

AESTIMATIO

Critical Reviews in the History of Science

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Critical Reviews in the History of Science

Volume 12
2015

Edited by

Alan C. Bowen and Tracey E. Rihll

A Publication of the Institute for Research in
Classical Philosophy and Science
Baysville, Ontario, Canada

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ISSN 1549-4470

ISBN 978-1-934846-08-7

Published online at Spindrift, Lake of Bays, ON, Canada

Aestimatio: Critical Reviews in the History of Science is distributed electronically free of charge at <http://www.ircps.org/aestimatio>.

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Preface

Here at last is volume 12 of *Aestimatio*. Though the titular date of this volume is 2015, its date of publication is 2018, a clear indication of how changes in the lives of the editorial staff can affect the production of this journal. For my part, retirement and a return to Canada after 42 years in the USA were the main factors. For my co-editor, Tracey Rihll, new opportunities in promoting classical studies in the UK have had significant impact. In any case, we do apologize for this delay and assure you, our readers, that work on *Aestimatio* continues.

With the completion of this volume, Tracey will put aside her duties as my co-editor in order to take on new responsibilities. I thank her wholeheartedly for her contribution to the journal since its inception in 2004 and wish her all success in what comes. Over the years, she has proven herself an excellent colleague, a constructive reader with exemplary editorial judgment, and a patient sounding-board when needed. The debt that I and our reviewers owe her is great indeed: she is one of the reasons for the success of *Aestimatio* to date.

Alan C. Bowen

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Islamic Astronomical Tables: Mathematical Analysis and Historical Investigation by Benno van Dalen

Farnham, UK/Burlington, VT: Ashgate 2013. Variorum Collected Studies Series 1040. Pp. Xii + 350. ISBN 978-1-4724-2238-5. Cloth \$165.00

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For the last 25 years, Benno van Dalen has devoted his efforts indefatigably to the study and analysis of medieval astronomical tables, particularly Islamic tables, and his research has contributed substantially to the progress in this field since the pioneering works by O. Neugebauer and E. S. Kennedy, among others. Van Dalen's writings have appeared in various books, and journals; these are not always easy to obtain and it is most welcome that nine of his most remarkable papers, dating from 1989 to 2008, are now published together in a single volume. The papers presented here are grouped into two categories, one concerning methods for analyzing astronomical tables (five chapters) and the other devoted to the study of various *zijes*, that is, astronomical handbooks with tables and explanations for their use (four chapters).

The core idea underlying the analysis of astronomical tables is that the parameters embedded or explicit in them are key indicators of their dependence on previous tables compiled by previous authors and thus provide a secure way to unveil the transmission of astronomical knowledge. More specifically, van Dalen has focused on the development of statistical estimators for the parameters in astronomical tables, such as the LNEC (Least Number of Errors Criterion), a mathematical criterion to determine the range of values of a parameter containing the largest number of values 'correctly computed' [see VI.7]. Of course, the crucial issue here is how to decide what a correctly computed value is. For this, van Dalen uses the concept of tabular error, defined here as the difference between an entry in a table and the corresponding value derived from the function underlying the table [see II.144]. In the cases examined in this volume, statistical analysis of tabular errors proves to be a powerful tool to 'crack' a table and to put it into context; but it has to be handled carefully to avoid potential anachronisms. To be sure, the concept

of a function as understood nowadays does not necessarily apply to all the material that the medieval table-maker had in front of him to compile an astronomical table. This, together with computational methods that are not always consistent with those in use at the present time, can lead to values perfectly computed but slightly differing from those derived from a nice modern function.

In chapter 1, van Dalen uses statistical methods to obtain approximations to a parameter in an astronomical table and introduces statistical estimators in order to establish confidence intervals with a fixed probability of containing the unknown parameter. He focuses on two cases: the determination of the value of the obliquity of the ecliptic in a right ascension table and the value of the solar eccentricity in a solar equation table. In both cases, we are faced with a single unknown parameter. Van Dalen discusses the use of both a weighted estimator and the maximum likelihood estimator to determine its value. The results are then compared with the attested values for these parameters in the astronomical literature. The appendices provide further details of these estimators as well as a clarification of the concept of tabular error, of which three categories are mentioned: scribal errors, computational errors, and rounding errors.

In *Almagest* 3.9, Ptolemy defines the equation of time but does not tabulate it. This he does in the *Handy Tables*, using the true solar position as the independent variable and giving entries to minutes and seconds of an hour at intervals of one degree. Van Dalen analyzes this table in chapter 2, originally published in 1994. The purpose is to establish its underlying parameters and to explain the computational methods used by the author. Inspection of the successive tabular differences already leads van Dalen to conclude that Ptolemy used linear interpolation within intervals of 6° , giving rise to a distributed linear interpolation in the full table. Estimation of the parameters by the least squares method confirms that the independent variable is the true, not mean, solar longitude and, quite successfully, assigns the embedded parameters (obliquity of the ecliptic, solar eccentricity, longitude of the solar apogee, and epoch constant) 95% confidence intervals around historically plausible values. As for the methods of computation, van Dalen concludes that Ptolemy used a rounded value of 66° for the longitude of the solar apogee instead of the attested value $65;30^\circ$ and linear interpolation between right ascension values for every 10° . These results were confirmed by Raymond

Mercier in a later analysis, although with a different approach, of the same table [2011, 103].

Next, the author analyzes a table to compute the true solar longitude extant in a manuscript containing the *Jāmi' zij* by Kūshyār ibn Labbān (ca AD 964). In chapter 3, van Dalen uses two methods: the least squares estimation, already applied in chapter 2, and a rather sophisticated method involving Fourier analysis and the development of a 360° -periodic function as a Fourier series. The good results obtained for the parameters underlying the table point towards Yaḥyā ibn Abī Maṣṣūr (ca AD 830) as the author of this table.

The equation of time is again addressed in chapter 4, in the framework of a general study of the astronomical tables in al-Khwārizmī's *Sindhind zij* in the version by Maslama (ca AD 980), the only one extant. Application of the method of the least squares makes it possible to determine the structure of the table and the values of its embedded parameters: an obliquity of the ecliptic of $23;51^\circ$ (a rounding of Ptolemy's value, $23;51,20^\circ$), a factor of $15^\circ/\text{h}$ for the conversion from hours to time-degrees, a maximum solar equation of $2;14^\circ$ (thus different from Ptolemy's), and a longitude of the solar apogee of $82;39^\circ$ (the value used in the earliest Islamic *zījes*, among others). As was the case with Ptolemy's equation of time, the independent variable is found to be the true solar longitude.

In chapter 5, van Dalen applies the mathematical technique LNEC to the analysis of Rajah Jai Singh's tables for the mean motion tables of the Sun, the Moon, and the five planets, completed around 1735 in Jaipur, India. The author convincingly shows that they derive from Philippe de la Hire's *Tabulae astronomicae* (Paris, 1702 and 1727). Indeed, a copy of these tables was brought to Jaipur in 1730 by the Jesuit missionaries at the Rajah's request.

The *Nāṣirī zij* by Maḥmūd ibn 'Umar, the earliest *zij* written in India, is the subject of chapter 6. This voluminous *zij* was compiled in the middle of the 13th century; only the tables for determining planetary longitudes are addressed here. The application of the LNEC to the tables for the mean motions provides good results, for it shows agreement with the Byzantine version by Gregory Chioniades (ca AD 1305) of the lost *'Alā' ī zij* by al-Fahhād al-Shirwānī (ca AD 1180), indicating that this was the source of the *Nāṣirī zij*. The tables for the planetary equations are basically of the standard type and in all of them we find displacements of 12 zodiacal signs to avoid the use of subtractive values, a feature not uncommon in Arabic *zījes*. In this

chapter, the author outlines a project of his to compile a list of all known Arabic *zijes* (now up to 250) with basic information on them (author, title, date, geographical origin, available manuscripts, and so forth).

In chapter 7, van Dalen provides a detailed description of a manuscript now at the University Library of Leipzig, MS Voller 821. He was thus afforded the opportunity to find materials therein from the early period of Islamic astronomy, including a second copy of the *Mumtaḥan zij* by Yahyā ibn Abi Maṣṣur (ca AD 828), together with chapters and extracts from works by Ḥabash al-Ḥāsib (ca AD 860), al-Battānī (ca AD 900), and Ibn al-ʿAlam (10th century). The only copy previously known is at the library of El Escorial (MS Árabe 927). The Leipzig manuscript that van Dalen examined was probably copied in northern Iraq around 1200 and was bound in great disorder, so that part of van Dalen's work has consisted not only in identifying the authorship of the various tables and texts but in rearranging the manuscript.

The purpose of chapter 8, written in collaboration with F. S. Pedersen, is to make an inventory of the problems related to the transcription of al-Battānī's *zij* with a view to a possible new edition of it. In this chapter, the authors focus on a re-edition of the table for the solar declination (obliquity = $23;35^\circ$) and display the apparatuses, which are not easy to read, for a variety of tables in this *zij* (sine, cotangent, half excess of the longest daylight, mean motion of the northern lunar node, lunar equation of anomaly, and lunar latitude).

Chapter 9, originally written as an entry in the *Encyclopaedia of Islam* (2000), deals with chronology and presents valuable information on the various calendars and eras used in the Islamic World. Most useful are Tables 1 and 2, which contain precise information on the calendars used in a dozen *zijes* from the ninth to the 15th centuries, and the most common epochs (Hijra, Alexander, and Yazdigird, among others) used in them, together with the differences in days (both in decimal and sexagesimal notation) between these epochs. We are also given formulas and examples, without appealing to Julian day numbers, for counting the number of days from one epoch to a given date and, conversely, for computing the number of years between a given date and a given epoch.

Indices of subjects, personal names, titles, localities, and manuscripts complete a valuable volume offering only a part of the fruitful work produced by Benno van Dalen in the last 25 years. It is to be hoped that he will keep generating more and more results of his high-level research on mathematical

astronomy in Islam, creating new tools for table analysis and providing a long awaited updated version of Kennedy's *A Survey of Islamic Astronomical Tables*, originally published in 1956.

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Lexis: Supplements 26 and 47. Amsterdam: Adolf M. Hakkert, 2004–2008. 2 vols. Pp. 749 + 639. ISBN 90–256–1192–3, 90–256–1239–3. Paper €160.00 + 136.00

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Titus Aurelius Alexander (this is his full name as it emerges from a recently found inscription from his native city of Aphrodisias in Caria)¹ was the most influential Peripatetic philosopher of late antiquity. We do not have precise dates for him but we know that he was active in the late second and early third century AD. It has long been clear that his lost commentary on the *De caelo*, together with his lost commentary on the *Physics*,² stood out as an elaborate presentation, clarification, and defense of Aristotle's physics in the context of the debate between philosophical schools. By collecting, editing, translating, and commenting on all the evidence that goes back, directly or indirectly, to Alexander's commentary on the *De caelo*, Andrea Rescigno has put together a tremendous amount of information that helps us to appreciate not only the theoretical concerns motivating Alexander's exegetical activity but also his achievements and their subsequent *fortuna*.

Sources of Alexander's lost commentary on the *De caelo*

Simplicius' commentary on the *De caelo* and Themistius' paraphrase of the same work (which is not extant in the original Greek but is preserved in Arabic-Hebrew and Hebrew-Latin versions) are our two most important witnesses for Alexander's lost commentary. Because of the learned nature of his commentary, Simplicius is by far our principal source of information. Themistius is rarely as helpful: his paraphrase is a restatement of the original

¹ On this inscription and its implications, see [Sharples 2005](#).

² On the latter, see [Rashed 2011](#).

text with little or no room for elaboration. In a number of cases, the hidden presence of Alexander in Themistius becomes apparent thanks to explicit references in Simplicius. In addition, Philoponus uses Alexander's exegesis of the *De caelo* in the *Contra Proclum*.³ Although his use of Alexander is limited to the final part of the first book [*De caelo* 1.10–12], it is of some interest to us because it overlaps with that of Simplicius. We have here a unique opportunity to control how free Simplicius is in his use of Alexander's commentary. I will return to this topic shortly. For the time being, I am content to add that a few scholia on the *De caelo* have been transmitted to us as well. These scholia are the result of a condensation and reworking of an ancient commentary tradition that is at least in part independent from both Simplicius and Themistius. Hence, they can be used either to confirm or to supplement the evidence provided by Simplicius and Themistius.⁴

Ipsissima verba? Fragmenta, testimonia, and vestigia

There are a few cases where Simplicius quotes Alexander's actual words—or at least claims that he is doing so. For instance, in fragments 67a [Heiberg 1894, 249.3–17], 129b [Heiberg 1894, 377.20–378.29], 129d [Heiberg 1894, 379.18–381.2], and 136c [Heiberg 1894, 404.4–30], Simplicius tells us that he is reporting Alexander's words (ρήματα). Does this mean that there is no manipulation of the original wording in the form of rearrangement, addition, omission, or replacement in these cases? We cannot answer this question for the simple reason that we have no independent way to assess how faithful Simplicius is in reporting Alexander. In a couple of cases, fragments 96b [Heiberg 1894, 293.11–295.26] and 97b [Heiberg 1894, 297.9–298.20], we can see how Simplicius uses his source because we have a parallel use in Philoponus, *Contra Proclum*: fr. 96a [Rabe 1899, 212.16–213.4] and fr. 97a [Rabe 1899, 213.17–216.23]. Rescigno engages in a comparative study of how both Proclus and Simplicius use Alexander's exegesis. The upshot of his study and its implication for how Simplicius uses Alexander can be summarized with the help of a brief quotation:

³ Philoponus also used Alexander's exegesis of the *De caelo* in the lost *Contra Aristotelem*. What we know about this work depends on Simplicius and his commentary on the *De caelo*.

⁴ On these scholia and their provenance, see also Rescigno 2013, 479–516.

the comparison...highlights some freedom of use of the model [on the part of Simplicius] and at the same time makes us sure of the dependence [of Simplicius] on Alexander. [1.532]

In other words, Simplicius does not simply copy from Alexander's commentary. Rather, he makes a conscious effort to insert Alexander's exegesis in the fabric of his own commentary. This entails disassembling and reassembling the original text as appropriate. This way of proceeding makes it difficult, if not outright impossible, for us to extract Alexander's *ipsissima verba* from Simplicius' commentary.

Also, in light of this fact, I agree with Rescigno's decision to avoid the distinction between *testimonia* and *fragmenta*.⁵ I also approve of his decision to refrain from setting out in print Alexander's putative *ipsissima verba* from the context in which they are embedded.⁶ However, speaking of fragments as he does is a bit misleading. In a few cases, we are dealing neither with *testimonia* nor with *fragmenta* but rather with *vestigia* of Alexander's lost commentary. Fr. 128b is a good example of this phenomenon. Simplicius is here referring to Alexander by using impersonal expressions such as 'they solve [this problem] by saying that' [Heiberg 1894, 373.3–4 λύουσι λέγοντες] and 'they take as evidence' [Heiberg 1894, 373.6 τεκμήριον ποιούντες (fr. 128b)]. Other cases where the presence of Alexander remains hidden in the text could be given. In all of them, it takes some ingenuity on the part of the editor to prove that the exegetical position defended depends on the same source, and that this source is to be identified with Alexander and his lost commentary on the *De caelo*. In my view, *testimonia* would have been a more precise, and indeed more appropriate, description of the various and complex nature of the extant evidence that the editor has collected and evaluated in the two volumes.

⁵ This decision is defended in the foreword to Rescigno's first volume [1.9].

⁶ The practice of setting out the stretch of text that is believed to go back to Alexander as an extract is adopted by Ian Müller and Jim Hankinson in their separate translations of Simplicius' commentary on the *De caelo* produced for the Ancient Commentators on Aristotle Project. This practice fortifies the impression that, after all, we can extract Alexander's *ipsissima verba* from the fabric of Simplicius' commentary.

Exegetical work and philosophical debates

The extant evidence suggests that Alexander was not content to explicate the text of the *De caelo* but also enlarged upon it. Such amplifications are common in the context of the commentary to the second book of the *De caelo*. Aristotle's celestial physics poses enormous challenges to the ancient and modern interpreter. Alexander did not shy away from these challenges. Quite the opposite. He confronted them by engaging in more or less independent inquiries (ζητήσεις), which may have also entailed the presentation and resolution of certain difficulties (ἀπορίαι). Here is one example taken from Alexander's exegesis of *De caelo* 2.3. In fragments 136c and 136d [Heiberg 1894, 404.4–30 and 405.8–27], Alexander amplifies the Aristotelian text by discussing how divine providence extends to the sublunary world through the motion of the heavens. The context of this amplification is an inquiry (ζήτησις) into how circular motion contributes to the explanation of the mutual transformation of the four simple sublunary bodies. The whole discussion is prompted by a post-Aristotelian (mainly Stoic) concern but is conducted solely on the basis of what is found in the *De caelo*: more importantly, it is presented as an explication of the Aristotelian text.

