

Rhazes in the Renaissance of Andreas Vesalius

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Abstract: Andreas Vesalius' (1514–64) first publication was a *Paraphrasis* of the ninth book of the *Liber ad Almansorem*, written by the Arab–Persian physician and alchemist Rhazes (854–925). The role of Rhazes in Vesalius' oeuvre has thus far been much disregarded. The different ways Rhazes recurs reveal an intellectual evolution in Vesalius' work. In the *Paraphrasis*, Vesalius subjects Rhazes to the authority of Galen in the context of the early sixteenth-century humanist campaign for the substitution of Arab influences by Greek 'originals'. Over the years Vesalius continues his work on Rhazes, but his approach becomes more internationalistic. Ultimately, Vesalius criticises Galen while expressing sympathy for the Arab author. This may be the more significant as Rhazes could have influenced Vesalius in the act of criticising Galen – critical discussions of Galen were available to Vesalius in Latin translations of Rhazes's *Liber Continens*. Although Vesalius never refers to the work, it is hardly possible he was unaware of it: similarities in structure, rhetoric and form between the *Continens* and the *De humani corporis fabrica* could support this hypothesis.

Keywords: Andreas Vesalius; Rhazes; Galenism; *Liber Continens*; *Paraphrasis*; *De humani corporis fabrica*

Introduction

*The dusty crowd of Arabs declares that learning aids us,
While in olden times things barbaric were in favour.
Among these Arabs, Rhazes, the medical writer, is pre-eminent,
An excellent man because of his service to mankind.
But having been badly translated, his work till now displeased
Our countrymen, while henceforth it will be more esteemed.
This fact, Vesalius, we can attribute to you.
Praise deservedly is yours. Do thou lead. I follow.¹*

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¹ 'Nostros docta iuvant, placuerunt barbara quondam / Hoc Arabum dictat pulverulenta cohors. / Inter quos topici Rhazes medicaminis autor / Emicat, excellens utilitate sua. / Sed male quod versus, patria cum gente legatur. / Displicet, at posthac gratior extiterit. / Quod tibi Wesali merito tribuisse

Andreas Vesalius (1514–64) started his career as an author in 1537 with a paraphrase of the ninth book of the *Almansor*, written by the Arab–Persian physician and alchemist Ar-Rāzī, in the Latin world known as Rhazes (854–925). Despite having been reprinted several times,² this early work has never really been regarded as part of Vesalius’ oeuvre. On the contrary, in most studies about Vesalius, the *Paraphrasis* is mentioned as a mere footnote. Some historians even use derogatives.

Moritz Roth (1892), in his five-hundred-page biography of Vesalius, spends only half a page on the *Paraphrasis*. Vesalius ‘rendered the ninth book of Rhazes’ *Almansor*... from the barbaric version into a readable translation’.³ Singer and Rabin (1946), although devoting a whole study to the Hebrew and Arabic elements in the *Tabulae anatomicae sex*, call the *Paraphrasis* ‘unimportant and without originality’.⁴ In 1961, Charles Singer uses further scorn and imagines the *Paraphrasis* to be a headache Vesalius had left over from the Middle Ages: ‘It is a work of no importance and a mere “hangover” from the scholastic period, though several times reprinted. For us its only significance is that it contains the *suggestio falsi* that its author understood Arabic. It cannot be a “graduation thesis” but it is not above that level’.⁵

The ‘Bio-bibliography’ of *Harvey Cushing* (1962)⁶ grants a bit more space to the *Paraphrasis*, and translates its preface and epilogue. Cushing relates Vesalius’ work on Rhazes to his family tradition of commenting on Arabic authors, but does not offer any further reflections on the position of the *Paraphrasis* within Vesalius’ oeuvre.

C.D. O’Malley’s *Andreas Vesalius of Brussels, 1514–1564* (1964), gives a short summary of the contents of the *Paraphrasis*. As far as its meaning is concerned, O’Malley admits that ‘it is of interest that Vesalius, so staunch a partisan of the revived Hippocratic and Galenic medicine and therefore a critic of the medieval practices based upon Moslem opinion, should have chosen Rhazes as a subject.’ Nonetheless, O’Malley warns that ‘we need not spend much time on its contents, which had no share in the author’s later fame’. The work is ‘of no more than antiquarian interest today’ because ‘one must not expect, nor does one find, any free enquiry in this treatise’.⁷

After Vesalius’ greater biographers, more recent studies have not spent any time on Rhazes either. The disregard for Vesalius’ work on the Arab author reveals a

queamus./ Laus te certa manet, tu modo perge, sequor.’ Epigram by Jodocus Velsius, Vesalius’ friend at the universities of Paris and Louvain, included after the prologue of Vesalius’ *Paraphrasis* of Book IX of Rhazes’ *Almansor*. Andreas Vesalius, *Paraphrasis in nonum librum Rhazae medici arabis clariss. ad regem Almansorem, de singularum corporis partium affectuum curatione* (Lovanii: ex Officina Rutgeri Rescii, 1537) [hereafter Vesalius, *Paraphrasis*], fol. 5v; in Harvey Cushing (author and trans.), *A Bio-bibliography of Andreas Vesalius* (Hamden: Archon Books, 1962), xxvii.

²Basel 1538, Basel 1544, Lyon 1551 and Wittenberg 1586. Cushing, *ibid.*, 6c.

³‘Vesal [führte] das neunte Buch des Almansor von Rhazes ... aus barbarischer Version in lesbare form über’. Moritz Roth, *Andreas Vesalius Bruxellensis* (Berlin: Georg Reimer, 1892), 76.

⁴Charles Singer and Chaim Rabin, *A Prelude to Modern Science: Being a Discussion of the History, Sources and Circumstances of the ‘Tabulae anatomicae Sex’ of Vesalius* (Cambridge: Cambridge University Press, 1946), xxv.

⁵Charles Singer, ‘Eighteen years of Vesalian Studies’, *Medical History*, 5, 3 (1961), 210–20: 212.

⁶Cushing, *op. cit.* (note 1), xxiv–9.

⁷Charles Donald O’Malley, *Andreas Vesalius of Brussels, 1514–1564* (Berkeley, CA: University of California Press, 1964), 71.

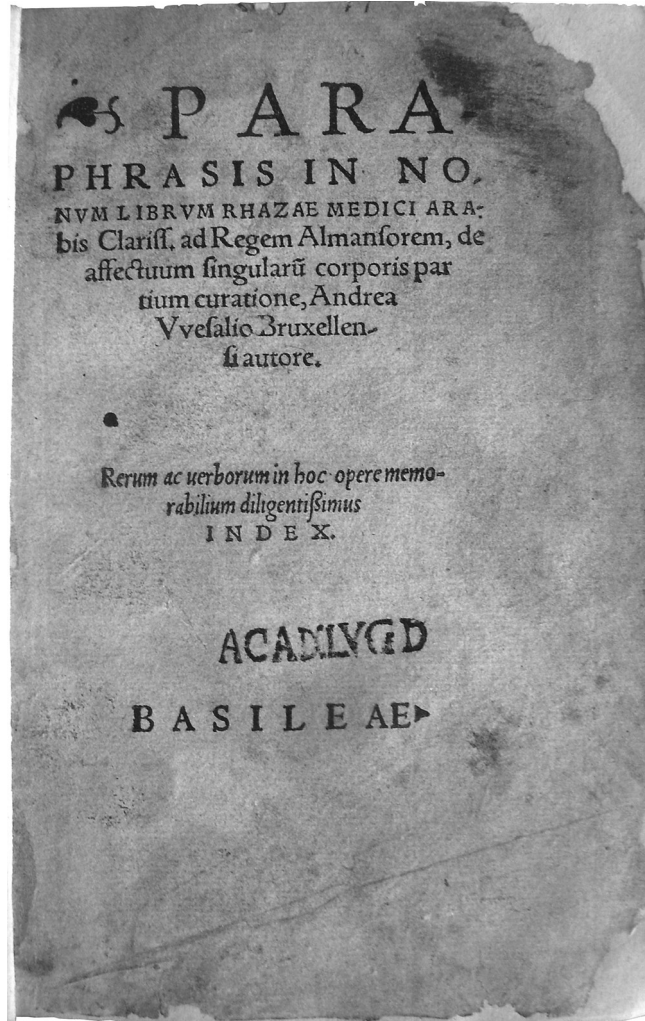


Figure 1: Andreas Vesalius, *Paraphrasis in nonum librum Rhazae medici arabis clariss. ad regem Almansorem* (Basel: Robert Winter, 1537), title page. Courtesy: Leiden University Library, obj. nr. 607F21.

one-dimensional view of Vesalius' development as an author. A closer look at the role of Rhazes within Vesalius' oeuvre gives us an insight into an evolution Vesalius went through as a scholar in his own time. Furthermore, Rhazes is known to have been an author critical of Galen, which makes for an interesting similarity between the two authors. In this paper I hope to offer context to Vesalius' work on Rhazes, and have made an attempt to establish whether Rhazes could have influenced Vesalius in the latter's famous critique of Galen in his masterpiece, *De humani corporis fabrica*.

Rhazes

'Rhazes' is the Latinised name of Abū Bakr Muḥammad bin Zakariyā ar-Rāzī. Born in 854 AD in present-day northern Iran, Rhazes studied philosophy, musicology and alchemy, and worked as a poet and advisor to the ruler before studying medicine at a later stage. At Rayy he was charged with managing one of the very first hospitals, and he was asked to co-ordinate the building of a new hospital in Baghdad. Rhazes wrote approximately two hundred books on a diversity of subjects. His most influential medical works are known as the *Kitāb al-Ḥāwī fī l-Ṭibb* [*The Comprehensive Book on Medicine*, known as the *Liber Continens*] and the *Kitāb al-Mansūrī* [*The Book of Mansur*], which came to be known in Europe as the *Liber ad Almansorem* or just briefly as the *Almansor*.

