that tradition and passed it on. Its agent was the social and political history of the Abassids against a background of wider historical events, including signs of decline of the Byzantine Empire and, in the Arab lands, conquest of neighbouring peoples and the establishment of the Caliphates.

In many ways translators have the leading roles in the translation movement as arbiters of meaning, knowledgeable in the subject of the text under translation and sensitive to the nuances of the language being translated. Hunayn ibn Ishaq was reputed for the skill and numerous translations he undertook for the caliph; he fulfilled, it seems, these ideals. He set a standard for those around him who were engaged in the same task.[48] A modern necessity for piecing together evidence of a topic of this kind is the survival of manuscripts. The Byzantines were known for the copying of their inheritance of the Greek masters; much is now lost with the passage of time. Manuscripts remained subject to destruction, especially in war (witness the burning of great and small libraries of the past), in intemperate climates and not least in a failure to realise the significance of their contents (the palimpsest alone has seen the loss of valuable material). A glance through Diels' *Die Handschriften der antiken Ärzte* often singles out the losses where only one copy of a text survives under a writer's name.[49] Happily, medieval Islam was a pre-eminent source of

[48] See Pormann-Savage-Smith, *Medieval Islamic Medicine* cit. 25-33.

[49] See A. Touwaide, *Byzantine medical manuscripts: Toward a new catalogue*, «ByzZ» CI (2008) 199–208.

transmission through their translations from the Greek of works that might otherwise be lost to later centuries where the Greek original failed to survive. A summation of this paper might be Pormann's words, that «medieval Islamic medicine was not simply a conduit for Greek ideas but a venue for innovation and change» to which we might add «and presentation».

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'Syriac' plant names in a fifteenth century Greek glossary (from the Wellcome Library Books and Manuscripts)

The 'Syriac glossary'

The Wellcome Library is one of the world's most important resources for the history of medicine and related subjects. Among its holdings is a substantial collection of early printed books and manuscripts in many languages of East and West. The majority of Greek and Byzantine manuscripts were acquired in 1984,[1] when the manuscript holdings of the Medical Society of London were transferred to the Wellcome Library. The 169 new acquisitions included a fifteenth century book written in Greek,[2] which comprised a collection of 43 diverse works of medical character. The work represented here is a list of drugs accompanied by their allegedly Syriac counterparts. It covers only one folio (71v) and is described by the cataloguer, W.R. Dawson, as «A botanical list in four columns, headed *Syriac Names of Plants*».[3] The list, still unedited, comprises interesting Graeco-Arabic parallels and names of plants, written in vernacular Greek. It is hoped that the annotated edition of this list offered here will contribute to many fields of medical, historical and linguistic studies. Among these one can name the historical botany of what in the fifteenth century was the Ottoman Empire and the history of the Greek language. The late Greek *materia medica*, which comprised quite a significant

[1] Dawson, *Manuscripta Medica* 68-72. The sale has been made possible through the generous grant of the Wellcome Trust and good offices of E.J. Freeman and H.J.M. Symons.
For full bibliographical information, please see the bibliography.

[2] Shelved at WMS 60.

[3] Dawson, *Manuscripta Medica* 70.

number of the graeco-oriental glossaries has been an object of intensive study for the last two centuries. The studies by J. Boissonade, and later by A. Delatte,[4] and M. Thomson[5] and by L. Tartaglia,[6] have amassed a great deal of the plant-names used by Greeks in the late Middle Ages. The foundations for the difficult task of correct identifications of often mysterious names were already laid in 1866 by B Langkavel, who supplied the plant-names with their Linnaean classification.[7]

Byzantine Glossaries of Oriental *materia medica*

Late Byzantine Greek glossaries of Eastern (Arabic and Syriac) *materia medica* display the level of linguistic perception of Byzantines by their neighbours and enemies, the Arabs and vice versa. The already mentioned J. Boissonade, M. Thomson and others tended to see transliterations in the 'Saracenic' names of the plants written in Greek characters, corresponding to real Arabic plant names. Their efforts, however, often yielded insufficient results, due mainly to the fact that the Greek transliterations of the Arabic plant names were in fact originally Greek names, which were adopted by the Arabs and later transliterated back into Greek. This was shown in 1999 by the author of these lines.[8] These 'Saracenic names' often took their origin from the lemmas, which introduced *materia medica* in various Arabic medical manuals and dictionaries. The original words (in Arabic) were superscribed by their Greek translations or explanations, which later were converted into independent word lists. This explains the origin of such strange remedies like γήζου

[4] Delatte, *Lexique*, Delatte, *Anecdota*
[5] Thomson, *Textes grecs inédits.*
[6] Tartaglia, *Il lessico medico.*
[7] Langkavel, *Botanik*
[8] Serikov, *Saracinskii leksikon*

ἐλαίοι, which being read in the opposite (namely Arabic) direction yielded the ἐλαῖοι τῆς γῆς, i.e. the word for word translation of the Arabic زيتون الارض, i.e. χαμελαία[9], etc.

The titles of such word-lists often show the intrinsic ways of how the scientific Greek words made their way into Arabic and became domesticized there. There were generally two classes of Greek words, called by the Arabs themselves *rūmī* (i.e. of later, mostly Byzantine origin) and *yūnānī* (i.e. old Greek words, which came to Arabic through Syriac and Pehlevi). They often existed on the parallel basis within one and the same work. People often did realize that the *yūnānī* words came via Syriac language; therefore the titles like Συριακὰ ὀνόματα βοτανῶν[10] indicated the way these words penetrated into Arabic rather than their origin.

Principles of edition

The present edition is diplomatic. The author of the present lines believes that the so-called critical editions produce one virtual, non-existent text instead of the many which did really exist.[11] Therefore all the accents and spelling features have been retained. The botanical species were supplied with their scientific classification on the basis of the recent works by A. Dietrich.[12] The parallel readings were taken from my *Dictionary of Greek Foreign and Loan Words in Arabic*.[13]

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[9] Serikov, *Saracinskii leksikon* 95 no. 5.

[10] For the slightly awkward title Λεξικὸν τῶν Σαρακηνῶν 'Saracenic Dictionary' one may suggest a conjecture: the Σαρακηνῶν could be replaced by Συριακῶν or Σύρων.

[11] Cf. the corrections applied by L. Tartaglia in Tartaglia, *Il lessico medico* esp. 549.

[12] *Dtr., Diosc. Erkl.*

[13] Comprises more than 50,000 lemmata; is currently being set up.

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Text

σϋρϊακὰ ὀνόματα βοτανῶν:

ἀσαφέτϊδα: – ἀλτὴλ:[1]

ἀγαρϊκὸν : – γαρϊκὸν:[2]

ἀρμίνϊος βωλος : – χατζὰρ ἀρμενικ[όν]:[3]

ξϋλοβάλσαμον : – ἀτὰπ βελσὲμ:[4]

κολοκϋνθΐδα : – χαλτὲλ χάνταλ:[5]

δακρϋά : – σκαμωνέα:[6]

κάλαμον ἀρρωματικ[ὸν] : – χαοῦτελ κάρχε[7]

σάνταλ[ον] λευκὸν : – σάνταλάπϊὰτ:[8]

σάνταλον ἐρϋθρ[ον] : – σανταλάχμὰρ:[9]

σάνταλ[ον] κίτρϊνον : – σάνταλ ἀσφὰρ:[10]

καστόρϊον : – Ὸ ζοῦντζουπεντάτελ:[11]

στάχος : – σούμπουλ:[12]

σχοίνου ἄνθος : – χαλφεντεμὲκ:[13]

σπόδϊον : – ταπασὴρχιτ[ό]ν:[14]

ὀποπάναξ : – ντζέουσὴρ:[15]

ἀνακάρδϊον : – μπελάρδε:[16]

ἀμωνϊακόν : – κεϊλὰκ:[17]

κουπέπε : – καπαπᾶσϊν:[18]

ἀσπροπΐπερ : – φϊλφϊλ ἀπϊὰτ:[19]

μακροπΐπερ : – ταρηφὶλφὶλ:[20]

ξϋλαλόην : – σαντὰλ:[21]

ἄνθος γλυκον κανθ : – πεδουάρ:[22]

πολΰγονον : – ἔλιψ:[23]

καλαμύνθην : – τούρβεδι:[24]

κόνειον : – χάρμελ:[25]

ἀκαλυφη σπέρμα : – πέζαρ:[26]
σαγαπηνὸν : – σϋκϋβϋνϊτζ:[27]
κάψικον ἰνδικ[ον]: – σευτηρ αζχιτην:[28]
αλϋπΐα : – τέρβεθ[29]
λϋκϊον : – χαυλὰν καὶ λωτὸς τὸ ἀυτο:[30]
φωμᾶξ : – σουκέκα:[31]
τραγηβήλανα : – χαρουβαβασκέβεβε:[32]
βουλΐλϊζ : – ἔμρλεζ:[33]
ἄκορον : – ὀὐέτζ:[34]
πίπερ κοινῶς : – φὶλ φὶλ:[35]
δρακόντ[ος] αἷμα : – μτεμελαχώνη:[36]
κὲπουλεξανθ[ὰ] : – ἀσφὰρ:[37]
κέπουλεμελαινα : – καπουλε:[38]
μϋροβάλανα : – κΐντι:[39]
γλοττ[α] στρουθίου : – λϋσᾶν ἀσφοὺρ:[40]
βδέλιον : – μούκλα:[41]
γαλαγγὰν : – αβλουντζϊὰγ ἀκαρπῆ:[42]
ἀλόηνξανθ[ον] : – σάπερ ἀσφὰρ:[43]
σμΰρνα : – μοῦρ:[44]
μάκερ : – σπϊσπασὰν:[45]
κϊνάμωμον : – κΰρ φη:[46]
μοσχοκράνιον τὸ μέγα : – ντζού χΐντη:[47]
καρποβάλσαμον : – χάπουβαλσὰμ:[48]
γραντα παραδΐσε : – ντὴλ φὺλ:[49]
πολϋπόδϊν : – στη βᾶν:[50]
καφουρᾶν : – καφουρὰφανσουρή καφουρᾶ ἀζην καφουραταγίαν:[51]
κασίς μέλαινα : – χϊὰρ σαμπὰρ:[52]

ὀξϋφοίνικον : – τάμαρ χίντη:[53]

καρϋόφϊλον : – κουρόνηφὴλ:[54]

ζϊγγίβερ : – τζεντζεπὴλ:[55]

πϋρεθρον : – ὀτουκαρ το αὐτο τέ και δετ:[56]

τ..... : – ὠτσαλεπ:[57]

τνυφαιρεσι : – χαμελαρους:[58]

κάγχρϋον : – κακόλη:[59]

δαμασώνιον : – ἔβμρε ἐμάει:[60]

χελϊδόνϊον : – μεμηρὶν:[61]

φϋλλον ϊνδικ[ον] : – ἔγπτϊχαλ:[62]

ἄλας ἀμωνικο[ον] : – μὶλχ χαρανθανη:[63]

θῦμος : – χῶσε:[64]

λημναιαν σφαγϊς : – ταμούχημ [65]

τελος

Notes

[1]The ἀλτὴλ is a misspelt word. The correct Greek form, which corresponds the correct Arabic **حلثيث** or **حلتيت**, the 'devil's dung' would be *αλτήτ. However, in the manuscript the final τ has been wrongly rendered as the λ, cf. **no. 51**. This plant is also known in Arabic as **الانجدان** (Ghaleb, *Encyclopedie* no. 2470), which is probably the *Ferula assafoetida*. However, the plant has not been exactly identified until the present day, cf. *Dtr.* III 75f.

[2]The ἀγαρϊκὸν is a mushroom, which grows on trees, the *Larix europaea* or *Larix*

decidua L. and others. The Greek form γαρικόν recorded here is a transliteration of the Arabic غاريقون (cf. e.g. *ʿAbdūn* ʿUmda [Rab.] fol. 25a,21-27), which in turn was a transliteration, almost certainly via a Syriac medium from the Greek ἀγαρικόν.

[3]The ἀρμίνϊος βωλος literally means 'Armenian soil' and corresponds to the طين ارمانى. A similar lemma is found in *Lexikon ton Sarakinon* no. 2: ἀρμένη βόλο – ἡ μολία, where the last μολία is, no doubt, [γῆ] κιμωλία, 'a white clay', cf. اصناف ومنها] صنف يقال له قيمولياغي وهو نوعان احدهما ابيض والاخر فيه فرفير الطين [(*Diosc.* [*Arab.*] 440,15 [V no. 131]); τῆς δὲ Κιμωλίας ἡ μέν ἐστι λευκὴ ἡ δὲ ἐμπόρφυρος (*Diosc.* [*Graec.*] III 105.13 [V no. 156]). The expression χατζὰρ ἀρμενικ[όν], however, is a transliteration of a different species, the 'Armenian stone', in Arabic الحجر الارماني (*IB* II 12,9).

[4]The ξυλοβάλσαμον is a Greek translation of ἀταπ βελσὲμ, which is transliterated into Greek from the Arabic حشب بلسمان 'the balsam tree'. The word ξυλοβάλσαμον has been recorded in Greek sources (Langkavel, *Botanik* 13,1) and also with a reference to Simon of Genoa's, a physician to Pope Nicolas IV, multilingual dictionary as accessed on www.simonofgenoa.org. The constructions with ξυλο– (a translation for the حشب 'tree') are recorded in the Greek glossaries of the Arabic *materia medica*: ἀγάλοχον – ξυλαλόη (*Lexikon ton Sarakinon* no. 1, cf. Serikov, *Saracinskii leksikon* 94) and elsewhere: ξυλοζιγγίβερι (Langkavel, *Botanik* 218,4, ξυλοκανάβη (Langkavel, *Botanik* 43,1), ξυλοκαρυόφυλλον (Langkavel, *Botanik* 58,2), etc.

[5]The κολοκϋνθΐδα is not the 'pumpkin', *Cucurbita pepo*, but, judging from the Arabic translation (حنظل – *Dtr.* IV 167) 'wild colocynthe' (*Citrullus colocynthis* [*L.*]). Two words χαλτὲλ and χάνταλ are in fact the transliterations of the Arabic حنظل. The χάνταλ is a Greek transliteration of حنظل; the χαλτὲλ is a transliteration of the same word حنظل written, however, without a dot above the *nūn*: ∗حظل. The *nūn* was subsequently elongated and the whole word was 'corrected' into ∗حلطل .

[6]The σκαμωνέα (*Convulvulus scammonia L.*) is in Arabic مديد عطر (*Chynan-*

tum indicum) according to E. Ghaleb (Ghaleb *Encyclopedie* no. 26080). Due to the similarity of pronunciation of the Arabic ق and ع in the vernacular dialect of Syria the word عطر 'scent' has been understood by the translator as قطر 'drop' and translated back into Greek accordingly: 'tear' (δακρϋά).

[7]Correct: κάλαμος ἀρωματικός. This plant is still difficult to identify (*Dtr.* I 15). The Arabic glossaries interpret it as قصب الذريرة 'an odoriferous reed'. An identical interpretation is found in the Greek glossaries of the Arabic *materia medica*: κάσαβ εδδηρΐραι – καλαμὶς αρωματική (*Lexikon ton Sarakinon* no. 143). The interpretation χαοῦτελ κάρχε is obviously a transcription of the Arabic حوط القرح literally 'guard against inflammation'.

[8]The σάνταλάπϊὰτ is the translation of the Arabic صندل ابيض (*Santalum album*, white Sandalwood (Ghaleb, *Encyclopedie* no. 16543, Langkavel, *Botanik* 186.3). It corresponds to the first part of this lemma.

[9]The σανταλάχμάρ is translation of the Arabic صندل احمر (*Adenanthera*), Red sandalwood tree (Ghaleb, *Encyclopedie* no. 16544). It corresponds to the first part of this lemma.

[10]The σάνταλ ἀσφὰρ is translation of the Arabic صندل اصفر, which is probably *Santalum*, sandalwood (Ghaleb, *Encyclopedie* no. 16542). It corresponds to the first part of this lemma.

[11]The Greek ζοῦντζουπεντάτηρ is a translation of the Arabic جندبدستر, the beaver's *testiculi* (*Diosc. Erkl.* II 24, *Dtr.* II 22). The Arab translators often confused two similarly looking Greek words, καστόριον, a secretion found near the hinder parts of the beaver (*Dtr.* II 22) and κάστωρ, the beaver (*Castor fiber*) himself.

[12]The generic Greek στάχυς means 'an ear of a corn', which corresponds to the generic Arabic سنبل . However, from a botanical point of view this translation is less correct: in the Arabic terminology اسطاخيس most probably means the 'stachys' *Stachys Germanica L.* (*Dtr.* III 100) and سنبل is applied to the 'nard' *Nardostachys jatamansi DC* (*Dtr.* I 6), cf. Langkavel, *Botanik* 177,1.

[13]The Greek σχοίνου ἄνθος is a composite of σχοῖνος 'rush' and ἄνθος 'flower' (*Dtr.* I 14). This is a rush identified as *Cymbopogon schoenanthus L.* This word was used to translate the enigmatic χαλφεντεμὲκ, which is obviously also a composite word. The χαλφε is the Arabic حلفاء 'stipa', 'feather grass' (*Stipa tenacissima L.*). The ντεμεκ

(pronounces in colloquial Greek as [*demek*]) is a garbled Arabic transliteration of the Greek ῥάμνος 'shrub': رامنس → ∗دامس → ∗دامق. It could be also the Ottoman دىمك in a sense 'called'

[14]The word σπόδιον as being applied to a plant could not be found. The Arabic 'original' suggests either translation of السراخس (Ghaleb *Encyclopedie* no. 9505) or تافرسوتين (*Dtr.* IV 178 n. 7), both of which mean πολυπόδιον 'polypody' (*Polypodium vulgare L.*). However, this is merely a suggestion. Cf. here a similarly sounding word τζαβουσήρ, which is explained by B. Langkavel as *ferula opopanax* (Langkavel, *Botanik* 129,34) and **no. 15**.

[15]This glossa is also recorded in the Greek glossaries of the Arabic *materia medica*: τζευσήρ – ὀποπάναξ (*Lexikon ton Sarakinon* no. 355). The Greek ντζέουσὴρ (cf. here the variant readings cited at Langkavel, *Botanik* 129,34) is a transliteration of the Arabic جاوشير or شجرة الجوشير, the opopanax (*Dtr.* III 47).

[16]This glossa is also recorded in the Greek glossaries of the Arabic *materia medica*: βελέδορ – ἀντίδοτος, ἀνακάρδιον (*Lexikon ton Sarakinon* no. 48). This allows us to suggest for an enigmatic μπελάρ a conjecture (confirmed by Langkavel, *Botanik* 11,1): ∗βελέδωρ. This is بلاذر شرقي *Sempecarpus anacardium L.* (Ghaleb, *Encyclopedie* no. 3885). The word ∗ἀνακάρδιον in this meaning, however, did not originally exist in the Greek language. It had been invented by the Arabs and came to the Greek language from Arabic, cf. Serikoff, *Rūmī and Yūnānī* 183, notes 46, 47 and other occurencies (Langkavel, *Botanik* 11,1, 179,1).

[17]The ἀμωνϊακόν is not the plant *Ferula terulago L.* (Langkavel, *Botanik* 129,34) but the resin of the tree *Dorema ammoniacum Don.* Its Arabic equivalent is كلح or كلخ (*Dtr.* III 72, 79), of which κεϊλὰκ is a true transliteration. The second part of the lemma corresponds to the first.

[18]The Greek κουπέπε is a transliteration of the Arabic كبابة, a kind of pepper *Piper cuebeba L.* (*Dtr.* III 44 n. 5) as it comes from the explanation by E. Ghaleb: كبابة هي فلفل كبابة اطلبه (Ghaleb, *Encyclopedie* no. 23150). The mysterious Greek καπαπᾶσϊν therefore should be read either as κα πέπεριν, which invites a conjecture:

∗καὶ πέπεριν [τὸ αὐτό] or even simpler: ∗καπαπα ἐστίν and translates: '*koupepe* this is *kapapa*'.