The exposition of an authoritative text such as the *De caelo* was for Alexander the occasion to expand on doctrines that were perceived as core, and as such non-negotiable, doctrines in the Aristotelian system. Fr. 91a [Heiberg 1894, 284.28–285.5, 285.21–286.27] is an excellent illustration of this phenomenon. This fragment is from the commentary on the first book of the *De caelo*, where Aristotle says that there cannot be place, void, or time outside the world since there is no body outside it [Heiberg 1894, 279a11–12]. Alexander expands on the Aristotelian thesis by engaging in an extended refutation of the Stoic claim that there exists an extra-cosmic void. Such an expansion on the Aristotelian text makes sense only if we assume that there existed a debate between the Peripatetic and Stoic schools on this very point, and assume that this debate was still very much alive at the time when Alexander composed his commentary. Interestingly enough, we do have independent evidence of an ongoing post-Hellenistic debate on this very topic: Cleomedes (his *floruit* is to be placed around AD 200) discusses objections that bear

some resemblance to those advanced by Alexander from a Stoic standpoint in his lectures on astronomy.⁷

In his commentary, Alexander tackled one of the most intractable problems of the *De caelo*, namely, that of the unity and integrity of its four books. Our source of information is Simplicius [Heiberg 1894, 1.2–24], who reviews the ancient views on the aim (σκοπός) of the *De caelo*. Apparently, Alexander argued that Aristotle in the *De caelo* was concerned with the world (περὶ κόσμου). It is not immediately clear what may have motivated Alexander to put forward this overall interpretation. It has been suggested that framing the *De caelo* as a work on the world (περὶ κόσμου) has the implication of putting the *De caelo* in direct contention with the pseudo-Aristotelian work circulating under the title ‘On the World’ («Περὶ κόσμου»).⁸ Moreover, it has been suggested that both *On the World* and Alexander’s interpretation of the *De caelo* are to be regarded as two independent attempts on the part of the Peripatetic tradition to fill what was perceived as a lacuna in Aristotle’s physics *vis-à-vis* the Stoic practice of writing on the world (περὶ κόσμου).⁹ If we accept this suggestion, we can see how a certain interpretation of the *De caelo* may have been prompted by theoretical pressures that are not only external to the Peripatetic tradition but also the direct result of a close confrontation with Stoic physics.¹⁰

⁷ For an English translation of Cleomedes’ lectures on astronomy, see Bowen and Todd 2004.

⁸ This work is also known with the Latin title of ‘De mundo’.

⁹ For both suggestions, see Kukkonen 2014, 311–352. That the *De mundo* is a post-Hellenistic attempt to fill a lacuna in the Aristotelian tradition *vis-à-vis* the Stoic practice of writing on the world (κόσμος) was first suggested in Mansfeld 1992, 391–411. The following Stoic philosophers are credited with a work entitled ‘On the World’ («Περὶ κόσμου»): Sphaerus, Chrysippus, Antipater, and Posidonius. For a discussion of the extant evidence, I refer the reader to the article by Mansfeld.

¹⁰ From the scholia to the lost commentary on Aristotle’s *Physics*, we learn that Alexander adopted the definition of the world (κόσμος) as a system (σύστημα): see Rashed 2011, 219. Interestingly enough, this definition is found also in the pseudo-Aristotelian *De mundo* 391b9–10: ‘[the] world (κόσμος) is a system (σύστημα) composed of the heavens, the Earth, and the natures contained in them.’ The Stoic origins of this definition are beyond dispute: it is ascribed to Chrysippus (the relevant testimonies are collected in von Arnim 1903–1905, 2.526–528) and Posidonius [Diogenes Laer-

Alexander and the earlier Peripatetic tradition

In his commentary, Alexander was critically engaged with prior attempts to explicate the *De caelo*. Fr. 145 [Heiberg 1894, 430.12–431.37] is a good case in point. In this fragment, Alexander builds on an exegetical tradition that included Alexander of Aegae (first half of the first century AD), Aspasius (first half of the second century AD), and Herminus (second half of the second century AD). Rescigno offers a useful discussion of this fragment not only in his second volume but also in the introduction to the first volume. I refer the reader to his discussion for a full treatment of the relations among these interpreters. What matters here is the general observation that what we know about the early engagement with the *De caelo* is filtered through Alexander (and mediated *via* Simplicius). While we have no choice but to look at the early engagement with the *De caelo* through the lenses of Alexander, we should be aware that what we see is somehow distorted by his exegetical and philosophical concerns. Elsewhere I have tried to show that this is certainly the case for another interpreter of the *De caelo*, Xenarchus of Seleucia (second half of the first century BC) [Falcon 2011]. The results that I reached in the study of the extant evidence for Xenarchus invite some pessimism on the prospects of arriving at a fair view of the Peripatetic tradition before Alexander. This tradition did not simply prepare the ground for what Alexander accomplished in his commentary on the *De caelo*. In some cases, the philosophers working in this tradition before Alexander were motivated by a different set of exegetical and philosophical concerns and, as a consequence, arrived at different results.

Conclusion

Rescigno has recovered, collected, edited, and translated into Italian 231 fragments from Alexander's lost commentary on the *De caelo*. He has also offered a detailed analysis of each of these fragments, which is not easy reading even for a native speaker of Italian. In my view, the work as a whole would have benefited from having a much shorter discussion of the fragments. In saying this, I do not mean to take away anything from what

tius, *Vitae* 7.138 = Edelstein and Kidd 1972, fr. 14]. More importantly, it is regarded as a standard definition in post-Hellenistic Stoicism. Tellingly, Cleomedes opens his lectures on astronomy with this definition: see Todd 1990, 1.1.13.

Rescigno has accomplished. One can only congratulate him for having put together a vast amount of information which will be an indispensable starting point for future studies of the Peripatetic tradition in antiquity.

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Taming the Unknown: A History of Algebra from Antiquity to the Early Twentieth Century by Victor J. Katz and Karen Hunger Parshall

Princeton/Oxford: Princeton University Press, 2014. Pp. xiii + 485. ISBN 978-0-14905-9. Cloth \$49.50, £37.95

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Writing about the history of algebra is fraught with difficulties and even dangers. Scholars have disagreed about the definitions of even the basic terms (What is algebra? And what is history?) and opponents have carried on vigorous and sometimes ill-tempered debates, not just about the validity of one another's work but also about one another's competence.

The most difficult issue to resolve is the nature of algebra itself. Part of the problem is that the meaning of the word 'algebra' has changed significantly over the last 1,200 years. It begins, in the work of al-Khwarizmi (about AD 825), as the name of a single operation (the restoration of a subtracted quantity) carried out during the process of solving for an unknown quantity. But, by 1600, it became the name for that whole process and, because of Viète's *In artem analyticam isagoge* (published in 1591), it came to include the idea of using symbols (ordinary letters) to represent both known and unknown quantities. But algebra continued to evolve well into the 20th century. In an article tellingly entitled 'The Beginnings of Algebraic Thought in the Seventeenth Century', Michael Mahoney [1971] offered the following definition (partially quoted in the present book [4-5]; I have italicized the missing parts):

First, then, what should be understood as the 'algebraic mode of thought'? It has three main characteristics: first, this mode of thought is characterized by the use of an operative symbolism, that is, a symbolism that not only abbreviates words but represents the workings of the combinatory operations, or, in other words, a symbolism with which one operates. Second, precisely because of the central role of combinatory operations, the algebraic mode of thought deals with mathematical relations rather than objects. Even when certain relations become themselves objects, say the set of a group morphisms, one seeks the

relations that link these new objects. The subject of modern algebra is the structures defined by relations, and thereby one may note as a corollary that the algebraic mode of thought rests more on a logic of relations than on a logic of predicates. Third, the algebraic mode of thought is free of ontological commitment. *Existence depends on consistent definition within a given axiom system, and mutually compatible mathematical structures live in peaceful co-existence within mathematics as a whole.* In particular, this mode of thought is free of the intuitive ontology of the physical world.

Although this definition sought to bring clarity to a famous debate about whether there is, for example, algebra hidden in book 2 of Euclid's *Elements*, in the context of this review it actually highlights several sources of difficulty. First, in modern times, the word 'algebra' has fractured into two distinct meanings. On the one hand, there is the algebra familiar to high-school and college-level pre-calculus students, which 'simply' involves operating on symbols and equations with the aim of finding unknown quantities. This corresponds roughly to the first of Mahoney's criteria and, to a certain extent (but there could be room for argument here), it also engages with his third criterion. On the other hand, there is the 'modern algebra' (to use Mahoney's phrase, even if he may not have intended a separate meaning) which is a product of 19th- and 20th-century interest in generalization and structure; and this algebra certainly satisfies all three of Mahoney's criteria. Mahoney used his definition to argue that there could not be any algebra in book 2 of Euclid's *Elements*. But from the point of view of the present book, it means that a historian really has two histories to write: one for algebra and one for modern algebra.

However, Mahoney's definition raises another issue for us. It is a definition of a mode of thought rather than of (say) a use of symbolic manipulation and so it could suggest the possibility that this mode of thought was present before the invention of the symbolic tools we now associate with it. So maybe al-Khwarizmi was using algebraic thought even though his quantities, equations, and operations were purely verbal (that is, 'rhetorical', in the usual terminology of the history of algebra) rather than symbolic. And maybe there was algebraic thought present even before the use of the word algebra in the calculations of ancient Babylonians or the arguments in book 2 of Euclid's *Elements*.

The idea that something might be present before it is named, or before it is even noticed, is a recurring theme in the present book and it highlights a difference of approach between historians and mathematicians when studying

the history mathematics. Ivor Grattan-Guinness [2004] has described these approaches as ‘history’ and ‘heritage’ where, roughly speaking, the history approach tries to describe what happened in terms of the culture of the time, while the heritage approach tends to ask what modern mathematics has inherited from the chosen episode, person, or culture. However, the difference is not always clear, since even the historian may need to reach across the centuries to render historical mathematics in a form which is intelligible to modern readers, and since different people are sensitive to different levels of such intervention.

For example, I cringe a bit when S. Ahmad and R. Rashed [1972] talk about the method that al-Samaw’al used in the 12th century ‘to find the root of a square element of the ring’:

$$Q[x] + Q[\frac{1}{x}]’.$$

For me, the ring structure is more or less irrelevant to al-Samaw’al’s calculations. Rings are a late 19th-century abstraction of all the different mathematical systems in which you can add, subtract, and multiply and in which (roughly speaking) these operations behave like ordinary addition, subtraction, and multiplication of real numbers. But, in fact, rings include systems where multiplication does not necessarily satisfy the commutative law; so the use of the word ‘ring’ can conjure up alien and anachronistic associations for a modern reader.

On the other hand, and again this is just my opinion, there are occasions when the judicious use of symbolic algebra can illuminate mathematics done 100s or even 1000s of years before Viète had the idea of assigning letters to unknown or known quantities. For example, what we now call linear problems in several unknowns arose 100s of years before the invention of symbolic algebra; and a truly authentic account of them would be purely verbal, with the problems stated in words, as in the following example from the *Liber Abbaci* written by Leonardo of Pisa (or Fibonacci) in 1202 [Sigler 2002, 317].

Two men with *denari* find a purse with *denari* in it.

The first says to the second, ‘If I were to have the *denari* from the purse along with those I already have, I would have three times as much as you.’

To which the other replies, ‘And if I were to have the *denari* from the purse along with my *denari*, I would have four times as much as you.’

How much does each man have and how much is in the purse?

The solution process, too, would be spelled out in (possibly several pages of) wordy explanation. In this context, most modern readers would probably like to see the problem stated symbolically, if only because the symbolism strips away the ‘irrelevant’ information and reveals the structure of the problem in a much briefer and more familiar (and so, easier to grasp) form. Thus, readers feel that they know and understand the nature of the problem being solved. For example, the above problem could be represented in terms of two symbolic equations:

$$a + p = 3b$$

$$b + p = 4a$$

There is little doubt that modern readers lose something by this simplification but it is a way of enticing them to step out of their own culture and make the effort to understand the historical culture. There are also risks with such simplification though. If Leonardo is able to solve this problem (and others like it, involving up to five men) can we conclude that Leonardo could solve (some) systems of linear equations in up to six unknowns, even though no one would write down such equations for another 400 years or so? Using symbolic representation could lead the reader to think the answer is ‘Yes!’ But others may feel it is nonsensical to claim that someone could solve a problem that they could not even formulate.

Mathematicians do seem to be particularly prone to what historians might call anachronisms but what mathematicians might see as new ideas in old settings. Part of the problem here is that, as the present book shows, such recognition is often a crucial part of the way in which research mathematicians actually do mathematics. The extent to which the mathematician claims to see the new in the old does vary. For example, the old may just be a source of raw material, as when Lagrange carries out a ‘detailed review of the existing solution methods for third- and fourth-degree equations’ [295] on his way to discovering the role of permutations in the solvability of such equations [296–298]. Or the old may be a source of inspiration, as when Sylvester and Cayley find ‘the germ of a whole new theory that they would call invariant theory’ while reading Boole’s work on the effect of linear transformations on higher degree ‘forms’ [353]. But sometimes the mathematician claims that

everything was already there in the past. Perhaps the most spectacular example of this is Viète's claim that his new 'analytic art' (effectively, symbolic algebra) was nothing but ancient Greek analysis dressed in modern clothes [236]. It is not clear to what extent he thought that this was clever marketing in a society that revered classical Greek culture, as opposed to a recognition of his key ideas embedded in the ancient texts. But, in a similar vein, we have the 'plausible but unprovable assumption', this time made by A. Weil [1984, 170] on behalf of Fermat, that Fermat's original proofs in number theory 'could not have differed much' from those obtained by Euler about a century later. This behavior puts the historian of mathematics in a bit of a bind. Do you stick to the printed evidence or should you allow yourself to be swayed by the mathematical expert who says things like, 'these two quite different-looking things are really exactly the same' and 'this person must have been thinking such-and-such because that is the way you think when you know this subject as well as they did'?

To a certain extent, how you approach these issues depends on your intended audience. The present book targets readers with a college major in mathematics [3], educated laypeople if you like, not research specialists in the history of mathematics. The authors have judged, correctly I think, that such readers are more likely to appreciate a story told mostly in their 'native tongue', in this case symbolic algebra. For example, ancient Babylonian problems which we can interpret as quadratic equations are represented that way [24], despite the fact that the algebraic symbolism would not be invented for another 3,000 years or more. But the reader is still given a flavor of the 'foreign language' by way of a verbal account of the solution process as given on the original clay tablets, along with Høyrup's conjectured cut-and-paste geometric construction which explains where that process might have originated. Similarly, there is copious use of the phrase 'what today would be called' as a way of connecting quite foreign-looking historical accounts with the intended reader's modern viewpoint. In most cases, this is accompanied by a sketch, at least, of what the calculations (or other thought processes) looked like to the original participants. Thus, the readers see, for example, the relative clumsiness of the first explanations of many ideas compared with the slick and polished presentations in modern textbooks.

The book falls into three main sections. Chapters 1 to 8 deal with the pre-history of algebra, what the authors call 'algebraic thought' despite Mahoney's

definition mentioned earlier, up to the advent of symbolic algebra. In these chapters, the authors adopt Euler's definition of algebra [6] as 'the science which teaches how to determine unknown quantities by means of those that are known'. This part of the story begins in the earliest history of mathematics with algebraic thinking being found in ancient Egyptian, Babylonian, Indian, and Chinese problem-solving, as well as in the traditional Arabic birthplace of al-Khwarizmi's 'algebra'. This section also includes special mention, in chapter 3, of the 'geometric algebra' that has caused so much dissent in the past. Here the approach is even-handed, acknowledging that Euclid's book 2 is geometric in intent (the history) but accepting too that this same material was used by later writers (the heritage) to justify their algebraic calculations.¹

Chapters 9 and 10 discuss the invention of symbolic algebra and how it was used to solve polynomial equations and to support the invention of coordinate geometry. This part of the story begins with the amazing tale of how cubic and quartic polynomial equations were solved by Scipione del Ferro, Nicolo Tartaglia, and Ludovico Ferrari without the help of symbolic algebra. Again, many of the painful details are rendered intelligible to us lesser mortals by using that algebra. The first historical use of algebra that we learn about is the invention by Fermat and Descartes of coordinate geometry [ch. 10].