The *Kitāb al-Mansūrī* was written as a medical handbook for King Al-Mansūr of Khurasan. Its ten books cover physiology, 'temperament', common therapies, general health, skin diseases, prescriptions for travellers, surgery, poisons, therapies 'from head to toe', and different kinds of fever.⁸ It was translated into Latin by Gerard of Cremona at the time of the influx of Arabic science into Europe in the twelfth century. The subject of Vesalius' edition became popular as the '*Liber Nonus*' and remained part of the university curricula in Europe for many centuries.⁹

The *Kitāb al-Ḥāwī fī l-Ṭibb* is in fact an enormous collection of notes and comments, posthumously collected by Rhazes' students. Next to a number of fascinating case descriptions, of which the one on smallpox and measles became the most famous,¹⁰ it contains thousands of observations and thoughts, with critical discussions of practically all authors available in Rhazes' time: Arab, but also Greek, Persian and Indian. It was first translated into Latin by the Jewish physician and translator Faraj ibn Sālem (Latin: *Farraguth*) for King Charles of Anjou (1226–85) and published as '*Liber Continens*' in Sicily or Naples in 1279. The work was so immense that Meyerhof estimates its translation 'must have taken nearly the whole lifetime of the translator'.¹¹ The *Continens* was one of the nine books available in the Bibliothèque de Paris in 1395.¹² It was printed for the first time in Brescia in 1486 and, containing 588 large pages, was 'the most bulky of all the incunabula', its two volumes weighing more than twenty pounds.¹³ It was repeatedly reprinted in Venice in the course of the sixteenth century; in 1500, 1506, 1509, 1529 and in 1542.¹⁴ An edition was published in Paris in 1534 by Simon de Colines.

⁸ Rhazes, *Abvbetri Rhazae Maomethi, ob vsvm experientiamqve mvltiplicem. . . exponit, & in lucem profert / per Gerardvm Toletanum medicum Cremonensem, Andream Vesalium Bruxellensem*, facs. of 1544 edn, (Brussels: Culture et Civilisation, 1973). See also Donald Campbell, *Arabian Medicine and its Influence on the Middle Ages* (Amsterdam: Philo Press, 1974), 66–7.

⁹ Latin translations of the complete *Almansor* were printed in Milan in 1481, Venice in 1497, and Lyon in 1510. A Basel, 1544 edition includes Vesalius' *Paraphrasis* of Book IX. Campbell, *ibid.*, 68.

¹⁰ A number of Rhazes' clinical cases were translated by Max Meyerhof, 'Thirty-Three Clinical

Observations by Rhazes', *Isis*, 23, 2 (1935), 321–72. The case on smallpox and measles was published many times in Latin and was translated into the English language by William Alexander Greenhill, *A Treatise on the Small-pox and Measles, by Abū Becr Mohammed ibn Zacariyā ar-Rāzī (Commonly Called Rhazes)* (London: The Sydenham Society, 1848)

¹¹ Meyerhof, *ibid.*, 325.

¹² Campbell, *op. cit.* (note 8), 68.

¹³ Meyerhof, *op. cit.* (note 10), 325.

¹⁴ Campbell, *op. cit.* (note 8), 68–70; Campbell did not note the Venice, 1529 edition of the *Continens* which is discussed in this article.

Perhaps the most distinguishing characteristic of Rhazes is his critical and experimental mind. His uncompromising attitude is illustrated by discussions with the theologian Abū Hātim, in which he appears as a kind of Voltaire, challenging religious dogma and giving preference to a philosophical approach.¹⁵ Medical authors were also not safe to Rhazes. Rhazes devoted an entire book to a critique of Galen, the *Kitāb shukūk 'alā jālinūs*, ('The Book of Doubts about Galen'). And in the *Continens*, all the authors known in Rhazes' time are commented upon and criticised if deemed necessary. Rhazes' apology for his critique sounds like the modern catchphrase 'standing on the shoulders of giants':

Asked why modern scholars should attach [such critiques] to [the works of] the ancients, I cite several reasons. Among these is that error is inherent in human beings.... Another reason I cite for such critiques is that the sciences continually grow and are refined as time passes. [. . .] If it then be said that this is tantamount to claiming that modern scholars are better than the ancients, I reply that I do not see that this statement is valid except on condition that the moderns improve on that which has been laid down by the ancients.¹⁶

The Renaissance Attack on Things Arabian

Rhazes was, after Avicenna, foremost among the large number of Arabic authors who had inspired scholarship in Europe since the twelfth century. In the early sixteenth century, the time of Vesalius' early education, a change in attitude towards the Arab authors came to a climax. Ever since Alvaro made his complaint against the Mozarab youth of Al-Andalus in the ninth century, Christian humanists had desired emancipation from the dominance of Arabic authors in the scientific field.¹⁷ In the dynamic of the evolving emancipation movement, the classical Greek authors came to be seen as the founders of true science and the Latin and Greek languages as the expression of humanist purity.¹⁸

¹⁵ L.E. Goodman, 'Razi, Muhammad bin Zakariya al – ' in C. Bosworth *et al.* (eds), *The Encyclopaedia of Islam*, Vol. 5 (Leiden: Brill, 1980), 474–6: 474.

وإن سألت عن السبب الذي من أجله يستدرك المتأخرون في الزمان على أفاضل القدماء مثل هذه الإستدراكات قلت إن ذلك أسباباً: فمنها السهو والغفلة الموكلة بالبشر. (...) ومنها أن الصناعات لا تزال تزداد وتقرب من الكمال على الأيام. (...) فإن قيل لي: هذا يدعو إلى أن يكون المتأخرون من أهل الصناعات أفضل فيها من القدماء قلت: إني لا أرى أن أطلق ذلك إلا بعد أن اشتراط في وصف هذا المتأخر في الزمان بأن أقول إذا كان مكتملاً لما جاء به القديم.

Muhammad ibn Zakariyā Rāzī, *Kitāb al-Shukūk 'alā Jālinūs*, Mehdi Mohaghegh (ed. and trans.), (Kuala Lumpur: International Institute of Islamic Thought and Civilisation, 1993), 2–3, and 'introduction', 113.

¹⁷ This is discussed in e.g., George Makdisi, *The Rise of Humanism in Classical Islam and The*

Christian West with Special Reference to Scholasticism (Edinburgh: Edinburgh University Press, 1990), 330

¹⁸ Few scholars have attempted to explain the radical move of Christian humanists towards Greek and Roman heritage, which had, after all, not always been regarded as compatible with Christianity. William Montgomery Watt writes: 'Europeans were attracted to Aristotle, not simply by the inherent qualities of his philosophy, but also by the fact that he belonged in a sense to their own European tradition. That is to say, the assignment to Aristotle of a central position in philosophy and science is partly understood as one aspect of the European assertion of distinction from Islam. The purely negative activity of turning from Islam, especially when so much was being learnt from Arab science and philosophy, would have been difficult, if not impossible, without a positive complement. This positive complement was the appeal to Europe's classical (Greek and Roman) past'. William Montgomery Watt, *The Influence of*

But while the Renaissance ideal of a revived classical heritage was thus constructed, Arabic dominance was repelled by a violent attack on its heritage in Europe.

The effects of this attack in the field of medicine have been well documented by Nancy Siraisi in her *Avicenna in Renaissance Italy*.¹⁹ From the fourteenth century, when Petrarch condemned medicine itself as ‘Arabian lies’, several themes developed in the rejection of Arabic medical literature. Obvious charges were concerned with the supposedly heretical nature of the religion or philosophy of the authors, Arabic writings were deemed ‘obscure’, erroneous, and a corruption of the ‘pure’ Greek sources. The many Arabic borrowings in botany and pharmacology came to be regarded as impractical, whereas perceived traces of the Arabic language itself were condemned as ‘coarse’ and ‘barbaric’ when compared with the Renaissance ideal of Ciceronian Latin.

Siraisi observes that by 1530, ‘the role of the Arabs was a central issue in debates over the reform of medicine’,²⁰ creating ‘an intellectual climate in which hostility to the Arabs had become a shibboleth of modernism in medicine’.²¹ Polemical pamphlets were published in Venice, Paris, Tübingen, Leipzig and Montpellier, sporting titles like the ‘Little Works of the New Florentine Academy against Avicenna and against the Neoteric Physicians Who, Neglecting the Discipline of Galen, Cultivate the Barbarians’.²² Hardliners, notably in Paris and Germany, started to talk of the ‘tyranny’ of Avicenna and of Arab ‘occupation of the schools’. Known anti-Arab polemicists include the champions of the humanist movement, such as Nicolò Leonicensis and Giovanni Manardo in Ferrara, Bassiano Landi in Venice, Pierre Brissot and Jacobus Sylvius in Paris, Symphorien Champier in Montpellier, and Leonhart Fuchs in Tübingen. Scholars like Fuchs advocated abolishing Arabian literature entirely, but a more common strategy was to ‘purify, to reinterpret and integrate’ the Arabian literature using the newly found Renaissance rhetoric.

A younger generation of physicians used the polemic against the Arabs to distance themselves from the established order. The Arabs were accused of being merely ‘compilers of books’, whereas the Greeks ‘knew nature first hand’.²³ The University of Alcalá de Henares stopped teaching Avicenna in 1565. By 1563, the London College of Physicians had decided to examine new candidates on Galenic texts only. The University of Tübingen, perhaps so advised by Leonhart Fuchs, went so far as to discourage, in its statutes, the reading of Arab authors.