[19]The Greek ἀσπροπίπερ is a direct translation of the Arabic فلفل ابيض 'white pepper' (cf. Ghaleb, *Encyclopedie* no. 21009). This type of composite noun is also attested elsewhere, e.g. ἀσπρομολόχη (Langkavel, *Botanik* 48,2).

[20]The μακροπίπερ is the 'long pepper', μακρὸν πέπερι mentioned by Dioscurides (*Dtr.* III 134, cf. Langkavel, *Botanik* 144,6). The ταρηφίλφϊλ is the transliteration of the الدارفلفل with the same meaning (cf. *ibid.*).

[21]This lemma is recorded in the Greek glossaries of the Arabic *materia medica*, e.g. *Lexikon ton Sarakinon* no. 1: ἀγάλοχον – ξυλαλόη (cf. Serikov, *Saracinskii leksikon* 94). This is aloe, *Aloexylon agalochum Lour.* (cf. Serikov, *Saracinskii leksikon* n. 56, Langkavel, *Botanik* 29.5), which, however, has been incorrectly translated as صندل , namely the 'white Sandalwood' (Ghaleb, *Encyclopedie* no. 16543). Cf. σάνταλον λευκόν (**no. 8**).

[22]The ἄνθος γλυκον κανθ is explained as πεδουάρ, which in Arabic is باذاورد. This word generally means a 'thistle', a closer identification is more difficult (*Dtr.* III 14). The enigmatic Greek ἄνθος γλυκον κανθ is obviously an explanation based upon the root ورد 'rose' and the traditional Arabic explanation: روح الورد (*Dtr.* III 14 note), which can be interpreted as 'a sweet flower and a flower'.

[23]The πολύγονον 'common knot grass', *Polygonum aviculare L.*, is here followed by beginning a description of its properties. The Greek ἔλιψ, probably a ἅπαξ λεγόμενον invites a conjecture: اليابس, i.e. 'dry' a property as applied to a remedy.

[24]The καλαμίνθη, mint (*Mentha L.*) is explained via 'tourpeth', a resin of the convolvulaceous plant (*Dtr.* IV 121). Normally this explanation is applied to the ἄλυπον or ἀλυπιάς, *Globularia alypum*, cf. **no. 29**.

[25]The χάρμη is a transliteration of the Arabic حرمل 'wild rue' (Langkavel, *Botanik* 16,2). It was traditionally used to explain the word κώνειον 'hemlock': واهل افريقية يسمونه الحرمل البلدى (*Diosc. Erkl.* IV 71).

[26]The Greek πέζαρ is a corrupted transliteration of the Arabic بزر الانجورة 'nettle

seed', which appears in the form πετζαντζουρ as it appeared in other Greek glossaries of the Arabic *materia medica*: πεζαροῦντζουρ – τζηκνήδας σπέρμα,(*Lexikon ton Sarakinon* no. 267, cf. Serikov, *Saracinskii leksikon* 97 n. 56).

[27]Sagapenum (σαγαπηνόν) is a resin from the tree *ferula Scowitziana DC, Var.*, which is a transliteration from the Persian سکبینه. The Arabic السکبینج is likewise a transliteration of the same Persian word. The σϋκϋβϋνϊτζ is obviously a transliteration from the Arabic, cf. also a lemma: κευήνηζ – σαγαπινον (*Lexikon ton Sarakinon* no. 159).

[28]According to B. Langkavel (Langkavel, *Botanik* 218,2) the καψικόν means 'cardamon' (cf. **nos 37, 59**); he also lists the words σίτρεψ and σίταξ, which can be considered as synonyms to the σευτήρ, a counterpart for the καψικόν. The exact etymology of both καψικόν and σευτήρ remains to me unknown. Cf. here **no. 49**.

[29]The Greek ἀλυπιάς is a later form of the ἄλυπον, *Globularia alypon* (*Dtr.* IV 159). It is traditionally explained as 'tourpeth'. The lemma also appeared in other Greek glossaries of the Arabic *materia medica*: αλυπίας ἤτοι τούρπιτε (*Lexikon ton Sarakinon* no. 357), cf. **no. 24**.

[30]A plant, called λύκιον (*lycium* is still awaiting a narrower identification (*Diosc. Erkl.* I 102). Traditionally it was explained as كحل خولان, namely 'collyrium of the tribe Khawlān' (*Diosc. Erkl.* I 102). This explanation is reflected in the transliterated word χαυλὰν. I failed to find the explanation of the λύκιον as 'λωτὸς' *Medicago sativa L.*

[31]The φωμᾶξ looks like a corrupted فونيقس, possibly a 'rye grass' (*Dtr.* IV 38), which has been identified as a *genus* as σουκ, Arabic شوكة 'thorn'. However a narrower identification remains a desideratum.

[32]The Greek explanation: χαρουβαβασκέβεβε looks like a transcription of the colloquial (Syriac) Arabic خرنوب بس كبابة, i.e. '[this is] the carob tree, not the pepper'. However, one cannot say this for sure because the exact meaning of the word τραγηβήλανα still remains obscure. Grammatically, however, the form τραγηβήλανα is possible, because the similar construction φοινικοβάλανοι (فينيقوبلانو) is recorded

elsewhere (*Diosc.* [*Graec.*] I 103,19 (I no. 109) – *Diosc.* [*Arab.*] 105,20 I no. 116), cf. τραγορίγανος (Langkavel, *Botanik* 151.9).

[33]Both words βουλΐλϊζ and ἔμρλεζ are rather difficult to interpret. Similar lemmas, however, do occur as **no. 60** below: δαμασώνιον : – ἔβμρε ἐμάει and also βελίλιζ – δαμασώνιον (*Lexikon ton Sarakinon* no. 43); δαμασώνιον – πελίλιτζ (*Lexikon ton Sarakinon* no. 63); ἐμέλζ – τὸ δαμασώνιον λέγεται (*Lexikon ton Sarakinon* no. 84); πελίλιτζ – δαμασώνιον (*Lexikon ton Sarakinon* no. 260, Langkavel, *Botanik* 236,1). From these lemmas it becomes obvious that the Greek δαμασώνιον (the name for the water-plant *Alisma plantago aquatica*) as well as βουλΐλϊζ and ἔμρλεζ are synonyms. The similarly written ἔμρλεζ, ἔβμρε ἐμάει, ἐμέλζ is obviously a transcription of the اذان العنز , the synonym of the Arabic name for the *Alisma plantago aquatica*, مزمار الراعى (Ghaleb, *Encyclopedie* no. 26494). The enigmatic βελίλιζ, πελίλιτζ, etc., however, still remains unexplained.

[34]Both words ἄκορον and ὀὐέτζ mean *Acorus calamus L.*, a perennial marsh-plant, in Arabic: وج (*Dtr.* I 2). The lemma is found in other glossaries of the Arabic *materia medica*: βενεριὰμ – ἄκορον (*Lexikon ton Sarakinon* no. 52); ουέτζ – ἄκορον (*Lexikon ton Sarakinon* no. 247).

[35]The word φὶλ φὶλ is the Greek transliteration of the Arabic translation (فلفل) of the πέπερι (*Piper nigrum L.*), black pepper (*Dtr.* II 143).

[36]The word δρακόντ[ος] αἷμα is a direct translation of the Arabic دم الاخاوين, the 'dragon's blood', a resin of a certain art of the *Lileaceae* (*Dtr.* IV 79 n. 3). The μτεμελαχώνη is the Greek transliteration of the Arabic دم الاخاوين .

[37]The κὲπουλε (or cf. **no. 38** καπουλε) is the Greek transliteration of the Arabic قاقلة, *Elettaria cardamum maior, Wilder* (*Dtr.* III 70 n. 6), which was obviously written as ∗قافله. The [ξανθ–] is a translation of the ἀσφὰρ (اصفر). This is the white cardamon. B. Langkavel (Langkavel, *Botanik* 29,14) identified it as *Emblica officinalis Gaertn.* Cf. **no. 49**.

[38]The κέπουλεμελαινα comprises two words, قاقلة and μέλαινα, cf. **no. 37** and means 'black cardamon'.

[39]The Arabic equivalent for the myrobalan, written as κἵντι remains unidentified, however, following B. Langkavel (Langkavel, *Botanik* 29,14) one might suggest that κἵντι might be a garbled form of κεπούλε.

[40]The γλοττ[α] στρουθίου is the direct translation of the λϋσᾶν ἀσφοὺρ لسان العصفور, 'the sparrow's tongue', the fruits of the ashwood, *Fraxinus excelsior L.*, (*Diosc. Erkl.* III 125, *Dtr.* III 122 n. 5). B. Langkavel (Langkavel, *Botanik* 189,2) identified it as *Polygonum aviculare*.

[41]The Greek βδέλλιον is a name applied to a number of plants (*Diosc. Erkl.* I 57). Traditionally it was translated by the Arabic مقل, here hellenized as μούκλα. The lemma is found in other glossaries of the Arabic *materia medica*: μουκουλ ἀζραϰ – βδέλλιον γεράνιον (*Lexikon ton Sarakinon* no. 201), cf. Langkavel, *Botanik* 230.1.

[42]The word γαλαγγὰν, i.e. 'galagal', *Alpina officinarum* explains the same word, written down in Arabic as خولنجان and pronounced in colloquial (Syriac?) Arabic or even Turkish. A similar lemma found in another lexicon: ηαύλην ζὲν – γαλαγκαν (*Lexikon ton Sarakinon* no. 410) just confirms this suggestion. The Greek ηαύλην ζὲν is no doubt خولنجان. The word αβλουντζὶὰγ also looks like a transcription of the خولنجان, cf. Langkavel, *Botanik* 218,1: κουλούτζια. The word ἀκαρπῆ is pure Greek and means 'of no fruits'.

[43]The word ἀλόηνξανϑ[ον] is a direct translation of the σάπερ ἀσφὰρ, صبر اصفر an aloe-tree (*Dtr.* III 23).

[44]This lemma provides a Greek equivalent σμὕρνα for the Arabic μοῦρ, مر , murrh, *Commifora abyssinica* (*Dtr.* III 27).

[45]Maker (μάκερ) is the muscat flower. It was normally translated into Arabic as بسباسة (*Dtr.* I 50, *Diosc. Erkl.* I 83), which is also reflected in this lemma. Similar lemmata occur in other Arabic glossaries: διαδοῦξαι – μάτζης (*Lexikon ton Sarakinon* no. 61); δαδοῦξε – καὶ μάκερ (*Lexikon ton Sarakinon* no. 64); μάκερ δεδοῦξ (*Lexikon ton Sarakinon* no. 202); πεσπές – μάκερ (*Lexikon ton Sarakinon* no. 272). Cf. Serikov, *Saracinskii leksikon* 96.

[46]The Arabic قرفة transliterated into Greek as κὕρ φη is the cortex of cinnamon *Cortex cinnamoni Cassiae* (*Dtr.* I 45 n. 6).

[47]For the μοσχοκράνιον τὸ μέγα cf. the lemma: καρϊωφϊλον – μοσκοκάρφην (*Lexikon ton Sarakinon* no. 175). That is probably why our text should also read ∗μοςκοκάρφιον, cf. μουσκοκάρφι (Langkavel, *Botanik* 58,2). The μουσκοκάρφι is the *Carophyllus aromaticus L.*, a carnation. It allows us to see in the enigmatic ντζού χΐντη the 'big carnation', or the 'hyacinth'. In fact the ντζού χΐντη pronounced in colloquial Greek as [*dzuchindi*] is a transcription of the Italian 'giacinto'.

[48]The word χάπουβαλσὰμ is the Greek transliteration of حب البلسان the 'balsam seed' (probably that of the *Commiphora opobalsamum [L.]*). The Greek 'translation' was made from the oral source, where the Arabic حبّ [*ḥabb*] 'seed' has been heard as καρπο- from καρπός 'fruit'. The word καρποβάλσαμον is recorded: Langkavel, *Botanik* 13,1 and means *Amyris*.

[49]The γραντα παραδΐσε is the *granum paradisi*, the fifteenth century Italian name for the Malagueta pepper (*Capsicum frutescens var. malagueta, Solanaceae*). The explanation ντὴλ φύλ looks like a garbled Greek transliteration of the Arabic فلفل → *دلفل → *بلفل.

However, the actual word, which has resulted in the enigmatic ντὴλ φύλ might well be the cardamon (in Arabic قاقلة) (cf. **nos 28, 37, 49**): قالقلة → *فلفلة → ∗فلفل → ∗بلفل → ∗دلفل as it comes from the reference by B. Langkavel (Langkavel, *Botanik* 218.5).

[50]The πολυπόδιον, common polypody (*Poloypodium vulgare L., Var.*, was traditionally translated into Arabic with its Persian counterpart بسبايج, which literally means 'of many feet' (*Dtr.* IV 178). The Arabic equivalent written in Greek (στη βᾶν) is obviously a garbled transliteration of بسبايج; cf. also Serikov, *Saracinskii leksikon* 96.

[51]All words are variants of the Arabic word كافور, which is *Camphora officinalis* (*Dtr.* III 24 note 6). The narrower indications of the camphor mentioned here καφουρὰφανσουρή, καφουρᾶ ἀζην and καφουραταγίαν are to be found at Langkavel, *Botanik* 187,2. B. Langkavel identified it as *Persea Camfora* and listed other forms: καφόρα, κάφουρα, καφούριον and especially καφουρέλαιον. The words καφουρᾶ ἀζην

and καφουραταγίαν might be a garbled form of καφουρέλαιον. About the graphical errors of τ and λ see **no. 1**.

[52]The κασίς μέλαινα is the 'cassier' or 'needle bush' (*Vachellia farnesiana* or *Acacia farnesiana*), in Arabic خيار شنبر (Ghaleb, *Encyclopedie* no. 9610), as it also becomes evident from its Greek transcription. This plant has been known in Europe since the sixteenth century.

[53]Apart from the present word-list the lemma ὀξϋφοίνικον is mentioned in another late Greek source: οξυφοίνικον – ὀπόπαναξ (*Lexikon ton Sarakinon* no. 252). The ὀπόπαναξ is πάνακες Ἡράκλειον, a sweet myrrh (*Opopanax Chironium L.* or the resin produced from its root (*Dtr.* III 47). However, the Greek explanation is nothing else but تمر هندي, the 'Indian date', the tamarind (*Tamarindus Indica*). *Oxyphoenicum* explained as *Thamarindi* is to be found in the botanical directory by the German Enlightenment writer Adam Lonitzer (1528-1586): *Oxyphoenix. Lat: Palma Sylvestris. 'Wilder Dactelbaum' Fructus ejus Tamarindi Oxyphoenica seu Tamarindi Actuario teste humectant et refrigerant in abscessu secundo.* (Lonitzer, *Naturalis Historiae opus novum* Glossarium s.v.) B. Langkavel identified οξυφοίνικον as *Ferula opoponax L.* (Langkavel, *Botanik* 129,34).

[54]The καρϋόφϊλον is the 'carnation' *Dianthus caryophyllus* in Arabic قرنفل. The second part of the lemma, κουρόνηφὴλ is the direct transliteration of the Arabic form (*Dtr.* III 44 n. 7). Cf. similar lemma: καρούφουλ – καριόφυλλον (*Lexikon ton Sarakinon* no. 146).

[55]The ζϊγγίβερ is ζιγγίβερι, 'ginger', *Zingiber officinalis, Roscoe*, which in Arabic is written in a form الزنجبيل . The second part of the lemma, τζεντζεπὴλ is the direct transliteration of the Arabic form (*Dtr.* II 144). Similar lemmata occur in other texts: ζενζιπήλ – ζιζίβερ *Lexikon ton Sarakinon* no. 112.

[56]The Greek word πύρεθρον indicates a kind of chrysanthemum *Anacyclus pyrethrum L.*. Arab botanists translated it with a Berber word عاقرقرحا (*Dtr.* III 69), which garbled version (*عاترقر) is transliterated here as ὀτουκαρ, cf. the form οτουηάληαλ

(Langkavel, *Botanik* 174,19). The τέ και δετ might be a wrongly understood Berber name تاغندست as it comes in the Arabic Dioscurides: فرثرون قال اصطفن هو العاقرقرحا المعروف بلغة اهل المغرب تاغندست (*Diosc.* [*Arab.*] III 70).

[57]The first word is illegible. The Greek ὡτσαλεπ looks like جلاب, ipomoea (genus *Convolvulaceae*), however, this still cannot be said for certain.

[58]The enigmatic τνυφαιρεσι is a stem-for-stem translation of the χαμελαρους, i.e. χαμαί and ∗λαυρος, لوره = *laurus* (*Dtr.* I 45), the 'low laurel'. The τνυφαιρεσι then must be ∗دفنى الارض written as ∗دفنى الارص (without a dot ober ض). The reconstruction is legitimate, since similar composite χαμαίπιτυς – صنوبر الارض is recorded elsewhere (*Dtr.* III 150).

[59]The Greek κακόλη means 'cardamon' Du Cange, *Glossarium Graecitatis s.v.*, Langkavel, *Botanik* 218,5, cf. **no. 37**. A similar lemma is found in another source: κακουλέ τὸ λεγόμενον κάχρυον (*Lexikon ton Sarakinon* no. 135). B. Langkavel (Langkavel, *Botanik* 218,2) indicated that for the word κάχριον its synonym was καψικόν. Cf. **no. 28**.

[60]Cf. **no. 33**.

[61]The χελιδόνιον, curcuma is translated into Arabic as ماميران (*Dtr.* III 162), which in this case is transcribed into Greek as μεμηρῖν, cf. Langkavel, *Botanik* 110,3. A similar lemma is found elsewhere: χελιδόνιον – μεμιθά (*Lexikon ton Sarakinon* no. 387).

[62]The φϋλλον ϊνδικ[ον] is allegedly a species of στρατιώτης, also called by the Arabs as the 'dog's tongue' (*Dtr.* IV 90). The ἔγπτϊχαλ in colloquial Greek pronounced as [*endikal*] (= *indicon*) is obviously a garbled Greek transliteration from the Arabic ∗اندقن (ἰνδικόν), which as an example has been discovered by A. Dietrich in az-Zahrāwī's work (*Dtr.* I 9 n. 7) in the form as follows: فلو اسقه.

[63]The ἅλας ἀμωνικο[ον] is a rare mineral composed of ammonium chloride, it forms colorless to white to yellow-brown crystals. Its modern translation in Arabic is ملح النشادر. The interpretation given here μὶλχ χαρανθανη and equally that found in

another source: μέλχ ελ δεράνον – ἀμμωνιακου ἅλατος (*Lexikon ton Sarakinon* no. 198) are still in need of interpretation.

[64]Arabic translation of the thyme (probably *Saturea calamintha L.*) is حاشا (*Dtr.* III 36), which entirely corresponds to the χῶσε as found in the lemma.

[65]This is λημνία σφραγίς , a kind of earth used to seal. The transliterated ταμούχημ indicates a different kind of earth, namely the 'earth of Samos'. In our case it should be ∗Σάμου γῆ, the correct form is Σαμία γῆ or صاماعى (*IB* III 109,23). The Arabic substrate in our case should possibly look like ∗طاموخى.

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Word list

The following pages contain a word list of the Greek and Arabic vocabulary found in the dictionary. The numbers refer to the notes and to the main text as well. The sign ‡ indicates that the commented word occurs only in the footnotes.