Chapters 11 to 14 deal with the evolution of what we might call high-school algebra into modern algebra, with its concern for generalization and structure. This evolution begins with the slow dawning of realization that higher degree polynomials might not always be solvable. It is ironic that symbolic algebra, which Viète had touted as a universal problem solver [237], should be the tool used to reveal that some problems cannot be solved. Without algebra's ability to condense verbal calculations and strip away all inessential distractions, it is difficult to imagine how anyone could ever have dealt with such complications as Lagrange's permutations of polynomial roots [295–297] or how anyone could have found the equivalent of the new alge-

¹ It is interesting, incidentally, that although the authors reference Nesselmann's classic paper of 1842 which broke down the development of algebra into three stages (rhetorical, syncopated, and symbolic), they do not seem to mention it in their text. Assuming this neglect is deliberate, I agree completely, as it is hard to see Nesselmann's syncopated step actually occurring as a second step. After all, its first appearance was supposed to be in Diophantus, long before the 'rhetorical' writings of al-Khwarizmi and those of his Arabic successors who were familiar with Diophantus.

braic tools for investigating solvability (such as what we now call groups [300–303] and fields [310–312]). The final chapters show how the recurrence of these ‘structures’, especially groups and fields, but also what we now call matrices, vectors and linear transformations, all led mathematicians to see value first in abstraction and then in axiomatization. The book concludes with an account of how van der Waerden’s two-volume book *Moderne Algebra* [1930–1931] was based on the lectures of Emmy Noether and Emil Artin, and how it came to popularize what Mahoney understood as algebra.

The authors have, I think, pitched their writing perfectly for their intended audience. The broad outline of the story is expressed in clear prose, combined with a judicious use of that other ‘native tongue’ of the college mathematics graduate, symbolic algebra. If the reader is willing to make a further effort, then there is sufficient detail in other forms (often paraphrases of the wordy originals) to give an experience somewhat closer to reading the original historical documents. And for the really keen reader, there is an extensive bibliography presenting the more detailed historical research that has been carried out, particularly in the last 30 years. You could base a really nice third-year course on this book.

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Venus Seen on the Sun: The First Observation of a Transit of Venus by Jeremiah Horrocks translated with introduction and notes by Wilbur Applebaum

Medieval and Early Modern Science 18. Leiden/Boston: Brill, 2012. Pp. xxiv + 82. ISBN 978-90-04-22193-2. Cloth. US \$136.00

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Jeremiah Horrocks (1618–1641) is perhaps best known to historians of science for his telescopic observation of the transit of Venus in 1639. This book edited by Wilbur Applebaum offers what might be called, for want of a better word, a ‘compilation’ into English of Horrocks’ manuscript drafts and possibly of the early published text on the transit observations. I hasten to make it clear at the outset that I am uncomfortable with this ambiguous description but am at a loss as to how to explain the puzzling fact that Applebaum does not tell the reader what exactly he is translating. Let me briefly explain.

In 1662, Johannes Hevelius published a tract by Horrocks entitled *Venus in sole visa*. This was the first appearance in print of some version of Horrocks’ manuscript notes on the 1639 transit of Venus [xix]. In 1673, John Wallis edited an *Opera posthuma* of works by Horrocks that did not contain any material on Venus—for, as Applebaum recounts, John Flamsteed proposed to publish separately a more correct version than the Hevelius edition, an intent, however, that came to nothing. Flamsteed had in the meantime acquired some of Horrocks’ manuscripts [xx]. In 1859, the first and until now unique English translation was eventually published. The translator and editor, Arundell Blount Whatton, based his translation on Hevelius’ text, only correcting punctuation according to a ‘Greenwich manuscript’ that is not further identifiable without undertaking an extensive philological analysis of the extant sources [1859, xiii]. Applebaum lists four holograph manuscripts currently known. The first draft is 67 folios, the second 72 folios, a fair copy of the second has 72 folios, and a ‘final draft’ has 58 folios [77]. No further information is given on how the order among the manuscript drafts has been established and by whom. It strikes me that the final draft should be much

shorter than the first, though this might be due to handwriting styles. Another manuscript entitled 'Philosophical Exercises and Astronomical Exercises' is cited by Applebaum in the bibliography but it is not at all clear if this also contains a copy of the Venus material or not [77]; probably not, since this latter manuscript is quoted by Applebaum in reference to Horrocks' opinion on the aether [10n10].

This confused state of affairs as to the exact material that has been used by Applebaum as a basis for his translation unfortunately creates more puzzles. On page 8 (note 1), Applebaum refers the reader to 'the manuscript' [cf. 13n20, 17n2, and 21n1]. On page 47 (note 14), appended to the last word of chapter 12, we are told that '[t]his is as far as Horrocks got with his third draft, which was interrupted by his death on 3 January 1641'. But a third draft is nowhere to be found in the bibliography listed by Applebaum. (Might it be the fair copy of the second one?) Applebaum then adds a 'continuation of final draft' section [48] that he says is 'at the end of his chapter on Lansberge from the second draft' [47n14]. Chapter 13, we are told, comes from 'Horrocks' chapter 12, second draft' [49n1]. Chapter 15 is from chapter 14, second draft [54n1]. Chapter 16 is from chapter 15, second draft [58n1]. Chapter 17 is from chapter 16, second draft [66n1]. Finally, chapter 18 is from chapter 17, second draft, unpublished until now [71n1].

I speculate that Applebaum has done some interesting collating work in preparation for this edition and that the text which he has reconstructed and used as a basis for translation is the result of a complex situation in which the manuscripts contain more or less different material. This is all too common with archival sources, especially when the author did not have the opportunity to bring his work to publication, as was the case with Horrocks. Regrettably, we are told nothing about this collation process, the philological criteria that Applebaum has applied or, more importantly, the motivation for his choices. One would especially have expected to be told if anything had been left out or if there are different drafts of chapters or sections thereof, all of which would be of great importance in understanding the creative process by which Horrocks came to transform his observational knowledge into a literary piece of work.

Moreover, I think that the choice of not publishing the reconstructed Latin text on facing pages has not only impoverished Applebaum's book but also deprived the reviewer of the possibility of forming an opinion of the char-

acter of the translation with respect to the original. More importantly, it has deprived the reader of the possibility of comparing and contrasting Applebaum's modern English rendition with Horrocks' original 17th-century Latin. It seems to me that this is a missed opportunity, for Horrocks' endeavor would have deserved the presentation of a full apparatus of textual variants and especially the alternative texts that, I suspect, are included in the extant manuscript drafts listed in the bibliography but somewhat confusingly referenced throughout the main text.

On a more positive note, I think that Applebaum supplements the translation with an informative introduction to what little is known of Horrocks' life and work, and to the complicated vicissitudes that his manuscripts underwent. Little, however, is offered in the way of a historical, sociological, and/or philosophical assessment of Horrocks' work. Yet there are sparse comments by Applebaum that might have been pursued with more vigor. He suggests that Horrocks' work on Venus

has the power to delight and charm us as the record of a young astronomer's encounter with a rare astronomical event and the manner in which he discovered, observed, and drew conclusions from it. [xi]

Rightly so! But then we are disappointed that Applebaum does not follow up on his brilliant intuition. Again, Applebaum says,

[w]hile pervaded by a spirit of mathematical precision and scientific ingenuity, Horrocks' treatise can be read as an intellectual adventure. It is filled with an unrestrained enthusiasm...written in a style now completely gone from scientific literature, for it was only after Horrocks' lifetime that scientists began to discard from their scientific writing the expressions of enthusiasm, the digressions, the classical allusions, and the personal comments with which Horrocks' brief work is filled. [xxiv]

But again, the insightful promise never comes to fruition in the scant commentary furnished by Applebaum in the footnotes.

Let me suggest an example. Horrocks reflects on the 'manner and history of my observation' in chapter 2, giving a fascinating account of his anxieties in preparing for the great event and of how he was able to alleviate his state of heightened tension. He realized that he could opportunely adapt a fine telescope, an optical tube, for the purposes at hand so as to make sure that his observations would be reliable. The anxiety was discharged in a surprising way. His enthusiasm erupted in a poetic style, and Horrocks sat

down to write a long poem on the usefulness of the instrument. Here, at the cost of being repetitious, I emphasize again how disappointing it is to have to base an opinion of the poem and its linguistic resonances solely on Applebaum's English rendition, though it sounds fluent and convincing. And why not expand in the commentary on the questions raised by this interesting psychological event, by which a young astronomer happily discharges his melancholia by writing Latin verses?

In summary, while I welcome the readable English translation offered by Applebaum as a very useful addition to our knowledge of an important episode in the history of early modern science, I think that the effort would have been even more rewarding if a philologically sensitive approach had been chosen, if the Latin text had been printed on facing pages, and if a more incisive commentary had been added to Horrocks' text. In fairness, finally, I must stress that Applebaum offers lucid and helpful explanations of the complicated calculations and the more technical aspects of Horrocks' work.

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Les saviors magiques et leur transmission de l'Antiquité à la Renaissance
by Véronique Dasen and Jean-Michel Spieser

Micrologus' Library 60. Florence: SISMEL Edizioni del Galluzzo, 2014. Pp. xviii + 537. ISBN 978-88-8450-493-7. Paper €77.00

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This collection of essays is the result of an international colloquium at the Université de Fribourg and a subsequent round table at the 22nd Congrès international des études byzantines in Sofia, both held in 2011. Its 21 original contributions are united by their attention to various ritual practices and systems of knowledge broadly associated with magic in pre-modern Europe and the Mediterranean. These are divided by the editors into two parts. Those in the first part consider 'processus de transmission et d'appropriation des rites et pratiques magiques de l'Antiquité à la Renaissance' [x]; those in the second, 'pratiques magiques dans le domaine byzantine' and 'la problématique de l'opposition entre magie et religion, sinon entre celle de magie et savoirs' [xiv-xv]. No single coherent definition of Byzantium is offered but these latter contributions generally center upon the city of Constantinople from the ninth to 14th centuries AD. Between the two parts, a wide range of rites and practices that could be considered within or bordering upon magic are reviewed and our knowledge thereof substantially increased, including amulets and incantations for protection and healing, cursing *via* inscribed tablets, rituals to inflict erotic passion, necromancy, divination, alchemy, and medical astrology. The majority of the contributions (13) are in French, the rest in English; each is provided with an abstract in English.

The introduction hails a boom in recent scholarship on 'la magie antique' [ix] and its overlap with fields such as astrology and medicine; and the present volume is certainly a welcome contribution to that enterprise, particularly commendable for its consistent attention to the concrete reflection of such practices in objects and written texts. I suggest at the outset that more might have been done to integrate the two halves or, by number of pages, the 'Byzantine' quarter and the 'western' three-quarters—a division presumably

left over from the genesis of the volume in two separate colloquia—as well as to place the individual contributions in dialogue with one another. I suggest a few examples of this at the conclusion of this review. Even in the synthetic introduction, comparison of Byzantium with the occident is hinted at only briefly [xviii n8]. This criticism does not of course diminish the convenience of uniting a substantial number of original contributions within a single volume.

The definition of magic and the distinction between it and religion have occupied generations of scholars and continue to be contested—no small part of the debate concerning the validity of a distinction in the first place or of a separate category for magic. The editors in their introduction speak of magic as distinct from but to be studied along with religion, though the distinction is not theorized beyond an acknowledgment of ‘l’immense problématique des rapports entre magie, savoirs, religion’; the opposition ‘licit’ and ‘illicit’ is proposed as more operative, at least for the Byzantine sources [xv]. The question of what ‘magic’ is for the purposes of this volume or, more particularly, what is ‘un savoir magique’, is left open by the introduction. But several of the contributors take it up independently.

R. Gordon is quite explicit: ‘I use the term magic in a purely conventional sense, to denote a group of sub-types of instrumental religion linked by family resemblance’ [253n1]. M. Martin [5] and H. Bernier-Farella [354] stress the role of social construction in both magic and religion. Others acknowledge the blurring of categorical divisions in other ways: for S. Kerneis there are affinities between magic and law (*ius*) in Rome, ‘une parole efficace, performative dont l’efficacité résidait dans le prononcé exact des formules’ [25], while E. Zwierlein-Diehl, at least with respect to users of amuletic gems, can speak of ‘devotees of the magical religion’ [96]. The approach of J.-M. Spieser [333–351] is to take the Christian Church’s definition of magic at its word as a step in defining its position thereto.

It seems in general, then, that magic includes what modern scholars benefit from including—in what has become a convenient category in the study of intellectual history.

The editors in the introduction neatly survey the scope and extent of the contributions, and I will now add my own assessment of their individual merits.

M. Martin [5–24] considers the tradition of the practice of aggressive ritual binding (*envoûtement*) in the medieval and early modern period, with a focus

on the West. After a review of similar practices in Mesopotamia and Egypt and among the Hittites, which might have provided the origin of the Greek practice, Martin finds that the Hittite practice shows the closest resemblance to the Greek *κατάδεσμος* (Latin *defixio*) and suggests that there may be a broad Indo-European tradition, but that the Greek practice is substantively original. In general, Martin supposes a double process of tradition for this practice by both oral and written means, the oral being the most prevalent, for which he adduces the classical authors Lucian and Apuleius. At a key moment in this earlier transmission, Martin considers the spread of binding from Greek to Roman practice, namely, by cultural contact in Magna Graecia, then from Rome throughout the Roman provinces. A more nuanced discussion of how its adoption in those areas brought changes in form and content would have been desirable and would have supported the author's conception of magic, in which he draws on Mauss [1902–1903], as innovative and adaptable [5].

Martin illustrates the written mode of transmission primarily with two recipes from late ancient Greek handbooks preserved on papyrus from Egypt, which he presents in French translation only.¹ Aside from the obvious problems of reliance on so small a sample and on texts heavily influenced by local tradition (a significant portion of Preisendanz and Henrichs 1974, P 4 is in the Egyptian language), it is important to note that the latter recipe [Preisendanz and Henrichs 1974, P 4] serves a distinct, separate type of binding in erotic magic. Some discussion of the differentiation between erotic and other kinds of binding directed at personal enemies would have been useful. Indeed, the bibliography especially on the erotic side is rather bare: one might refer above all to Faraone's account [Faraone 1999].

Martin next traces binding into the medieval West: lead tablets with indecipherable signs excavated from Merovingian graves, a few examples from medieval France, and references in medieval authors to maleficent practices involving weaving. It is not entirely clear to me, however, how a homily condemning the use of inscribed metal tablets as phylacteries for protec-

¹ The texts in question are an opisthographic book-roll of the third or fourth centuries AD, probably from Thebes or the Fayum and now in London, British Library pap. 121 [Preisendanz and Henrichs 1974, P 7.429–458] and the 'great Paris magical codex' from Thebes, Bibliothèque nationale de France cod. suppl. gr. 574, dated to the fourth century AD [Preisendanz and Henrichs 1974, P 4.296–335].

tion against storms ‘fait une référence très claire à la survie des tablettes de malédiction’ [18]. The piercing of a figurine with iron needles recounted in 10th-century England is likewise a rather vague reminiscence.² A general weakness in the medieval account is, again, a lack of attention to what local traditions may have contributed to the traditional inheritance. Martin’s treatment is particularly strong in accounts of trials and investigations from France, with consideration of the use of effigies, especially of wax, and of a sort of ‘Christianization’ in the baptism of these figurines. He points, finally, to the fascinating survival of the inscribed *defixio* tablet as late as the 17th century in Britain. An intriguing point is made in the conclusion about ritual binding as a release for passionate emotion, though the article has not theorized the mechanism for how this release happens nor provided any concrete grounds for evaluation of the closing question ‘combien de crimes, combien de viols l’évoûtement a-t-il permis d’éviter?’ [24].

S. Kerneis [25–42] considers a smaller and more localized subset of material evidence for binding (*defixio*) tablets from Roman Britain, specifically following a distinction developed by H. Versnel, a separate category of ‘prayers for justice’ as examples of an alternative system of justice outside of that controlled by the state. Kerneis concentrates on a group of about 100 tablets found at the sanctuary of Minerva/Sul at Bath, dated to the second through fourth centuries AD and concerned with theft, with the question ‘quelle relation entretenaient les prières judiciaires avec la mentalité magique’ and a related attempt at reconstructing the ritual procedure at the temple that would have accompanied the tablets. In general, despite formal similarities with ways of seeking justice in the legal system and a divergence in sphere from the secret execrations of curse tablets, an ‘action magique’ [29] remains at the core of the procedure. Applying anthropological *comparanda*, the solemn, public cursing of thieves by theft victims in Borneo discussed by Frazer, Kerneis interprets the Bath rituals as a means of applying pressure to the culprit, the goal being the return of the item and restoration of peace in the community. In Kerneis’ view, this judicial *defixio* is a compromise, adding ‘enchantement’ to Roman legal forms that convinced provincial users of the efficacy of the procedure and ultimately serving as a form of Romanization. Kerneis imputes a great deal of agency to priests in this model, e.g.,

² For the wide, if not universal, cross-cultural extent of aggressive ritual involving the mutilation of effigies (‘sympathetic magic’), see already [Frazer 1911–1915](#), 1.54–69.