Islam on Medieval Europe (Edinburgh: Edinburgh University Press, 1972), 79. George Makdisi states: ‘... why then did the humanists of the Italian Renaissance insist on eloquence in classical Latin? [...] The only answer I have, for this less than normal attraction toward a language not one’s own, is that there must have been an irresistible urge to answer the challenge of classical Arabic with an equally classical language.’ George Makdisi, ‘Humanism and Scholasticism in Classical Islam and the Christian West’, *Journal of the American Oriental Society*, 109, 2 (1989), 175–82: 182. Makdisi’s detailed study of the parallels between Arabic and Latin humanism is published as *The Rise of Humanism in Classical Islam*

and *The Christian West with Special Reference to Scholasticism*, *ibid*.

¹⁹ Nancy G. Siraisi, *Avicenna in Renaissance Italy: The Canon and Medical Teaching in Italian Universities after 1500* (Princeton, NJ: Princeton University Press, 1987), 66–77.

²⁰ *Ibid.*, 71.

²¹ *Ibid.*, 74.

²² Lionardo Giachini et al, *Novae Academiae Florentinae opuscula adversus Avicennam et medicos neotericos qui, Galeni disciplina neglecta, barbaros colunt*. (Venice: In officina Lucae Antonii Juntae, 1533)

²³ Siraisi, *op. cit.* (note 19), 73.

However, like the wave of extreme Galenism, the flood of extreme anti-Arabism was in fact short lived, and despite its aggression it did not pervade all levels of the scholarly world. Even at the peak of the antagonism there were writers who defended the Arab authors, as for instance Lorenz Fries, who in 1530 published a *Defensio medicorum principis Avicennae ad Germanica medicos*.²⁴ By the second half of the sixteenth century, Johann Lange (1485–1565), physician to the Elector Palatine, proposed that universities instruct the Arab language, and he decided not to hide the fact that he himself associated with those Arab lands and participated in Arab learning.²⁵ In the 1570s, the universities of Ingolstadt and Freiburg, where the curriculum had emphasised the Greeks at the expense of the Arabs, again introduced Avicenna and Rhazes;²⁶ and by the 1580s, printing offices, such as that of Plantin in Antwerp, showed a renewed interest in the Arab world and even printed texts in Arabic.²⁷

The short period, roughly between the 1490s and 1550s, became decisive for the later European self-image. The classics were sanctified *ad absurdum* as symbols of the humanist revolution, resulting, for example, in the bizarre defence of Galen's infallibility.²⁸ At the same time, individuals who were perceived as threats to the humanist cause could be severely intimidated. This violent attitude, so comparable to religious extremism, ultimately suffocated scientific advancement, as has been rightly pointed out by Lester King: 'The humanists who condemned scholastic authority and domination of the church, themselves bowed before an equal tyranny – the authority of the ancients'.²⁹

Vesalius' Paraphrase of the *Almansor* (1537)

Vesalius studied in Paris from 1533–6, when the anti-Arab campaign was at its height. He studied with Jacobus Sylvius, and became acquainted with the work of other anti-Arab polemicists such as Giovanni Manardo, Pierre Brissot and Leonhart Fuchs.³⁰

²⁴ *Ibid.*, 71.

²⁵ *Ibid.*, 80.

²⁶ *Ibid.*, 77.

²⁷ See Alastair Hamilton, *Arab Culture and Ottoman Magnificence in Antwerp's Golden Age* (Antwerp: Museum Plantin-Moretus, 2002).

²⁸ Vesalius' teacher, Sylvius, argued against Vesalius that Galen had not erred but that instead the human body had changed since Galen. ('Nec in hoc est Galeni peccatum, sed naturae in nobis mutatio ex caelo, solo, victu profecta'). Jacobus Sylvius / Jacques Dubois, *Vaesani cuiusdam calumniarum in Hippocratis Galenique rem anatoicam depulsio* (Paris: Apud Catharinam Barbé viduam Jacobi Gazelli, 1551), fol. 13v. The case of Galen's pinholes in the heart septum is another well-known example. Leiden professors Otto Heurnius and Adriaen van Valkenburg sought to do the truth a favour by creating the holes themselves before showing a heart to their students. See F.C. van Leersum, 'Vesalius', *Nederlands Tijdschrift voor Geneeskunde*, 59 (1915), 4–16: 9. Vesalius himself went through a process of transformation in his perception of the septum, as has

been described by G.A. Lindeboom, *Andreas Vesalius: een schets van zijn leven en werken* (Haarlem: De Erven F. Bohn, 1964), 144. To make the issue of the heart septum even more interesting, it has been suggested that Arabic manuscripts influenced the evolution of this idea in Europe. See Joseph Schacht, 'Ibn al-Nafis, Servetus and Colombo', *Al-Andalus*, 22, 2 (1957), 317–36.

²⁹ L.S. King, 'Humanism and the Medical Past', in J.P. Mc Govern and C.R. Burns (eds), *Humanism in Medicine* (Springfield: Charles C. Thomas, 1973), 3–10: 9.

³⁰ As Vesalius would recall in 1539: 'Monardum, Fuchsium, Curtium et Brisottum... illorum in publicis disputationibus fretus...' ('I, relying on the authority of the public pronouncements of Manardus, Fuchs, Curtius and Brissot...') Andreas Vesalius, 'Epistola docens venam axillarem dextri cubiti in dolore laterali secandam' [hereafter Vesalius, *Epistola docens*], Latin text with Dutch transl., in M.A. van Andel (ed.), *Drie grepen uit de 16e eeuwse geneeskunde* (Amsterdam: Opuscula selecta Neerlandicorum de arte medica Vol. 8, Van Rossen, 1915), 1–75: 4–5.

Back in Louvain in 1537, Vesalius decided, for his bachelor's thesis,³¹ to paraphrase the popular ninth book of Rhazes's *Almansor*, of which he already possessed the commentaries his great-grandfather Everard had composed much earlier.³²

Vesalius' *Paraphrasis* echoes the anti-Arab rhetoric of Vesalius' teachers in Paris. Vesalius complained that physicians of his day were 'hopelessly and obstinately fixed in the very footprints, so to speak, of barbarians and Arabians'.³³ He considered Rhazes 'the most expert in the art of curing among all the physicians of his people',³⁴ but only because he 'does not differ, except in a few points, from the writings of the Greeks'.³⁵

The most important aim for Vesalius was a stylistic one, to present Rhazes 'clothed in elegant Latin style'.³⁶ Even in this apparent favour to Rhazes, the humanist cleansing rhetoric permeated almost every sentence. To the suggestion that the *Almansor* was in fact a Greek work attributed to Rhazes – which could have made it easier to be accepted within a humanist frame of mind – Vesalius replied that this was highly unlikely because one could recognise without difficulty 'the horrid and coarse style of expression in common use among the Arabians and totally different from the fine elegance of the Greeks'.³⁷ Vesalius praised other authors who had almost managed to 'rid the druggist shop of all barbarian words, if I may not say of all false drugs, and to restore them to their pristine integrity'.³⁸ Rhazes' work should reach the hands of its readers 'cleansed of all barbarian names of medicaments unrecognisable to Latin ears... so that what was heretofore squalid and coarse and too obscure to be intelligible, will now be brightened....'³⁹ Vesalius denounced fault-seekers who do not wish to have anything 'cleansed and purified from its horrid barbarity'.⁴⁰

Wherever the name of Galen is mentioned in the text, it is put into capital letters, so as to stress Vesalius' support for the humanist cause.⁴¹ Vesalius vows to subject Rhazes to 'the stone of the Lydians',⁴² to correct him wherever he deviated from the Greeks, a

³¹ Singer says that 'it cannot be a graduation thesis', Singer, *op. cit.* (note 5), 212, but on the cover sheet of the 1537 edition, Vesalius mentions himself as 'medicinae candidato', which after his graduation is omitted in the second edition, as noted by Cushing, *op. cit.* (note 1), 3.

³² Vesalius would explain his family tradition of commenting on Arab authors in the *Letter on the China Root*: '[V]el mei Everardi nomine, cuius in eos Rhazes libros non inductam habeo commentationem...' Andreas Vesalius, *Andreae Vesalii Bruxellensis, medici Caesarei Epistola, rationem modumque propinandi radicis Chynae decocti* (Basel: Joa. Oporinus, 1546) [hereafter Vesalius, *Radicis Chynae decocti*], 196.

³³ '[B]arbarorum, Arabumque perpetuo (prope dixerim) vestigiis tam pertinaciter inhaerentem.' Vesalius, *Paraphrasis*, fol. 2v, in Cushing (trans.), *op. cit.* (note 1), 3–4

³⁴ '[E]um namque inter reliquos suae gentis in curandi artificio primas tenere...' *ibid.*, fol. 3r, 4.

³⁵ '[N]on nisi in paucissimis a Graecorum decretis declinarit...' *ibid.*, fol. 3r, 4.

³⁶ '[E]legantiori latini sermonis cultu circumdatus...' *ibid.*, fol. 3r, 4.

³⁷ 'Sed manifeste reclamare videntur, tum incognita Graecis medicamina, tum ipse dictionis stylus et character, adeo horridus et incultus, quemadmodum est Arabum universus, ut nihil omnino cum Graecorum illi concinnitate et elegantia conveniat...' *ibid.*, fol. 3r, 4.

³⁸ '[R]epurgatis non solum medicamentorem barbaris, latinisque auribus incognitis vocibus, sed tota etiam orationis serie in melius commutata, ut quae prius squalida et inculta essent, nec propter obscuritatem percipi possent, nunc quatenus fieri possit, et res ipsa ferat, splendeant...' *ibid.*, fol. 4r, 4–5.

³⁹ *Ibid.*, 4–5.

⁴⁰ '[A] sua horrida barbarie emutatum enouatumque velint...' *ibid.*, fol. 4v, 4–5.

⁴¹ *Ibid.*, fol. 18r. See figure 2. The capitalised Galen is no longer present in the second Basel edition.

⁴² '[A]d lapidem Lidium...' Vesalius, *Paraphrasis*, fol. 3r.