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ἀγάλοχον 4 ‡

ἀγαρϊκὸν 2

ἀζην 51 → καφουρᾶ ἀζην 51

ἀζρακ 41‡→ μουκουλ ἀζρακ 41‡

αζχιτην 28 → σευτηρ αζχιτην 28

αἵμα 36 → δρακόντ[ος] αἵμα 36

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ἄκορον 34

ἄλας ἀμωνικο[ον] 63

ἀλόηνξανθ[ον] 43

ἀλτὴλ 1

αλϋπία 29

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ἀσαφέτϊδα 1

ἀσπρομολόχη 19‡

ἀσπροπίπερ 19

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βᾶν 50 → στη βᾶν 50

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βδέλλιον γεράνιον 41‡

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βελσὲμ 4 → ἀτὰπ βελσὲμ 4

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᾽ βόλο 3‡→ ἀρμένη βόλο 3‡

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γαλαγγὰν 42

γαλαγκαν 42‡

γαρϊκὸν 2

γεράνιον 41‡→ βδέλλιον γεράνιον 41‡

γῆ 65‡→ Σαμία γῆ 65‡

γλοττ[α] στρουθίου 40

κευήνηζ 27‡
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μέλαινα 52 → κασίς μέλαινα 52
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μεμηρὶν 61
μεμιθά 61‡
μὶλχ χαρανθανη 63
μοσχοκράνιον τὸ μέγα 47
μούκλα 41
μουκουλ ἀζραχ 41‡
μοῦρ 44
μπελάρδε 16
μτεμελαχώνη 36
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ξϋλαλόην 21, 4‡
ξϋλοβάλσαμον 4
ξυλοζιγγίβερι 4‡
ξυλοκανάβη 4‡
ξυλοκαρυόφυλλον 4‡
ὀξϋφοίνικον 53
ὀποπάναξ 15
ὀὺέτζ 34
ὀτουκαρ 56
ὀτουηάληαλ 56‡
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πεζαροῦντζουρ 26‡
πελίλιτζ 33‡
πίπερ κοινῶς 35
πολύγονον 23
πολϋπόδϊν 50

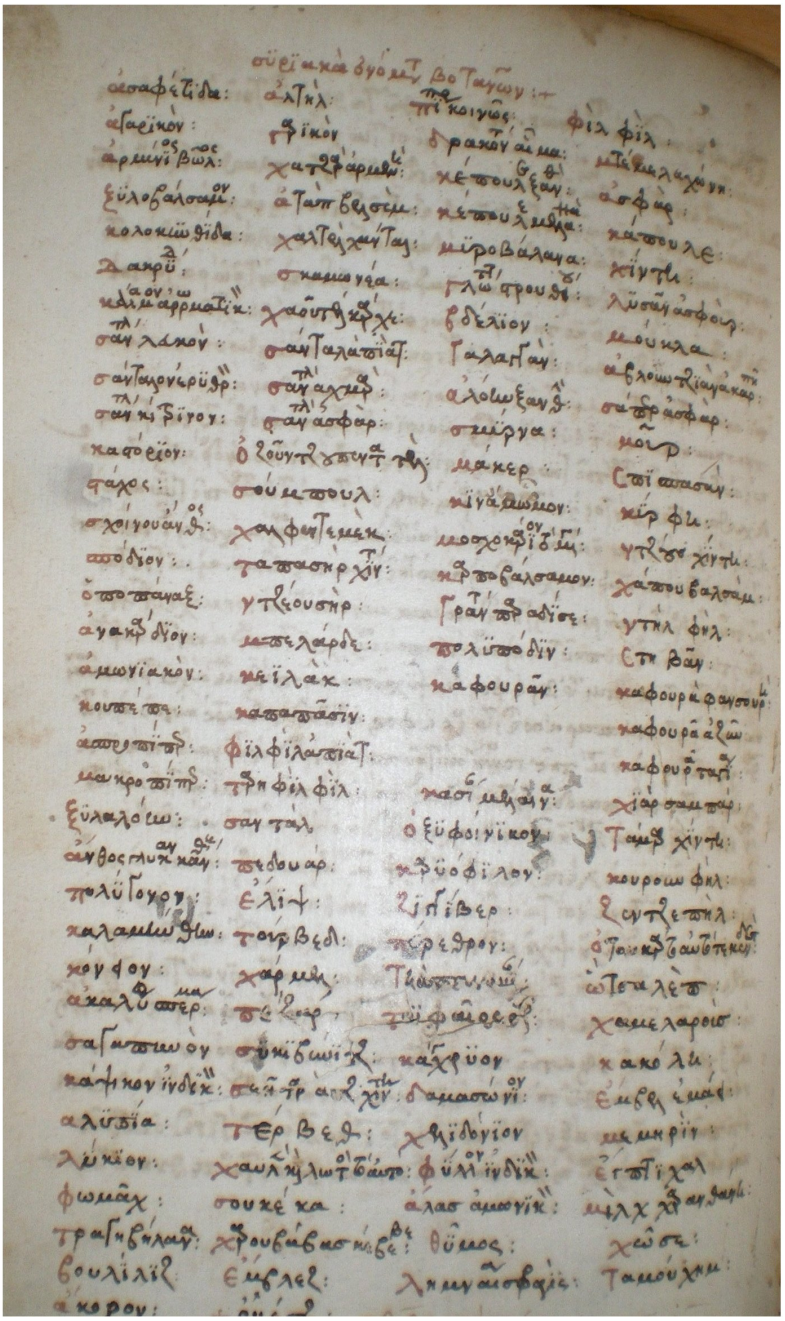

Figure 1: Wellcome Library London, MSL 60, f. 71v.

The Reception of Galen's *Art of medicine* in the Syriac *Book of medicines*

I. Introduction

It is a commonplace that a significant amount of Greek medical literature from Late Antiquity was translated into Arabic through an intervening Syriac version.[1] In view of this, it is surprising how little research of value has been done on Syriac medical literature, something that will become apparent through the course of this paper.[2] The value of the Syriac medical corpus, however, goes beyond its role as the intervening stage between the Greek and Arabic versions of ancient texts — it also affords us a rare glimpse into the mechanics of reception, that is, how the traditional Mesopotamian medical system absorbed the new science that came from the West, first accompanying Christianity as it spread eastwards,[3] and, subsequently, with the official sanction of the Abbasid caliphate in Baghdad.[4]

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[1] E.g. M.W. Dols, *Syriac into Arabic: The Transmission of Greek Medicine*, «ARAM» I (1989) 45-52; R. Le Coz, *Les médecins nestoriens au Moyen Âge: Les maîtres des Arabes*, Paris 2004.

[2] For a previous discussion of this neglect, see S. Bhayro, *Syriac Medical Terminology: Sergius and Galen's Pharmacopia*, «Aramaic Studies» III (2005) 147-165: 149-152.

[3] For a brief summary of the historical circumstances of the eastward spread of Greco-Roman medicine with Christianity, see P.E. Pormann-E. Savage-Smith, *Medieval Islamic Medicine*, Edinburgh 2007, 17f.

[4] Again, for a brief summary of the Abbasid-sponsored translation movement, see Pormann-Savage-Smith, *o.c.* 24-29. For a more detailed and very useful treatment, which is a little dated in respect of the Syriac sources, see H.D. Isaacs, *Arabic Medical Literature*, in M.J.L. Young-J.D. Latham-R.B. Serjeant (edd.), *Religion, Learning and Science in the 'Abbasid Period*, Cambridge 1990, 342-363.

The Syriac *Book of medicines* is perhaps the best demonstration of the mechanics of reception. In this paper, we shall consider an indicative example: the reception of the section of Galen's *Art of medicine* that discusses the physical properties of the head and the corresponding qualities of the brain (VI 2-12), juxtaposed with traditional herbal remedies for headaches that probably originate from Mesopotamia. We shall also see that a recent scholarly treatment of the reception of *Art of medicine* VI 2-12 in the Syriac *Book of medicines* is deeply flawed. But first, some words about Syriac and the Syriac translations are in order.

II. Syriac

Manfred Ullman wrote that, «after the Near East had been more and more christianized, Koine-Greek lost in significance in this area as *lingua franca*, while the native languages, Aramaic in Syria and Iraq, Coptic in Egypt, and Pahlavi in Persia, flourished again».[5] Syriac is perhaps the most prestigious of the Aramaic dialects that flourished at this time, both in terms of the scope of its literature and the extent of its influence. It began as the dialect of Edessa and its environs, around the area of Urfa in what is today south-eastern Turkey, with the earliest dated inscription coming from the year 6 CE, but it quickly spread eastwards as the language of eastern Christianity.[6] The following three centuries witnessed the translation of the Bible into Syriac, along with some early Christian writings. From the fourth century CE, writers such as Aphrahat and Ephrem ushered in a golden age of Syriac literature that ended only with the spread of Islam in the middle of the seventh century. From this point, Syriac gradually ceased to be the Christian vernacular, being replaced by Arabic, although it continued to be used as a liturgical language and a language of learning akin to Latin in early-modern Europe.[7]

In this paper, however, we are more concerned with Syriac translation

[5] M. Ullmann, *Islamic Medicine*, Edinburgh 1978, 7.

[6] S. Brock, *A Brief Outline of Syriac Literature*, Kottayam 1997, 7. For an introduction to the various Aramaic dialects of the time, see S. Moscati, *An Introduction to the Comparative Grammar of the Semitic Languages: Phonology and Morphology*, Wiesbaden 1964, 11f. For the earliest dated inscription, see J. F. Healey, *Aramaic Inscriptions & Documents of the Roman Period*, Oxford 2009, 223-225.

[7] For more detail, see Brock, *o.c.* 8-87.

activity, especially the translation of scientific works, rather than the Syriac language or its literature in general. In order to appreciate the proper context of the Syriac *Book of medicines*, it is imperative that we understand the distinct phases of Syriac translation activity, of which, broadly speaking, there are five:[8]

> Phase One — up to the third century CE: This period witnessed the first translations of Biblical and early Christian literature from Hebrew and Greek into Syriac. While the subject matter was not scientific, the experience gained, particularly in translating from Greek into Syriac — not a simple task, given how different the two languages are — would prove to be invaluable.
>
> Phase Two — sixth century CE: This was the century of the first Syriac scientific translation movement, in which whole corpora were systematically translated from Greek, e.g. Sergius of Resh ʿAina's translations of Galen's works. Although disparaged by later writers, these translations were certainly reader orientated.[9]
>
> Phase Three — seventh century CE: This period is characterised by more rigid, less reader orientated translations, as well as revisions of older translations. There seems to be nothing of interest to medical historians pertaining to this phase.
>
> Phase Four — late eighth and ninth centuries CE: Under Abbasid patronage, another stage of systematic translation activity took place, this time from Greek into both Syriac and Arabic.[10]
>
> Phase Five — tenth to thirteenth centuries CE: This is the age of the great scientific encyclopaedic compilations, in which the priority was bringing order to the vast corpora and arranging them in a practical way.[11]

[8] More or less following Brock, *o.c.* 120-123.

[9] See Bhayro, *Syriac Medical Terminology* cit. 152-157.

[10] For a discussion of the relationship between the earlier, sixth-century, and later, ninth-century, translation movements, see S. Bhayro-S.P. Brock, *The Syriac Galen Palimpsest and the Role of Syriac in the Transmission of Greek Medicine in the Orient*, «BRL», themed issue: R. David (ed.), *Ancient Medical and Healing Systems in the Near East, Greece and Rome*, forthcoming.

[11] This mirrors the trend in Arabic medical literature — see Isaacs, *o.c.* 347f.

III. Budge's Acquisition of the Syriac *Book of medicines*

In 1894, Ernest Wallis Budge, on one of his many trips to Mesopotamia to secure antiquities for the British Museum, found himself in Alqosh, a village with a rich Christian heritage located approximately thirty kilometres north of Mosul, in what is now the predominately Kurdish area of northern Iraq. He encountered a learned resident of Mosul who was in possession of a small library of manuscripts. One manuscript that caught his eye was a twelfth-century medical compendium. From its size and binding, Budge concluded that it had once been part of a monastic library. Despite missing several quires, enough remained for it to cause great excitement to Budge, who referred to it as «the most important and most perfect Syrian treatise on Anatomy, Pathology, and Therapeutics known to us».[12] If we are to believe Budge's account, the owner guarded his manuscripts jealously. Budge was, therefore, forced to pay a professional scribe, at his own expense no less, to make a copy of this manuscript. Thus, regarding the value of this nineteenth-century copy as a textual witness to the Syriac medical tradition, we are left at the mercy of this scribe's competence and the necessarily hurried nature of the transaction.[13]

As a twelfth-century medical compendium, therefore, the Syriac *Book of medicines* belongs to the final phase described above, which means two things that are relevant for our present purposes. First, the Syriac *Book of medicines* is not a translation, but an encyclopaedia that contains excerpts of much earlier translations, thus allowing ample opportunity for various kinds of textual corruptions to creep in, either in the transmission of the earlier translations or in the process of editing, and often abridging, them into the compendium. Second, its content is drawn from a variety of sources that have been edited together for the sake of convenience rather than to preserve the integrity of the various source texts.

Budge described the compendium as consisting of three distinct works. The first was the most 'scientific', containing transcribed medical lectures, each followed by relevant prescriptions. The second was astrological, and concerned with omens and spells. The third contained folk prescriptions of

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[12] E.A.W. Budge, *The Syriac Book of Medicines: Syrian Anatomy, Pathology and Therapeutics in the Early Middle Ages*, I-II, London 1913, I xiiif.

[13] For Budge's description of how he acquired the manuscript, see Budge, *o.c.* I xxxvii-xli.

the most extraordinary nature. For Budge, each section was distinct, with the first having been penned by the most educated scribe, while the second and third by other, more superstitious and ignorant, scribes.[14]

Regarding the first, more 'scientific', section, Budge wrote: «These Lectures were translated from Greek into Syriac by a Syrian physician, who was probably a Nestorian, and who was well acquainted with Greek and Syriac; and he may well have been attached to one of the great Medical Schools, which existed at Edessa (Urfa) and Âmid (Diarbekîr), and Nisibis, in the early centuries of the Christian era. The style of the Syriac is fluent and good, and exhibits everywhere the touch of a master hand».[15] Budge is correct in that his manuscript does indeed contain much Greek science in Syriac translation. Furthermore, it is indeed likely to be a Nestorian scholarly text. But the way in which the Greek science has been received within the text, with its careful ordering of earlier known medical material in abridged form, coupled with the wealth of non-Greco-Roman medical lore, suggests that this is not a translation of a Greek medical work or series of lectures into Syriac. Rather, it is a compendium based on a combination of Greco-Roman and Mesopotamian sources. Furthermore, Budge's attempt to divorce the latter two sections from the first one was seriously misguided.[16]

IV. Greek science in the Syriac *Book of medicines*

That much Greco-Roman medical lore is contained in this text is beyond doubt. Indeed, between 1926 and 1946, Schleifer produced a series of ten articles in which he analysed the Galenic passages contained in the Syriac *Book of medicines*, with reference to Kühn's edition of Galen's works.[17] Schleifer's analysis goes as far as the end of the first section (ending on page 440 of Budge's edition), demonstrating that a significant portion of the Syriac text of the first, more 'scientific', section is derived from Galen, although often in an abridged form. The theoretical basis of the system of medicine in the

[14] Budge, *o.c.* I v-xi.

[15] Budge, *o.c.* I v.

[16] For a recent critique of Budge, which is useful despite probably going a little too far, see A.H. Becker, *Doctoring the Past in the Present: E.A. Wallis Budge, the Discourse on Magic, and the Colonization of Iraq*, «HR» XLIV (2005) 175-215.

[17] See the Appendix below.

first section of this manuscript is, therefore, clearly Galenic. But how is this Galenic tradition received?

Let us consider one example that relates to the anatomy and physiology of the head and brain:[18]

[A]

ܫܘܟܢܐ ܫܝܢ ,ܡܚܝܐܢܐ ܟܬܒܐ ܕܥܠ ܫܝ ܫܒܫ ܡܫܠܚ ܠ

[B]

ܐܡܪ ܫܝ ܫܟܝܟܐ ܫܒܥܐ ܠ ܡܚܐ ܕܡܚ ܕܡ ܐܡ ܐ ܕܡ ܠ ܡܠ ܠ ,ܡܚܝܐܢ ܠ ܡܠ ܫܝ ܫܝ ܠ ❖

[C]

ܐ ܫ ܫ ܫ ܫ ܫ ܫ ܫ ❖ ❖

[D]

❖ ܐ ܐ ❖

[18] The Syriac text is taken from Budge, *o.c.* I 36, with the following changes: **[E]** line 2, ܕܡܥ for ܕܡܥ, following J. Schleifer, *Zum Syrischen Medizinbuch*, «Zeitschrift für Semitistik und verwandte Gebiete» IV (1926) 70-122: 108; **[F]** line 4, ܫܒܒܒ for ܫܒ. The English translation is my own, although that of Budge, *o.c.* II 33f., has been taken into account.

[E]

ܐܢ ܡܩܝܡܝܢ ܥܠ ܡܝܬܪܘܬܐ ܡܚܘܝܢ. ܘܐܢ ܬܘܒ ܓܠܝܠܝܢ ܘܥܫܝܢ
ܦܘܣ̈ܝܗܘܢ: ܘܕܠܝܠܝܢ ܒܪ̈ܬܗܘܢ ܘܡܥ̈ܙܙܢ ܘܕܡ̈ܙܢ ܚܝ̈ܢܝܗܘܢ ܘܚܪܝܦ: ܥܠ
ܡܝܬܪܘܬܐ ܡܫܘܕܥܝܢ܀ ܐܝܠܝܢ ܕܝܢ ܕܢܓܝܢ ܠܩܕܡܝܗܘܢ ܘܡܚܝܠܝܢ ܦܘܣ̈ܝܗܘܢ:
ܘܐܝܠܝܢ ܬܘܒ ܕܐܪܝܟܝܢ ܝܬܝܪ ܡܢ ܡܫܘܚܬܐ: ܥܡܘܪܕܐ ܐܢܘܢ ܕܒܝܫܘܬܐ
ܐܝܟ ܕܒܣܘ̈ܓܐܐ܀ ܐܝܟܢܐ ܗܟܝܠ ܕܥܠ ܪ̈ܫܐ ܪ̈ܘܪܒܐ. ܗܟܢܐ ܘܐܦ ܠܗܠܝܢ
ܡܦܫܩܝܢ ܥܠ ܡܘܚܐ. ܚܕܐ ܠܚܕܐ ܕܝܢ: ܘܐܦ ܡܢ ܗܠܝܢ ܫ̈ܚܝܚܐ ܗܘܝܢ
ܡܫܬܟܚܝܢ. ܐܝܟ ܡܢ ܕܗܘܐ ܚܝܠܗ ܚܝܠܐ ܒܟܘܠܗ ܕܡܘܚܐ܀

[F]

ܡܘܚܐ ܗܟܝܠ ܡܚܒܠܐ. ܡܫܡܫܢܐ ܘܠܟܘܬܗ ܢܦܫܢܝܬܐ. ܘܠܐ ܗܘ ܒܠܚܘܕ
ܬܐܘܪܝܐ ܕܡܕܒܪܢܘܬܗ. ܘܠܐ ܡܬܝܕܥܐ ܟܠ ܡܢ ܒܢܝܐ ܕܡܢ ܠܒܪ. ܐܝܠܝܢ
ܕܝܢ ܕܐܝܟ ܗܠܝܢ: ܒܥܒܕܘܬܗܘܢ ܐܝܟ ܗܟܢ ܗܢܘܢ. ܘܒܥ̈ܠܬܗܘܢ
ܬܘܒ ܗܟܢ. ܘܒܥܠܡܘܬܗܘܢ ܬܐܪܝܬܐ. ܒܗ ܐܬܘܬܗ، ܒܝܬ ܡܣܘܣܣܘܬܐ
ܠܥܒܕܘܬܐ ܘܠܐ ܡܦܪܫܝܢ ܕܠܐܠܬܐ܀

[A] Concerning the natural framing of the head and concerning the signs of the natural constitutions of the brain.
[B] It is right, therefore, that before everything, for we shall write concerning the cure of headaches, that we should nevertheless speak a little concerning its natural constitutions, for this also is of necessity required of us.
[C] A small head, therefore, is a sign of the bad construction of the brain. But neither is that which is large by any means excellent. For if it is that by the firmness of the power of the inner part that it attains for itself much matter (and) the head becomes thus (i.e. large), it is a sign of evil.
[D] But it is right to distinguish all the (different) kinds of heads.
[E] If they are constituted (properly), they signify virtue, and if, moreover, they are spherical and their veins are firm, and their openings are thin, and their eyes are set firmly and piercing and keen, they indicate virtue. But those that slope towards their front, and their veins are weak, and those, moreover, that are longer than normal measure, they are, for the most part, a sign of evil. Therefore, just as concerning large heads, so also these we interpret concerning the brain;[19] but sometimes, nevertheless, of these a very few are

---

[19] I.e., just as we interpreted the external signs regarding the size of the head as being indicative of the constitution of the brain, so we also interpret these distinguishing features just mentioned as indicative of the constitution of the brain.

excellent, as (with) the one who the formative power of the inner part was strong.
[F] The temperate brain, therefore, its mental impulse is moderate, and the abundance of its motion is not great, and it is not easily harmed by an external accident. For those who are such as these, in their infancy their hair is reddish, and in their youth it is redder, and in their manhood even more so, while it is between curly and straight, and they do not bald easily.