‘les prêtres sont à leur façon les acteurs de la romanisation des provinces’; but in the case of Roman Britain, where little evidence for the priestly role is adduced, it seems to be mostly the author’s assumption that priests will have been central to this first, reconciliatory stage.

J.-M. Spieser [333–351] provides an orientation to the stance of the Christian church towards what it itself defined as magic at an early phase of its existence, the third through seventh centuries, in the process focusing particularly on amulets. Beginning with the proliferation of amulets in the third century, which he ties to a breakdown of ‘le système conceptuel qui unissait les acteurs de l’empire romain’ [334], Spieser traces how Christianity ‘se développe dans le cadre conceptuel de son époque’ and so includes the use of amulets and apotropaic ritual [339]. Such amulets show combinations of Christian and non-Christian iconography and text. Christians are in general embarrassed by the proximity between their ritual—and by the acknowledgment of miracles and ‘le pouvoir des mots’—and that of pagans and so take pains to delineate and to defend Christ from the label of magician. For patristic authors, the project of defining a separate Christian identity entails conceding the efficacy of magic while also strongly condemning it. Slower in its progress is the Christianization of the tendency to resort to invisible forces for protection in the form of amulets, a category rather broadly drawn by Spieser to include ‘blessing’ tokens given to pilgrims (*eulogia*). Indeed, this amuletic inheritance lasts all through the medieval period in both East and West.

Amulets are also at the core of an essay entitled ‘An Antique Magical Book Used for Making Sixth-Century Byzantine Amulets?’ [43–66], in which J. Spier considers continuity in magical practices through written media in a period of transition. Despite his admission that, in reference to his title, ‘no sixth-century magical book in fact survives’ [43], we are fortunate to have the remains of several Greek formularies on papyrus from the fifth and sixth centuries,³ which might have been considered here. Spier’s main conclusions are valid and well demonstrated—that a significant amount of such continuity

³ E.g., *P.Ant.* 2.66 [Daniel and Maltomini 1990–1992, 2 no. 94], *P.Ant.* 3.140 [Daniel and Maltomini 1990–1992, 2 no. 99], P.Mil.Vogl. inv. 1245–1253 [Maltomini 1979, 58–93; Daniel and Maltomini 1990–1992, 2 no. 96], P.Mil.Vogl. inv. 1251 [Maltomini 1979, 94–112; Daniel and Maltomini 1990–1992, 2 no. 97], P.Mil.Vogl. inv. 1254–1262 [Maltomini 1979, 113–120; Daniel and Maltomini 1990–1992, 2 no. 98].

from pre-Christian practice did exist in early Byzantium, specifically, in formulae visible in the text inscribed on apotropaic metal amulets—and he has made a useful contribution to an area which could surely benefit from further examination, for which the more detailed study promised here [44n3] will also be eagerly awaited, and in which for example the grouping of amulets by workshops or ateliers and the criteria for those distinctions may be further developed [44–45]. The essay is open to criticism on several points of detail, however.

First, a more rigorous examination of the ‘*historiolae*, little stories that resemble folktales’ [54] which Spier frequently identifies among the amuletic formulae with reference only to Heim’s useful but dated study [1893], seems necessary [see, e.g., [Frankfurter 1995](#)]. Another of the formulae, which urges the harmful entity to flee because some higher power is pursuing it, was not completely ‘Christianized by the fifth century’ as Spier claims [54]. Indeed, Poseidon appears in the role of pursuer in an incantation still circulating in a Byzantine compendium of veterinary medicine⁴ and a variant of the formula in a 15th-century manuscript threatens another affliction, ‘the king of Hades chains you’.⁵ For the intriguing mention of the fierce dog (λάβραξ ὁ κύων)⁶ in the amulet discussed on pages 54–55, whose presence is apparently intended to ward off demons, there are in fact several parallels in amulets of a similar type,⁷ though its interpretation remains uncertain.⁸

⁴ *Hippiatrica Parisina* 22 φεύγε οὖν κακὴ μάλι, διώκει σε Ποσειδῶν [[Oder and Hoppe 1924–1927](#)]; cf. [Heim 1893](#), no. 65.

⁵ [Vassiliev 1893](#), 334 from Vatican, BAV cod. Barber. gr. III 3, « φεύγε κείον, φεύγε ἡμί-κτιον· ὁ βασιλεὺς τοῦ ἄδου σε δεσμεύει. » [τοῦ ἄδου *coniecti*: τὸν ἄδον *cod.*, [Vassiliev](#)].

⁶ Spier’s reading « ΛΑΒΡΑΞ » (for which « ΛΑΒΡΑΧ » is presumably a mere mechanical error) is difficult to confirm on the photograph [fig. 6]: only a single letter appears to be present between « ΚΑΙ » and « ΒΡΑΞ », which resembles neither « Λ » nor « Α ». Indeed, I would prefer to read « Ο », supposing an error on the part of the engraver: « ΚΑΙΟ<ΛΑ>ΒΡΑΞΟΚΥΩΝ » for « καὶ ὁ <λά> βραξ ὁ κύων ». The sense is, in any case, substantively the same.

⁷ Most recently, *Supplementum Epigraphicum Graecum* 36.1316 (found in excavations at Tyre); three further examples of uncertain origin: [Seyrig 1934](#), 5–9 (with [Barb 1972](#) and [Robert 1965](#), 267n1); [Barb 1972](#), 344–353 and 353–357.

⁸ I wonder whether there may be an association with the Babylonian goddess Gula of Isin. On apotropaic dog statues among the Assyrians and a collection of recipes for

The discussion of the wandering womb [55ff] could be enriched by reference to C. A. Faraone's thorough study on belief in, and measures against, this supposed malady in classical and late antiquity [2011]. Spier adduces an amulet, now in the British Museum and said to be from Akko, of uncertain function and interpretation, as a plausible precedent for some of the formulaic phrasing of a group of later Byzantine amulets specifically targeting the wandering womb, and on which he has written a fundamental study [Spier 1993]. In the text of that amulet, of which Spier presents a partial edition on pages 55–56, it seems better, based on the accompanying photograph [fig. 7], to take «EIAIEC» with the following «M» and to regard the resulting «EIAIECM» as a simple graphic error of the engraver for «EIAIECAI» («AI» confused with «M»), that is, «εἰλίεσαι» for «εἰλύεσαι», a *koine* form for «εἰλύη» ('you coil'), rather than Spier's «εἰλί<cc>εic». ⁹ The interpretation offered for «ματέρα ἀπογίεν» (*sic*), with the translation 'he healed the womb', ¹⁰ is very doubtful.

Spier is surely right that the core of the 'spell to calm the womb' [56ff] is 'clearly very old' and surely its original form is not Christian. But it might have been of interest to present a nuanced view of how this core was in fact subject to some amount of Christianization in its combination with Christian formulae, a process quite visible in the material which he has himself gathered in Spier 1993. As it stands, his discussion focuses on four unpublished amulets, each illustrated by photographs. For the first three [figs. 11–13], Spier provides only partial transcriptions of the Greek text; and in some cases the readings are doubtful or difficult to confirm on the photographs. A fuller description of the entire object in each case, especially

making such figures and inscribing them with apotropaic names such as 'conqueror of the unfriendly', borne out by applied examples found in the palace of Ashurbanipal, see Faraone 1987, 269–270. On the figure of Sisinnios, add a reference to Schwarz 1996, the most convincing explanation so far offered for the etymology and mythological context of the name.

⁹ If this were the underlying verb, we might expect the *koine* form «ἐλίccεic» (or «ἐλίccεic») rather than the Ionic «εἰλίccεic».

¹⁰ As if «μήτραν ἀφύγιεν», from an otherwise unattested «ἀφυγίζω» (cf. «ἀφυγιάζω»?) A form of «ἀπείργω» (by-form «ἀπειργίζω»?) might be preferable, «ἀπούργιεν» for «ἀπεῖρξεν» ('he warded off' or 'he checked'). In any case, the difficulty calls for some comment by the editor justifying his reading.

the text beyond the side or few lines quoted, would have been desirable, though the author may well already be in the course of remedying this in his more detailed study. It is of great interest, for example, that the amulet pictured in figure 13 and discussed on pages 62–65 in fact provides a personal name for the fierce hound mentioned above, Titianos (ὁ λάβραξ κοίων [l. κύων] «Τιτιανός», ll. 5–6, is clear on the photograph). Finally, the connection between what Spier terms the ‘hungry wolf’ formula on the Byzantine amulets and an incantation in a late ancient Latin medical collection by Marcellus of Bordeaux [Niedermann 1916, 20.78] is intriguing but not as certain as it is presented here: the commonality is only in the coincidence on both sides of wolves and eating, whereas it can easily be objected that the voraciousness of wolves is well known wherever they are encountered.

R. Gordon also considers the graphic side of ritual [253–300], selecting the *charaktêr* (χαρακτήρ) as a representative example of the ‘ritualised manipulation of writing’ [253]. Gordon traces tradition and innovation in these marks, tentatively defined as significant graphic signs, ‘intentional but not conforming to linguistic rules’ [255], which will be familiar to specialists from their ubiquity in both handbooks and amuletic applications. His contribution provides a welcome application of critical theory to the study of such signs, as well as a systematic basis for their description, well illustrated with reproductions of the signs themselves.

Gordon has selected a sample of more than 1,000 *charaktêres*, of which he finds 12 occurring in ‘precisely the same form more than fifteen times’ (reproduced on page 264). He sketches a hypothetical process by which the signs could transgress ‘all the basic assumptions behind conventional writing-systems’ yet still form a ‘communicative system’ by relying on a set of 31 ‘basal’ signs derived primarily from the Greek and Latin alphabets, subjected to ‘a few estranging devices,’ especially the addition of circles at the termini (*signes pommetés*) to create great variety [266]. Gordon finds that this basic process could account for 85% of the sample, the rest perhaps derived from signs in the Egyptian language, *sigla* in technical literature, or random invention. The routinized process of sign-creation would have been especially appealing in contexts of low technical proficiency, while high-quality products were accompanied by the most inventive *charaktêres*, e.g., the well known ‘divination kit’ from ancient Pergamon.

The so-called Greek magical papyri constitute an important early source for *charaktères* and here, where his command of the material and resulting analysis is at its strongest, Gordon locates the ultimate origins of the signs in Graeco-Egyptian practice, specifically, the dynamics of the introduction of the Greek language to the Egyptian temples. The bilingual priests offered 'magical services' to Greek clients, drawing on traditional Egyptian expertise with the introduction of material from Greek and Jewish sources. Throughout the Roman period, with the general decline in the skill of writing in hieroglyphic and the substitution of pseudo-hieroglyphs, 'it was often the idea of hieroglyphs rather than the text they communicated that was important' [260–261]. The divinity and symbolic signification claimed for hieroglyphs by Greek authors resemble the claims made for *charaktères* and so the development of the latter is likely associated with Greek reception of hieroglyphs, while they seem particularly favored 'by practitioners on the margins of the temple tradition, those in most frequent contact with clients requiring pragmatic magical services' [263].

The rest of the essay is devoted to a survey of re-appropriation, or creative misunderstanding, of the *charaktères* in Coptic, Byzantine, and Western medieval magical practice.

In Coptic sources, Gordon finds a high degree of routinization and the dominance of one particular subtype, the *signe pommeté*. A related development in the later first millennium is their close connection with images of Christian holy figures. In Gordon's distinction—*charaktères* in Coptic practice are intended for 'an implied human reader', especially due to their presentation in lengthy series, in contrast to Graeco-Egyptian practice where the aim is 'spirit-attention' [276]—there is perhaps an underestimation of the presence of the former goal in the latter practice. What is to prevent us from supposing, with no less foundation, that the practitioners behind the Coptic texts simply believed that their spirits would pay attention best to such accumulations? It is worth pointing out also, *à propos* of spirits, that the Coptic name « ΤΕΝΑΜΙΣ » ('tenamis'), with which the lesser spirits are labeled in the text P.Heid. inv. Kopt. 686, can probably be understood as a deformation of the Greek « δύναμις » ('dunamis'),¹¹ that is, 'Power' [*contra* 276n64] and, hence, referred to

¹¹ Cf. Förster 2002, s.v. δύναμις.

the Δυνάμεις (Powers) of the angelic hierarchy attributed to Dionysius the Areopagite.

For Byzantine practice, Gordon is mainly concerned with ‘clerical or scribal magic’ [280], for which he relies on handbooks and recipes represented by relatively late manuscript material dating to the 15th through 19th centuries,¹² where there is continuity in name (χαρακτήρ) but a ‘quite different overall impression’ in the much livelier graphic form [285]. He points to ‘uncertainty about how best to go about composing *charaktères*’ in the absence of institutional training (such as the Graeco-Egyptian temples), the transmission context being instead the ‘clandestine textual community’ and the tradition being supplemented by the admixture of other types of signs. What Gordon adduces as one instance of the latter, termed ‘sigilla’, however, and reproduced on page 289,¹³ seems to recall the *charaktères* that he adduces from the much earlier Pergamon divination equipment, a point which might have been explored further. Gordon points out that *charaktères* are rare on Byzantine amulets—though it is worth bearing in mind that these are in general rare—with the exception of the *hystera* amulets studied by Spier [1993]. While Gordon concentrates on direct attestations, commendably in my view, perhaps select *testimonia* to such use of signs would have helped fill in the gaps in the Byzantine tradition. I suggest a couple of examples from the *acta* of the 14th-century patriarchal court at Constantinople of prosecution and punishment for magical practices which show that these signs were present in earlier Byzantine usage, at the very least in the vocabulary of plausible defamation. In one, dated to 1338, the accused is said to have been

¹² Gordon is to be commended for accurate engagement with these important yet difficult and understudied texts. I offer here comments on two points of detail: on p. 283n82, the text accompanying the amulet-design in the Bolognese codex numbered 17 in [Delatte 1927](#), 604, «...ἰδοῦν Κολομών υἱὸς Δαυὶδ...» is better translated ‘...Here is Solomon, son of David’, etc., a common idiomatic use of «ἰδοῦν» in fact frequently employed in texts of this type to introduce *charaktères* themselves, e.g., «ἰδοῦν οἱ χαρακτήρες» (‘Here are the *charaktères*’). On p. 285, «καὶ παράχουσε τοὺς» should be translated ‘and bury them’ (i.e., the inscribed *characteres*), not ‘and it will pull them in’ (i.e., potential customers), though Gordon is probably right in seeing the use of lead from a fishing net as the substrate material (and the timing of the ritual near the Full Moon) as symbolic for the desired attraction of business to a workshop.

¹³ From an 18th-century manuscript now in Athens: see [Delatte 1927](#), 19.

apprehended defiling the name of Christ by writing it and treading upon the ink, as well as writing down *χαρακτῆρες* and invocations of demons.¹⁴ In another, a specialist from Thessalonica is said to have created an amulet for a monk to win ecclesiastical advancement, including writing the Lord's Prayer backwards and upside-down, the names of the targets of the monk's quest for favor, and *χαρακτῆρες*, which the monk duly wore stitched into his clothing after exposing it to the stars overnight, and which was discovered on his person in court.¹⁵

In the Western medieval tradition, Gordon finds that signs comparable to *charaktères* are rare until the introduction *via* Latin translation of Arab, Greek, and Jewish texts in the 12th century. Some earlier prescriptions for the use of *caracteres*, so called, in amulets are known, however; and, of course, we should bear in mind the significantly smaller overall quantity of early medieval manuscripts. For these *caracteres* and later forms influenced by the external traditions, Gordon relies on the study by Grévin and Véronèse [2004]. He finds a significant amount of innovation in both form and terminology (e.g., also 'figura, signum, sigillum', etc.) but, all in all, a relatively minor role for these signs in medieval European practice.

¹⁴ Miklosich and Müller 1860–1890, 1.180 (no. 79); Hunger *et alii* 1981–1995, 2.124 (no. 113):

ὡς καὶ γράφειν τὸ τοῦ Χριστοῦ τοῦ ἀληθινοῦ θεοῦ μέγιστον καὶ θεώτατον ὄνομα καὶ
 εβεννύειν καὶ πατεῖν τῷ μέλανι, ἅμα δὲ καὶ χαρακτῆρας καὶ ἐπικλήσεις δαιμόνων
 ἐκτίθεσθαι.