RHAZAE DEMORCVR. .19.
gulorum drachmæ decem, agarici drachmæ
quinque, cardamomi recentis & acuti acro
risque, ꝑ liquoris Cyrenaisi præstantissimi,
aristolochiæ rotundæ singulorū sesquidrach
ma, exprimito ex scilla succum, ac eum equa
li mellis portione commixtum decoquito. Hodie officina affam, foetida uocant.
illoꝝ simplicibus medicamentis exceptis,
formato electuarium, cuius, nucis auellanae in
star, cum liquore quopiam medicamentorū
vim ad caput dirigente, indies æger mane,
& tribus horis post frugalem coenam, assu
met, & a crassioribus cibis interim abstine
bit. Electuarium hoc omnibus morbi com
itialis differentijs, probe auxiliatur, si mo
do vnam a GALENO descriptam exci
pias, quæ scilicet ex sanguine ducit originē,
cuius & nos iam supra meminimus. Huic
sane sanguinis primum ex vena interiorem
maleolum perreptante missionem, deinde ex
axillari, presentaneum remediū adferre sæ
pe vidimus. Victus autē ratio hoc malo im
plicito, instituenda est, ex his quæ sanguinē
minuunt, atque refrigerant. Quocirca car
ne, vino, reliquisq; dulcibus abstinendum,
C ii & acido

Figure 2: Andreas Vesalius, *Paraphrasis* . . . (Louvain: In officina Rutgeri Rescii, 1537). fol 18r. Showing 'Galen' spelled in capital letters. The capitals disappeared in the subsequent Basel edition. Courtesy: Google Books.

‘procedure which is most often commended by the Parisian physicians to their students’,⁴³

Consequently, Vesalius noted in the margins where he saw Rhazes cross the line. The subject of bloodletting had become a sensitive issue just before Vesalius published the *Paraphrasis*. In 1514, Pierre Brissot had commenced an attack on Arab influences in bloodletting.⁴⁴ During a dissection in Louvain, at the time Vesalius was working on the *Paraphrasis*, he somehow entered ‘rather fiercely’ into discussion about the proper place of venesection with Jeremias Drivièrre (Thriverius), an author who still defended the reading of Arab authors. Vesalius probably threw himself into the discussion with the fire of a new convert to the humanist cause. Thriverius answered by ridiculing Vesalius’ teachers as ‘the Lutherans among physicians’. This seems to have humiliated Vesalius, and he referred to it even ten years after the event had taken place.⁴⁵

In the *Paraphrasis*, Vesalius referred extensively to the subject of bloodletting. When Rhazes prescribed a small venesection by means of cupping the shin, Vesalius corrected him with ‘Galenus arterias intersecat’.⁴⁶ Where Rhazes prescribed a clyster for lethargia, Vesalius commented: ‘Paulus et Alexander in lethargia secant venam’.⁴⁷ He did the same in the chapter about cataract.⁴⁸ Roth, Saunders and O’Malley noted that Vesalius interpolated the word ‘dextra’ whenever Rhazes calls for section of the *vena axillaris*. Vesalius would later come back to this issue in his *Bloodletting Letter* of 1539.⁴⁹ In the *Paraphrasis*, the theme came to a climax in the chapter about pleuritis. Rhazes was of the opinion that one should cut the vein ‘at the affected side, unless because of plethora the body should be full of blood’.⁵⁰ Vesalius, however, comments:

Hippocrates, Galen and almost all the other Greeks divert the urge of the blood stream at the opposite side. So, they cut the vein at the right place from the start, even when the body is plethoric, at a place as close as possible to the side of urge, diverting it directly from the affected side. This in contrast to the Arabians and their followers, whom one could rightfully call *haemophobic*.⁵¹

Psychologically, the opposite could also have been true for Vesalius having become a *bloodthirsty* follower of the cleansing ambitions of his Paris teachers. This, however,

⁴³ ‘Hanc etiam rationem excellentissimi Parisienses medici suis tyronibus plurimum commendarunt...’ Vesalius, *Paraphrasis*, fol. 2v, 4.

⁴⁴ Adrian Wilson, ‘On the History of Disease Concepts: The Case of Pleurisy’, *History of Science*, 23, 3 (2000), 271–319; 293.

⁴⁵ ‘Monardum, Fuchsium, Curtium et Brisottum medicorum Lutheranos in frequentissimo eruditissimorum virorum concessu appellare non puduit: quod illorum in publicis disputationibus fretus, contra ipsius de vena secanda placitum, acrius forte instarem.’ Vesalius, *Epistola docens*, 4–5 (‘[W]ho, in a very crowded assembly of the most erudite men was not ashamed to call Manardus, Fuchs, Curtius and Brissot the Lutherans of physicians because I, relying on the authority of their public pronouncements, had attacked, perhaps too sharply, his conclusion on venesection.’); John B.de C.M. Saunders (ed.) and Charles Donald O’Malley

(trans.), *Andreas Vesalius Bruxellensis: The Bloodletting Letter of 1539* (New York: Henry Schuman, 1948), 41–3.

⁴⁶ Vesalius, *Paraphrasis*, fol. 9v

⁴⁷ *Ibid.*, fol. 12r

⁴⁸ *Ibid.*, fol. 34r

⁴⁹ Roth, *op. cit.* (note 3), 95; Saunders & O’Malley, *op. cit.* (note 45), 83, footnote.

⁵⁰ ‘[E]ius partis, quae dolor infestat... nisi forte universus corpus sanguine plenum plethoricumque fuerit.’ Vesalius, *Paraphrasis*, fol. 52v.

⁵¹ ‘Hippocrates et Galenus ac alii Graeci fere omnes, affluentem fluxurumque sanguinem in contrarium revellent, atque iam in partem affluxum a locoque maxime vicino una derivantes, e directo lateris affecti venam etiam in corpore plethorico, ac inter initia opportune secant, aliter quam Araborum et eorum sequaces, quos ‘αιμοφοβους merito quis appellaverit.’ Vesalius, *Paraphrasis*, fol. 52v.

would change as Vesalius moved to Padua for the next phase in his career. His *Paraphrasis* was published by his friend Rutger Rescius in Louvain in February 1537. After taking his bachelor's degree, Vesalius travelled to Basel where a revised edition was published by Robert Winter, in early 1538.⁵² Robert Winter was one of the two companions of Johann Herbst, later known as Oporinus. Oporinus probably corrected the manuscripts of this second edition.⁵³ He must have left an impression on Vesalius, as six years later Vesalius had the precious woodblocks for the *Fabrica* sent all the way over the Alps to be printed by him.⁵⁴ Perhaps Oporinus' liberal intellect was a first step to offer some fresh air into Vesalius' mind, after the extreme Galenism of Paris and Louvain.

Rhazes in Vesalius' Later Work

In Padua also, the atmosphere seems to have been more mundane, as Vesalius later recalled: 'Nowhere in the world is Galen held higher in esteem than in Italy, which they have unmistakably proved by publishing his works. Although they do not reject completely the Arab authors either, who still deserve to be in the hands of those who study medicine.'⁵⁵

In 1538, Vesalius published the *Tabulae anatomicae sex*, which consisted of six anatomical prints he had made for his students. The prints no longer reflected Vesalius' earlier ambition to express himself in a pure Ciceronian Latin idiom. The plates are accompanied by an elaborate lexicon of anatomical terms in Latin, Greek, Arabic, and Hebrew. Singer and Rabin showed influences from Rhazes' *Almansor* in names such as '*rostrum porcinum*', offered by Vesalius as a synonym for the *Acromion* (the 'crow beak'). Singer and Rabin state that *rostrum porcinum* is a corruption of '*rostrum corvinum*' ('crow beak'), used in Gerard of Cremona's translation of the *Almansor*.⁵⁶ The same applies to the *Alhosos*, used as a synonym for the *Os coccygis*.⁵⁷

Vesalius sent the *Tabulae* to the Emperor's Court, more specifically to his 'mentor' Florenas, a friend of his father, to whom he had earlier dedicated his *Paraphrasis*. In response, Florenas asked him for his opinion about the proper rules for venesection. In his reply, known as the *Bloodletting Letter*, Vesalius proposed a solution for disagreements among authorities on the subject. He suggested that both Greeks and Arabs used to practice in accordance with an insight he had just rediscovered:

⁵² Because of the different calendar used in that area, the issue date is given as 1537. Cushing, *op. cit.* (note 1), 6–6b. This gave Singer and Rabin the impression that the reprint was issued only 'a few weeks' after the first edition, *op. cit.* (note 4), xxv.

⁵³ Max H. Fisch, 'The Printer of Vesalius' *Fabrica*', *Bulletin of the Medical Library Association*, 31, 3 (1943), 240–59: 246.

⁵⁴ William Ivins, who perhaps did not consider Oporinus' special combination of craftsmanship and erudition, leaves the journey of the woodblocks to Basel a mystery. W.M. Ivins, 'What About the *Fabrica* of Vesalius?', in Samuel Waldron Lambert

et al. (eds), *Three Vesalian Essays to Accompany the Icones Anatomicae of 1934* (New York: Macmillan, 1952), 43–99.

⁵⁵ '[Q]uum nulla diuinis Itatorum ingenii Galenum magis colant et venerentur, id quod vel ipsius operum editione abunde probarunt: etiam si Arabes interim non penitus contemnunt, ex medicinae candidatorum manibus neutiquam excutiendos.' Vesalius, *Radices Chynae decocti*, 28 [translation by the author].

⁵⁶ Singer and Rabin, *op. cit.* (note 4), 21.

⁵⁷ *Ibid.*, 43.