As we shall see, this short portion of text contains several distinct components (title, editorial insertions, translations, abridgements) and demonstrates several interesting features (textual corruption, enforced changes, editorial choice and the age-old tension between theory and practice).

In terms of its components, part **[A]** is the title of this section, and was the invention, presumably, of the scribe who compiled the overall section concerning headaches. Also belonging to the hand of this editor is part **[B]**, in which the reader is warned that, before proceeding to the instructions for how to cure headaches (the part the reader is most likely to need), some theory should be learned. This tension between theory and practice is nothing new — indeed, it is a constant feature in the transmission of Galen. According to Vivian Nutton, this was already the case in Galen's lifetime, due, in part, to the intimidating size and complexity of the Galenic corpus.[20] Furthermore, Andrew Cunningham discusses how this continued in later Alexandrian, Arab and medieval European contexts.[21] In the earliest stage of the transmission of the Galenic corpus from Greek into Syriac, in the sixth century, this tension is very clear. For example, in Sergius of Resh ‹Aina's introduction to his translation of the sixth book of Galen's *Simples*, Sergius makes a heartfelt plea to his student Theodore not to neglect to master the theoretical basis of the art of medicine — ܦܘܩܕܢܐ ܓܘܢܝܐ ܠܐܘܡܢܘܬܐ «the rules that pertain in general to the art» — before considering its practical remedies — ܕܘܪܫܐ

[20] V. Nutton, *From Galen to Alexander, Aspects of Medicine and Medical Practice in Late Antiquity*, «DOP» XXXVIII (1984) 1-14 [reprinted in V. Nutton, *From Democedes to Harvey: Studies in the History of Medicine*, London 1988, X, 1-14]: 3f.

[21] A. Cunningham, *The Theory/Practice Division of Medicine: Two Late-Alexandrian Legacies*, in T. Ogawa (ed.), *History of Traditional Medicine.* «Proceedings of the 1st and 2nd International Symposia on the Comparative History of Medicine - East and West. 1st Symposium: October 22-28, 1976, 2nd Symposium: October 23-29, 1977, Susuno-shi, Shizuoka, Japan», Tokyo 1986, 303-324.

ܟܬܒ ܟܬܒܐ «the instruction that is in detail».[22] The compiler of the Syriac *Book of medicines* thus maintains this agenda, stating, in part **[B]**, that a sound theoretical basis is a necessity.

In order to establish this theoretical basis, the editor inserts, in part **[C]**, a quotation from an earlier Syriac translation of Galen's *Art of medicine*, VI 2. The passage from which this translation was drawn probably read something like this:[23]

> ἡ μὲν οὖν μικρὰ κεφαλὴ μοχθηρᾶς ἐγκεφάλου κατασκευῆς ἴδιον σημεῖον· ἡ μεγάλη δὲ οὐκ ἐξ ἀνάγκης ἀγαθῆς κατασκευῆς σημεῖον· ἀλλ' ἐι μὲν διὰ ῥώμην ἐγένε το τῆς ἐγχωρίου δυνάμεως, ὕλην χρηστήν τε καὶ πολλὴν δημιουργούσης, ἀγαθὸν σημεῖον· εἰ δὲ διὰ μόνης τῆς ὕλης τὸ πλῆθος, οὐκ ἀγαθόν·
>
> A small head is the specific sign of a poor state of the brain. A large head, however, is not necessarily a sign of a good state; but if it has become so through the strength of its residual power, producing matter both useful and abundant, it is a good sign; but if solely by a plethora of matter, it is not good.

Comparing the Greek and Syriac versions, it is clear that something is amiss:[24]

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[22] This passage is found in the British Library manuscript *BL Add* 14,661 1v:1-2v:13, previously edited with a German translation in A. Merx, *Proben der syrischen Uebersetzung von Galenus' Schrift über die einfachen Heilmittel*, «Zeitschrift der Deutschen Morgenländischen Gesellschaft» XXXIX (1885) 237-305: 244-248. See also the section on *Theory and Practice* in Bhayro-Brock, *o.c.*, in which this passage is re-edited with an English translation.

[23] For the text with a French translation, see *Galien,* II. *Exhortation à la Médecine, Art médical*, ed. V. Boudon, Paris 2000, 288. The English translation is based on *Galen. Selected Works*, transl. by P.N. Singer, Oxford 1997, 352.

[24] In the following table, the Greek and Syriac versions are given with their respective English translations. In the English translation of the Greek, the text in **bold** shows what is not represented in the Syriac version. In the columns containing the Syriac text and its English translation, the text in **[bold]** shows what should be present.

ἡ μὲν οὖν μικρὰ κεφαλὴ μοχθηρᾶς ἐγκεφάλου κατασκευῆς ἴδιον σημεῖον·	A small head is the specific sign of a poor state of the brain.	A small head, therefore, is a sign of the bad construction of the brain.	ܗܝ ܕܟܝ ܪܫܐ ܙܥܘܪܐ ܐܝܬ ܠܗ ܠܡܒܢܝܬܐ ܒܝܫܬܐ ܕܡܘܚܐ ܕܝܠܗ ܀
ἡ μεγάλη δὲ οὐκ ἐξ ἀνάγκης ἀγαθῆς κατασκευῆς σημεῖον·	A large head, however, is not necessarily a sign of a good state;	But neither is that which is large by any means excellent.	ܗܝ ܕܪܒܐ ܠܐ ܒܗܟܝ ܐܦ ܗܝ ܡܢ ܛܒܘܬܐ ܕܡܘܚܐ ܫܦܝܪܬܐ ܀
ἀλλ᾽ ἐι μὲν διὰ ῥώμην ἐγένε το τῆς ἐγχωρίου δυνάμεως,	but if it has become so through the strength of its residual power,	For if it is that by the firmness of the power of the inner part	ܐܢ ܗܟܝ ܐܬܐ ܠܗ ܡܢ ܬܩܝܦܘ ܕܚܝܠܐ ܕܟܝܢܐ ܕܒܓܘ ܀
ὕλην χρηστήν τε καὶ πολλὴν δημιουργούσης,	producing matter both useful and abundant,	that it attains for itself much matter (and) the head becomes thus (i.e. large),	ܕܡܕܟ ܠܗ ܫܓܝܐ ܕܡܕܟ ܛܒ ܘܣܓܝ ܐܦ ܗܝ ܪܫܐ ܗܟܢܐ
ἀγαθὸν σημεῖον·	it is a **good** sign;	it is a sign **[of virtue]**	ܛܒ ܙܥܘܪܐ [ܕܡܬܐܝܕܐ ܀]
εἰ δὲ διὰ μόνης τῆς ὕλης τὸ πλῆθος,	**but if solely by a plethora of matter,**	**[but if it is an abundance of matter alone,]**	[ܐ ܐܢ ܗ ܕܡܕܟ ܫܓܝܐ ܕܡܕܟ ܠܚܘܕ]
οὐκ ἀγαθόν·	**it is** not good.	**[it is a sign]** of evil.	[ܛܒ ܙܥܘܪܐ] ܕܒܝܫܬܐ ܀

It is clear that, at some stage of copying, a phrase has been omitted by homoioteleuton, in this case due to the probable repetition of ܫܘܕܥܐ ܗܘ ܕ 'it is a sign of' in the original Syriac translation. This was already suggested almost one hundred years ago by Schleifer.[25] In view of this, the treatment of the Syriac evidence in a recent critical edition of Galen's *Art of medicine* represents a regression in scholarship, something that is indicative of the neglect of the Syriac sources mentioned in the introduction to this paper. The treatment in question reads as follows:[26]

> Dans certains cas, on constate que le texte syriaque est en désaccord à la fois avec le texte des manuscrits grecs et avec la traduction arabe de Hunain. C'est le cas du premier passage (c. 6,2) où il est question de la forme de la tête et du pronostic que l'on peut en faire. Le grec comme l'arabe distinguent deux cas : si la tête est petite, c'est mauvais signe ; mais si elle est grande, ce n'est pas forcément bon signe. Sur ce point, la traduction syriaque est en accord avec l'ensemble de la tradition. Mais les divergences s'observent, lors de la distinction établie par Galien à partir de ce dernier cas [...]. La traduction syriaque ignore cette précision et conclut à l'opposé [...]. C'est là aboutir à un non-sens.

While it is true that the Syriac text, as it now stands, is nonsensical, the point is that, as we have seen, it is not the case that the Syriac text is ignoring the precision of the Greek version and concluding the opposite. The Syriac text has simply omitted a crucial clause in the process of transmission for a very obvious reason. While this may seem like a subtle distinction of little importance, the full significance of this point will become apparent when we consider the nature of the abridgements in parts **[E]** and **[F]**.

Having inserted this except from Galen's *Art of medicine* (part **[C]**), our scribe moves to summarise the details. But first, he is careful to distinguish between the direct quotation (part **[C]**) and the following abridgement (part **[E]**) by inserting an editorial notice — part **[D]**.

What follows, in part **[E]**, is not a direct translation nor even a simple abridgement of the following portion of the *Art of medicine*. Instead, we have an abridgement in which the core theme has been changed from mental

25 Schleifer, *o.c.* 107f.

26 From Boudon, *o.c.* 232f.

prowess to morality. Thus, while Galen's *Art of medicine* VI 3-10 is concerned with the head as an indicator of the brain's intelligence, mental aptitude and powers of memory, the corresponding section of the Syriac *Book of medicines* is concerned with the head as an indicator of the mind as the seat of morality and virtue. Thus, for example, the Syriac text has ܡܝܬܪܘܬܐ 'virtue' and ܒܝܫܘܬܐ 'evil', as opposed to the ἀγχίνοια 'quick-wittedness' and βραδυτὴς διανοίας 'slowness of thought' found in Galen's *Art of medicine* VI 10.

Rather than referring to this simply as an 'abridgement', I would suggest adopting the phrase 'thematic abridgement'. It is not just that the scribe has distilled Galen's text — he has also evidently deemed it to be of little value and very much in need of updating according to the beliefs of his readers. Indeed, we can read part **[D]** as the scribe drawing the reader's attention to the updated agenda. Thus part **[E]** reflects more the changing context in which the text was transmitted, rather than the abilities of the translators and editors.[27]

Having rewritten Galen's *Art of medicine* VI 3-10, the scribe arrives at VI 11f., which fits in well enough with his new agenda to require less drastic modification (part **[F]**):[28]

27 In addition to this thematic abridgement, it is possible that the scribe has incorporated a quotation from another Galenic work. Thus ܘܡܚܪ̈ܪܢ ܘܙܗܝ̈ܪܢ ܚܪ̈ܝܦܝܗܘܢ ܘܣܝܡܝܢ could correspond to καὶ τοὺς ὀφθαλμοὺς δεδορκότας δριμὺ...ἄριστα διακεῖσθαι τὴν τοιαύτην κεφαλήν from Galen's *On Hippocrates' 'Epidemics'*. Once again, this was already suggested by Schleifer, *o.c.* 108. If this is the case, this insertion may have been provoked by the context, which is describing facial features, although further investigation may bring another motivation to light.

28 For the Greek text with a French translation, see Boudon, *o.c.* 291f. The English translation is based on Singer, *o.c.* 353.

ἔτι δέ μοι δοκῶ λείπεσθαι δύο γένη γνωρισμάτων, ὧν ἐξ ἀρχῆς ὑπεσχόμην ἐρεῖν, ἓν μὲν τὸ τῶν φυσικῶν ἐνεργειῶν, ἕτερον δὲ τὸ τῶν ἔξωθεν προσπιπτόντων· ἔσται δὲ κοινὸς ὑπὲρ ἀμφοῖν ὁ λόγος·	But it seems to me that two kinds of indication yet remain of those that I initially undertook to discuss — one concerning the natural activities and the other concerning external events. There is a common explanation concerning both of them:		
εἰ μὲν εὔκρατος ὁ ἐγκέφαλος ὑπάρχει κατὰ τὰς τέσσαρας ποιότητας,	If the brain is temperate in respect of the four qualities,	The temperate brain, therefore,	ܕܡܙܓ ܟܝܢ ܕܡܚ ܕܡܘ ܕܡ.
ἁπάντων τε τῶν εἰρημένων ἕξει μετρίως,	it will be moderate concerning all of which we spoke,	its mental impulse is moderate,	ܕܡܫܟܚ ܢܦܫ ܕܡܘ ܕܡ.
καὶ τῶν περιττωμάτων, ὅσα δι᾽ ὑπερῴας ἢ ὤτων ἢ μυκτήρων ἐκκαθαίρεται, καὶ τούτων ἕξει μετρίως,	and concerning the secretions, those cleared out through the palate, the ears, (and) the nostrils, it will also be moderate,	and the abundance of its motion is not great,	ܕܡ ܕܡ ܕܡ ܕܡ ܕܡ ܕܡ.
ἥκιστά τε βλαβήσεται πρὸς ἁπάντων τῶν ἔξωθεν προσπιπτόντων, ὅσα θερμαίνει, καὶ ψύχει, καὶ ξηραίνει, καὶ ὑγραίνει·	and hardly damaged by all of the external events, which are heat, and cold, and dry, and wet.	and it is not easily harmed by an external accident.	ܕܡ ܕܡ ܕܡ ܕܡ ܕܡ ܕܡ ܕܡ ܕܡ ܕܡ ܕܡ.
τοῖς τοιούτοις αἱ τρίχες τῆς κεφαλῆς, βρέφεσι μὲν οὖσιν ὑπόπυρροι,	The hair of such people is reddish as babies,	For those who are such as these, in their infancy their hair is reddish,	ܕܡ ܕܡ ܕܡ ܕܡ ܕܡ ܕܡ ܕܡ ܕܡ ܕܡ ܕܡ ܕܡ.
παισὶ δὲ ὑπόξανθοι,	and with children blondish,	and in their youth it is redder,	ܕܡ ܕܡ ܕܡ ܕܡ ܕܡ.
τελειουμένοις δὲ γίνονται ξανθαί,	and reaching maturity it becomes blonde -	and in their manhood even more so,	ܕܡ ܕܡ ܕܡ ܕܡ ܕܡ.
μεταξύ πως οὖσαι τῶν τε ἀκριβῶς οὐλων καὶ ἁπλῶν,	they are, I suppose, in between truly curly and straight,	while it is between curly and straight,	ܕܡ ܕܡ ܕܡ ܕܡ ܕܡ ܕܡ ܕܡ ܕܡ ܕܡ ܕܡ ܕܡ.
οὐ μὴν οὐδὲ φαλακροῦνται ῥᾳδίως·	and neither do they easily become bald.	and they do not bald easily.	ܕܡ ܕܡ ܕܡ ܕܡ ܕܡ ܕܡ.

Again, we can see that the text is certainly abridged, particularly at the start, but the immediate theme remains unchanged, albeit it is now in a different context on account of the thematic changes made in part **[E]**. In abridging the text, the scribe removes all of Galen's references to himself in the first person. Also deemed surplus to requirements is the initial section, which has been made irrelevant by the way the preceding text has been edited.

One interesting difference between the versions relates to the colour of the hair, which involves a change from red to blonde in the Greek, but an intensifying of red in the Syriac. In reference to this point, Boudon states that «la traduction syriaque simplifie donc le texte grec»,[29] which fits in with her overall line of argument regarding the Syriac *Book of medicines*. It seems likely, however, that this is not so much a simplification but an acclimatisation, that is, a reference to a person's hair becoming blonde as they reach maturity would make little sense in Mesopotamia.

Thus part **[F]** represents a good epitome of Galen's *Art of medicine* VI 11f. The epitome in this twelfth century text was probably derived from an existing Syriac translation, made perhaps in the ninth century, so it represents a valuable witness to the Syriac medical terminology that underlies the later Arabic translations.

In view of our observations regarding parts **[E]** and **[F]**, we must again take issue with the treatment of the Syriac *Book of medicines* in Boudon's study, which states:[30]

> Dans d'autres cas, la traduction syriaque ne donne qu'une version abrégée de passages plus développés dans le texte grec et arabe [...]. Le texte syriaque omet donc délibérément les nuances et les précisions présentes dans le texte grec pour aller plus vite à l'essential et s'en tenir aux seules conclusions.

Again, it is not the case that the Syriac text just abridges its source text, deliberately omitting details in order to get to the conclusions quickly. This seems to accuse the Syriac translator of adopting a lazy approach to transmission, which runs counter to the sophisticated manner in which the Galenic source is received in the Syriac text. The scribe has rewritten the source text to suit his own agenda, in the process simplifying it as well, and

[29] Boudon, *o.c.* 233.
[30] Boudon, *o.c.* 233f.

has abridged the sections that suit his purposes with accuracy and in a way that would be sensible to his readers.

Furthermore, to refer to the Syriac text of the *Book of medicines* as a translation really misses the point and invites people to assess it on the wrong basis. This results in the distinct possibility that an important text will be relegated to the margins of scholarly endeavour because it is considered of little value. Indeed, this is clearly the case in Boudon's study, as she then states:[31]

> Quoi qu'il en soit, le caractère nécessairement tronqué de ces citations syriaques rend difficile leur utilisation pour l'établissement du texte grec qu'elles ne permettent pas de sensiblement améliorer. Aussi n'avons-nous pas retenu ce témoignage dans l'apparat critique.

This results in an indefensible situation in which Gerard of Cremona's Latin text is incorporated into Boudon's critical apparatus, but the Syriac of the *Book of medicines* is not. In other words, a Latin translation based on an Arabic intermediary, which itself is probably based on a Syriac intermediary, is used, while a Syriac abridgement is rejected.[32]

It is clear that a wholesale analysis of the mechanics of Galen's reception in the Syriac *Book of medicines* is a strong desideratum. Fortunately, Schleifer's articles have laid the foundation for this. That this work has not been advanced in the ensuing century is another sad testimony to the neglect experienced by the Syriac sources.

V. Practical Remedies in the Syriac *Book of medicines*

The incorporation of Galen's *Art of medicine* VI 2-12, discussed above, occurs in the third chapter of the *Book of medicines*, which runs from folios 1b-30a and is concerned with diseases of the head.[33] The first part, folios 1b-23b, is mostly devoted to theoretical matters, and contains much that is derived from Galen.[34] The second part, folios 23b-30a, is more practical and

[31] Boudon, *o.c.* 234.
[32] See, for example, Boudon, *o.c.* 267.
[33] See Budge, *o.c.* I xli-li, 1-61 and II 1-65.
[34] Schleifer, *o.c.* 75-113.

presents a series of medicinal recipes.[35] The ingredients vary, but include many elements that suggest a Mesopotamian rather than a Greco-Roman context for the recipes. Consider, for example, this list of ingredients for a recipe for headaches, which is indicative of the kind of recipe encountered in this section:[36]

ܫܠܓ ܕܬܝܐ . ܗܓܓܝܢ . ܫܪܝ ܫܪܝܪ . ܫܠܓ ܕܡܝܢܝ . ܫܪܝ ܕܒܪ ܫܪܝ .
ܫܪܝ ܕܫܝܥܪ . ܫܪܝ ܕܒܝܫ . ܫܪܝ ܕܒܝܫ . ܫܪܝ ܕܫܝܥܪ . ܫܪܝ ܕܫܝܥܪ .

[a] ܫܠܓ ܕܬܝܐ - «fat of jackal» or «juice/sap of fennel»: this phrase is ambiguous because both elements possess multiple meanings.[37] The former interpretation was given by Budge,[38] and would appear to suggest that this is not a Greco-Roman recipe. The latter interpretation, which is supported by ingredients **[b]** and **[e]**, could leave the origin open to question. The context of its use in the treatment of head complaints, however, resonates much more with contemporary Arabic prescriptions,[39] rather than the earlier Greek sources, so its use here probably reflects an oriental rather than Greco-Roman context.