¹⁵ Miklosich and Müller 1860–1890, 1.343–344 (no. 153); Hunger *et alii* 1981–1995, 3.152 (no. 199):

ὁ Καππαδόκης...τὴν τε γὰρ κοινὴν τῶν Χριστιανῶν ἡμῶν προσευχὴν τὴν εἰς τὸν
 κύριον ἡμῶν καὶ κατὰ χάριν πατέρα ἀναπεμπομένην γράμμασιν ἀντικτρόφως καὶ ἐν-
 ἀλλὰξ ἔγραψεν ἐν χάρτῃ τινὶ παραγεγραφὸς τούτῳ καὶ τὰ ἄπερ ἐξελέξατο, καθάπερ
 ἐβουλήθη, ὀνόματα, ὥστε εἶναι αὐτοὺς εὐηγίους καὶ εὐενδότους καὶ καθυπαγομένους
 ἔνεκα τῶν ζητημάτων αὐτοῦ, πρὸς δὲ καὶ χαρακτῆρας τινὰς...πάννηχον κείμενον δι-
 εβίβασεν ἀντικρὺ τῶν ἄστρον...ὁ μοναχὸς τῷ ἱματίῳ προσράνας τοῖς στέρνοις εἶχεν
 ἐγκείμενον.

That the entire synod witnessed the *χαρακτῆρες* is stressed:

τῶν προσγεγραμμένων ἐν τῷ χάρτῃ κατὰ τὸν ἀναγεγραμμένον τρόπον χαρακτῆρων
 καὶ γραμμάτων ἀριδῆλως ἀναφανέντων εἰς μέσον συνοδικῶς.

In conclusion, Gordon remarks that in the long term, the ‘incomprehensibility’ [263] which had made *charaktères* so popular a ritual implement eventually proved a weakness: time and again, users attempted to recover some sort of signification by linking the signs to more intelligible figures, ‘a tacit admission that mere unintelligibility in the long run is no basis for a claim to power’ [299]. Worthy of special note, finally, is the ‘exhaustive database of Graeco-Egyptian *charaktères*’ which Gordon signals [270n53], under development by K. Dzwiza at the University of Heidelberg. Its eventual completion will no doubt greatly benefit the study of this long neglected textual practice.

E. Zwierlein-Diehl turns to the use of engraved precious stones for protection and healing, in particular, ‘the afterlife of magical gems’ in the medieval and early modern West [87–130]. She considers this afterlife in three parts: tradition, transformation, and innovation. Under tradition falls the continued use of gems as originally intended, that is, as amulets and occasionally as seals, as attested in the archeological record and indirectly through the copying and reading of lapidaries. Discussion of the seals goes into much more detail in tracing discussions of hematite and heliotrope from Pliny through various medieval and early modern compendia;¹⁶ further discussion of the amulets would have been welcome. Under ‘transformation’, Zwierlein-Diehl considers new interpretations given to the iconography of gems as described in lapidaries, with particularly detailed discussion of the treatise attributed to the Jewish author Techel. There, however, it seems more proper to speak of an introduction of a different tradition, namely, a Jewish one, brought to bear on familiar materials and needs. Under ‘innovation’, finally, comes new scholarly interpretation of magical gems in the Renaissance as products of an early Christian heresy. The scholarly interpretation substitutes for a ‘living tradition’ about the meaning of the stones, but also ‘[q]uite independent of this learned development, belief in the magical powers of these gems continued unabated’ [108]. Zwierlein-Diehl’s discussion of these developments is

¹⁶ A couple of minor points on Zwierlein-Diehl’s treatment of Latin texts: ‘spells’ [98] is not the best translation for the *carmina* by which the heliotrope is said to predict the future in the passage cited from Damigeron-Evax but rather ‘poetic utterances’ *vel sim.*: these are oracular responses given in meter, part of a venerable tradition extending back to Greek antiquity. On p. 107, in Techel no. 33, ‘*equus spumans*’ should be translated ‘a horse foaming at the mouth’ rather than ‘a leaping horse’.

particularly strong, tracing collaboration between scholars and engravers, and well illustrated with photographs. This Renaissance innovation encompasses not only interpretation but also production, a particularly interesting example of which is a Hellenistic cameo of Harpocrates inscribed in the Renaissance with another image of the divinity and an invocation, 'a highly learned' original composition.

Á. M. Nagy also deals with the medieval and early modern reception of engraved gems, concentrating on a single engraved motif, a human figure with the head of a rooster and snakes for legs (the 'cock-headed anguipede') often accompanied by a Greek version of the Hebrew tetragrammaton [131–155]. His discussion fills a gap in the study of such gems between their original production in classical and late antiquity and their rediscovery in the well-known publications by Macarius and Chifflet in the 17th century. As Nagy traces it, the motif was first adopted by a gradually Christianizing culture in late antiquity in combination with Christian iconography, at least some of them luxury products. Medieval re-use saw such gems built into the design of the decoration of reliquaries and incorporated into royal and other official seals, as shown by their surviving impressions on documents; both are evidence of 'une nouvelle interprétation du schéma' alongside 'gnostique' and 'magique' [140]. Several of the gems used as seals, Nagy suggests, were in fact produced in the medieval period. At the same time, there was a diffusion of information about the motif in Western medieval lapidaries, both Latin and vernacular, thanks to its inclusion in the influential *Liber sigillorum*. The prevailing textual description refers to a helmeted human figure trampling snakes, in contrast to a smaller group of late-Renaissance descriptions likely based on observation of ancient *exempla*. Nagy argues that the former group does not represent a misreading of the iconography but is instead an expression of the prevailing interpretation of its meaning, which is consistent with an amuletic function claimed for it by the lapidaries for protection against enemies. A later 'péjorative' reading emerged in the 16th and 17th centuries and cast the anguipede as one of the mythological Giants. Here, Nagy finds the genesis of the influential theory of Macarius that the anguipede-schema represents 'l'héritage matériel des hérétiques' [152].

A. Mastrocinque also selects a single gem type for his contribution [157–167], which he terms the fusiform or spindle hematite and finds noteworthy for its uncommon physical disposition. These gems are engraved with images but,

in the absence of any traces of piercing or mounting on surviving specimens, could not have served the usual function of amulets worn on the person. It could be objected, however, that such objects might have been worn in other ways: metal tubes and capsules as containers for amuletic objects, suspended in turn around the neck of the bearer, are well attested. In any case, Mastrocinque points out plausibly that the use of hematite (blood-stone) suggests that these gems targeted blood. More speculative, but still worth entertaining, is his suggestion that the spindle form was intended to facilitate insertion of other medicinal substances into the nostrils to stop nosebleeds. Mastrocinque concludes with a brief discussion and catalogue of 16 examples of objects with prismatic form, speculating about identification of workshops responsible for the production of subsets of this group and a possible function for the objects ‘as seals to transmit a divine force to medical substances’ [167].

V. Dasen continues the attention to stones used for healing and protection [195–220], tracing the ‘anthropomorphisme’ applied in antiquity to such objects in one specific sense, how writers about and users of precious stones attribute gender to them, and how this gender factors into their application. Dasen begins by tracing evidence for ancient belief in the animation of stones more generally in descriptions of transformations between stone and other organic substances, as well as of substances that occupy a liminal space between the two (such as coral), of stones resembling or extracted from animals, and of stones that resemble parts of the human body. She then provides an interesting review, though with a tendency to collapse evidence from ancient sources (e.g., Pliny the Elder) with those of a much later date (Marbode of Rennes, Mandeville), of the principles by which stones were categorized as masculine (ἄρρην) or feminine (θηλυς) in lapidaries or, in one case, as bisexual (διφρής): principles such as color, texture, and other physical features, the aetite, for example, perhaps a kind of geode, being associated with birth because its form suggests pregnancy.¹⁷ But, as Dasen points out

¹⁷ Dasen’s treatment of literary sources is not without occasional errors of detail: e.g., the reading of Pliny’s *Nat. hist.* 37.151 [211: wrongly cited as 37.150] to claim that the stone *baroptenus* produces monsters: ‘on n’en veut pas comme amulette, parce qu’il engendre des monstres [*proiciture portentosa*]’. The Latin should in fact read *proicitur ueluti portentosa*, wherein there is nothing to suggest any generative function of the stone; rather, it is rejected as an amulet (*adalligata*) because it is monstrous

by applying the corrective of archeological evidence for the use of precious stones as amulets, these sex-based distinctions did not restrict use to one human gender or another.

The essay by P. Gaillard-Seux [169–194] shifts to the use of substances derived from animals but applied to similar aims, namely, to medical remedies based on the swallow, particularly, to the powder or liquid produced from its young and stones extracted from its body especially for disorders of the eyes. Gaillard-Seux argues that such practices, which were transmitted to the medieval West by way of late ancient medical authors such as Marcellus of Bordeaux and derived in turn from earlier, Hellenistic *physica* such as that attributed to Democritus (Bolos of Mendes) and circulating under the names of various eastern sages such as Zoroaster, ultimately originated in the ancient Near East.

The author sees in lore about the swallow and the plant *chelidonia* (celandine)—which acquired an association with healing the eyes by association with the swallow, which was supposed to be able to heal its own eyes—the sort of analogical reasoning based on natural sympathy characteristic of magic. In the discussion of Pliny the Elder, there is a preference for a particular type of swallow that builds its nest underground, reached by a tunnel, to treat maladies of the throat because, Gaillard-Seux supposes, the nest resembles the human throat. Any accompanying ritual acts that might have made such sympathetic logic clear, however, will have been stripped out by the medical writers: the validity of this hypothesis seems stronger in some cases than others, however, as with Marcellus of Bordeaux, who shows little hesitation in describing magical ritual.¹⁸

(i.e., monstrously ugly). To the discussion of the recipe against bleeding in the Leiden codex, UB VLQ 9, add Barb 1952, an important study with emendation of the text.

¹⁸ E.g., the transfer of warts from the patient to another person by a ritual involving contact with pebbles or the healing of wounds by the analogous mutilation and healing of a plant [see Niedermann 1916, 34.102 and 33.26, respectively]. Note that Marcellus claims in the preface to his *De medicamentis* to have included in his collection anything whatsoever useful for the promotion of health and healing, no matter how lowly the source:

si quid umquam congruum sanitati curationique hominum uel ab aliis comperi uel ipse usu adprobaui uel legendo cognoui, id sparsum inconditumque

The connections that Gaillard-Seux draws with traditions in the Near East and Egypt are intriguing but more difficult to document, e.g., the association between celandine and swallows modeled on that between the dove and olive branch in the biblical deluge, the lunar associations of ‘columbids’ as relevant to the treatment of epilepsy, and a further link with Aphrodite (cf. Ishtar and Isis) that adds a religious dimension beyond the appeal to natural sympathy.

F. Marco Simón examines ‘nigromancy’, or necromancy, in the early modern period as attested by accusations of its performance in trials under the Inquisition in Aragón [67–85]. Marco Simón concentrates on one particular trial, that of Joan Vincente in 1511, and conducts an analysis of the ritual practices described in the official transcript with particular attention to intersections with known handbooks such as the *Clavicula Salomonis*, which Vincente stood accused of possessing.¹⁹ There is further consideration of other techniques ascribed to Vincente, including lecanomancy, and their background in the Greek magical papyri and elsewhere. Marco Simón finds a general resemblance to late ancient practice and traces traditions attributing magical knowledge to the biblical King Solomon as well as the treatises attributed to him that passed from Byzantium to the West, and Hebrew and Arabic texts translated into Latin.

Marco Simón shows that such practices were far from a peripheral phenomenon in late medieval society: earnest practitioners seeking direct access to divine power ensured variation, updating, and adaptation in the transmission of material over long periods of time. For secular and ecclesiastical courts, in turn, this constituted a serious concern. Among the practitioners, there was a particular role for minor clergy, such as Vincente himself.

collegi...nec solum ueteres medicinae artis auctores...lectione scrutatus sum sed etiam ab agrestibus et plebeis remedia fortuita atque simplicia...didici.

¹⁹ References here are sometimes incomplete, e.g., where in Caesarius of Heisterbach does ‘the notion of the circle as a protective device’ appear [74]? What is the shelf-mark for ‘the Raulinson manuscript of the Bodleian Library’ which also contains this device [74]? Is it perhaps the same one mentioned on p. 75, again without shelf-mark but with reference to [Kieckhefer 1998](#)? What Marco Simón means by a ‘classic Byzantine treatise on magic’ is unclear [75] in referring to [Greenfield 1988](#), 286–287 and, indeed, the notion of ‘classic’ and ‘treatise on magic’ cannot help but seem at odds.

The textual evidence of the flourishing survival of handbooks is undisputed but the veracity of the accusation against Joan Vincente and others is an issue not explicitly addressed by the author. One wonders whether the fact that Vincente obtained an annulment of his death sentence from the papal curia, as Marco Simón points out [72], might indicate problems in the evidence or the possibility of false confessions. Further, more attention could have been paid to distinguishing between the venerable and widespread stereotypes and rhetorical *topoi* of sorcery from the *realia* of late medieval practice. Just how much of the trial transcript of Vincente could have been supplied by the former?

F. Gury considers what may be ancient evidence for another branch of occult knowledge, alchemy, in a welcome investigation of a neglected aspect of the monarchic project of the Roman emperor Caligula [221–251]. In this closely argued and well documented account, Gury begins with Pliny's account of how Caligula managed to produce gold of high quality from orpiment but at prohibitive expense and extremely low efficiency [*Nat. hist.* 33.79], which on examination Gury finds plausible grounds for posing the question whether Caligula was 'le premier prince alchimiste d'Occident' [227]. There is also the purely chemical explanation belonging more to metallurgy than to alchemy that the procedure involved simply the refinement of large amounts of orpiment-ore containing also trace amounts of gold. The distinction, as drawn by Gury after comparing the method described by Pliny with later alchemical recipes, is the introduction into technical recipes of the mystical, drawn from eastern influences as well as of elements of Greek philosophy. Gury finds that Caligula's process was not purely empirical: the choice of orpiment was probably informed by knowledge of its religious significance in Egypt as well as its obvious resemblance to true gold, to which he may have hoped it could be transformed. Caligula was well-versed in chemicals (poisons) and the ability to produce gold would have suited his well-known eagerness to procure money by all available means. But it will also have satisfied a separate, 'véritable fascination pour l'or' which included bodily contact, which Gury in turn ties to the emperor's desire for deification, inspired by the solar symbolism of gold in ancient Egypt and its use along with orpiment in mummification. Indeed, this raises the intriguing possibility that gold-making was associated with his initiation into the rites of Isis-Hathor. Gury notes the 'Egyptophilia' of Caligula's family, in particular, of his father Germanicus, who sought an oracular response from the Apis bull,

an incarnation of Ptah, who was himself associated with metallurgy. Various members of Caligula's entourage were also versed in the occult. All in all, alchemical *savoir* would have been readily accessible to him, even if it cannot be conclusively proven that he made use of it.

W. Hübner [301–330] provides a useful but necessarily cursory survey of the ancient project of *melothesia*, part of a Platonic and Neoplatonic system of projecting 'les structures du macrocosme céleste au microcosme du corps humain' [301], here the mapping of the 12 zodiacal signs onto the various parts of the human body. In medieval and Renaissance medicine, *melothesia* was of particular importance for determining the correct location for bloodletting. Hübner concentrates on the iconographic evidence for this mapping, attested beginning in the medieval period, and his discussion is richly illustrated with reproductions from manuscripts. A primary problem in this visual mapping was how to superimpose a circular form, the zodiacal circle or ecliptic, upon a (normally linear) representation of the human figure. Some approaches contorted either the one or the other: the preference was to keep the human figure erect, as a mark of dignity. It also proved possible to combine a circular zodiac with a standing human figure marked at the appropriate points with duplicate signs, as in the *Très Riches Heures* of the Duke of Berry. Alternatively, rays were drawn to link the signs on a circular border with the parts of a standing figure in the middle. Over time, the presence of the celestial circle diminished in favor of a rectangular arrangement of the signs around the human figure, again linked by rays. Hübner notes survivals into the 20th century in the American *Farmer's Almanac*. Some consideration of the development, or lack thereof, of *melothesia* in Byzantine astrology, given the clear roots of the Western practice in ancient Greek texts, would only have further enriched this study.

With the contribution of H. Bernier-Farella [353–369], the focus of the volume shifts from the West to Byzantium (more so than that of Spieser, which introduces the Byzantine section but seems to engage more with the world of late antiquity), though the concern about tracing change and continuity with respect to classical antiquity remains. Bernier-Farella's topic is necromancy, a reflection on rituals of communication between the living and dead in antiquity and Byzantium; in particular, the terminology used to describe such practices and to what extent they represent 'survivance'.