With what objection, I pray, should it be held in less faith that Hippocrates, very studious of brevity, in which the majority of the Greeks and Arabs and all of us today are very remiss, so spoke? For Galen, perpetually explaining himself, Paulus, Aetius, Alexander, Oribasius, Rhazes, Avicenna and others of the Arabian cohorts, frequently urge that the axillary [basilic], common median and humeria [cephalic] must be cut, but do not add right, when nonetheless they unquestionably desire that to be opened. And when they prescribe section of some or other vein on the left, they sometimes add of the left elbow or the left foot.⁵⁸

We no longer see Vesalius attempting to subject the Arabs to the Greeks, instead he rather tried to reconcile the two. By the time his masterpiece *De humani corporis fabrica* was published in 1543, Vesalius had developed a more balanced view on the merits of both Arab and Greek authors. In the first lines of the preface, Vesalius stated that the nowadays fragmented art of medicine had still been fully intact under ‘the reign of Mansor, king of Persia’. He made reference to Rhazes when stating that under this king ‘flourished those Arabs who are now rightly as familiar to us as are the Greeks’.⁵⁹ Vesalius shows a rather international appreciation of the profession when he argues that Europe left surgery to be performed by ignorant barbers while focusing on medicines, whereas:

[I]n India even kings do not disdain to practice surgery; the Persians hand it on under a law of inheritance to their children just as once the sons of Asclepius handed down the art of medicine as a whole; the Thracians and many other nations pay it the highest honour and reverence, while almost completely neglecting the other branch of the art.⁶⁰

In the letter to his publisher Oporinus, Vesalius denounced the fashionable attack on Arab authors by referring to a plagiarist of his *Tabulae* as ‘some dunderhead [who] quite undeservedly denigrated Avicenna and the other Arabs’.⁶¹ Like the *Tabulae*, the *Fabrica* contains many words in both Hebrew and Arabic.⁶²

After the publication of the *Fabrica*, Vesalius was reminded of his roots in Paris, as his former teacher Sylvius threatened him with opposition if he did not retract his criticism of Galen. In the *Epistola rationem modumque propinandi radicis Chynae decocti* (‘Epistle on the China Root’, 1546), a letter to his friend Joachim Roelants,

⁵⁸ ‘Quid obstiterit obsecro, quo minus fide tenendum sit, Hippocratem brevitatis studiosissimum ita locutum, uti et apud Graecorum et Arabum plerosque, et in omnibus nobis hodie receptissimum est? Nam Galenus alioquin perpetuo se ipsum explicans, Paulus, Aëtius, Alexander, Oribasius, Rhazes, Avicenna et caetera Arabum cohors, venam axillarem, communem, humerariam secundam subinde hortantur, non adicientes dextram, quum eam tamen aperiri certissimo velint. At quum ex sinistra aliquam secundam praescribunt, nunquam non sinistri cubiti, aut pedis sinistri adiicunt.’ Vesalius, *Epistola docens*, 65, Saunders and O’Malley (trans.), *op. cit.* (note 45), 83.

⁵⁹ ‘Mansoremque Persiae regem (sub quo Arabes nobis adhuc cum Graecis meritos familiares vigeabant)...’ *Andreas Vesalius: De humani corporis fabrica libri septem*, facs. of 1543 edn, (Nieuwendijk: De Forel, 1975) [hereafter Vesalius, *Fabrica*], fol. 2r.;

this and all subsequent translations are from W.F. Richardson, *Andreas Vesalius: On the Fabric of the Human Body: A Translation of De Humani Corporis Fabrica Libri Septem*, 5 vols, (San Francisco: Norman Publishing 1998), Vol. 1, xlvii. Richardson fails to recognise Rhazes as the physician of Al-Mansur and suggests Vesalius uses an ‘elastic chronology’, talking of ‘especially the Persian scholar Avicenna’ [c.980–1037], *idem*, xlvii, footnote 4.

⁶⁰ ‘[I]d quod tamen hodie apud Indos maxime reges exercent, Persae haereditario iure suis liberis perinde ac quondam tota Asclepiadum ars tradunt, Thracum cum plerisque nationibus summe colunt ac venerantur. ea artis parte propemodum neglecta ...’ Vesalius, *Fabrica*, *ibid.*, fol. 2v., xlvii.

⁶¹ ‘[N]escio quis rabula Germanicem est praefatus, et praeter meritum in Avicennam reliquosque Arabes blaterans...’ *Ibid.*, lxi.

⁶² See Figure 3.

Rhazes in the Renaissance of Andreas Vesalius

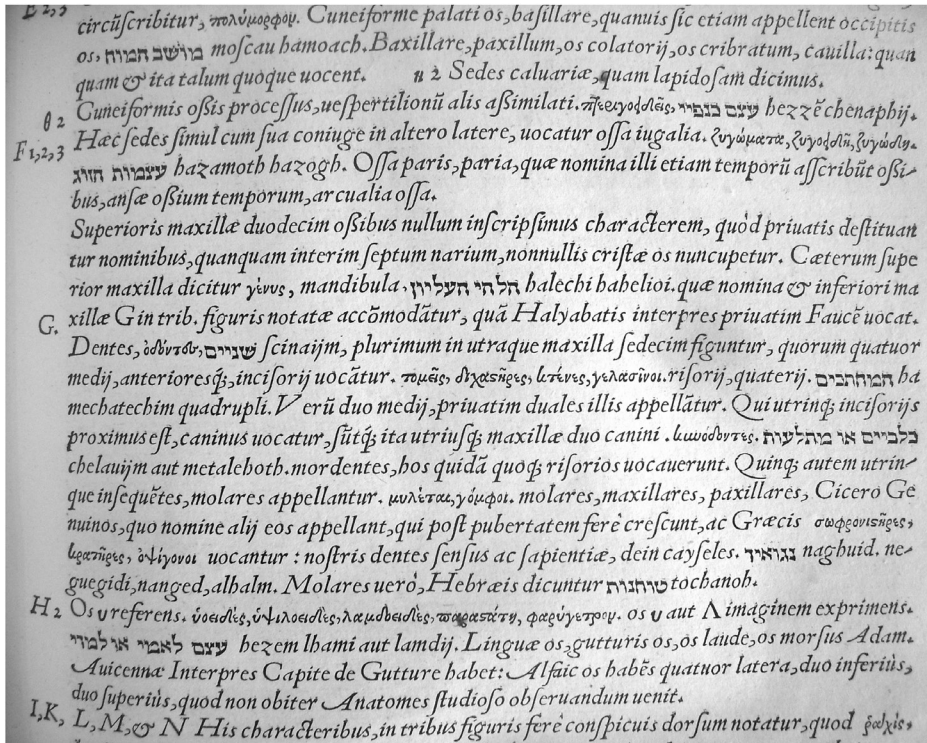


Figure 3: Andreas Vesalius, *De humani corporis fabrica* libri VII (Basel: Joa. Oporinus, 1543). Passage on p. 207 about the teeth with words in Hebrew and Greek type, and references to Arab authors Avicenna and Haly Abbas. Courtesy: Leiden University Library obj. nr. 1402c.

Vesalius defended his attack on Galen. The letter was written after Vesalius' departure from his academic career in Padua, and offers interesting insights into his inner thoughts, feelings and convictions. Vesalius described his radical departure from academic ambitions by hurling his books and notes into the fire. In his reflection on whether this loss should be regretted, Vesalius interestingly juxtaposed Galen with Rhazes:

As far as my notes [on Galen] are concerned, which had accumulated into a large volume, they have, together with a complete paraphrase of the ten books of Rhazes' *Almansor*, much more accurate than that of the ninth book, which still exists, and the outlines of a book on the preparation of medicines (for which I had gathered much, to my judgment very useful, material) on one single day perished. Along with all the books of Galen, which I had used in the study of anatomy and, in the way these things go, had scribbled all sorts of notes upon. Because when I left Italy to apply myself to the court [of Charles V] and the physicians whom you know, together with some notables, had judged very pessimistically my books and all that is published these days for the promotion of the medical profession, I burned everything, with the intention of restraining myself somewhat in writing.

However I have often regretted the upsurge and have felt sorry for not listening to the advice of my friends, who were present. Although, as far as the notes are concerned, I am very much pleased, because even if they would still be in my possession, I would not feel tempted to publish them, as I can easily foresee that they would make each and every one my enemy. Even the small part of my work which happens to contradict Galen, has already enraged so many, and three years ago already had them gird their loins to protect Galen, before my work had even appeared. They will eventually submit their writings to the students and come forward with a longdrawn letter with slanderings, without explaining themselves fully.

About Galen's books I feel no pain at all, as they would surely have fallen in the hands of people who are unable to distinguish the good notes from the bad. You do know how often it occurs that, under the supervision of the teacher or after reading for the first time, one makes a note which afterwards appears completely odd and ridiculous. I, for myself, realise this very well, having read Galen's '*On Bones*' up to three times before my students, before having the courage to note an error with Galen. Whereas I am now baffled by my own stupidity, that I had hardly understood what was written and that I had deceived my own eyes so badly.