[b] ܗܓܓܝܢ - This is a loan from Greek σαγάπηνον,[40] which probably refers to «(the resin of) Persian fennel».[41] Despite its name, it is described in Greco-Roman sources as growing in Syria,[42] which probably includes upper Mesopotamia. Its use for head complaints accords with our observations for substance **[a]**.

[c] ܫܪܝ ܕܒܪ ܫܪܝ - «pure *mumia*»: The precise meaning of ܫܪܝ is unclear, but it probably refers to a type of asphalt or bitumen that probably originates

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35 Indeed, Schleifer gives no notes for these pages.

36 From Budge, *o.c.* I 56.

37 See M. Sokoloff, *A Syriac Lexicon: A Translation from the Latin, Correction, Expansion, and Update of C. Brockelmann's Lexicon Syriacum*, Winona Lake-Piscataway 2009, 451f. and 584.

38 Budge, *o.c.* II 58.

39 See, for example, E. Lev-Z. Amar, *Practical Materia Medica of the Medieval Eastern Mediterranean according to the Cairo Genizah*, Leiden 2008, 166-168.

40 Merx, *o.c.* 295.

41 See Sokoloff, *o.c.* 966, *s.v.* ܗܓܓܝܢ.

42 See Lev-Amar, *o.c.* 171.

from India, Iran and Iraq.[43] Thus Syriac ܡܘܡܝܐ and Arabic مومیا both possibly derive from an Iranian term (compare Middle Persian *mōm* 'wax' < Old Iranian **mauma* 'impure liquid').[44]

[d] ܪܘܣܐ - 'Syrian rue': Greek βησασᾶ 'Syrian rue' is probably a loan from an oriental original that is realised in Syriac as ܒܝܣܐ and ܪܘܣܐ.[45] In his discussion of the rue, Sergius tell us: ܘܐܚܪܢ ܡܬܩܪܝܢ ܠܗ ܦܝܓܢ ܪܘܣܐ ܒܪܝܐ ܘܬܘܒ ܐܚܪܢ ܐܪܡܠܐ. ܘܣܘܪܝܝܐ ܩܪܝܢ ܠܗ ܒܝܣ ܪܘܣܐ ܒܪܝܐ ܕܡܬܬܡܪ ܠܗ ܡܢ ܠܘܩ. 'And others call this "wild *pygn*", and again others "*armela*", and the Syrians name it "*bšš*"'.[46] The first name listed by Sergius for this plant derives from the Greek πήγανον 'rue', while the second is probably the Semitic form that underlies both Syriac ܐܪܡܠܐ and Arabic حرمل, as well as Greek ἁρμαλά and the plant's scientific name *Peganum harmala*.[47] The third name, which is the one used in our recipe, is said by Sergius to be the proper Syriac name for the plant.

[e] ܥܨܪܐ ܕܣܠܦܝܘܢ - 'juice of σίλφιον': Budge interpreted this as 'fat made from horns',[48] but ܩܘܪܢܝܐ is now known to derive from 'Cyrene' (compare Greek Κυρήνη),[49] the north African city that was a major exporter of the plant σίλφιον. In his discussion of juice, Sergius states: ܕܡ ܡܬܐܡܪ ܩܘܪܢܝܐ ܕܡ ܩܪܝܢ ܠܗ ܘܕܡ ܕܡܕܝܐ ܘܕܡ ܕܣܘܪܝܐ. 'That which comes from Cyrene we name thus (i.e. after Cyrene), and (also) that which is from Media and that which is from Syria'.[50] In other words, the term ܩܘܪܢܝܐ had been applied to other regional varieties of σίλφιον in the same way that Greek has σίλφιον κατὰ Μηδίαν, σίλφιον κατὰ Συρίαν etc.[51] In his list

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[43] See Sokoloff, *o.c.* 725-762, *s.v.* ܡܘܡܐ and ܡܘܡܝܐ; Lev-Amar, *o.c.* 453f.

[44] See D. Durkin-Meisterernst, *Dictionary of Manichaean Middle Persian and Parthian*, Turnhout 2004, 233; D.N. MacKenzie, *Mani's Šābuhragān*, «Bulletin of the School of Oriental and African Studies» XLII (1979) 500-534: 531.

[45] See Sokoloff, *o.c.* 194f.

[46] For the text, see Merx, *o.c.* 282.

[47] See Lev-Amar, *o.c.* 505f. See also C.C. Townsend, E. Guest, *Flora of Iraq Volume Four Part One: Cornaceae to Rubiaceae*, Baghdad 1980, 302-304.

[48] Budge, *o.c.* II 58.

[49] See Sokoloff, *o.c.* 1366.

[50] For the text, see Merx, *o.c.* 291.

[51] See H.G. Liddell-R. Scott, *A Greek-English Lexicon*, 9th ed., Oxford 1940, 1599.

of plant names, Sergius equated ܣܝܠܦܝܘܢ < σίλφιον with ܚܠܝܬܝܬ ܡܕܝܐ 'the plant asafoetida' (compare Arabic حلتيت), which is the Median variety, so it is possible that this is the variety being referred to in the recipe.[52] In any event, the term being employed is a native Syriac invention based on the toponym famed for exporting the substance rather than the Greek loan word for the substance itself.

[f] ܦܘܠܦܠܐ ܕܓܠܓܠ ܦܘܠܦܠ - 'round and long pepper': This is a common oriental term for a very common ingredient.

[g] ܥܘܫܩ - 'gum ammoniac': This is derived from early Middle Persian **(w)ušaq*, which was loaned into Syriac and then into Arabic as اشق, and is preferred in the recipe over the Greek loan word ܐܡܘܢܝܩܘܢ < Ἀμμωνιακόν.[53]

[h] ܩܣܛܘܪܝܘܢ - 'secretion of beaver': This is a loan from Greek καστόρειον, which was also loaned into Arabic as قسطوريون. Its use for treating head complaints, however, is indicative of contemporary Arabic medical texts rather than the earlier Greek sources.[54]

[i] ܐܦܝܒܘܪ - 'spurge': At first sight, ܐܦܝܒܘܪ is clearly a loan from Greek εὐφόρβιον, but it has an uncharacteristic way of transliterating the initial Greek εὐ-, for which we would expect −ܘܪ. Indeed, this is the form Sergius gives: ܐܦܝܒܘܪ.[55] It appears that the Syriac form is immediately derived from the Arabic افربيون, suggesting that the term had, by the twelfth century, become orientalised.[56]

[j] ܦܓܪ ܕܓܡܠܐ - 'urine of camel': This is certainly not a common ingredient in Greco-Roman medicine.

Thus terms **[a]**, **[c]**, **[d]**, **[e]**, **[f]** and **[g]** are of clear oriental derivation, with clear Greek-derived alternatives rejected in the cases of **[d]**, **[e]** and **[g]**. Moreover, term **[a]**, taking the more likely explanation, reflects an oriental use of the substance. Terms **[b]** and **[h]** are Greek loan words, but the use of the substances is oriental. Term **[i]** is a Greek loan word, but through an Arabic

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52 See Merx, *o.c.* 296; see also Lev-Amar, *o.c.* 339f.
53 See Sokoloff, *o.c.* 23 and 54; Lev-Amar, *o.c.* 333f.
54 See Sokoloff, *o.c.* 1387; Lev-Amar, *o.c.* 354f.
55 See Merx, *o.c.* 257.
56 See Lev-Amar, *o.c.* 487f.

intermediary in what was probably its orientalised form. Furthermore, substances **[a]** (following Budge) and **[j]** are not typical of Greco-Roman medicine, and substance **[c]** was probably unknown in the west. It appears, therefore, that this is a Mesopotamian rather than a Greco-Roman medicinal recipe.

This is a feature that is repeated throughout the first 'scientific' section of the *Book of medicines*. In successive chapters, the Galenic material has been edited together with dozens of medicinal recipes that appear to belong to the traditional, indigenous medicine of Mesopotamia. It seems, therefore, that the Mesopotamian medical compendia[57] did not simply abridge and reorganise Hellenistic medical lore, but also incorporated those aspects of indigenous medicine that were still thought to be efficacious.[58]

VI. Conclusion

The Syriac *Book of medicines* is an invaluable witness to the mechanics of reception. It shows how Mesopotamian herbals persisted in the face of the arrival of Greco-Roman science. It also shows how this new science was received and amended to suit its new cultural, material and religious context. Since it became known to western scholarship, the Syriac *Book of medicines* has suffered, initially on account of the prevailing prejudices of the early twentieth century, which sought to contrast the irrational, mystical orient with the scientific occident, but more recently on account of its neglect or dismissal as an unreliable source, even when more questionable sources are not dismissed. Although it is not a translation, in many cases, the Syriac *Book of medicines* will be our only source for the Syriac intermediary between the Greek and Arabic medical terminology, so it certainly merits its place at the centre of our investigations.

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[57] I say compendia because their production continued well into the nineteenth century, e.g. manuscript Syriaque 325 — see R.J.H. Gottheil, *Contributions to Syriac Folk-Medicine*, «JAOS» XX (1899) 186-205; see also Bhayro, *o.c.* 150f.

[58] It is interesting that, in an attempt to infuse these medicinal recipes with the authority of Greco-Roman science, some of these prescriptions were ascribed to figures such as Galen and Ptolemy. The subject of medical pseudepigraphy in the Syriac *Book of medicines*, however, merits a separate, detailed study.

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VII. Appendix: Schleifer's articles on the Syriac *Book of medicines*

J. Schleifer, *Zum Syrischen Medizinbuch*, «Zeitschrift für Semitistik und verwandte Gebiete» IV (1926) 70-122.

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— *Zum Syrischen Medizinbuch*, «Zeitschrift für Semitistik und verwandte Gebiete» V (1927) 195-237.

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Medieval hospital formularies: Byzantium and Islam compared

I. The novel availability of editions or transcriptions of medical writings associated with hospitals in the medieval Middle East makes possible something that has not been attempted before: comparison of Byzantine and Islamic examples of such material.[1]

This comparison – of what we can label hospital *iatrosophia*[2] – is important for two reasons. First, it makes good long neglect. If *iatrosophia* in general have largely been ignored, those relating to hospital practice have, until quite recently, remained wholly unknown. Second, the comparison adds a fresh dimension to the debate about hospital medicalization in the Middle Ages. This is a more intricate task.

Great claims have by turns been made for the quasi-modernity of both Byzantine and medieval Islamic hospitals. ≪Philanthropic social welfare and medical assistance institutions [in Byzantium] [...] were in every respect perfect and nearly similar to present day institutions of this kind [...] they were the first fully equipped European hospitals≫.[3] No serious historian would write in such terms now. Yet the medical superiority of Byzantine hospitals,

[1] For the definition and outline history of the hospitals in question, see P. Horden, *The earliest hospitals in Byzantium, western Europe, and Islam*, ≪Journal of Interdisciplinary History≫ XXXV (2005) 361-389; Horden, *How medicalised were Byzantine hospitals?*, ≪M&S≫ X (2006) 45-74; P.E. Pormann, *Islamic hospitals in the time of al-Muqtadir*, in John Nawas (ed.), *Abbasid Studies*, II, Leuven 2010, 337-381. See also D. Stathakopoulos in this collection. What follows could not have been written without the unstinting assistance and advice of the late David Bennett.

[2] For the definition of *iatrosophia* see Nutton in this volume.

[3] G.C. Pournaropoulos, *Hospital and social welfare institutions in the medieval Greek Empire (Byzantium)*, in *XVIIe Congrès international d'histoire de la medicine*, I, Athens 1960, 378, quoted by D. Constantelos, *Byzantine philanthropy and social welfare*, New Rochelle, N.Y. 1991^2, 118.

at least over those to be found in contemporary western Europe, has been stoutly maintained by Timothy Miller in a number of publications. «*Xenones* [or *nosokomeia* – hospitals] evolved [he writes, in 2008] as the principal centres of Byzantine medicine because of their link to the *archiatroi*, the ancient chief physicians of the *polis*.» And he adds: «that members of the ruling elite sought treatment at Byzantine hospitals demonstrates how different these institutions were from the Hôtel-Dieu in Paris or Saint Bartholomew in London».[4] Even such modified eulogy of Byzantine charitable establishments has been questioned. Yet this way of describing medieval hospitals lives on – in effect asserting the superiority of one culture over another by reference to the degree to which its hospitals were in some sense medicalized.

It lives on, indeed has long flourished, in the realm of scholarship about early Islamic hospitals. «The emergence of the prototype of the modern hospital in medieval Islam»: the title says it all.[5] That is from 1980. The latest, and also the most learned and authoritative exponent of such a view has been Peter E. Pormann. With him, the *comparandum* is Byzantium, not western Europe – it is always the poorer neighbour. And the contrast drawn is between (implicitly) backward Christian health care in Byzantium and forward-looking, secular – or at least multi-faith – establishments in Islam. In these hospitals, as in Miller's version of Byzantium, elite patients were treated by elite physicians. And the density of hospital provision in tenth-century Baghdad is ultimately validated by estimating its statistical superiority to that of modern Pakistan:[6]

> It is therefore evident that the medieval Islamic hospital was a

[4] T. Miller, *Charitable Institutions*, in Elizabeth Jeffreys *et al.* (edd.), *The Oxford Handbook of Byzantine Studies*, Oxford, 2008, 627, reflecting the overall argument of Miller, *The Birth of the Hospital in the Byzantine Empire*, Baltimore 1997^2.

[5] A. Sayili, *The Emergence of the Prototype of the Modern Hospital in Medieval Islam*, «Türk Tarih Kurumu Basimevi Belleten» XLIV (1980) 279-286, cited by Leigh Chipman, *The World of Pharmacy and Pharmacists in Mamluk Cairo*, Leiden-Boston 2010, 135.

[6] P.E. Pormann-E. Savage-Smith, *Medieval Islamic Medicine*, Edinburgh 2007, 101, with italics added; echoing Pormann, *Al-Muqtadir* cit. and other papers by him (which is why I attribute the view to Pormann solely rather than to both authors). For the comparison of proportional hospital provision in tenth-century Baghdad with that of the *whole* of Pakistan in 1998 see Pormann and Savage-Smith cit. 110. According to the on-line *World health statistics 2010* Pakistan did indeed average 6 hospital beds per 10,000 of population in 2000-2009, placing it at very near the bottom in

> more elaborate institution with a wider range of functions than the earlier poor and sick relief facilities offered by some Christian monasteries and hospices. The care for the insane in hospitals was unprecedented and an important part of even the earliest Islamic hospitals. Although early Islamic hospitals drew on Christian models, there are some things which make them unique. First, unlike their Christian counterparts, the medicine practised there was *secular* in character, insofar as it was based on the principles of humoral pathology rather than religion. Treatment in Christian institutions before the eighth century would customarily begin with a confession, and be carried out by monks or priests – that is to say, by Christians for Christians through Christian ritual (although of course not limited to it). In contrast, there were no mosques or places for religious ritual associated with Islamic hospitals, though in a few instances mosques were attached at a later date. In Islamic hospitals from the tenth century onwards (as far as we know), Muslim, Jewish, Christian, and even pagan doctors worked together, treating not only patients of their own community, but also those of other communities. Secondly, *elite medical theory and practice came together* in Islamic hospitals in a way that they had not done so before. This is illustrated by the fact that some of the best physicians of the time worked in hospitals and produced there some of their most advanced and innovative research. Thirdly, over time hospitals became *centres for the teaching of medicine*, in which students were encouraged to obtain their medical education. Finally, hospitals were *part of wider public health efforts* promoted by the ruling elite.

Again, therefore, the hospital is presented as a centre of medical excellence – of research, teaching, and practice informed by theory. It is a medical-history equivalent of the *translatio imperii*: from Constantinople to Baghdad. The *translatio* may turn out to be entirely justified, but its basis needs testing – and on as many fronts as the evidence permits.

There are various ways in which the accuracy of the Byzantine-Islamic comparison could be appraised. But some obvious methodological caveats

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terms of world rankings. This statistic seems to tell us more about Pakistan than about Baghdad.

must be heeded first. Is like being compared with like – or does the starkness of the presumed contrast between a Christian and a secular ethos vitiate further discussion? Is what is being compared the generality of hospitals in each culture, which is what the rhetoric of both Miller and Pormann implies? Or are really only a few metropolitan hospitals in question, as the specific supporting examples (such as Baghdad) suggest? Still more to the point, on what yardstick is medicalization being measured – the mere presence or absence of doctors; the degree of authority they wielded; whether they were courtiers; the number of beds at their disposal; what sort of medicine they were therefore likely to have dispensed; or how that medicine's efficacy would have been assessed in the modern laboratory?[7]

On a practical level, answers to these methodological questions must be sought using contemporary evidence, or as near to contemporary as possible. This is not the place to review that evidence, which (very much in Pormann's favour, let it be stressed) does include some first-hand, contemporary descriptive texts of elite physicians active in hospitals, as well as later, retrospective narratives in the same vein; prescriptive (deontological) exhortations to learn medicine in hospitals; and medical case books that record experiments with treatments that in some ways might be seen to anticipate modern clinical trials.[8]

What should be mentioned here is a wider trend within the scholarship of early Islamic medicine, that is, medicine from the ninth century onwards. This trend is to point up the contrast, not between Islam and some other culture, but within Islamic medicine itself – a contrast between the sophisticated procedures and treatments advocated on the theoretical and technical medical literature of the period and the much simpler responses to the same medical problems recorded in the case histories.[9] The contrast is more than a matter of the doctors' selecting a narrow range of treatments from the large arsenal in principle available to them.[10] It suggests a deliberate avoidance of the sophis-

[7] On that last-mentioned front see e.g. Leigh Chipman, *How effective were cough remedies known to medieval Egyptians?*, ≪Korot≫ XVI (2002) 135-157.

[8] Pormann, *Medical methodology and hospital practice: the case of fourth-/tenth-century Baghdad*, in P. Adamson (ed.), *In the age of al-Farabi: Arabic philosophy in the fourth/tenth century*, London 2008, 95-118.

[9] See the contributions of Emilie Savage-Smith and Cristina Álvarez-Millán to ≪Social History of Medicine≫ XIII (2000) 293-306, 307-321.

[10] *Pace* Pormann, *Al-Muqtadir* cit. 364.

tication paraded in those writings intended to attract and hold the attention of potential patrons. It seems almost to concede that these writings were only (to recall the gloomy tones of Manfred Ullmann) ≪lifeless theory [...] mere book knowledge≫.[11] Perhaps the practice of elite medicine in hospitals was different from the theory.

The possible implications of that for the comparison of Byzantine and Islamic medical literature deserve further exploration – elsewhere. For the moment it is simply worth bearing them in mind as we come to the one type of evidence that has not so far been pressed into service when juxtaposing the hospitals of the two empires: the Greek hospital *iatrosophia* and their Arabic equivalents, the hospital *aqrabadhinat*.[12]

II. The first task is to establish the corpora involved. On the Byzantine side, David Bennett has surveyed the relevant manuscripts, in a discussion that supersedes all others in both scope and thoroughness.[13] I am indebted to him for permission to summarize and continue disseminating his main findings.

There are five or six texts in question – depending on how one counts a text that has at some point been divided into two by its copyists.

1. "Prescriptions and classifications [of fever?] of the great hospitals, of the kind that doctors prescribe from experience for healing, especially for patients in the hospitals." That is the translated title of one version of a compilation of treatments (parts of which, including the title, variously appear in at least four other manuscripts). The compilation is divided under sixteen very miscellaneous headings and dates from approximately 1050. It is found in the fourteenth-century *Vat.* gr. 292. Three other manuscripts (nos 2, 4, and 5 below) also preserve these 'prescriptions and classifications' to varying extents, but sometimes without the titular ascription to hospitals.

2. *Vat.* gr. 299 is an anthology of medical writings dating from the later fourteenth century. Within a long concluding medical compilation (of around

[11] M. Ullmann, *Islamic medicine*, Edinburgh 1978, 106.

[12] B. Lewin, *Akrabadhin*, or *karabadhin*, in *EI*2 (the term derives from the Greek *graphidion*, short treatise or register, via the Syriac).