Beginning with antiquity, she finds that necromancy is not originally assimilated to the semantic field of magic, as attested in Homer, Herodotus, Plutarch, and Pausanias, but rather constitutes a subspecialty within divination. A more pejorative characterization of necromancy is found in Artemidorus of Ephesus and the presence of institutional control seems to be a distinguishing factor between 'la nécromancie ordinaire' and 'la nécromancie magique', as well as the communication with the more dangerous 'restless dead' as studied by S. Iles Johnston [1999]. Nor was necromancy, in the broad definition of Bernier-Farella, immediately condemned in patristic Christian texts. Here she adduces an anecdote about Macarius of Egypt in which the anchorite finds a human skull in the desert and questions it as to its former owner (a pagan priest) and the conditions of his and other souls in hell. There is no question, of course, of this text applying the narrower label of necromancy, along the lines of Bernier-Farella's 'nécromancie magique', to that act of communication. An innovation in the patristic period is the attribution of all divination, including necromancy, to demons, whereas earlier Platonic theory cast *daimones* as only intermediaries for the gods; imperial law reserves condemnation only for the private practice of necromancy.

Bernier-Farella next searches for a coherent place for necromancy in later Byzantine practice, objecting to Maguire's term 'survival' as indicating obsolescence [Maguire 1995, 1], and considering also interaction with the dead in funerary ritual and incubation. Her attempt to demonstrate the currency of necromancy in this period, not implausible in itself, stumbles somewhat in interpretation of the late Byzantine evidence. By the surprising reference on page 363 to a 'lecture d'un épisode de craniomancie conservé par un papyrus de la fin de la période byzantine' [my underline] is apparently meant instructions for a ritual preserved in a *paper* manuscript codex. No such material is to be found in the reference given by Bernier-Farella at note 34 to 'Codex Parisinus 2425'. We must look instead to a 15th-century codex copied by Georgios Midiates, BnF cod. gr. 2419, ff. 140v–141r.²⁰ The subsequent interpretation that the user is supposed to place the skull 'sur les ossements

²⁰ The instructions there were first edited by Cumont in collation with another copy of the same text in a manuscript now at Milan (BNA cod. H 2 inf., f. 225r) [see Cumont in Boll *et alii* 1898–1953, 3.53] and later by Delatte [1927, 450], who added further material from the same codex.

d'un animal et sur la fourrure d'une belette' is not entirely accurate. The directions here in fact read:

ἔπαρον πλευρὸν φουρκικμένου καὶ ποιήσον ἓνα πόλον καὶ βάλε μέσον δέρμα γαλιῆς
μελαίνης καὶ βάλε τὴν κεφαλὴν ἐπάνω εἰς αὐτό,

that is,

Take a rib of a hanged man (φουρκικμένου: cf. Latin *furca*)²¹ and make a pole and put in the middle the skin of a black weasel and put the head on top of it.

Terming the ritual 'un schéma principalement hellène' without any consideration of the possibility of influence of the Arabic, Jewish, Turkish, or even Western traditions over centuries of Byzantine practice seems rash, especially in view of the text prescribed for inscription on the skull, « μπουακ καριακ λουτζηφερ », the last being a Greek transliteration of the Latin *Lucifer*. I see no justification for the claim 'c'est-à-dire Lucifer phénico-syrien'.

B. Pitarakis also selects a specific ritual practice, the amuletic use of the iconographic motif of the lion *passant*, in an account well illustrated with photographs and drawings [371–396]. This motif she locates most notably on a group of early Byzantine metal amulets from the Near East, then traces it both backwards to more ancient traditions of medical astrology and forwards in its absorption 'dans les pratiques de piété populaire' in later Byzantium. The early Byzantine evidence comes in the form of prescriptions for amuletic rings in the medical compendium of Alexander of Tralles as well as actual amulets from the archeological record. In the case of the red jasper gem now in Paris [373: [Delatte and Derchain 1964](#), no. 280], Pitarakis interprets the object as targeting colic but with an inscription addressed to bile (reading « κολέ » as « χολή », apparently a misprint for « χολή », ²² reasoning that bile was considered the principal cause of colic. It also seems possible, and simpler, to regard « κολε » as orthographically correct as engraved, referring to the colicky colon itself, which is addressed in the vocative (so, articulate « κόλε ») and ordered to retire (« ἀναχώρι » for « ἀναχώρει »), that is, to stop acting up.

Among the amulets, particular attention is paid to a group of:

- (a) oblong metal pendants depicting the lion along with a mounted figure (often called the holy rider) lancing a demon, a group of animals

²¹ See [DuCange 1688](#), s.v. φουρκίζειν.

²² See [Heim 1893](#), no. 60 for treatment of this incantation

attacking the ‘suffering’ evil eye and various inscriptions (e.g., the acclamations of « εἰς θεός » and invocations for help with « βοήθει »); and

- (b) circular metal medallions with similar iconography and inscriptions ordering a demon to flee the bearer, with Solomon (or an angel) in pursuit,²³ or the *incipit* of *Psalm* 90.

In the example of the latter type cited on 388n47 in the collection of Dumbarton Oaks, I suggest—based on the photograph published in the catalogue of [Ross 1962](#), no. 60—that at the end of the psalm text around the circumference we should be read « ἐπί » (for « ἐρεῖ »), not « εκ » as previous editors have taken it. Further, Pitarakis publishes for the first time photographs of both sides of the Solomonian medallion amulet in the Benaki Museum, inv. 11497 (she prints text for only side b), whereby we can now correct the reading given by the first edition on side a:²⁴ read the unassimilated « ἄγγελος » in place of « ἄγγελος ».

In general, Pitarakis finds, the lion could have alternatively beneficial and maleficent connotations, i.e., astral and Mithraic associations but also metaphorical representations of the disease to be combatted or the evil to be warded off, the latter borne out by references in the New Testament and the Testament of Solomon. Pitarakis suggests numerous other iconographic associations, including representations of stylite saints and other Christian symbols. The attention to the iconographic and textual whole of each amulet considered is commendable, though in the absence of explicit contemporary *testimonia* some of the reconstructed significations must remain conjectural.

C. Morrisson [409–429] also considers amuletic objects in Byzantium of an even more specific kind, coins transformed for wearing as amulets. These are attested from the sixth and seventh centuries onward, some also inscribed with prophylactic Christian invocations, variations on « κύριε βοήθει τῷ φοροῦντι » (‘Lord, help the bearer’). Drawing on previous work by Maguire [1997], Morrisson analyzes such objects as products of ‘une piété privée dans laquelle l’Église avait réussi à canaliser le besoin de protection des fidèles’ [413]. The present study goes into greater detail concerning the objects them-

²³ The same ‘flight-and-pursuit’ formula mentioned in the contribution of Spier, above.

²⁴ V. Phoskolou in [Papanikola-Bakirtzi 2002](#), *Supplementum Epigraphicum Graecum* 55.732.

selves, based on a well-illustrated sample (which the author hopes will be augmented in the future) drawn from the collections of Dumbarton Oaks and the Bibliothèque nationale de France; and advances our knowledge of both the techniques of transformation and the temporal distribution of the attestations of the practice. Simple perforation for suspension is the most common means of preparation. There is a great increase in attestations after the end of iconoclasm in 843. Morrisson also discusses a related use of 'pseudo-monnaies' featuring in particular the sanctified Constantine and Helena or other paired figures which could pass for them. Relevant to the theme of the first portion of the volume, the author also shows how the practice was taken up in the medieval West. It also continues after Byzantium, e.g., in the modern Greek *konstantinata*, with a particular preference for Venetian coinage, in which the presence of the *mandorla* may indicate a desire for amuletic protection against the evil eye.

Three contributions treat broader categories of Byzantine ritual practices which at least overlap with what might be considered magical. J.-C. Jouette [461–475] focuses on a period from the 11th to the 12th century in Constantinople itself, considering Byzantine folklore about supernatural properties of ancient statues in Constantinople, reprising to some degree previous studies on Constantinopolitan statuary [Dagron 1984, Mango 1963]. Jouette finds a general distrust of the statues manifested in historiographical sources and remarks on their divinatory and talismanic function, the latter concerning particularly talismans supposed to have been set up by Apollonius of Tyana. The latter in particular were tolerated because they belonged 'au domaine naturel et au monde physique' [474].

C. Cupane considers reflections of 'magie malveillante' in Byzantine literature [477–496]. She draws particularly on historical narrative and literary fiction, from the ninth through the 14th centuries and the ritual categories of aggressive magic and binding. The result is a useful survey of the various methods employed—inscribed tablets, nails, figurines—and the social position of their users. Cupane concludes that attestations for 'superstitious' practices span all levels of society, not merely the lower classes. The reader may be left with a question on Constantinopolitan statuary similar to one raised the chapter by Marco Simón, a question which Cupane addresses in only one case [490]: Just how much of the literary references to such well-attested classical practices as the use of inscribed tablets in bindings (*κατάδεσμοι* and *defixiones*) are

mere antiquarian commonplaces of a piece with the markedly classicizing prose of their authors, as opposed to reliable contemporary detail?

A. D. Vakaloudi provides a survey of erotic magic and magic ‘for acquisition of glory and power’ [497–516], certainly a desideratum in Byzantium, though the present contribution must be approached with caution. No definition is offered, temporally or geographically, for ‘the Byzantine era’ [497]; and though the author is not alone in this in the present volume, her lower temporal terminus appears to be the unusually early fourth century AD [cf., e.g., 504], which calls for discussion. It is also difficult to share Vakaloudi’s conclusion, proclaimed at the outset, that ‘the origin of the myth of Faust is originally found in Byzantine magic, as proven by the Byzantine sources’ [497]. Cited in support of this grand claim is the work of A. Kazhdan. But Kazhdan does no more than apply the noncommittal, convenient epithet ‘Faust-like’ to a group of Byzantine narratives referring to contracts with the devil [1995, 77]. The reader will not gain much that is new from Vakaloudi’s review of literary references to black magic; the treatment by Cupane elsewhere in this volume is to be preferred. Indeed, some questionable interpretations are offered here: e.g., a description of a contract between an Antiochene man and the devil in a narrative source as ‘full of every (kind) of lamentation and threat’ («παντὸς θρήνου καὶ ἀπειλῆς γέμουσαν») is connected ‘with the characteristics of γοητεία (harmful magic)’ [501], that is, as if it is itself a spell of some kind paralleled by the Greek magical papyri. The narrative appears rather to describe only the contents of the contract, i.e., the threats entailed in a breach by the Antiochene and the lamentable implications from the Christian perspective of the author of the narrative.

But the most serious problem with Vakaloudi’s study is that she uses Greek papyri from Egypt as a fundamental source—‘The Magical Papyri are the most basic sources in revealing the most hidden desires and actions of the Byzantine society. [514]’—without orienting the reader to that corpus of texts or considering theoretically how they differ from the literary sources used elsewhere in her account. On a more practical level, the method of citing the papyri changes confusingly between first editions and the standard collected corpus of Preisendanz [as revised in [Preisendanz and Henrichs 1974](#)]. Vakaloudi appears to view this entire genre indiscriminately as Byzantine, even those texts dated as early as the third century AD, e.g., [Preisendanz and Henrichs 1974](#), P LXI [506], which is even more problematic because

the text is in fact bilingual, a mixture of Greek and Egyptian, and probably contains further influence from Nubian.²⁵ Vakaloudi does not engage with the seminal work of C. A. Faraone on ancient Greek erotic magic and its reflections in these papyri from Egypt [1999] and even claims that erotic magic was created by the Byzantines under the influence of ideas about the inspiration of erotic passion in demons [503]. The payoff from the application of these sources also disappoints: a discussion in only the most general terms of similarities between instructions for ritual practices for erotic magic preserved on papyrus from Egypt, and hagiographical accounts (the use of demons, the infliction of ‘burning’ on the target, the use of analogy in ritual) without attention to the stark differences in context between Egypt²⁶ and Constantinople or the various other settings of the hagiographical narratives. The consideration of Byzantine literary references to such practices, which tend to be accepted at face value as authentic records, could have been usefully supplemented by discussion of handbook recipes with similar aims in later Byzantine manuscripts.²⁷

H. Maguire deals with representations and accusations of magical practices in the Byzantine literary and artistic record [397–408]. In particular, he surveys how accusations of sorcery set forth in these media, especially illuminated manuscripts, were deployed in the conflict over icons in the ninth century. Particular emphasis falls on the patriarch John the Grammarian, who is said, and pictured, to have practiced both divination and sorcery (γοητεία), the latter including the successful use of a kind of sympathetic magic (στοιχειώσις) involving the symbolic destruction of statues to combat enemy troops threatening Constantinople. The author also considers an elaborate contemporary portrait in a ninth-century illustrated copy of the *Homilies* of Gregory of Nazianzos of the erstwhile magician and future saint Cyprian attempting to perform erotic magic. Maguire neatly establishes that the illustrator has

²⁵ See [Dieleman 2005](#), 142–143. Similarly, the even earlier [Preisendanz and Henrichs 1974](#), P XII [513], on which see [Dieleman 2005](#), esp. 29–35.

²⁶ Note, for example, the invocation of the Egyptian god Osiris and the use of the scarab beetle, an ancient Egyptian symbol, in the example cited on p. 508.

²⁷ A considerable quantity of such material is available in [Delatte 1927](#). For post-Byzantine Greek, there is even more, e.g., the 19th-century handbook edited by Papatomopoulos [2006]. See also the useful, albeit dated, synthesis of [Koukoules 1948](#), 2:230–234.

drawn on sources outside the narrative of Gregory for the details of Cyprian's magical equipment, which included an astrological sphere and two effigy figurines, an elaboration in which later Byzantine illustrators of the same scene showed no interest, perhaps because they lacked the highly charged ninth-century context.

In the same vein as Maguire and Spieser, M. Mavroudi [431–460] takes up the process of differentiation between disparaged magical practice and praiseworthy devotion or rather, as she frames it, between licit and illicit conduct with respect to Christian divinities, in reference to a particular kind of divination based on physical responses of Byzantine icons as described in literary sources. The starting point for her discussion is a well-known passage in the *Chronographia* of the Byzantine statesman and philosopher Michael Psellus [Renauld 1926–1928, 6.66] describing the use of perfumes by the empress Zoe. These perfumes (ἀρώματα) were intended for the adoration of the empress' icon of Christ, called Antiphonetes (ἀντιφωνητής, The Answerer). (Zoe took the responses that the icon provided *via* changes in its color as a means to predict the future.) The ostentatiously erudite Psellus was familiar with Neoplatonic philosophy and Pseudo-Dionysius the Areopagite, as well as with Proclus and Iamblichus, all of which, Mavroudi suggests, was of heightened interest due to increased contact between Constantinople and heterodox Christians in Italy, in Mesopotamia, and in areas recently recovered from the Arabs. Divination and spiritual illumination, a central part of Neoplatonic texts, were also the terms in which Psellus understood and portrayed Zoe's devotion to her icon, which involved using the perfumes: she is 'united' with the divine light by her fervent piety (ταύτην τὸ περὶ τὸ θεῖον θερμότατον ἐβάβα τῷ πρώτῳ καὶ ἀκραιφνεστάτῳ φωτὶ ἀκριβῶς, ἴν' οὕτως εἶπω, συνεκέρασεν). But, as Mavroudi is careful to point out, this devotion stands in explicit contrast to pagan theurgy. Zoe's veneration of the icon includes the use of strings of 'the most beautiful of names' (« τὰ κάλλιστα τῶν ὀνομάτων »), which Mavroudi refers to Neoplatonic use of divine names in pursuit of illumination. Psellus clarifies that Zoe was not acting in a pagan or superstitious fashion (οὔτε ἑλληνικώτερον οὔτ' ἄλλως περιεργότερον) and that the use of perfumes would not have seemed any more problematic to contemporaries than the offering of incense. Mavroudi also considers Psellus' account of the 'animation' of an icon of Mary at Blachernai and shows how he adduces the Old Testa-

ment ephod as a Christian icon,²⁸ a component of the priestly vestments interpreted as early as Josephus as a form of oracle, functioning through the emission of light of various colors from its decorative gemstones, and further as a symbol of legitimate divination in the Old Testament in contrast to divination by lots or necromancy.

Throughout, Psellus asserts the superiority of a Christian understanding of images, incorporating terms from theurgy to actual pagan theurgy with its reliance on fallible human and demonic agency. Mavroudi convincingly demonstrates that, for Psellus and his intended audience at least, there was nothing magical or illicit about Zoe's practices with respect to her favorite icon, which could be comprehended entirely within a Christian belief system attentive to precedents drawn from the Old Testament.