Losing the *Paraphrasis* however saddens me dearly, as I enjoyed so much its compilation, comparing the Arabs to Galen and the other Greeks with regard to the parts of the profession, treated by Rhazes in each book. Even if it were only for my grandfather Everard, of whom I possess a very learned study on the mentioned books of Rhazes...⁶³

This fragment is fascinating because in it so many crucial elements of Vesalius' life and times come together. The Renaissance polarisation of Arab and Greek authors returns in the contrast pictured between Galen and Rhazes. We learn from this passage that Vesalius, throughout his work on Galen, and even throughout the *Fabrica*, enjoyed reading Rhazes and comparing his work with that of the Greeks. It is clear, however, that the balance of the comparison had changed decisively since he had published his

⁶³ 'Quod vero attinet ad Annotationes, quae in ingens volumen excreverant, illae cum integra in decem libros Rhazes ad Almansorem regem paraphrasi, multo diligentius quam illa quae in nonum librum prostat a me conscripta, et libri cuiusdam de medicamentorum formulis apparatu (in cuius materiam multa meo iudicio non inutilia congesseram) una die mihi interierunt, cum omnibus Galeni libris, quibus ego in discenda anatome usus eram, quosque, ut sit, varie commaculaveram. Quum enim aulam aditurus, Italiam relinquerem, atque illi quos nosti medici, de meis libris omnibusque quae hodie promovendis studiis eduntur, apud Caesarem, et alios quosdam magnates pessimam fecissent censuram, ea omnia (in posterum manus facile a scribendo cohibiturus) cremavi: etsi non semel interim, eius petulantiae me penituerit, meque amicorum, qui aderant, monitis non stetisse, doluerim. Quanquam de Annotationibus eo nomine non mediocriter gaudeam, quod nulla eas emittendi cupido (etsi ad manum essent) me capere debeat, quum facile augurari possim, quam illae mihi omnes infestos reddidissent, si modo tam pauca, quae casu in meos libros Galeni placitis pugnantia irrepserunt, adeo multis stomachum commoverint, totque Galeno patrocinando, annis tribus, imo ante meorum librorum

editionem, sese accinxerint: qui tandem semel opinor, tanto hiatu apparata, studiosis communicabunt, et non brevi duntaxat epistola, calumniis turgida, citra locorum omnium explicationem, prodibunt. De Galeni libris nihil doleo, quum illi in eorum manus forte pervenissent, qui male a bene in marginibus scripta, haud valuissent distinguere. Es enim opinor, haud ignarus quam multa in scholis sub praeceptoribus, aut quum primum aliquid legimus, in librorum marginibus scribere solemus, quae postea videntur nobis ineptissima, et ridicula. Ego ex me vel inde coniecturam facere possum, quod Galeni librum de Ossibus vel ter studiosis praelegerim, priusquam mendam aliquam Galeni annotare ausus fluissem: quum tamem nunc satis nequeam mirari meam stupiditatem, qui, quae scribebantur, tam parum assequer, et ipse meis oculis ita imponerem. Quia vero in paraphrasi paranda plurimum oblectatus eram, in Arabum cum Galeno caeterisque Graecis in iis artis partibus, quas Rhazes singulis libris pertractabat, collatione, illam mihi periisse graviter fero: vel avi mei Everardi nomine, cuius in eos Rhazes libros non indoctam habeo commentationem...' Vesalius, *Radix Chynae decocti*, 195-6 [translated by the author].

Paraphrasis in 1537. Where Vesalius had first subjected Rhazes to Galen, he now allowed the moment when his eyes were opened to the ‘stupidity’ of blindly following Galen, be followed by a confession of sympathy for Rhazes.

The close juxtaposition of Galen and Rhazes in this passage could become more significant as Vesalius may have discovered that Rhazes’ empiricism was close to his own attitude towards science.

Criticism of Galen

Vesalius’ *Fabrica* is considered revolutionary, not only because of the extraordinary combination of writing and visual anatomy, but also because in an era where the classics were considered infallible, Galen is criticised in favour of empirical observation. As has been said, Rhazes is known to have been of critical mind and he did not exclude Galen from his criticism. Having taken notice of Vesalius’ affection for Rhazes, we may ask the question whether Vesalius could have been influenced by Rhazes in the criticism of Galen.

Despite its obvious title, Rhazes’ ‘*Book of Doubts about Galen*’ is of limited value to us in this regard, as in mediaeval Europe, the work seems not to have been very well known.⁶⁴ About the *Almansor* we have Vesalius’ own testimony. It is however a practical guide to medicine in which Rhazes comes forward as a clinical and empirical mind,⁶⁵ but which contains no critical discussions of other authors. Galen is mentioned every ten or so pages, but is only referred to and not commented upon. Vesalius included words from the *Almansor* in his *Tabulae*, and additional study will probably reveal that words and ideas from the *Almansor* also reached the *Fabrica*. On the whole, however, the *Almansor* will not offer the desired connection either.

This is different for the *Liber Continens*. As has been mentioned, several editions had been printed in Paris and Venice around the time of Vesalius’ presence there, and at least the Arabic text is known to contain critical discussions of Galen’s work.⁶⁶ The question which occurred to me was whether these critical discussions of Galen were still present in the Latin translations of the *Continens* available to Vesalius. I gathered that the strong humanist zeal of the early sixteenth century could have resulted in censoring the *Continens* from its critical passages on Galen, so it remained to be seen whether Vesalius could have actually encountered them.

⁶⁴ A.M. Mokhtar, ‘Rhazes Contra Galenum: Die Galenkritik in den ersten zwanzig Büchern des “*Continens*” von Ibn-ar-Rāzī’ (unpublished PhD thesis: Friedrichs-Wilhelms-Universität, 1969), 17.

⁶⁵ In the words of Nancy Siraisi, ‘Rhazes, in the work known as the *Almansor*, appeared less dogmatic and more clinically oriented; his work was basically empirical in its approach and contained much information from his own experience.’ Nancy Siraisi, *Medieval and Early Renaissance Medicine: An Introduction to Knowledge and Practice* (Chicago, IL: University of Chicago Press, 1990), 12.

⁶⁶ Ahmad Mohammed Mokhtar, in 1969, presented an inventory of thirty-one instances from

the Arabic *Continens* where Rhazes corrects Galen: Mokhtar, *op. cit.*, (note 64). The complete Arabic edition was published as Abi Bakr Muhammad b. Zakariyya al-Rāzī, *al-Ḥawī al-kabīr fī al-Ṭibb*, 23 vols (Hyderabad : Da’irat al-Ma’arif al-‘Uthmaniyya, 1955–79) [hereafter *Ḥawī Hyderabad*]. An English translation of the first chapter of Book I has been published in Jennifer S. Bryson, *The Kitāb al-Ḥawī of Rāzī (ca. 900 AD) : book one of the Ḥawī on brain, nerve, and mental disorders : studies in the transmission of medical texts from Greek into Arabic into Latin*. (Ann Arbor: University of Michigan Dissertation Services, 2001); 230–73.



Figure 4: Rhazes, *Continens Rasis: quisquis es qui antiquiores...*, 2 vols (Venice: Ottovano Scoto, 1529), Vol. I, title page. Courtesy: Leiden University Library, obj. nr. 631 A 11-1.

The Latin *Continens* has escaped the eye of scholars in the years when Vesalius and Galenism were fervently studied. The Arabic edition was published from 1955, upon which Ahmad Mohammed Mokhtar described the critique of Galen therein, in 1969. Owsei Temkin had just finished his monograph on Galenism in 1973, when he heard of Mokhtar's thesis. He offers a quote from a Latin edition, but is unable to reflect thoroughly on its implications for the history of Galenism in Europe. The Latin *Continens* has remained out of sight ever since.⁶⁷

I consulted the 1529 edition of the *Continens*, which was published in Venice only nine years before Vesalius arrived in Padua.⁶⁸ To my happy surprise, the first pages start outright with a discussion of the nervous system, with numerous critical references to Galen:

1. The intestine and the bladder expel their contents by means of a muscle. I noticed that Galen says ('*dico quod Galienus dixit*') in this book [the *Affected Parts*], that the bladder does not have a contracting muscle and the urine is either expelled naturally or it has muscles in its exit that retain the urine, which he also states. In healthy people, the urine is discharged when the muscle wrapped around the exit of the bladder relaxes and the bladder carries out its function. The function of the bladder occurs naturally, not voluntarily, by a natural expelling force that expels waste. Then at the end of the mentioned book he says similarly that the bladder expels its contents by voluntarily relaxing its muscles and that it [also] contracts around and retains its contents. I say ('*dico ego*') that his words could be seen to be contradictory. But perhaps they are not, because he may mean by his statement 'by means of a muscle' expulsion rather than contraction of the bladder and the anus, in the same way as the muscles of the body parts which help them to contract, like the diaphragm and the muscle of the abdomen or the mirach.⁶⁹

2. In the fourth chapter of the summary of the *Affected Parts*, Galen says: whenever the lesion occurs in the rear interior of the brain, if it affects half of it, it causes haemiplegia, and if it affects the whole, it causes apoplexy. However, the word 'haemiplegia' requires some explanation, as the composition of the brain half is affected, but not the nerves and the spinal chord originating from it.

⁶⁷ Mokhtar somehow did not inquire to what extent the critical discussions about Galen were still present in Latin translations of the *Continens*. Perhaps not aware of Vesalius' appreciation of Rhazes, he even disappointingly stated: 'Es wäre... falsch, bei der arabischen Galenkritik nach Erscheinungen zu suchen, die das Abrücken von Galen auch im Abendland erhellen können'. Mokhtar, *op. cit.* (note 64), 9. Owsei Temkin admitted he became aware of Mokhtar's thesis too late to reflect thoroughly on the *Continens*: Owsei Temkin, *Galenism: Rise and Decline of a Medical Philosophy* (Ithaca, NY: Cornell University Press, 1973), 73–4, 122. I have not come across later studies in which the passages on Galen in the Latin *Continens* are discussed.

⁶⁸ Rhazes, *Continens Rasis: quisquis es qui antiquiores...*, 2 vols (Venice: Ottoviano Scoto, 1529). Leiden University Library obj. nrs. 631 A 11–1 and 2 [hereafter Rhazes, *Continens*]. See Figure 4.