[13] D.C. Bennett, *Xenonika: medical texts associated with* Xenones *in the late Byzantine period*, University of London PhD thesis 2003, together with his contribution to this collection, and his forthcoming monograph, *Xenonika*, which he kindly discussed with me. See also Miller, *Birth of the hospital* cit. ch. 9. The summary that follows revises and corrects that in my paper, *How medicalised?* cit. 60-62.

180,000 words) it contains five remedies ascribed to three named physicians of the Mangana hospital, founded in the mid-eleventh century,[14] and one other remedy ascribed to a named, but otherwise unknown doctor, for whom no institutional affiliation is given. The three hospital physicians are: (a) Stephanos, *archiatros* (chief physician) and *aktouarios* (court physician);[15] (b) Abram 'the Saracen', *aktouarios* and *basilikos* (imperial) *archiatros*; and (c) Theodore, *iatros* (physician) at the Mangana. There are six other passages ascribed only to the Mangana hospital, with no physician named. These are dispersed over about a half of the compilation but form only a tiny proportion of the whole. A further six passages in the same remedy collection correspond to parts of the collection in *Vat.* gr. 292 (no. 1, above) in which they are said to be derived from 'the great hospitals'.

3. The fifteenth-century *Par.* gr. 2194 includes eight remedies ascribed to Michael, *aktouarios* of the otherwise undocumented Mauraganos (*recte* Maurianos?) hospital. These six remedies are found in a text headed, in a hand that differs from that of the copyist, *dynameron xenonikon dia peiras* ("On the potency of hospital prescriptions found by experience"). That text is succeeded by another similar brief collection entitled, even more simply, *xenonika* (from the main Greek term translatable as hospital, *xenon*). So far as is currently known, none of the hospital-related material found here survives in any other manuscript.

4. The *Vind. med.* gr. 48, from the late thirteenth century, has a text attributed in its title to Romanos, *koubouklеisios* (an imperial honorific) of the Great Church (Hagia Sophia) and *protomenutes* (chief physician) of the imperial Myrelaion Hospital in Constantinople.[16] Fragments of this text survive in only two other manuscripts. The title *koubouklеisios* disappeared after the tenth century, and the Myrelaion hospital was re-founded by the Emperor Ro-

[14] Miller, *Birth of the hospital* cit. 149f., with P. Lemerle, *Cinq études sur le XIe siècle byzantin*, Paris 1977, 273-283.

[15] On the changing meaning of *aktouarios* see *Oxford Dictionary of Byzantium*, I-III, Oxford 1991, *s.v.*

[16] On the *protomenutes* see U. Criscuolo, *Pour le texte du médecin Romanos*, in A. Garzya (ed.), *Storia e ecdoctica dei testi medici greci. Histoire et ecdotique des textes médicaux grecs.* ≪Actes du colloque international Paris 24-26 mai 1994≫, Naples 1996, 113-131: 114.

manus Lecapenus in the mid-tenth century.[17] Romanos *kouboukleisios* cannot be dated any more precisely than that.

5. The text attributed to Romanos is actually only the first half of a much longer work. Its second half survives separately, in the *Laur.* plut. 75,19, under a different author's name, as the *Apotherapeutike* of one Theophilos, in which the material is said to be drawn from hospital books (*xenonikon biblon*). *Apotherapeutike* is an odd term, but its sense of 'remedy list' is clear enough.[18]

Both these two parts – Romanos's and Theophilos's – contain passages similar to parts of *Vat.* gr. 299 (no. 2 above) where the hospital treatments are attributed to the Mangana hospital.

6. Manuscript *Laur.* plut. 7,19, of the thirteenth to fourteenth centuries, is a collection mainly of theological works. Like nine other manuscripts, it contains a text (mostly, but not always, the same text) with the title: "Therapeutic medical treatments by various doctors set in order according to the defined procedure of the *xenon*". This is a short piece of some 2,750 words. In none of its versions does it live up to the orderliness implied in its title. It includes abbreviated versions of remedies recorded in four other manuscripts under the name of John *archiatros*,[19] in one other manuscript under that of Galen, and in a sixth, under both names. More on the 'Therapeutic medicines' below.

Overall, then, we have five or six texts, known to us from eighteen manuscripts, that have hospital connections made explicit in their titles or their contents. To them can be added two manuscripts (*Par.* gr. 2315 and 2510) that were copied for hospitals, one manuscript (*Scorialensis* Y.III.14) dedicated to a hospital by its scribe George (all three of these from the fourteenth century), and perhaps three or four others that may have been owned by a hospital in the late Byzantine period, including such 'luxury products' as the *Niketas codex* and the rebound *Vienna Dioscorides*.[20] Some fifteenth-

[17] Miller, *Birth of the hospital* cit. 113f.

[18] On the text see also A.P. Kousis, *The Apotherapeutic* [*sic*] *of Theophilos according to the Laurentian codex, plut. 75, 19*, ≪PAA≫ XIX (1944) 35-45; Anna Maria Ieraci Bio, *Sur une Ἀποθεραπευτική attribuée à Théophile*, in A. Garzya, *Storia e ecdotica dei testi medici greci*, Naples 1996, 191-205.

[19] See further B. Zipser, *John the Physician's* Therapeutics, Leiden-Boston 2009.

[20] Bennett, *o.c.* appendix V, 440f., listing also post-Byzantine manuscripts ascribed to *xenones*.

century humanist feats of Galenic collecting and scholarship may have had a hospital setting in the Kral Xenon in Constantinople, but they are as far removed from patients' immediate clinical needs as they are from the style of the *iatrosophion*.[21]

III. As for the Islamic side: there was a genre of medical formularies (or pharmacopoeias, or dispensatories), written collections of compound remedies – the *aqrabadhin*. Within that body of writings we find at least three works explicitly redacted for use in the *bimaristan* (hospital).

1. Sabur ibn Sahl (d. 869) was a Nestorian Christian physician from Gondeshapur in Iran, where he may have held a post in the city's famed local hospital.[22] He became a court physician to the Abbasid Caliph al-Mutawakkil and his successors. His formulary survives in three different versions of varying length, known to philologists appropriately as the short, middle and long versions. It is noteworthy in passing that the unique surviving manuscript of the short one (*Berol. or. oct.* 1839, copied around 900) shows signs of extensive use: thumb imprints on the cover, reading marks of wax on several leaves, and numbering of quires and folios as 'finding aids' perhaps added early in the manuscript's life.[23] Overall these different versions survive in five manuscripts dating from the tenth to the seventeenth century or even later. It is not clear which version most faithfully reflects Sabur's original, perhaps written in Syriac. Nor can it even be known whether any of the surviving redactions were made during his lifetime. In the mid-eleventh century, someone produced a fourth version: a revised, rearranged, abridged text explicitly entitled: "The formulary of Sabur according to the ʿAdudi hospital, a synopsis of Sabur's formulary on the composition of drugs, [in] sixteen chapters" (one chapter fewer than the small version but drawing on both small and large redactions). The

[21] *Ibid.* 37, 62f., 81f., 124; Brigitte Mondrain, *Jean Argyropoulos professeur à Constantinople et ses auditeurs médecins, d'Andronic Éparque à Démétrios Angelos*, in C. Scholz-G. Makris (edd.), *POLYPLEUROS NOUS: Festschrift für Peter Schreiner*, Munich 2000, 223-249. See also Nutton and Petit in this volume.

[22] For what follows see M. Ullmann, *Die Medizin in Islam*, Leiden 1970, 300f.; *Sabur ibn Sahl. Dispensatorium parvum*, ed. by O. Kahl, Leiden-New York 1994; *Sabur ibn Sahl. The Small Dispensatory*, transl. by O. Kahl, Leiden-Boston 2003; O. Kahl, *Sabur ibn Sahl's Dispensatory in the Recension of the ʿAdudi Hospital*, Leiden-Boston 2008.

[23] Kahl, *Small Dispensatory* cit. xi.

ʿAdudi was the hospital founded in Baghdad on the west bank of the Tigris by the Buyid ruler ʿAdud al-Daula. It opened in the year of his death, 982. The version made for it is represented in a unique manuscript, dated 1341, the work of a copyist not entirely at ease with what was presumably being dictated to him: *Munich Staatsbibliothek* arab. 808,2. I shall come back to Sabur and this hospital text below.

Some circumstantial evidence suggests that the hospital formulary under his name became, if not standard, then widespread in the major hospitals of Baghdad, perhaps of the caliphate. The court and hospital physician al-Kaskari who worked in tenth-century Baghdad wrote in the prefatory remarks to his medical compendium:

> In each chapter I have limited myself to a description of the pastes [...] pills, pastilles, liquids, collyria [...] dressings, and other things in Sabur's Dispensatory to which people resorted in the hospitals. I compared this with the manuscripts in the hospitals dealing with this.[24]

In his *Fihrist* the bio-bibliographer Ibn al-Nadim (d. 995-998) corroborates the information that Sabur's work was used in hospitals as well as apothecary shops.[25]

2. Ibn al-Tilmidh (b. c. 1065 in Baghdad, d. 1154 or 1165) was another Christian doctor who worked in the ʿAdudi hospital.[26] He rose to be chief physician there as well as court doctor to the Caliph al-Muqtadiʿ. Written in the 1140s, his formulary became, according to the later biographical dictionaries, the default pharmacopoeia in the hospitals of Baghdad, replacing that of Sabur.[27] This formulary survives in two recensions, long (20 chapters) and short (13). A version of the short text seems also to have been adopted as a hospital formulary. The main, long, version comes to us in at least five manuscripts ranging in date from c. 1200 to c. 1600. According to the subtitles of some of these it was 'compiled from a number of [other] formularies'.

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[24] Pormann, *Al-Muqtadir* cit. 346; Ullmann, *Medizin* cit. 300.

[25] Ed. G. Flügel, I-II, Leipzig 1871-1872, II 297.

[26] *The Dispensatory of Ibn at-Tilmid*, ed. by O. Kahl, Leiden 2007; Ullmann, *Medizin* cit. 306; Chipman, *World of Pharmacy* cit. 31f.

[27] Kahl, *Ibn at-Tilmid* cit. 5.

3. Finally in this roster of authors of hospital *aqrabadhinat* comes the (Karaite) Jewish apothecary Ibn Abi al-Bayan (d. c. 1236).[28] He too was a court physician, and treated Saladin's successor al-ʿAdil. He was director of the Nasiri hospital in Cairo and composed his *Dustur al-bimaristani* for use in it. It survives in some twelve manuscripts, which represent two different versions, dating from around 1200 to 1600, and was perhaps based on earlier compilations already maintained in the Cairo hospital.[29]

IV. With the 'cast' of texts assembled, we can turn to the business of comparison.

Even a brief review of the material in Arabic immediately suggests differences from the Byzantine corpus. First, at the simple level of the progress of scholarship, on the Islamic side there are editions and translations at our disposal, as well as a significant if small secondary literature (which is one reason why I have given less detail of Arabic than of Greek manuscripts). Even if some of the editions are very recent, this discursive literature has been building up over a number of years. That state of affairs contrasts with the virtually solitary work of David Bennett.[30] To some extent the contrast reflects the far greater degree of philological and historical attention given to Islamic medicine in general, by comparison with the neglect from which Byzantine medicine has quite generally suffered. Many of the major Greek texts languish unedited, not to mention the *iatrosophia*. There are some studies of individual authors and writings but no modern synthesis.[31]

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[28] Chipman, *World of Pharmacy* cit. 38-41; Ullmann, *Medizin* cit. 309.

[29] Chipman, *World of Pharmacy* cit. 39; Ullmann, *Medizin* cit. 309.

[30] See Bennett, *o.c.* 34f., for previous work; also his contribution to ≪Social History of Medicine≫ XIII (2000) 279-291. See also A. Touwaide, *Byzantine hospital manuals* (iatrosophia) *as a source for the study of therapeutics*, in B.S. Bowers (ed.), *The medieval Hospital and medical Practice*, Aldershot 2007, 148-173.

[31] A Byzantine equivalent to Pormann and Savage-Smith is almost inconceivable in the present state of our knowledge; see meanwhile ≪DOP≫ XXXVIII (1984), *Symposium on Byzantine medicine*.

The contrast owes far more, however, to the fact that the manuscript traditions of the Islamic works in question are r e l a t i v e l y easy to establish, at least in broad outline. For all the individual variation of particular witnesses, they fall into distinct recensions each with its own stemma. We find named authors, with biographies known even if only in stark outline. The authors are often active at court. They also hold high rank in specific hospitals that have their own documented histories, two in Baghdad, one (in the case of Ibn Abi al-Bayan) in Cairo. Their writings are specifically redacted for use in these hospitals. They display a firm editorial hand. They cite their sources, but they also rework them. There are some vignettes in narrative evidence of the actual use of their work. Each author's text seems to achieve 'market dominance' in its region. That dominance lasts for centuries in the cases of Sabur ibn Sahl and Ibn al-Tilmidh. Ibn al-Bayan was surpassed in popularity rather more quickly, by the Jewish apothecary al-Kuhin al-ʿAttar. But then the latter's *Minhaj al-dukkan* (*Management of the* [*pharmacist's*] *shop*) of about 1260 continued in use for four hundred years, until the 1660s.[32] The status of hospital medicine within the whole genre of the pharmacopoeia is attested by the way al-Kuhin al-ʿAttar explicitly removed hospital references when transplanting material from his principal sources, which included Sabur and Ibn al-Tilmidh.[33] He was trying, almost against the odds, to replace the perspective of a hospital doctor with that of an apothecary.

Nothing like this can be said of the Byzantine corpus. Its 'authors' or compilers are anonymous, pseudonymous, or at best obscure. Their careers, such as they may have been, are lost to us. Though some parts of the corpus purport to have a specific hospital association (e.g. with the Mangana), the actual hospitals in which the texts may have been used are unknowable. The textual history of the material is immensely complex. Writings combine and recombine, changing title and ascribed authorship. If the Islamic material presents a stiff but ultimately surmountable challenge, that from Byzantium is an editor's nightmare. Overall, little can be surmised about where or when the texts were deployed. There is certainly no clear succession of dominant writings.

The Islamic corpus is probably larger in its page extent than the Byzantine one. I estimate that, in his thesis, David Bennett is discussing something

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[32] Chipman, *World of Pharmacy* cit. 1.

[33] *Ibid.* 19, 32f.

of the order of 200 to 230 pages of manuscript material, including some overlaps in content and the whole of the Romanos/Theophilos text, but not counting wholesale duplication. (Of course this takes no account of variation in script and folio size. My point is simply that the aggregate is nearer to 200 than to 10 or to 800 pages.) I also estimate very crudely that this is a slightly smaller aggregate than the three main authors writing in Arabic for hospitals combined. While there are occasional signs that other hospital formularies than the works of those three were created and preserved in Islamic hospitals, perhaps anonymously,[34] it seems likely none the less that those works surviving in Arabic are most of the iceberg, not just the tip.

That iceberg, to continue the metaphor, is quite substantial in relation to the ice shelf from which it has become 'calved'. Ullmann's survey of the medieval literature of pharmacy composed in Arabic[35] (that is, not counting translations of Galen or Dioscorides) allows us to situate the work of our three hospital writers within a larger corpus of only some twenty-three authors, who wrote either free standing works or included major sections on complex remedies within larger treatises (as did Ibn Sina with the *Canon*). I do not know of a comparable survey of the Greek manuscript material, but I doubt that the 'Bennett corpus' would loom anything like as large within it.

To approach the question of relative proportion in a different way: the scale of the Byzantine material should be set against the estimated aggregate of 2,200 medical manuscripts surviving in European libraries (although that includes some post-Byzantine material).[36] The numbers of hospital manuscripts could of course be inflated a little. The Byzantine iceberg may well have been deeper than the Islamic one. Many manuscripts that once existed will have succumbed to ordinary wear and tear, let alone the Fourth Crusade or the Ottoman onslaught. Hospital material can survive without its title. And more hospital texts doubtless remain to be discovered, hiding behind misleading or inadequate catalogue entries. Yet there are limits to the number of hypothetical manuscripts that can plausibly be added. For material can gain as well as

[34] *Ibid.* 39f.

[35] Ullmann, *Medizin* cit. ch. 15.

[36] A. Touwaide, *The Corpus of Greek Medical Manuscripts: A Computerised Inventory and Catalogue*, in W.M. Stevens, *Bibliographic Access to Medieval and Renaissance Manuscripts: A Survey of Computerised Data Bases and Information Services*, New York 1992, 75-92; Touwaide, *Byzantine medical manuscripts: toward a new catalogue*, ≪ByzZ≫ CI (2008) 199-208.

lose its xenon ascription in the unpredictable course of copying and re-copying. However we exercise the imagination, the number of hospital manuscripts that were produced in Byzantium must remain a very small proportion – a fraction of one per cent – of the entirety of medical writing. We must envisage a tiny corpus as far as the Byzantine Middle Ages are concerned.[37]

On the Islamic front, again I do not know of any estimate of the total surviving bulk of the manuscripts to set alongside that for the medieval Greek corpus. Ullmann's second index to his survey of *Die Medizin in Islam* lists over 1,000 Arabic and Persian book titles, including translations. While some are no longer extant, it is a fair estimate that many of those that are, perhaps the majority, survive in more than one manuscript. Simply as a percentage of the total, then, the Arabic hospital texts are probably as insignificant in relative bulk as the Greek.

Any such statistic fails, however, to take account of the relative prestige of the two corpora. The Arabic texts may represent only a sub-genre of the type of writing called *aqrabadhin*, but that genre is more distinct than that of the *iatrosophion*. A few Greek hospital texts were given the sobriquet *xenonika*, but hardly to the extent that implied the recognition of a new kind of medical writing. The medical world of the great hospitals in Baghdad or Cairo is a world in which court and hospital practice seem perfectly compatible for elite physicians, whatever medicine they actually dispensed in the hospitals. We have no such evidence for regular links between Byzantine hospital doctors and the imperial court.[38]

On the other hand, the medical standing of Byzantine hospitals should not be underestimated. Consider the sheer longevity of the tradition of hospital writing. What survive for us are mostly later medieval copies of ninth-to-eleventh-century texts. And some of the *xenonika*, like the Arabic hospital formularies, continued to be copied into the sixteenth century. Given the cost of the materials and the skills required for the making of the least pretentious codex, this longevity is some tribute to the perceived value of hospital remedies. Considerable stature must have attached to these remedies and

[37] Bennett, *o.c.* 441.

[38] The closest parallel would be the doctors attached to the Pantokator hospital according to its *typikon* or foundation charter, who were not supposed to abandon their hospital duties in order to treat provincial aristocrats, however close to the emperor they might be: ed. P. Gautier, ≪REByz≫ XLV (1987) 107, lines 1305-1308, with Horden, *How medicalised?* cit. 54.

treatments. This is a medical world in which texts mutate with each copying. A title, if there is one, becomes an assertion of value rather than a certificate of authenticity. Witness the remedies which are now attributed to a hospital, now to John *archiatros*, now to Galen. What matters in the present context is not which (if any) of those ascriptions is the right one. Nor is it whether a given remedy generally originated, or was used, in a hospital. What is significant, rather, is that, at some stage in the remedy's manuscript career, someone – sponsor or copyist – thought that the hospital ascription was an appropriate measure of value. A hospital remedy is as good (so the manuscripts imply) as one supplied by Galen. A hospital *archiatros* is as good an authority as any of the other possible names that might be attached to a treatment. And this is so even in the later medieval period when there were fewer Byzantine hospitals and it is far from clear that even the 'great ones' continued to function on the same scale after the Latin conquest ended.[39] By the same token, hospital texts – when they are labelled as such – keep very good company in the medical anthologies that have preserved them. They can be found associated with all the 'big names' from Hippocrates to John *aktouarios*, one of the last of the stellar Byzantine physicians.

V. So far the texts have been viewed from the outside: their profiles within the total pool of manuscripts, within established genres, within their social setting in hospital and court. The inside, the contents, need scrutiny.