As a coda to this exculpation of Zoe, as it were, Mavroudi reviews another document previously considered as relevant to Zoe's interest in perfumes [478: cf. Luck 2006, 473 with n48], a recipe for an unguent (ἄλειμμα) attributed to her (τῆς κυρα Ζωῆς τῆς βασιλίccic [sic]) in a later Byzantine manuscript.²⁹ Mavroudi demonstrates that this recipe has simply a cosmetic rather than an aromatic purpose and need not be attributed to the authorship of Zoe herself based merely on its title, which could be only a sort of 'advertising' by assimilation of an otherwise anonymous home remedy to a famous and preternaturally youthful figure.³⁰

²⁸ In Psellus' explanation for deferring discussion of the ephod, in an essay on the rhetoric of praise [Renauld 1926–1928, 6.76–82], cited on page 452,

καὶ δεῖ τὸν εἰς λεπτὸν κατιόντα τοῖς θεωρήμασι μακρὸν ἀνελίξει λόγον τὸ περιεπτωγμένον τοῦ νοῦ ἀναπλοῦντα καὶ ἀναπτύccοντα.

is perhaps better rendered:

Anyone who would treat these sights in detail would have to unwind [i.e., set forth] a long discourse in unraveling and unfolding what is enfolded in the mind. with «ἀναπλόω» and «ἀναπτύccω» both serving, along with «ἀνελίccω», a classicizing metaphor of exposition and explication based on the physical structure of the papyrus book-roll.

²⁹ Florence, BML cod. Plut. 7.19, ff. 226v–227r.

³⁰ I offer here some minor textual notes on the recipe for Zoe's unguent [456–457], which do not affect the main thrust of the argument:

(a) Mavroudi interprets «εἶθ'» as «εἶθ'» (while faithfully reproducing the accentuation supplied by the scribe). But the word is perhaps better understood in

On the whole, I find that this volume achieves high scholarly quality, offers great interest and value to students of the ancient, medieval, and early modern civilizations of the Mediterranean and Europe, and of the transmission of knowledge within and among them; and that it is entirely worthy of inclusion in library collections. A few general desiderata remain. For a book that is sure to become a standard reference, and in which textual sources are crucial, it is unfortunate that closer attention was not paid to orthographically correct presentation of primary source texts, particularly

both cases as « εἶθ' » ('next'), given the « καί » preceding the second instance: hence, it marks the subsequent step in the process,

then, having mixed the aforesaid [ingredients] in this way and pounded them likewise, add sweet oil; and then in this way use [it]

for

εἶθ' οὕτως τὰ προλεχθέντα ἐνώσας καὶ αὐτὰ ὁμοίως κοπανίνας βάλε μύρον· καὶ εἶθ' οὕτως χρῶ

(I atticize the orthography of the Greek text here).

On this reading, then, the sweet oil (μύρον) is not optional but on equal footing with the other ingredients.

- (b) Better sense could also be obtained from the recipe by expanding the abbreviations « τταφί^δ » and « ἰχά^δ » in the manuscript as « τταφίδων » and « ἰχάδων », respectively, instead of as « τταφίδες » and « ἰχάδες »; and construing them in each case with « λίπος » ('oil of grapes', 'oil of figs').
- (c) The 'two suggestions on how to avoid procrastination when a sick person is taking a bath' described in this same medical recipe collection [458] would seem to refer, if indeed the title (quoted in n104, πρὸς τὸ μὴ ὀλιγορεῖν [*sic pro ὀλιγορεῖν*] ἀσθενῆ εἰς τὸ λουτρόν) accurately describes the contents, to methods for keeping the patient from *fainting* in the bath: cf. *Lexikon zur byzantinischen Gräzität s.v. ὀλιγορία*. An examination of a digital facsimile available through the Bibliotheca Medicea Laurenziana seems to confirm this: the title is followed by instructions specifying that the patient should place a pickled olive under his tongue and then bathe [f. 226v ἐλαίαν κολυμβάδα βαλέτω ὑπὸ τὴν γλῶσσαν καὶ λουέσθω].
- (d) Further, while another recipe does indeed follow this one, it in fact has a title of its own (« [π]ρὸς τταφυλὴν κεχαλασμένην »), which refers to a disorder of the tonsils, and the body of which prescribes gargling with the juice of cabbage leaves (ἀνάτελλε κράμβης φύλλα μασιχάμενος καὶ τὸν χυλὸν κατέχων εἰς τὸ στόμα καὶ ἀναγαγαρίζων) and, therefore, has nothing to do with bathing.

in Greek,³¹ though this problem is hardly unique to the present publication. The volume is furnished with useful indices of personal names and places, ‘analytic’ terms, and manuscripts and papyri; additional indices of citations of primary source texts from the classical, medieval, and early modern periods, and, given their importance to several contributions, an index of references to objects (gems, amulets, tablets, other inscriptions) would also have been helpful. Finally, one might have hoped for further dialogue or at least cross-referencing between the contributions: e.g., Gordon’s discussion of *charaktêres* with Pitarakis’ examination of the lion motif which occurs with such signs in certain early Byzantine amulets [389–394]; the entirely independent discussions by Maguire and Jouette of John the Grammarian’s destruction of a statue in the hippodrome at Constantinople for the purpose of inflicting harm on an invading army; or studies of similar ritual practices, aggressive binding broadly considered, from western and Byzantine sources by Martin and Cupane respectively.

³¹ In the spirit of contribution to its already considerable value, I offer the following corrigenda: p. 56 ἀκούσα → ἀκούσας; p. 170 *madefactum* → *malefactum*; p. 173n12 καλάμω → καλάμω, μέλας → μέλας; p. 183 *oculi* → *oculis*; p. 185 ἀποστάζοι → ἀποστάζοι, ἀμβλωπίαν → ἀμβλωπίαν, Ἥ → Ἡ; p. 248 επιθυμία → ἐπιθυμία; p. 263 ἀφθέγκτοι → ἄφθεγκτοι, νοοῦμενων → νοουμένων; p. 268n48 χαρακτήρ → χαρακτήρ; p. 281 Ὑτέρα → Ὑτέρα, αρνίον → ἀρνίον; p. 284n83 σφράγις → σφραγίς; p. 285n85 χαρακτήρα, χαρακτήρες → χαρακτήραι, χαρακτήρες; p. 286 χαρακτήρα → χαρακτήραι; p. 289 σφράγιδες, βούλλαι → σφραγίδες, βούλλαι; pp. 299 and 300 καρακτήρ → χαρακτήρ; p. 354 νεκουμαντείας → νεκουμαντεία; p. 361 εἰδωλολατρεία → εἰδωλολατρεία [note also that the citation of the source text in the *Patrologia Graeca* is incorrect and should read 57:403 not 453]; p. 361 καὶ ἑλληνικά → καὶ ἑλληνικά; p. 372n2 εὐρικόμενον → εὐρικόμενον, ὅς → ὅς; p. 373 χολή → χολή; p. 377n17 εἶς → εἶς; p. 385 εἶς → εἶς; p. 388n46 κ(υρ)ίῳ → κ(υρ)ίῳ, εἶς θ(εὸ)ς ὁ νικῶν τὸν τὰ κακὰ → εἶς θ(εὸ)ς ὁ νικῶν τὰ κακὰ (νικῶν preferable, for νικῶν); p. 388n47 Εἶς → Εἶς; p. 413n13 βαστάσης → βαστάσης, ἀγίου → ἀγίου, θεομήτορος → θεομήτορος, χρυσῆν → χρυσῆν; p. 432 ρεῦμα → ῥεῦμα; p. 452 ποικίλην ἔχον → ποικίλην ἔχον, ποικίλλη → ποικίλη, ἐπεσημαίνεται → ἐπεσημαίνεται; p. 447 ἐμφάνειες → ἐμφάνειαι; p. 472 ἀνθρωπόμορφον → ἀνθρωπόμορφον, κητόπλαστα → κηρόπλαστα; p. 473 στηλωτικοὶ τῶν ἀποτελεσμάτων → στηλωτικοὶ τῶν ἀποτελεσμάτων, ἀποτελεσμάτιχοι τῶν στηλῶν → ἀποτελεσματικοὶ τῶν στηλῶν; p. 480 ὕφάμασιν → ὕφασμασιν; p. 484 ἑλληνικῆς → ἑλληνικῆς; p. 486 οἰκίας → οἰκίας; p. 487 χαρακτήρας → χαρακτήρας; p. 510 αὐτῆς → αὐτῆς, δυνηθῆ → δυνηθῆ, ἀν → ἀν, της → τῆς, περιχνομένου → περιχνομένου; p. 514 καταγεγοητεῦθαι → καταγεγοητεῦσθαι.

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On Simplicius' Life and Works: A Response to Hadot

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As its title 'Le néoplatonicien Simplicius à la lumière des recherches contemporaines. Un bilan critique' suggests, the book recently published by Ilsetraut Hadot is a critical overview of scholarly research on the Neoplatonist Simplicius.¹ It focuses on Simplicius' biography [13–134] and on a selection of his commentaries, namely, his commentaries on Epictetus' *Encheiridion* [148–181] and on Aristotle's *On the Soul* [182–228], *Categories* [228–266], and lost works [267–283]. It therefore puts aside Simplicius' commentaries on Aristotle's *Physics* and *On the Heavens*. No proper explanation is given for this omission but it is reasonable to assume that selection is related here to Ilsetraut Hadot's own research. Hadot is the first scholar after World War II to engage extensively with Simplicius, providing among several related contributions:

- (1) a study of his life and works [[Hadot 1987a](#)];
- (2) the first critical edition of Simplicius' commentary on Epictetus' *Encheiridion* [[Hadot 1996](#)];

(By taking into account, in the first study, not only Greek but also Arabic sources, Hadot made obsolete Karl Praechter's entry in the *Realenzyklopädie* [1927], while her contextualized study of the commentary on the *Encheiridion* (i.e., as an introductory part of the Neoplatonic curriculum) enabled her equally to discard Praechter's view [1910] that Simplicius, before going to the School of Athens, adhered to an allegedly simplified form of Neoplatonism that was taught at the School of Alexandria.)

- (3) a sustained defense of the attribution of the commentary on *On the Soul* to Simplicius [see, most substantially, [Hadot 2002](#)], restituted to Simplicius' fellow philosopher Priscian of Lydia by Ferdinand Bossier and Carlos Steel [1972: cf. [Steel 1997](#), 105–140 and [2013](#), 1–4]; and

¹ Ilsetraut Hadot. *Le néoplatonicien Simplicius à la lumière des recherches contemporaines. Un bilan critique*. Sankt Augustin: Academia Verlag, 2014. Pp. 311. ISBN 978-3-89665-639-1. Paper €34.50.

- (4) extensive studies of the prolegomena of Simplicius' commentary on the *Categories* [Hadot 1991, 2004], having also supervised a richly annotated translation of these prolegomena into French [Hadot et alii 1990].

Simplicius' biography, the identity of Athenian and Alexandrian Neoplatonism, the importance of the prolegomena for correctly assessing the commentaries and the authorship of the commentary on *On the Soul*, along with questions of dating Simplicius' commentary on the *Encheiridion*, constitute the bulk of Hadot's *bilan critique*. In her account of the controversial issues that are involved, Hadot reaffirms views that are well known from her previously published work, while she criticizes, at times harshly and in a repetitious style,² several scholars (from Karl Praechter to me) who have been led to different conclusions. Her reason for taking these conclusions as mistaken is that they derive, on the whole, from two starting-points which she takes to be false:

- (a) the interpretation of Simplicius' commentaries as self-standing works and not according to their place in the Neoplatonic curriculum.

(Obvious differences of style and doctrine in these commentaries, Hadot argues [136, 147, 200], should not mislead us as to their authorship or to the overall validity of their contents but should be explained as adaptations of Simplicius' style and doctrine to pedagogical demands.)

² To give an example, she criticizes me twice [24, 39] for entitling a section of my book [Golitsis 2008] 'Un maître sans école' in reference to Simplicius. See pp. 17, 21, 141, and 145 for other instances of harsh criticism. There is at times a notable lack of objectivity: Alan Cameron, in addition to his publishing an 'essai infructueux' [27] on the dating of Simplicius' commentary on the *Encheiridion*, is reprimanded for identifying 'd'une manière assez peu correcte [l'Académie de Platon] avec l'école néoplatonicienne d'Athènes' [166], despite the fact that Cameron's article dates prior to Gucker's study [1978], which shed light on the institutional history of the ancient Academy. Michel Tardieu and David Pingree, on the contrary, whose studies were published in 1986 and in 2002 respectively, are justified in their references to the Neoplatonic School as the Athenian Academy: 'C'est en suivant la coutume des néoplatoniciens que l'on peut parler d'Académie platonicienne dans le cas des écoles d'Athènes' [57]. There are, nonetheless, instances of generosity, e.g., 'l'on peut dans les grandes lignes souscrire à l'interprétation que Perkams donne de ce passage, y compris à sa critique de I. Hadot (concernant un détail de ce passage)' [204].

- (b) not reading several passages in Simplicius' commentaries in the light of the testimony of medieval sources as to Simplicius' life and works [24, 41], which, she maintains, can give us clues as to the historical circumstances in which these commentaries appeared.

My general view is that Hadot's use of the structure of the Neoplatonic curriculum and of the medieval testimonies is an unsafe guide for assessing Simplicius' life and works. The Neoplatonic curriculum is certainly of help but not as Hadot employs it. I believe that only if we take notice of Simplicius' liberation from the constraints of the curriculum can we properly account for the rich contents of his commentaries. As to the medieval testimonies, which are external to, and significantly later than, Simplicius, they should be carefully interpreted and verified against the contents of the commentaries. On several occasions, the reader gets the impression that Hadot's interpretation of Simplicius is meant to verify Michel Tardieu's hypothesis [1986, 1990], according to which a Platonic school in Mesopotamian Harran, (presumably) attested by the Arabian historian al-Mas'ūdi in the 10th century, was founded by Simplicius.

I hope to make clear in what follows that if Hadot had taken into account Simplicius' commentaries on the *Physics* and *On the Heavens*, which represent in terms of quantity more than half of his exegetical work, she would have been enabled to give a picture of Simplicius that would be less distanced from Simplicius' own texts and more critical of medieval testimonies (and modern hypotheses). To give an example at hand, Hadot affirms that 'the adjective 'divine' is never attributed to Aristotle' [143]. But, in fact it is, by Simplicius in the two commentaries that Hadot does not study [Heiberg 1894, 87.27; Diels 1882–1895, 611.8]. Qualifying Aristotle as divine is important. It underscores Simplicius' difference from his predecessors, which consists in his seeing Aristotle as a philosopher fully equal to Pythagoras and Plato.

Likewise, Hadot also claims that 'the harmony in the sense of identifying the philosophies of Aristotle and Plato never existed [in Neoplatonism]' [145]. Although it is not entirely clear to me what Hadot means by 'identifying', her view is that the study of Aristotle was preparatory to the study of Plato [142–143] and that Plato was considered to be superior to Aristotle [143–144]. This is true for other Neoplatonists but not for Simplicius, as the following passage allows us to infer:

I, putting forward the truth, which is dear to god and to Aristotle [*Eth. Nic.* 1096a16–17], will here add and try to do a careful investigation of the things which Alexander says are the opinions of Plato about the motion of the soul. I do this because of those who read Alexander's words in a more superficial way and are at risk to be misleadingly set against Plato's doctrines, which is the same as to say against Aristotle's doctrines and against the divine truth (πρὸς τὰ τοῦ Πλάτωνος δόγματα, ταῦτόν δὲ εἰπεῖν καὶ πρὸς τὰ τοῦ Ἀριστοτέλους καὶ πρὸς τὴν θεϊαν ἀλήθειαν). [Heiberg 1894, 377.29–34; trans. in Mueller 2004 (my underlining)]

In Simplicius' view, Platonic truth, Aristotelian truth, and divine truth (say, the truth contained in the *Chaldean Oracles*) are interchangeable; and they are interchangeable because, in spite of being formulated differently, they are identical.

Simplicius, a native of Cilicia, first studied philosophy with Ammonius, son of Hermias, in Alexandria and later joined Damascius, the head of the Platonic School at Athens. Hadot, who has devoted an influential book to establishing the philosophical identity of the two schools [1978], opens her *bilan critique* by justly underlining [16–17] 'the extreme religiosity and the practice of theurgy by some Alexandrian Neoplatonists contemporary and prior to Damascius', while she criticizes the author of this response for presenting the School of Athens as 'a bastion of pagan culture and religion' and for making Hierocles' establishment of the agreement of Plato with the *Chaldean Oracles* (as reported by Photius), 'an exceptional case in the history of philosophical exegesis in Alexandria' [see Golitsis 2008, 9n9].