⁶⁹ '[I]ntestina et vesica expellunt eorum superfluitates virtute musculorum. Et dico quod

Galienus [sic] dixit in eodem libro memorando: quia vesica caret musculis restringentibus ipsam et virtute sua naturali expellit urinam: veruntamen in ore vesicae sunt musculi retinentes urinam: et testatur ibi. Galienus [dixit] quod exitus urinae in sanis est cum musculus existens in ore vesicae quiescit ab operatione sua et tunc vesica exercet suas operationes. Et operatio vesicae est operatio naturalis et non voluntaria et virtute sua expulsiva naturali expellit nocivum. Et dixit similiter in fine memorati libri quod vesica expellit quod est in ea cum relaxant musculi eorum propria voluntate et congregat quod est in ea et tenet quod est in ea. Dico ego quod licet in his verbis videatur varietas: tamen non est. Quia possibile est narrationem suam esse quod virtute musculorum fit expulsio et non coopertorio vesicae et pudici et similiter virtute etiam musculorum membrorum iuvantium ipsos ad comprimendum et sicut sunt diafragma et musculi hypochondriorum vel mirach.' Rhazes, *Continens*, fol. 1a, left column, line 17 from below; cf. Mokhtar, *op. cit.* (note 64), 26 and *Ḥāwī Hyderabad*, *op. cit.* (note 66), Vol I, 4–5.

Galen confirms this in the fourth chapter of his book; do verify this. But we (*'atque nos'*) have seen haemiplegia while the face is healthy without impairment, and these words refute (*'destruunt'*) the preceding statements [of Galen] and are surprising.⁷⁰

3. Galen says that someone's head was drenched by rain and became so severely cold that he lost sense in the skin of his head. The doctors were warming [the skin], but I knew that the skin of the head receives its sense from the four nerves coming from the first vertebra of the spine. I treated these places and he recovered. I say (*'dico'*) that this problem was local, not in the origins of the nerves; think about it.⁷¹

Also further down in the *Continens*,⁷² the critical references to Galen are still to be found intact, for example:

4. Galen says in the first book of the *Affected Parts*: [...] When the remains of an ulcer are found in the stools, and the pain is in the upper part of the stomach and in the anterior of the thorax, then the ulcer is in the stomach. But when it is in the posterior part, the ulcer is in the oesophagus. And when the pain started after eating mustard or silium the ulcer is in the mouth of the stomach. But when the ulcer is in the pylorus, the pain will be felt all the way up to the thorax. I say: This is mistaken (*'dico hoc est peccatum'*); if the ulcer were in the oesophagus, he will have a prickling pain while swallowing, before [the food] arrives further below. But if the ulcer were in the mouth of the stomach, the pain would be felt at the time when [the food] reaches the places near the thorax. And if the ulcer were in the stomach, I state nothing would be felt at all; or only after a long time. But during the course of what is swallowed, nothing would be felt.⁷³

5. [Galen says]: For an abscess of the ear, grease is used which is applied to the surface, especially the grease of a duck and of a hen. But I believe (*'sed ego credo'*) that even if this method may soften the pain, the end result is not favourable. Therefore grease is not to be used except in case of severe pain after cupping and purgatives. And after these [therapies], poppy seeds and vinegar should be applied.⁷⁴

⁷⁰ 'Et in quarto membrorum dolentium: dixit Galienus cum accedit laesio posteriori cellulae cerebri si medietati eius eveniat facit paralysim medietati corporis si vero toti contingat facit apoplexiam: atque haec verba medietatis paralysis indigent expositionem: quia cum corrumpitur compositio medietatis cerebri et non cellararum nervi et spinalis medulla orta ab eo patietur. Fortificavit haec verba Galienus in quarto eiusdem libri sui: et immo recurrendum est ad ipsum: atque nos iam videmus patientem paralysim in uno latere: et eius facies ex illo latere non erat laesa: et haec verba destruunt praecedentia et mirum.' Rhazes, *Continens*, fol. 2a.

⁷¹ 'Et dixit Galienus quod quidam habuit caput medefactum a pluvia: et infrigidatus est forti frigiditate ita quod amisit sensum cutis capitis sui. Et medici calefaciebant ipsam cutim. Et, quia cognovi quod cutis capitis recepit sensum a quattuor nervis exeuntibus a primis spondilibus spondilium dorsi, curavi eundem locum et convaluit. Et dico quod hic morbus fuit in his locis: non tamen in locis in quibus est ortus nervorum. Et ideo praemeditandum est in his.' *Ibid.*, fol. 1a, last line to fol. 1b, first 5 lines

⁷² I searched the Latin *Continens* for the passages from the Arabic edition mentioned by Mokhtar, *op. cit.* (note 64).

⁷³ 'Dixit Galienus in primo libro membrorum dolentium: (...) Si in egestionem emissa fuerit cicatrix ulceris, si dolor fuerit superior penes stomachum, si fuerit in anteriori parte pectoris in mirach: ulcus erit in stomacho. Sed si fuerit in parte posteriori, ulcus erit in meri. Quod si ex assumptione synapis et silium dolor fuerit, ulcus erit in ore stomachi. Sed si fuerit in inferiori parte stomachi, dolor erit in meatu eius ad pectus. Dico hoc est peccatum quam si ulcus fuerit in meri habebit dolorem punctivum hora deglutitionis antequam perveniet multum ad inferiora. Sed si fuerit in ore stomachi habebit dolorem tempore quo perveniet ad loca propinqua pectoris. Sed si fuerit in stomacho omnino not sentietur: aut sentietur post longum tempus. Sed si in meatu deglutitionis non sentientur.' Rhazes, *Continens*, fol. 95b; cf. Mokhtar, *op. cit.* (note 64), 48 and *Ḥāwī Hyderabad*, *op. cit.* (note 66), Vol. v, 22–3.

⁷⁴ '[Dixit Galienus:] Conferunt apostemati aurium pinguedines cum hoc medicamine proprie si

6. Galen says in the thirteenth chapter of *Megategni*: When the head of the muscle is wounded, torn or punctured and one expects spasms which medicines against spasm will not cure, the muscle is to be incised in length; this will make the spasm disappear by itself. And he says: Similarly whenever the muscle is wounded or punctured, the indication is to incise it. Especially when the patient is close to going into a spasm. Or when, because of this [spasm], he will suffer mental derangement. Because both afflictions respond with difficulty to treatment. [I say:] One should begin to do everything that was said in the Canon up to this point. By no means incise the muscle, unless other therapies have gone without effect.⁷⁵

In some places the Latin edition differs from the Arabic edition of the *Continens* as it is now available to us. Some passages make a somewhat obscure impression in the translation, as in quote six, where the distinction between Galen and Rhazes appears to have been lost. On the whole, however, there seems to be no deliberate attempt to ‘cleanse’ Rhazes of his critique on Galen. The Latin *Continens* offers critical discussions of Galen in which his writings are evaluated secondary to Rhazes’ own observations. The second fragment is rather explicit in claiming to ‘destroy’ Galen’s theory, and the fourth translates the Arabic ‘ghalat’ (mistaken) with the strong ‘peccatum’. In this regard, the *Continens* certainly corresponds to Vesalius’ critical empiricism in the *Fabrica*. A comparison of content between the *Continens* and the *Fabrica* requires additional study. At this stage, two other similarities between the works can be noted. The first is a similarity in structure. As a collection of notes, the *Continens* has a remarkable pattern. Rhazes typically starts his notes with the phrase ‘he says’, or ‘says Galen’, after which he quotes the author. Rhazes then starts his own comment with ‘my opinion is...’ (*li*, translated as ‘*dico*’). As a result, the collected notes acquire a peculiar character when they are read one after the other; much like a sequence of observations and quotes without a beginning or an end. Although the *Fabrica* has a more defined structure, it offers a similar experience. Like Rhazes, Vesalius structures his text as a sequence of observations with intermitting critical references to Galen and other authors, for example:

1. Galen says that the stomach is located in the centre of the body, and many of the professors of dissection not only borrow this statement from him but also assert that, of all the different positions, it has chosen the one exactly in the middle because it is a common workshop for all the body parts. They have not measured our human proportions carefully enough!⁷⁶

superponuntur ei et pinguedines sunt ut pinguedines anatis et gallinae. Sed ego credo quod si facta fuerit huiusmodi compositio licet mitiget dolorem non erit laudabilis finis Unde non est utendum mihi eis nisi in vehementi dolore post minutionem et laxationem. Et post illud utendum est scief memithae et aceto’. Rhazes, *ibid.*, fol. 47a, second column, line 17 from below. cf. Mokhtar, *ibid.*, 32 and *Hāwī Hyderabad, ibid.* Vol. iii, 6–7.

⁷⁵ ‘Dixit Galienus in tertio capitulo *Megategni*: Quotiens in capite musculi accidit vulnus: aut morsus aut punctura et sequitur qui non medicinatur cum aliquo faciente ad spasnum opus erit quod incidatur ipse musculus per latitudinem, ut inde tollatur idem spasnum et deficiat effectus ipsius musculi. Dixit et similiter quotiens accidit in musculo morsus aut punctura: opus est ut secetur. Si vero videris

patientem proximum esse ad patiendum spasnum aut alterationem mentis ex causa praedicta: quoniam duae passiones hae sunt difficilis receptionis curae. Et incipiendum est totum id quantum in canone usque nunc. Est et nulla fiat incisio musculi: nisi quando curae non erunt conferentes’. Rhazes, *ibid.*, Vol. ii, fol. 264b, first column, fifth line from below, until second column, line 9; cf. Mokhtar, *ibid.*, 64 and *Hāwī Hyderabad, ibid.* Vol. 12[ditto], 151–2.