Some common features first. It should already be evident that there is nothing special about hospital medicine in either Byzantium or Islam. These texts can be redactions of medical writings for general use. That is precisely because the hospital, whether Byzantine xenon or Islamic *bimaristan*, is not a place for great medical innovation, even though, as Pormann has suggested for early Islam, it may be a place of experiment, of limited, un-'controlled' treatment trials. (On the Islamic side, at least, as noted earlier, a difference recognized at the time was not between hospital and non-hospital but between the approaches to dispensing medicine of a physician and an apothecary.)[40]

[39] Miller, *Birth of the hospital* cit. xvi-xviii, produces evidence, some of it perplexing or oblique, of doctors active in late Byzantine hospitals in the capital. For a thorough review see D. Stathakopoulos, *Stiftungen von Spitälern in spätbyzantinischer Zeit (1261-1453)*, in M. Bogolte (ed.), *Stiftungen in Christentum, Judentum und Islam vor der Moderne*, Berlin 2005, 147-157.

[40] Chipman, *World of pharmacy* cit. 18f.

Not until the nineteenth century, after all, will hospitals anywhere begin to provide a type of medicine that could not be had outside 'the clinic'. Again, as a common feature it should be remarked that both bodies of information about drugs and remedies, the Greek and the Arabic, depend to a considerable extent upon a classical Greek past, in which the names of Galen and Dioscorides loom large. Finally, on neither side of the religious division do the texts, because of their practical emphasis, generally include background theory of humours or complexions, semiology, or reference to the condition of the patient. This is a relatively simple kind of medical writing.

Differences as well as commonalities must be registered, however. To bring them out I shall focus the comparison on just two texts. They are the short Greek piece (c. 2,750 words) headed "Therapeutic medical treatments by various doctors set in order according to the defined procedure of the *xenon*", **T** for brevity, and the hospital redaction of Sabur (**S**), which bears the title (following Kahl's translation), ≪The formulary of Sabur according to the copy of the ʿAdudi hospital, [being] a synopsis of Sabur's dispensatory on the composition of drugs, [in] sixteen chapters≫. This recension (to recall) survives uniquely in a thirteenth-century manuscript but was dated by Degen and Ullmann to the mid-eleventh century (presumably before the flood that partially destroyed the hospital in 1045).[41] **T** survives in ten manuscripts dating from the thirteenth to the sixteenth centuries but Bennett, following Litavrin, is inclined to date its compilation to around the mid-eleventh century also.[42] The two texts are thus more or less contemporary.

The most immediate difference between them lies in their organisation, which is characteristic of their respective medical cultures and the hospital texts of each. **T** is arranged in the traditional head to foot order, at least for its first 46 remedies, after which a miscellaneous supplement seems to follow:[43]

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[41] R. Degen-M. Ullmann, *Zum Dispensatorium des Sabur ibn Sahl*, ≪WO≫ VII (1973/1974) 241-258; flood: Pormann and Savage-Smith, *o.c.* 98; the hospital was not rebuilt for another 23 years.

[42] Bennett, *o.c.* ch. 6, with App. IV; for dating of the compilation as represented in the earliest manuscript see G. Litavrin, *Malade et médecin à Byzance, XIe-XIVe siècles: remarques sur le cod. plut. VII 19 de la Bibliothèque de Lorenzo de' Medici à Florence*, in Evelyne Patlagean (ed.), *Maladie et société à Byzance*, Paris 1993, 97-101: 98.

[43] Adapted from Bennett, *o.c.* table 6.3 (p. 249).

Head

1 For a sharp pain in the head
2 For a pain on one side of the head or face
3 For a pain in the head and one side of the head
4 For a feverishly hot head
5 Decoction for use in cases of giddiness
6 Head lotion

Eyes

7 An eye remedy
8 For trachoma of an eye
9 For cases of itching affecting the eyes
10 For a discharge from the eyes

Nose

11 For a nosebleed
12 For dryness of the nose

Mouth

13 A mouthwash
14 For ulceration of the mouth
15 Toothpaste
16 For haemoptysis
17 For pain in the tongue

Intestines

18 A laxative epithem
19 Affections of the bowels
20 For induration of the intestines
21 Affections of the liver, and pleurisy
22 For the liver
23 Poultices for sufferers from pleurisy
24 For a liver affection
25 For stomach pain
26 A plaster [strictly an epithem] for stomach pain and every affection arising from there
27 For affections of the spleen
28 An epithem for the spleen
29 About embrocations for the spleen
30 For all internal pain and poisoning
31 Kidney affections
32 A fomentation for kidney affections
33 Diuretics
34 An enema for sciatica

Skin lesions

35 For sores on the privy parts
36 For cases of an external sore on the private parts
37 For every kind of induration
38 Counter-irritant plasters
39 An ointment for injuries
40 A medicinal ointment
41 For an excrescence of the flesh
42 A method of fomentation of the flesh
43 For a haemorrhage

Feet

44 For swollen feet
45 For gout
46 For a callosity

[**end of head to foot organization**]

Fever

47 For shivering fits

Emetics

48 Emetics

Inflammations

49 For external haemorrhoids
50 For buboes and the plague

Purges

51 Galen's purgative pills
52 Purgative for those suffering from the dropsy
53 Prescription for purging of phlegm

Ears

54 For the mucous discharge which some

call *glyky*, whatever its origin (mastoiditis)
55 Ear remedies for blockage of the ears

Throat and lungs

56 Affections of the uvula; for cases of the enlargement of the uvula
57 Gargles
58 Cough remedies
59 The Linctus
60 Remedies for shortness of breath

Skin lesion

61 For a suppuration (spreading) from head to hands or feet or any other limb

Digestion

62 A dry powder for the stomach to be taken with wine
63 For those who do not keep down their food
64 A desiccative compound efficacious for a flux from the head

Miscellaneous lesions

65 For a scald from hot water
66 For pruritis

St Gregory's Salt

67 A salt prepared by Gregory the Theologian

Antidotes

68 On the great decoction of the xenon
69 The great decoction of Athanasios
70 Antidotal drugs

S by contrast, in common with most *aqrabadhinat*, is arranged predominantly by kind of drug:[44]

1 Pastilles
2 Lohochs
3 Beverages and robs
4 Oils
5 Cataplasms
6 Enemas
7 Powders
8 Collyria
9 Liniments
10 Stomachics
11 Hierata
12 Decoctions and pills
13 Preserves
14 Preparing and testing theriac
15 Treating teeth and gums
16 Uses and properties of animal parts

Addenda: 49 compounds

Note that only ch. 15 on teeth and gums is 'topically' headed. Note also that madness is not represented, despite the emphasis on its treatment in many medieval Islamic hospitals.[45] We should also register the unsystem-

[44] Adapted from Kahl, *Recension of the ʿAdudi Hospital* cit. 9.

[45] M. Dols, *Majnun: The madman in medieval Islamic society*, Oxford 1992, 112-135.

atic addenda, comparable in that respect to **T**, but here (rather oddly for a hospital) mostly concerned with sexual hygiene or cosmetics.[46]

The structure of the remedies also differs between the two texts. Remedies in **T** have a short purposive title followed by a list of possible ingredients, mostly un-quantified, and with few directions for administration. **T** is a piece of writing that, if really to be used clinically, allows for, indeed depends upon, the experience of the doctor in deciding quantity and ingredients according to availability and need. In contrast, as Kahl summarizes, **S** proceeds fairly regularly by name and/or category of drug, range of application, ingredients with doses, instructions for combining ingredients, and directions for use. One could speculate that this would have worked better in a larger hospital with a staff of assistants, not necessarily medically trained, who might dispense remedies under a physician's supervision. When it opened, the ʿAdudi hospital reportedly had 25 doctors, including oculists, surgeons and bone-setters. The Byzantine texts, on the other hand, are more redolent of small hospitals that were each essentially one-person 'outfits'.[47]

The number of remedies marks a further difference between **T** and **S**: over 100 in **T** – where a single title may encompass a number of remedies – but 292 in **S**, albeit a text at least four times as long.[48] Gastrointestinal problems predominate in both, not surprisingly: 21%, Kahl estimates, in S; 25% in **T**, according to Bennett. Eye diseases rate surprisingly few mentions: 4.4% (Kahl), 5.7% (Bennett, using the fullest manuscript witness to **T**). Some ingredients are common to both: barley, celery, cinnamon, ginger, gum Arabic, honey, Indian spikenard, mastic, pepper, pomegranate, rose saffron, vinegar, water, and wine. But the wider range in **S** reflects the openness of the Islamic world to *inter alia* Indian and Chinese 'imports'.[49] **S** employs 411 simples while **T** uses 212 (including some ingredients in alternative guises, e.g. arsenic and orpiment). Most of **S**'s preparations are compounds. (Remedy 9 in ch. 1 of **S** invokes 17 ingredients for a pastille). By contrast the majority (80) of

[46] Kahl's defence (*Recension of the ʿAdudi Hospital* cit. at n. 350) of this supplement's basic integrity with the main compilation, *contra* Degen and Ullmann (*Zum Dispensatorium des Sabur ibn Sahl*) takes no account of that oddity.

[47] Pormann-Savage-Smith, *o.c.* 98.

[48] I am especially grateful to David Bennett here for his help in compiling the statistics of **T**.

[49] Kahl, *Recension of the ʿAdudi hospital* cit. 10f.

the remedies in **T** contain between one and four ingredients; 23 recipes have between 5 and 8; and only the remaining 6 have more than 8 ingredients.

In **T**, according to Bennett, 74% of the ingredients are vegetable, compared to 67.4% in **S**, which as well as vegetable and mineral remedies has its special section (ch. 16) on medicine from animal parts. With that in mind, compare their respective remedies for buboes:

> Take fermented dough three parts; borax, salt, pigeon droppings, and cock droppings one part in each. [This is] ground, strained, kneaded with olive oil, and used [applied?].

> From the outset, take a drink of natural brine with warm (water); when it has begun to take effect, boil a measure of lentils with water until it has been well infused, put the juice of the lentils into a linen cloth, and strain it, squeezing it well. [Now] put [the decoction] in another vessel and add to it honey and Indian nard and boil again. Give it as a drink to the patient since it expels every unhealthy state of the humours. Another remedy: there is a large-leafed plant that grows by rivers; give its well-steeped root as a drink, and boil as well as its [edible residue to eat].

Prejudice might suggest that the (still palatable to modern tastes) herbal/vegetable remedy is Islamic, the (stereotypically medieval) animal-based one Byzantine; the longer text Arabic, the shorter Greek. As it happens, the converse is true.[50]

VI. Comparison of this sort could be extended indefinitely. The Greek text, for example, has no equivalent of the Arabic section (redacted for a supposedly secular hospital) of *hierata*, remedies manifesting divine power. Yet, in general, no one who wants to assert the medical superiority of early Islamic hospitals over early Byzantine ones – superiority defined in terms of access to the full range of Galenic medical learning – is going to be shaken by what the foregoing juxtaposition (not just the pair of bubo remedies but the whole exercise of comparison) has suggested. Still, the Greek material has much to be said in its favour, too: it is clinically practical. We omit a whole dimension of medieval hospital history, and a whole dimension of the history

[50] *Ibid.* 63, 165; Bennett, *o.c.* App. IV, 63f.

of *iatrosophia* too, if we do not attend to it, and seek to place it in the widest comparative context.[51]

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[51] A final-forward looking comparison: differences of scale and sophistication between Greek and Arabic material pale when both are juxtaposed to the 1,035 detailed recipes in the vernacular *Ricettario* of the great hospital of Santa Maria Nuova, Florence, compiled in 1515. See J. Henderson, *The Renaissance hospital: healing the body and healing the soul*, New Haven-London 2006, 297-335.

Cancerous cells, Neanderthal DNA and the tradition of Byzantine medicine. Textual criticism in philology and genomics

Genome analysis and stemmatics may at first sight seem very different fields of research. Upon a closer look, however, a number of similarities become apparent. For instance, both disciplines are engaged in reading and interpreting text, looking for structural patterns and similar content; moreover, they catalogue and classify content and aim to reconstruct lineages. They use very similar techniques, comparing segments of genome and written text to identify insertions, deletions, modifications and errors. Despite the undeniably similar methodology, genome analysis is traditionally regarded as an exact science yielding clear results through a computerized comparison of material, whereas stemmatics is often associated with philological interpretation. However, as will become apparent in this paper, both phylogenetics and stemmatics are in fact faced with very similar challenges. There might be obvious differences in terminology and the data used, but in the following we will show that genome analysis and stemmatics share a surprising number of key ideas in analyzing their respective 'texts'. These similarities will make it possible for us to highlight several examples of how both disciplines can profit from collaborating with each other.[1]

[1] The general outline of this article was jointly drawn up by Florian Markowetz and Barbara Zipser. The section on philology was written by BZ, and the following section on genetics by FM. BZ's work draws on research carried out during a Wellcome Trust funded project on *Construction and Use of Byzantine Medical Texts*.

Philology and textual criticism

From the philological side, we are going to look at three topics. First, identical manuscript copies of the same text, second, a medical manual that was subject to several consecutive revisions, and finally an editor who improved the quality of a text. These findings are being presented here because they are incompatible with the standard methodology of stemmatics.

To begin with, we would like to introduce stemmatics to those members of our audience who are not from the philological field. In antiquity and the Middle Ages, books were passed on in handwritten form, one book being copied from the other. Only a very small, and often arbitrary selection of the total number of books that were once in existence survives to this day, providing us with random samples of their history. Most of the texts contained in these manuscripts survive in more than one copy. With the help of stemmatics it is possible to reconstruct the history of a given text. For this, samples from all extant copies of a text are collated, i.e. compared to each other. If two manuscripts contain the same mistake, they have the same source or one is the source of the other. The same process is then repeated to identify subgroups. In the end, the researcher will draw a stemma, or family tree, of the lineage.

In the majority of cases, it is rather straightforward to establish the history of a text. Sometimes however, the findings are inconclusive, and it appears that a manuscript contains mainly readings from one group of the transmission, and some selected variants from another. In these instances, the scribe used one copy as a basis for the main text, and another (or several) to correct readings that appeared corrupt. This scenario is commonly termed 'contamination'.

The process of establishing a stemma might be best illustrated with an analysis of the early history of Leo medicus' *Synopsis*, a therapeutic manual written by a professor for a former student.[2] It can be proven beyond any doubt that all extant copies of the text descend from an early tenth century original, the *Par. suppl.* gr. 446, which I call **S**. It is a very expensive and precious book. The pages consist of high quality parchment, the words are

[2] Leo says in the preface of the text (see the first lines of 89 Ermerins) that he wrote the book for his former student George. There is no further evidence on the identity of either Leo or George. For an edition of the text see *Anecdota medica Graeca*, e codicibus MSS. Expromsit F.Z. Ermerins, Lugduni Batavorum 1840 and *Anecdota nova*, ed. J.F. Boissonade, Paris 1844, 366-370.

very neatly written and a number of chapter headings are highlighted in bright colours. Yet some fundamental flaw must have occurred in the production of the codex: the ink used for these ornaments later proved to be corrosive, which led to holes in the parchment, which in turn deleted text on the other side of the respective page. All other manuscript copies have gaps in the text where **S** is damaged, which proves that it is their source. It is not often the case that we are able to determine the source of the entire transmission of a text with such certainty.[3]

The first topic to be discussed in this paper are two of the manuscripts descending from **S**, the fifteenth century *Par.* gr. 2671 (**P**), and the sixteenth century Moscow *GIM Sinod.* gr. 441 (**M**). Compared to each other, these witnesses contain an almost identical text. This was shown in a collation of pages 129,10-29 to 147,2 of the Ermerins edition.[4] This is highly unusual. Under any other circumstances, one would expect a passage of this length to contain a plethora of mistakes. Therefore, to validate these results even further, random samples from other parts of the text were collated, which yielded the same result.[5]

Clearly, one of these manuscripts must have been written by an extremely diligent scribe who did not make any mistakes, and had it not been for yet another case of physical damage, we would not be able to reconstruct the lineage: in **P**, a sheet of paper is torn out,[6] and **M** has a corresponding gap in the text.[7] This proves that **P** is the source of **M**.

To a textual critic whose sole interest is the reconstruction of a lost original, a flawless copy such as **M** might seem irrelevant, as it would not

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[3] For a general discussion of the transmission see B. Zipser, *Überlegungen zum Text der Σύνοψις ἰατρικῆς des Leo medicus*, in A. Hornung-C. Jäckel-W. Schubert (edd.), *Studia Humanitatis ac Litterarum Trifolio Heidelbergensi dedicata.* «Festschrift für Eckhard Christmann, Wilfried Edelmaier und Rudolf Kettemann», Frankfurt a.M. 2004, 393-399.

[4] The Ermerins edition presents Greek text and a Latin translation on facing pages. Therefore, just under nine pages of text in an average layout were collated.

[5] BZ eventually stopped collating due to constraints of time as **M** was only accessible on a microfilm at the IRHT in Paris.

[6] This page would have been between f. 215 and 216 in the modern numbering.

[7] Ermerins' edition is based on **P**, and contains the lacuna caused by the missing sheet of paper on page 299,28. This gap can be found on the bottom of f. 7r in **M**. See Zipser, *Überlegungen* cit. 396 n. 10.

have any bearing on the quality of the text. It is, however, of importance for all those researchers who use findings derived from stemmatics, which is a purely abstract analysis of the text, and link them to actual historical events involving the carriers of this text, namely the books. For instance, if the owner of a book is known, or if it appears very unlikely that a specific book ever left a certain location, the exact dependencies between manuscripts become very relevant indeed. Dismissing the possibility of a 'flawless copy' can easily lead to wrong conclusions.

The second topic to be discussed is the history of a medical work that evolved in a series of consecutive revisions, Theophanes Chrysobalantes' *De curatione*.[8] Even though this work was extremely popular in the Byzantine era, as the unusually large number of manuscript copies suggest, we do not have any direct information on the setting in which the book came into existence other than the little the text itself reveals. According to its title, it was commissioned by Emperor Constantine VII Porphyrogennetos. This suggests that it dates to the early or mid tenth century and was somehow connected to the Byzantine court. In the first few lines of the preface, Theophanes addresses the emperor and describes the rationale behind his work:

> Τὰς προσταχθείσας ἐπιτομὰς παρὰ τῆς σῆς θειότητος, ἐκ θεοῦ αὐτοκράτωρ, περὶ τῆς τῶν ἰατρικῶν θεωρημάτων συναγωγῆς ἔσπευσα κατὰ τὸ δυνατὸν διὰ συντομίας ὁμοῦ καὶ σαφηνείας πάσην τὴν ἰατρικὴν ἐπελθεῖν [...]
>
> I gave my best that the epitome of the overview of medical theories which your holiness, the emperor by god's grace, had ordered, covered the entire medical art as far as it was possible while being concise and clear at the same time [...]

From these lines, it appears that the original title of the work was *epitome of the overview of medical theories*, which is as puzzling in the Greek original as it is in English translation. Is the term 'epitome' used to describe a

[8] For an edition of the text see: *Theophanis Nonni Epitome de curatione morborum Graece ac Latine,* ope codicum manuscriptorum recensuit notasque adiecit I.O.S. Bernard, Gothae 1794-1795. A description of the manuscript witnesses can be found in: J.A.M. Sonderkamp, *Untersuchungen zur Überlieferung der Schriften des Theophanes Chrysobalantes (sog. Theophanes Nonnos)*, Bonn 1987.

genre, or does this imply that Theophanes epitomized an existing work which was called *overview of the medical theories*?[9]

We lack any evidence for such a hypothetical predecessor text Theophanes could have summarized. We do, on the other hand, know of at least two texts, one of earlier[10] and one of later date,[11] which are similar to *De curatione*, but the exact dependencies between these three remain opaque.[12] This proves that there were once more texts in existence than are known to us today, and that the history of the text starts earlier than the tenth century, even though we are unable to reconstruct the picture in its entirety.

Some parts of said picture are on the other hand much clearer. *De curatione* proved to be very popular, and it soon developed into versions;[13] the same applied to one of the related texts, John the Physician's *Therapeutics*. These developments required extensive philological efforts together with a profound knowledge of medicine, as well as access to high quality sources. Evidently, to the scholars involved in these projects, the main objective was to update and emend texts, rather than preserving them in their original form.

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[9] The wording of this preface reminds of the corresponding part of Oribasius' *collectiones medicae*. Here, Oribasius also refers to his work as both συναγωγή 'overview' and ἐπιτομή 'epitome'. However, these terms are used in equal right to describe his treatise. They do not, for instance, designate an 'epitome of the overview'. For the remainder of the text, Oribasius is not the main source of *De curatione*.

[10] This is Leo's *Synopsis* discussed above. See Zipser, *Überlegungen* cit. on the chronology and B. Zipser, *Zu Aufbau und Quellen der Σύνοψις Ἰατρικῆς*, in T. Fögen (ed.), *Antike Fachtexte. Ancient technical texts*, Berlin-New York 2005, 107-115, especially n. 4, along with Sonderkamp, *o.c.* 135 and 153f.

[11] A therapeutic manual attributed to a certain John the Physician coincides partially with *De curatione*; see B. Zipser, *John the Physician's Therapeutics. A medical Handbook in vernacular Greek*, Leiden-Boston 2009, 10f., and in particular n. 23.

[12] These three treatises share a larger amount of content. To complicate matters, some of this content can be traced back to other sources.

[13] This is already evident from Bernard's late eighteenth century edition, even though it is mainly based on only five manuscripts, a fraction of what is known today. (Readers should be cautioned that sigla are not used consistently.) For instance, based on all the manuscripts available today, chapter 74 Bernard is transmitted in three manuscripts, the *Monac.* gr. 362, the *Laur. ant.* 101 and the *Bucarest Bibl. Acad. R.S. Rom.* gr. 617. The differences in the arrangement of the chapters is evident from the pinax reproduced in Bernard XXII.

In the context of medieval medicine, this is not an uncommon occurrence.[14] Sometimes even translations from foreign languages were added to supplement existing corpora.[15]

The obvious problem for a stemmatic analysis is here that we are unable to determine a point of origin. Our starting point is a tenth century work, which is at least in part based on an earlier text. Moreover, we are unable to explain the exact dependencies between *De curatione* and a later text. All evidence points to the fact that we are dealing with a number of very similar texts which were developed by editors.

This leads us to the third and last topic to be discussed in this section, an editor who improved the quality of a text. At some point between the last decade of the thirteenth century and the fifteenth century, an unknown person went through one of the medical manuals discussed above, John the Physician's *Therapeutics*.[16] The specific version of the text he worked on has a rather rough appearance. This is not only caused by the fact that it is written in a vernacular dialect; the syntax sounds monotonous, and the vocabulary is often basic. Here are samples from both versions (the source of the corrected version is transmitted in three manuscripts, **M**, **A** and **B**):[17]

[14] This phenomenon has been widely discussed in the field of Latin medicine. For more details and bibliography see Fischer's contribution in this volume. The most comprehensive analysis of the Byzantine material can be found in D. Bennett, *Xenonika. Medical texts associated with* Xenones *in the late Byzantine period*, Diss. London 2003.

[15] See for instance B. Zipser, *Die Therapeutica des Alexander Trallianus: Ein medizinisches Handbuch und seine Überlieferung*, in R.-M. Piccione-M. Perkams (edd.), *Selecta Colligere II. Beiträge zur Methodik des Sammelns von Texten in der Spätantike und in Byzanz*, Alessandria 2005, 211-234.

[16] For a chronology see Zipser, *John the Physician* cit. 24-26. The text dates to the last decade of the thirteenth century, and this particular version is transmitted in two manuscripts, the *Vind. med.* gr. 33 of the fifteenth, and the *Vind. med.* gr. 43 of the sixteenth century. Both were acquired in Constantinople.

[17] These are the *Monac.* gr. 288, the *Par.* gr. 2236 and the *Par.* gr. 2224.

> Source: ῥόδιον ἤτοι ῥοδέλαιον βάλε καὶ (εἰς **M**, omitted in **A**) ὀξείδιν (ὄξος **M**) καὶ χλίανέ τα.[18]
>
> Corrected version: ῥόδιον ἤτοι ῥοδέλαιον λαβῶν μετὰ ὄξους χλίανον.[19]
>
> Source: ἔπαρον κραμβίου φύλλα καὶ καθάρισε τὰ ἀπὸ τὰ νεύρα αὐτῶν (των **A** τους **B**) καὶ κοπάνισε τὰ φύλλα μόνα (μόνον **A**) καὶ (omitted in **A**) ἀπέκει (οὕτως **M** εἶτα **A**) βάλε τριμμένον ἀρσενίκιν καὶ λίβανον τριμμένον.[20]
>
> Corrected version: λαβὼν κράμβης φύλλα καὶ καθαρίσας ἀπὸ τῶν νεύρων καὶ κοπανίσας τὰ φύλλα καὶ ἀπέκει βάλλον τριμμένον ἀρσενίκιν καὶ λίβανον τριμμένον.[21]

Certainly, these interventions improved the quality of the work.[22] To a textual critic, such a scenario causes obvious methodological problems, as there is no assumption in stemmatics that a scribe or editor could improve a text beyond the quality of the original. He may guess single readings correctly, which would be termed a conjecture, but overall he would not be able to outperform the author.

Overall, the three topics discussed above lead us to the following conclusions: stemmatics are based on two main assumptions, first, that a text was authored by a person at a specific time, and second, that the quality of this text deteriorated in the process of copying. As the samples discussed above show, these assumptions do not necessarily apply, as authorship and unity

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[18] This transcription is based on ω 3 (177, 6-8 Zipser).

[19] *Vind. med.* gr. 33 f. 5v.

[20] ω 12 (180, 10-12 Zipser).

[21] *Vind. med.* gr. 33 f. 6v.

[22] The differences between source and corrected version are difficult to capture in English translation. Predicates have been turned into participles. It may be best illustrated with the following simplified example: 'take A and clean it and chop it and mix it with B' has been replaced with 'take A, and having cleaned and chopped it, mix it with B'. The corrected version is closer to the classical idiom, which was at this time still used by the intellectual elite. However, it must be stated that the corrected version still contains a large proportion of vernacular words. Moreover, the participles which are used in the corrected version can also be found in the vernacular. Thus, even though the interventions of the editor can be termed 'classicising', they mainly affect the style of the text.

of text may be uncertain. Moreover, it could very well be the case that the quality of a text remained the same in the process of copying, or that it in fact improved.

The book of life and its history

Unlike physics, biology does not have a strong mathematical theory to explain and predict observed phenomena. This may be one of the reasons why biology is very rich in metaphors. The 'Tree of Life' connects all forms of life on earth. Conrad Waddington famously compared the development of cell types and tissues to marbles rolling down a grooved slope, the so called 'epigenetic landscape'.[23] And inside every single cell the nucleus contains an organism's genome, the 'Book of Life' written in the language of DNA. Similar to a text written in a human language, DNA transfers i n f o r m a t i o n, it can be t r a n s c r i b e d into a different form (RNA instead of DNA) and it can be t r a n s l a t e d (into proteins). The idea that the genome can be r e a d and e d i t e d pervades all molecular biology and forms one of the most powerful and suggestive metaphors of modern science.

Errors in the book of life. The step from a biological molecule to a written text seems large, but it is actually quite easy to make. DNA is built of four nucleotides, the bases Adenine, Cytosine, Guanine and Thymine, which can form long chains. In higher organisms, two chains together form the strands of a double-helix. The text of the book of life is a linear abstraction of the three-dimensional structure of DNA. The first step is to unwind the double-helix into two parallel linear strands. Next, we notice that the pairings between them are not random: Adenine only binds Thymine and Cytosine only binds Guanine. Thus, the strands are complementary; if I know one, I can reconstruct the other. This allows us to concentrate on a single strand. If we now, in a final step, abbreviate each nucleotide of this strand by its first letter, we have a linear sequence of A's, C's, G's and T's – the text of the book of life. For example, the beginning of the gene sequence of FOXP2, which is important for the development of speech in humans and only found in an altered form in apes, looks like this:[24]

[23] C.H. Waddington, *The Strategy of the Genes*, London 1957.

[24] Ensembl, Transcript: FOXP2-001 (ENST00000350908).

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CTGATTTTGTGTACGATTGTCCACGGACGCCAAAACAATCACAGAG
CTGCTTGATTTGTTTTAATTACCAGCACAAAATGCCATCAGTCTGG
GACGTGATCGGGCAGAGGTGTACTCACA...
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It is not visible in this very short example, but the genomic text is highly structured. For example, genes have precise start and stop positions. Around the genes short sequence patterns indicate the positions where proteins can bind to the DNA to turn genes on or off, allowing cells to react to different environments. Thus, even though the text is the same at all times in all cells of an organism, it's 'meaning' is context-specific: a liver cell and a brain cell both contain exactly the same genome, but in different tissues different parts of the text are read out. The basic process in genetics is the copying of the genetic DNA material, which happens every time cells divide. Mistakes in copying the genomic text in a single cell can have terrible consequences for the whole organism. For example, a copy mistake that activates an oncogene or de-activates a tumor suppressor gene can often lead to cancer.

Cancer is a distorted version of our self.[25] It took until the middle of the 20th century to realize that cancer does not invade the body from the outside but is often derived directly from the tissue in which it was first discovered. Both the normal growth of an organism and the abnormal growth of cancer, can be traced back to the genome. Observations like these strengthen the book of life metaphor and make DNA the center of interest in molecular biology.

Compared to a normal cell, the genomes of cancer cells often look completely chaotic: some parts are missing, other parts are repeated many times, and the order of the text can be completely lost. Think of a vandalized collection of books in a foreign language that has been poorly set together again by a novice librarian. Currently several international projects[26] are under way to catalogue as many genomic changes as possible in as many cancers as possible. The hope is that this catalogue will then point us to the 'drivers' of cancer, the genomic aberrations that cause a cell to become a cancer cell. This is a difficult task, because not all aberrations are causative; some are

[25] This point is powerfully made in Siddhartha Mukherjee's Pulitzer-price winning book *The Emperor of All Maladies*, New York 2011.

[26] The two major examples are the International Cancer Genome Consortium (ICGC) and The Cancer Genome Atlas (TCGA), which gather genomic and other molecular data on hundreds of patients for many cancer types. In 2011, the first available data sets described the genomic landscapes of brain and ovarian cancers.

just 'passengers', which develop because cancer in general has a much lower genomic stability than the more tightly regulated normal cells. To add to this complexity, there is not always a single driver for each type of cancer, instead different (combinations of) aberrations can cause very similar cancers. Untangling this complexity requires large sample sizes: cancer genome projects involve sequencing hundreds and thousands of genomes. This makes the cancer genome projects a much larger effort than the Human Genome Project[27], which took more than a decade to succeed. The hope is that in this mass of data the drivers of cancer will stand out as very frequently mutated genes, while the random mutations in the passengers are much less frequent. Success in these large-scale international projects will depend largely on technological advances and meticulous book-keeping, less on scientific inspiration and *eureka* moments.

Evolution and the book of life: textual criticism of genomic sequences. Cancer exploits natural mechanisms that have developed during evolution to allow a species to better adapt to its environment. Evolution has several mechanism to act on the genome. Individual letters (nucleotides in the DNA) can be mutated and changed. These mutations are called 'single nucleotide polymorphisms' (SNPs; pronounced 'snips'). Counting the number of SNPs allows us to infer how related two genomic sequences are: the more SNPs, the further apart they are. Another evolutionary mechanism is recombination, where a region of the DNA is cut out and joined in at a different position. One of the effects of recombination can be a change in the number of copies of a DNA region, which can get lost or amplified. In general all humans have two copies, but every one of us can naturally have more or less copies in particular regions. This variation is a very mild form of the chaos raging in a cancer cell. Finally, an evolutionary mechanism to act on the genome is the incorporation of genes from one population into another, so called gene flow. When not perverted by cancer, all these genomic changes happen naturally and contribute to the variety of body sizes, hair and eye colours and the rest of the phenotypic diversity we see in humans.

The mutations observable in the course of evolution were beneficial and

[27] The Human Genome Project launched in 1989, initially funded by the US National Institutes of Health (NIH) and Department of Energy but quickly joined by international collaborators. It produced a first draft in 2000 and an almost complete sequence in 2003.

induced an evolutionary advantage. In some sense, they are 'improvements' of the text. Just a few mutations can have an tremendous impact on the morphology and behaviour of related species. For example, the genomes of modern humans, chimpanzees and Neandertals are almost identical. Humans and chimpanzees differ by only 1.2 percent of all base-pairs in gene sequences, and Neandertals are even closer.

DNA changes trace the evolutionary history of species. We don't know all the details of the 'Tree of Life' but collections of genomic sequences allow researchers to estimate how many years ago two species were still one and when the split between them happened. In 2010 an international research consortium led by Svante Pääbo published a draft sequence of the Neanderthal sequence.[28] Their goal was to identify genomic features that distinguish modern humans from other hominin forms by comparing the human genome to the genomes of Neanderthals and apes. In humans and chimpanzees the DNA could be sampled from current populations. In Neanderthals, however, the DNA needed to be retrieved from archaeological and paleontological remains, making it a challenge to prove the authenticity of DNA sequences retrieved from ancient specimens. Still, obtaining a Neanderthal genome is worth the effort, because genomic analyses can reach much further back in history than archeological analyses based on excavated bones and artefacts can. For example, the earliest known remains of anatomically modern humans are 195,000 years old. From genomic data, however, it could be estimated that the split between ancestral human and Neanderthal populations happened 370,000 years ago, extending the horizon by 175,000 years.[29] So far, only around 100 genes – surprisingly few – have been identified that have contributed to the evolution of modern humans since the split. Less surprisingly, several of theses genes are involved in cognitive function and others in bone structure. Understanding the functions of these genes better can have a bearing on what it means to be human – or at least not Neanderthal.

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[28] R. Green et al., *A Draft Sequence of the Neandertal Genome*, ≪Science≫ CCCXXVIII 5979 (2010) 710-722.

[29] J.P. Noonan *et al.*, *Sequencing and Analysis of Neanderthal Genomic DNA*, ≪Science≫ CCCXIV 5802 (2006) 1113-1118 on-line. The method compares the Neanderthal genome to the human and Chimpanzee genomes and takes the variability observed in human populations into account. A computational model then simulates an evolutionary process and statistics is used to derive the age of the Neanderthal-human split that is most likely under the model.

Genomic data also allows us to address questions that can be very hard to solve from archeological data alone. Did Neanderthals interbreed with anatomically modern humans? Substantial controversy surrounds this question: Morphological features of present-day humans and early anatomically modern human fossils have been interpreted as evidence both for and against genetic exchange between Neanderthals and human ancestors. However, Neanderthals mating with humans must have left traces in both the Neanderthal and human genomes. Pääbo and his colleagues compared three Neanderthal genomes with five genomes of present-day humans from different parts of the world, including Africa, Asia and Europe. If Neanderthals are more closely related to present-day humans in certain parts of the world than in others, this would suggest that Neanderthals exchanged parts of their genome with the ancestors of these groups. Pääbo and his colleagues found that Neanderthals are equally close to Europeans and East Asians, but they are significantly closer to non-Africans than to Africans. This can be explained by Neanderthals exchanging genes with the ancestors of non-Africans.

Statistics versus 'the facts'. Svante Pääbo's study – elegant and diligent as it may be – will not be the last word on human prehistory. The dominance of the genome in phylogenetic studies is not uncontested. DNA evidence can be contradicted by other, more classical sources of data, like fossil records. In the question of Neanderthal-human interbreeding, the genomic evidence points to a period of 100,000-60,000 years ago in the Middle East. However, the archeological record for an overlap in the populations at this time and place is very sparse. Archeologists and paleo-anthropologists favour a scenario in which interbreeding happened in Europe, possibly from 44,000 years ago (when modern humans first entered Europe) to 30,000 years ago (when the last Neanderthals fell extinct).

What becomes visible here is the gap between two types of approaches to answer the same scientific questions: geneticists and computational biologists prefer to analyze DNA, because it directly shows the traces of evolution. To them, DNA is an overwhelmingly superior source of information. It can be analyzed much more precisely than the blur of phenotype in ancient specimens. Archeologists, on the other hand, prefer to draw conclusions from the fossil record. While most of them agree that geneticists have been making valuable contributions to human prehistory, they feel that genetic analysis rely too

heavily on computational methods and mathematical statistics. With their scientific training, archeologists find genetic arguments very hard to follow and far less solid, informative and convincing than 'hard' archeological fact.

In doubting statistics archeologist are not completely wrong. Reconstructing genomic phylogenies relies on the statistical analysis of genomic data and – like all statistical analyses – crucially depends on mathematical assumptions that can sometimes be disputed. No statistical method recognizes 'the truth'; they only make estimates based on the likelihood of observed events and a quantification of the uncertainty in the data. As a result, statistical estimates from genomic data are seldom so clear cut and convincing that they automatically beat conclusions drawn from other sources of information, like for example fossil records. Often, it is a judgement call for the researcher whether or not to trust the statistical results of a phylogenetic genome analysis. The same is, of course, true for archeological 'facts'. Facts are theory-bound – they need to be interpreted and put into a bigger context, else they are useless. This requires no less experience and judgement than the analysis of statistical results. Finding one type of evidence more convincing than the other is a matter of education and training, not of the intrinsic scientific value of different types of data.

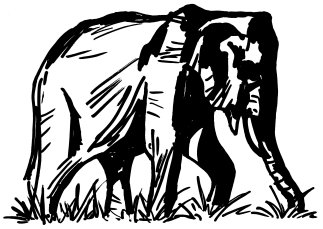

Figure 2: Elephant (Illustrator: Caroline Buckley)

The story about Neanderthal-human mating is not the only example of this gap in scientific backgrounds and approaches. The science writer Carl Zimmer has collected several others in his essay *The Genome: An Outsider's view*.[30] In some of them, the fossil evidence clearly contradicts the statistical claims; in others, fossil evidence later validated claims from DNA that had seemed far-fetched at first. Carl Zimmer compares the clash between different research styles with the fistfight between the blind men, who had touched different parts of an elephant and could not agree on an interpretation of what they had felt.

[30] C. Zimmer, *The Genome: An Outsider's view*, ≪PLoS Computational Biology≫ II 12 (2006) on-line.

A common theme emerging from these examples is the need for integrated approaches that combine different styles of research. In some areas, like cancer biology, interdisciplinary training and research are already well established. Other areas, like paleo-anthropology, will need to follow if they want to take advantage of the full range of data and insights. Maybe the abundance of metaphors in biology actually turns out to be a strength when it comes to interdisciplinary research, because metaphors – if used carefully – can bridge the gaps between disciplines.

Conclusion

Two main findings have come to light. In the section on genetics, it became clear that statistical estimates can be of value for other related disciplines, such as paleontology and archeology, even though these are based on mathematical models rather than an analysis of actual physical remains. Ideally, these estimates would be followed up in an interdisciplinary setting to discuss and validate results yielded with different methods. The same may be said about stemmatics, which often allow us to reconstruct historical data.[31]

In the section on stemmatics, it emerged that the standard methodology could not always be applied to Byzantine medical works. This was mainly caused by the fact that these texts were often updated and developed by competent editors, whereas stemmatics are built on the assumption that the quality of a text deteriorates in the course of its transmission. Here, our comparative approach yielded a number of important findings that help to overcome these methodological obstacles.

In genetic analysis, changes can be for the better and for the worse, or neutral – a mutation can lead to evolution and therefore progress, or to a disease such as cancer; an exchange between two groups is usually termed 'gene flow' (rather than 'contamination', its counterpart in the philological field). Any analysis focusses on observed events, regardless of their quality. This is also expressed in the way logical dependencies between these events

[31] For instance, a specific type of mistake can be linked to a handwriting that was only in use up to the late ninth century AD. Leo's *Synopsis*, which cannot not be dated with certainty, was shown to contain such a mistake, which proves that the text was written prior to this date. See Zipser, *Überlegungen* cit. For other approaches to date the text see Leo the Physician. Epitome on the nature of man, ed. R. Renehan, ≪CMG≫ X/4, Berlin 1969.

are displayed in scholarly publications. The family tree of a species or a single gene may, for instance, also merge with another family tree.

This more flexible methodology can easily be implemented in stemmatic research. In addition, we see a strong potential for the implementation of specialized databases in the philological field. Geneticists have over the past decade developed solutions to handle complex intricacies in large data sets. With the help of these applications it would for instance be possible to display compilations of medical texts, so called iatrosophia, and their sources in various stages of their history, which is not possible in the conventional output format in the form of a book.

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