⁷⁶ ‘Galenus itaque ventriculum in medio corporis collocatum asserit: quod plerique dissectionum professores ab ipso mutuati, non simpliciter enunciant, verum hunc secundum omnes positionis differentias ad amussim mediam sedem, instar communis omnium partium officinae adeptum asserunt, perfunctorie admodum in hominis proportione metienda versati.’ Vesalius, *Fabrica op.*

2. [The seven bones of the breast bone] are connected by intervening cartilage, and the connection is sometimes so loose as to differ little from that between vertebrae; it is to be regarded as a symphysis or union, like that of epiphyses with their bones, except that in oxen it does not disappear, even in old age. I am therefore surprised that Galen wrote in *On Bones* that the bones which form the breast bone are joined by synarthrosis....⁷⁷

3. Galen recorded that an extraordinarily large bone was excised from an elephant's heart by one of his friends, and says that a bone exists in the heart of large animals and cartilage in smaller. In all my researches so far I have not found a pure bone in the human or any other heart; at the point where Galen says this bone occurs I find a cartilaginous substance that, in my opinion, is merely the roots of the large artery and arterial vein as they come from the heart.⁷⁸

4. According to Aristotle, Galen and other physicians and scientists, the breasts were placed higher in humans and lower in other animals because of a lack of the nourishment (they call it the residue) that has to be converted into milk; but I do not think this is entirely correct.⁷⁹

5. I do not understand what Galen means when he claims that the intestines and mesentery receive veins that do not end in the liver and when he says elsewhere that branches spread from the hollow vein to the intestines. This is totally false...⁸⁰

Although Vesalius did not use Rhazes' typical '*dico*', the style in which other authors are briefly discussed, next to Vesalius' own observations, is reminiscent of Rhazes' notes. The critical discussions are included in the main text, creating a similar pattern of statements, observations and discussion.

A distant similarity between the works that could be noted is size. The *Continens* has been styled 'the most bulky of all incunabula'. Each of the two volumes of the 1529 *Continens* measures forty by twenty-seven centimetres. At the same time, the *Fabrica* had the largest format that could be printed in those days. It measures forty-two by twenty-eight centimetres. Both works are approximately four centimetres thick.

cit. (note 59), 389, in Richardson *op. cit.* (note 59), Vol. V, 63.

⁷⁷ 'Septem haec ossa (...). Horum connexus cartilaginis inventu interdum tam laxe perficitur, ut a vertebrarum compage modice differat: est tamen is connexus ad symphysim seu unionem ita referendus, ut appendicum cum suis ossibus connexus. nisi quod hunc connexum etiam in admodum decrepitis bobus est cernere. Unde etiam Galenum in libro de Ossibus miror, qui pectoris ossa synarthrosi scripserit committi ...' *Ibid.*, 91, Vol. I, 213.

⁷⁸ 'Galenus nanque ab elephantis corde, ac quopiam suorum familiarium os eximia magnitudinis exectum prodidit: et grandium quidem animalium cordibus os, minorum verorum cartilaginem ascribit. Ego autem hactenus, uti in nullo corde, ita neque in humano exquisitum os repperi, eamque sede, qua Galenus cordis os constituit,

substantiam observo cartilagineam, quae mea quidem fententia nihil est aliud, quam magnae arteriae et venae arterialis radices ac corde principium ducentes.' *Ibid.*, Vol. I, 219.

⁷⁹ 'Porro mamillas homini elatius, caeteris vero animantibus humillius ex Aristotelis et Galeni aliorumque philosophorum et medicorum suffragio collocatas esse propter alimenti, aut ut ipsi dicunt, excrementi quod in lac convertendum erat, penuriam: non omni ex parte sanum esse arbitror.' *Ibid.*, 545, Vol. V, 206.

⁸⁰ 'Neque satis assequor, quid Galenus sibi velit, quando intestinis, ipsique adeo mesenterio venas offerri testatur in iecur non terminatas: et dum alibi, a cava intestinis ramos quosdam propagari commemorat, quod sane falsissimum esse vel sectio ipsa luce clarius tibi demonstrabit.' *Ibid.*, Vol. V, 103

Conclusions

Vesalius' biographers have always regarded the start of his academic career with Rhazes a mere curiosity. Little did they take note that Vesalius also ended his career with an affirmation of sympathy for the Arabian author. Rhazes is important in understanding Vesalius for two reasons: the changing appearance of Rhazes in Vesalius' work offers an interesting perspective on Vesalius' development in his own age; and Rhazes could have influenced Vesalius in the act of criticising Galen.

Commenting on Rhazes was Vesalius' family tradition. When he decided to follow his great-grandfather in this practice, he had to do so within the setting of the early sixteenth-century campaign against Arab elements in medicine. In the *Paraphrasis*, Vesalius cleanses Rhazes in Latin appearance and subordinates him rather violently to a sanctified Galen, following the ideals of his humanist teachers in Paris. As Vesalius matures in his academic career, his vision becomes more inclusive. In subsequent publications, Vesalius treats the Arabs as on a par with the Greeks, and attempts to reconcile their differences. In both the *Fabrica* and the *Letter on the China Root*, Vesalius criticises Galen, while expressing sympathy for the Arab authors, Rhazes in particular.

The change in Vesalius' attitude reflects how anti-Arabian attitudes had pacified a little towards the middle of the sixteenth century. Vesalius' case, however, is all the more interesting, as this change parallels his own maturing view on science. Vesalius develops an internationalist vision as he approaches the decisive moment when empiricism is allowed to triumph over authority. In the telling fragment in the *Letter on the China Root*, Vesalius juxtaposes the 'stupidity' of blindly following Galen, to a confession of love for Rhazes.

Looking at it from this study, the fragment is symbolic for a possible role for Rhazes in Vesalius' emancipation from authoritarian Galenism towards empiricism. Although in the *Almansor*, Rhazes could have already impressed Vesalius as a sharp observer, Renaissance editions of Rhazes' *Continens* contained actual discussions of Galen's texts, which would have offered Vesalius an example for abandoning blind authority.

Unfortunately, Vesalius never mentioned the *Continens*, and if he did mention the name of Rhazes, it was always in connection with his work on the *Almansor*. It is, however, quite unlikely that Vesalius was unaware of the work. It had been a publication of great esteem in Europe ever since it had been translated by Farraguth in 1279. An edition was published by Simon de Colines, the printer of Vesalius' teacher Sylvius, during Vesalius' study in Paris, and no less than five editions were published in Venice around the period of Vesalius' stay in Padua. Vesalius said in the *Letter on the China Root* that he had gathered much useful information for a work on pharmacology.⁸¹ It is unlikely that he would not have consulted the *Continens* for this, as it had long been an important work of reference on pharmacology.⁸²

⁸¹ '[L]ibri cuiusdam de medicamentorum formulis inutilia congesseram)...' Vesalius, *Radice Chynae decocti*, 195.

⁸² Campbell, *op. cit.* (note 8), 68.

Nevertheless, finding hard evidence that Vesalius did know of the *Continens* would require further investigation. But the assumption he did, could explain aspects of Vesalius' work, most important of which is the courage to criticise Galen openly.

I do not wish to argue that Vesalius was unable to reach the intellectual maturity to criticise Galen by himself, but the *Continens* must certainly have resonated with Vesalius' own ambitions and views in science. Rhazes' fearless critique of Galen and other authors in the *Continens* could have offered Vesalius just that final push to dare launch his own critique amidst the humanist taboo to do so. The *Continens* also offered an editorial structure, a template, to juxtapose critique and empirical observation.

The giant size of both publications could make us speculate that Vesalius desired to compete with the *Continens*, the size of which was akin to its importance in the medical tradition. Most importantly, the discourse of the *Continens* could be likened to that of the *Fabrica*. In this article I have attempted to show that the way Galen is discussed in the *Fabrica* could be compared to the way Rhazes discussed other authors in the *Continens*.

If Vesalius did know of the *Continens*, what could have prevented him from referring to it to legitimise his critique on Galen? The answer I can offer is that during the wave of anti-Arabism, Arab sources could not be cited to support major scientific developments. There are other examples of peculiar silence around Arab sources in important achievements during this period: Copernicus never made mention of the Arabic source of the important astronomical models known as the Tusi-couple and the 'Urdu Lemma;⁸³ Michael Servet, Vesalius' fellow student in Paris, offered an early description of the pulmonary circulation, but makes no mention of a rare text by Ibn an-Nāfis which was probably his source.⁸⁴ It could thus be said that Vesalius permitted himself to praise Rhazes, while rejecting Galen, but that he could not bring himself to cite him in favour of the revolutionary act of the critique itself.

Here we are left with the catchphrase of scholars of Arab–Latin relations during the Renaissance: 'Absence of evidence is not evidence of absence'. Whether the critique of Galen contained in the *Continens* actually influenced Vesalius or not, the fact that these texts were available in Latin editions should make us realise that criticism of Galen was not a new phenomenon in Renaissance publications. The critique by Vesalius was significant, not because Galen had never been criticised, but because Vesalius was a humanist who had earlier on subscribed to the ideals of the humanist movement, including the infallibility of Galen.

The case of Rhazes in the work of Vesalius will serve to better understand the strange dynamic of early sixteenth-century humanism. It corresponds to recent studies which place Renaissance humanism in the broader context of the Arabic–Latin exchange, starting properly with the conquests of Sicily and Toledo in the eleventh century. The early sixteenth century saw the climax of a desire among Christian humanists to emancipate themselves from the Arabic tradition. The violent exclusivity of Renaissance humanism could be compared to religious fundamentalism, in the sense that it sanctified the 'pure

⁸³ George Saliba, *Rethinking the Roots of Modern Science: Arabic Scientific Manuscripts in European Libraries* (Georgetown: Center for Contemporary Arab Studies, Georgetown University, 1999). Copernicus' relationship with Arabic works is

thoroughly investigated by Saliba. He discusses the example of the pulmonary circulation of the blood on page 7.

⁸⁴ For a thorough discussion of Michael Servet, see Schacht, *op. cit.* (note 28).

sources' to a level of absurdity and answered any attempt of compromise with intimidation. Vesalius' rebellion against Galen could be seen as the liberation of his intellect from such fundamentalist indoctrination.⁸⁵

This liberation towards an international vision of science, I hope, will only add to the charm of the champion of Renaissance anatomy.

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⁸⁵ Vesalius' slowly shifting paradigm on the holes in the heart septum has before been compared to religion. H.S. Versnel, *Ter unus: Isis, Dionysos, Hermes: Three Studies in Henotheism* (Leiden: Brill, 1990), 10.