To make sense of this criticism, one is forced to admit that Hadot confuses here two quite different things:

- (a) the practice of theurgy, from which are supposed to derive the *Chaldean Oracles* themselves;³ and
- (b) the exegesis of the *Chaldean Oracles*.⁴

³ Characteristically, Proclus writes in his *In rem publicam*: 'This is also shown by the *Oracles*, which clearly say to the theurge (δηλοῖ δὲ καὶ τὰ λόγια πρὸς τὸν θεουργὸν λέγοντα σαφῶς) that...' [Kroll 1899–1901, 1.39.17–18].

⁴ It is unfortunate that Hadot fails to make this distinction in her recently published book about Athenian and Alexandrian Neoplatonism, and vainly refutes the same misunderstood thesis [Hadot 2015, 1].

Whereas theurgy was practiced, one supposes, not only in Alexandria but also at every place where fervent paganism existed,⁵ the philosophical exegesis of the *Chaldean Oracles* was, in all probability, a distinctive feature of the School of Athens.⁶ Hierocles himself says that the agreement of Plato with the *Chaldean Oracles* (and with other theological traditions) was taught to him by Plutarch [see Photius, *Bib.* 173a37–39 (cod. 214)], the founder of the School of Athens. The *Suda* informs us that Plutarch's successor Syrianus composed a work in 10 books entitled *The Agreement of Orpheus, Pythagoras, and Plato with the Chaldean Oracles* (Συριανοῦ συμφωνία Ὀρφέως Πυθαγόρου Πλάτωνος πρὸς τὰ Λόγια βιβλία δέκα) and we know from Marinus, *Vita Procli* §27 that Syrianus' successor Proclus enriched with his own explications his master's commentary on the *Chaldean Oracles*. Proclus himself refers to it in his own commentary on Plato's *Republic* [Kroll 1899–1901, 1.40.21–22] and frequently quotes verses from the oracles in his *Platonic Theology* as well as in each of his Platonic commentaries. The last 'Platonic successor' of Athens, Damascius, envisaged composing a commentary on the *Chaldean Oracles*,⁷ while Damascius' disciple, Simplicius, is to my knowledge the only exegete who quotes them while commenting on Aristotle.⁸ In sum, not only

⁵ Note, however, the presence of *philoponoi* in Alexandria, i.e., 'an association of Alexandrian laymen, many of them professors and students...[whose] favorite task was monitoring the activities of the pagan professors for sacrifice and other cult practices' [Trombley 1993–1994, 2.1].

⁶ This, of course, does not mean that the exegesis of the *Chaldean Oracles* originated in Athens. It suffices to think of Porphyry's *De philosophia ex oraculis* (Περὶ τῆς ἐκ λογίων φιλοσοφίας) and of Iamblichus' *Chaldean Theology*, referred to in Damascius, *De principiis* [Westerink 1989, 2.1.8].

⁷ Westerink 1989, 2.1.13–16; Westerink 1997–2003, 1.9.6–7, 1.12.1–2, 3.5.5–6.

⁸ See Diels 1882–1895, 614.8–617.32, where Simplicius sets forth an explication of *Or. Chald.* [des Places 1996, fr. 51 v. 3] in order to rectify Proclus' interpretation. This is 'proper philosophical exegesis of the hidden meaning of the Oracle', in Philippe Hoffmann's words [2015, 105]. It is worth noting in this context that Syrianus quotes in his commentary on the *Metaphysics* one and a half verses of the *Iliad*, qualified as 'the divine poetry (ἡ θεία ποίησις)' [Kroll 1902, 183.3–4], in a way that implies the reader's acquaintance with the allegorical interpretation of Homer. Syrianus' commentary on Homer is reported by the *Suda*, which also informs us about Proclus' (presumably allegorical) commentaries on Homer and on Hesiod's *Works and Days*.

were the Athenian philosophers well versed in the exegesis of the *Chaldean Oracles*, they also refer to them in their commentaries.

There is, *pace* Hadot, nothing comparable to be found in the commentaries produced in Alexandria, not even in the Platonic commentaries of Olympiodorus. Hadot [17] refers to Hermias' commentary on the *Phaedrus*, in which two verses of the *Chaldean Oracles* are quoted [Couvreur 1901, 110.5 and 184.21] but she fails to notice that Hermias' Alexandrian commentary consists in the lectures of his Athenian master Syrianus. All we find in the Alexandrian commentaries are two Pythagorean oracles (the so-called *πυθόχρηστα λόγια*) quoted by Ammonius, which fit well into the context of a series of lectures on the *Metaphysics* [Hayduck 1888, 20.27–28, 38.19]. Hadot's contention that there were no differences between the Schools of Athens and Alexandria is an oversimplification which looks exclusively at the general metaphysics of the two schools, overemphasizes the role played by the Neoplatonic curriculum, and overlooks the differences of the two schools as to the selection of texts to be commented on—a selection that is quite significant for a philosophy that, above all, conceived of itself as an explication of texts. Damascius reports that Ammonius, a highly influential figure in the history of the Alexandrian School, mostly explicated Aristotle's texts; and reprimands him for having made concessions to the Christian bishop of Alexandria [Zintzen 1967, fr. 79.1–2, 192]. Although the two points are not necessarily related to each other, it is reasonable to assume that Ammonius made concessions as to the selection of texts and the deepening of their exegesis for the benefit of the Christian audience that is known to have attended his lectures. This is an important point. For, as we shall see, it seems that Alexandrian Pagans had to appeal in the 530s to Simplicius, who had left from Alexandria many years ago, to provide them with a philosophical defense of their ancestral beliefs.

Despite Hadot's aspiration to the contrary, the place in which Simplicius settled after his leaving Persia in AD 532 remains an open issue. According to the sixth-century historian Agathias, Simplicius fled Athens to the court of the Persian king together with six fellow philosophers because of oppression by Christian authorities and locals, which apparently began after Justinian's banning of the teaching activities of the School of Athens in 529. Following Tardieu, Hadot is as convinced as ever [see 1987a] that:

the city where Simplicius lived happily until the end of his life without having in the least to conceal his pagan beliefs (according to Agathias), where he was able to found a school that persisted after him and where also the Manichaeans had found refuge, should be located in a territory out of the control of Byzantine State and preferably under Persian surveillance. When we add indications 7, 8 and 9, we are naturally oriented towards eastern Syria, especially to Harran. [132]

Alas, nothing is less certain than this conclusion. To begin, Agathias does not mention any ‘city’ in his report. He says that the seven self-exiled philosophers, who preferred to enter the territory of the Byzantine Empire and die there instantly than to remain in Ctesiphon (such was their profound disappointment and disgust for manners at the Persian court), were nevertheless able, thanks to their sojourn in Persia, to end their lives ‘in the most pleasant way (ἡδέως)’, *scil.* from a spiritual point of view; for upon request of the Persian king a clause was inserted in the *pax perpetua* of 532, according to which

those men [i.e., the philosophers] should be allowed to return to their homes (εἰς τὰ κοίτηρα ἦθι)⁹ and to live out the rest of their lives fearlessly as they wish (ἐφ’ ἑαυτοῖς), [that is,] without being compelled to alter their ancestral religious beliefs or to accept any view which did not coincide with theirs. [Keydell 1967, 81.15–19; trans. Frendo 1975, 67 (modified)]

That Simplicius should set out for a Byzantine territory out of the control of the Byzantine Empire, as Hadot speculates, is both contradictory in itself—Hadot [25] transfers this contradiction to Agathias in order to explain why Agathias does not specify where Simplicius went—and openly contradicts Agathias’ testimony. For, in spite of Hadot’s astonishment (‘Quelle peut être la raison de ce silence?’), Agathias *does* tell us where the seven philosophers settled: in their homelands, which he has carefully specified at the beginning of his narrative:

Damascius of *Syria*, Simplicius of *Cilicia*, Eulalius of *Phrygia*, Priscian of *Lydia*, Hermes and Diogenes of *Phoenicia* and Isidore of *Gaza*, all of them,...the quintessential flower of the philosophers of our age.... [Keydell 1967, 80.7–9]

⁹ According to the pertinent translation suggested by Watts 2005, 306n76.

Simplicius, therefore, in all probability, returned to Cilicia, as Damascius is known to have returned to Syria.¹⁰ I suppose that Agathias found it superfluous to specify that the philosophers acquiesced to what was ordained for them in the treaty ratified by Justinian.

Let us assume, however, for the sake of argument, that Simplicius returned to Cilicia (a fact that Agathias was aware of) and that he later decided (or was forced, if you prefer) to leave his homeland and to establish a school at some other place (a fact that Agathias was not aware of). Hadot deduces from Simplicius' reference to a conversation that he once had with a Manichaean sage that Manichaeans too had settled in that place [1996, 35.90–91]. Following Tardieu's contention that 'the only place where a direct contact [between Simplicius and the Manichaeans] was possible...is Harran' [1986, 24n105], she then concludes that Simplicius settled in Harran. Concetta Luna [2001, 491], however, has pointed out that there are three short passages in Ammonius' lectures on the *Metaphysics* [cf. Hayduck 1888, 271.33–36, 285.17–19, 292.26–29] which show that Ammonius too was polemicizing against the Manichaeans. Hadot [37] reads Ammonius' passages cursorily and discards them as simply adding to Aristotle's doxography of people believing in the simultaneous truth of contradictories. Nonetheless, the vocabulary used by Ammonius (ὡς πρὸς αὐτοὺς ἐλέγομεν...; οὕτως ὑμεῖς φατε...) indicates real circumstances and suggest that the Manichaean propaganda was also active in Alexandria. Moreover, Hadot does not justify the transformation of the Manichaean sage, of whom Simplicius speaks (ὡς ἐμοί τι τῶν παρ' αὐτοῖς σοφῶν ἐξέφηνε), to 'a group of Manichaeans'. Still, she criticizes [38] Robin Lane Fox [2005, 232] for not adducing any proof for his claim that 'in c. 530–50, Manichaeans still travelled all over the place.' The *onus probandi*, I think, is on the one who claims that a Manichaean, or anyone for that matter, did not travel.

Granted Simplicius' traveling to Persia, his relation to Damascius, and the latter's presence in Syria, point no. 7 in the passage from Hadot quoted above,

¹⁰ I here modify my previous account [Golitsis 2008, 21], according to which the philosophers continued to form a group around Damascius in Syria. This account was based on a false understanding of « ἐφ' ἑαυτοῖς », as “amongst themselves”; they might philosophise, but not in public' [so Foulkes 1992, 143]. But in such a context « ἐφ' ἑαυτοῖς » clearly refers to human freedom and self-determination: cf. the philosophical meaning of « ἐφ' ἡμῶν », i.e., 'what depends on us'.

namely, Simplicius' traveling on the river Aboras in a *kelek* [Heiberg 1894, 525.10–13 ὡς ἐπειράθην καὶ ἐγὼ κατὰ τὸν Ἀβόραν ποταμόν] should not surprise us: Simplicius must have traveled to Syria. This, however, is not established by point no. 8, namely, Simplicius' reference to the Syrian Atargate and the Egyptian Isis as meaning 'places of gods' [Diels 1882–1895, 641.33–35 διὸ καὶ τὴν Συρίαν Ἀταργάτην τόπον θεῶν καλοῦσιν καὶ τὴν Ἴσιν οἱ Αἰγύπτιοι, ὡς πολλῶν θεῶν ιδιότητος περιεχούσας]. Hadot, following Tardieu [1990, 159–160], ascribes to Simplicius knowledge of the etymology of the word 'Atargate' thanks to the use of a Syrian version of a Hermetic book (Tardieu actually speaks of a 'local Greek version') in which Atargate was identified with Isis. Nevertheless, all there is in this passage is a reference to, if not a quotation from, the *Corpus Hermeticum*, which is preceded by a quotation of the *Orphica* [Diels 1882–1895, 641.30–32] and followed by a quotation of Plato's *Phaedrus* [Diels 1882–1895, 641.35–37]. Hadot oversimplifies this passage when she affirms [94] that it claims that the ancient philosophers used the generic notion of place (τόπος) where they should use the specific notion of container (περιοχή). The scope of Simplicius' remark is larger and more sophisticated, since he wants to show that all three senses of «τοπός» as 'the determination of the position' («ὁ ἀφορισμὸς τῆς θέσεως») of bodies—i.e., as

- the receptacle of a body,
- the limits of the container of a body, and
- the ordering of some thing's position with regard to others

—apply equally to incorporeal substances according to the Pagan theological traditions taken as a whole. He therefore quotes Orpheus for an example of the first sense, the Egyptians (that is, Hermes Trismegistus) for the second sense, and Plato for the third. There is nothing suggesting that Simplicius was acquainted with the Greco-Aramaic etymology of 'Atargate', as Tardieu and Hadot think, nor that such knowledge was essential to his argument. What he needed was the Egyptians' reference to (καλοῦσιν) Atargate and Isis as a 'place of gods'. There is no reason to believe that such a Hermetic book was available exclusively in Syria.

Point no. 9 refers to the dedication of the commentary on *On the Soul*, mentioned in Ibn al-Nadīm's *Fihrist* (10th century), to a certain Atā-Wālis according to the vocalization suggested by Philipp Vallat, who helpfully discusses the relevant passage [102–129]. Vallat shows that al-Nadīm had secondhand knowledge of this commentary and entertains the possibility that

it was not the Greek original but the Syrian translation of the commentary that was dedicated to this person. I think that the latter alternative is more plausible, given that the dedication is not attested in the Greek manuscript tradition. Vallat claims that al-Nadīm could have had this information only from a Harranian source, which I am not in a position to verify. But even so, the presence of a commentary in a given place does not imply that its author was also there.

It remains to deal with Hadot's final (and crucial to her conclusion) point: the existence of a School of Simplicius. Hadot's belief in it starts from Tardieu's controversial thesis [1986], based on an interpretation of a passage of al-Mas'ūdī, that a School of Platonist Sabians, different from charlatan Sabians, existed in Harran in the 10th century. The interpretation of al-Mas'ūdī's passage as distinguishing between two types of Sabians is disputed by Lameer [1997]. I am not competent to interpret al-Mas'ūdī's text but I think that one has to agree with Dimitri Gutas [1988, 44n34] that Tardieu's understanding of «al-Yūnāniyīn» ('Pagan Greeks') as members of the 'Platonic Academy' is forced.

Let us grant, however, for the sake of Hadot's argument, that a School of Platonist Sabians did exist in Harran. Her saying that Simplicius founded it is, however, an extravagant claim which rests on her misinterpretation of testimony by the mathematician Ibn al-Qiftī (1172–1248). Here is how Hadot reports and comments on al-Qiftī's testimony:

According to Gätje [Gätje 1982, 16], [Ibn al-Qiftī] adds that Simplicius had composed, among other widespread writings, 'a commentary on the introductory part of Euclid's book, which is an introduction to geometry' and had gathered around him pupils and successors who were named after their professor... The information about Simplicius' celebrity as a mathematician, his activity as a professor and his school, his successors who were named after him, is of great interest, since it shows not only that Simplicius himself was teaching but also that his school persisted after him. [39–40: my underlining]

We do not need to look far to see that the Arabic source, which is quoted *verbatim* selectively, is erroneously reported by Hadot. Vallat provides us later in the book with a translation of this passage from al-Qiftī:

Simplicius: mathematician and geometer, who lived after Euclid's time. In his time, he was celebrated. His science, as we have described it [i.e., mathematics] was then honored; he was given the first rank because of the usefulness that

was recognized for [mathematics] in the land of the Hellenes. His name there became famous and his position eminent among all, and he had friend colleagues (*ashāb*) and successors (*atbā'*), who made a name for themselves. He was Roman by birth. Among his well-known writings, there is the book *Commentary on Euclid's Book*, that is, the introduction to geometry, and other writings. [128: my underlining]

First of all, Simplicius' alleged successors were not named after him, as Hadot affirms. All al-Qiftī says is that the successors themselves became famous. Nor does the passage mention any foundation of a school. But leaving aside such obvious shortcomings, we should ask: Is al-Qiftī's testimony, if correctly interpreted, reliable? Let us look into the details of the passage, which unfortunately neither Hadot nor Vallat discusses.

Al-Qiftī says that Simplicius was 'Roman', a word that, as Hadot (relying on Vallat) explains while defending Tardieu's translation of «al-Yūnāniyīn» as 'Platonists', should mean 'Christian' [60]. Now, making Simplicius a Christian would cast serious doubt on al-Qiftī's reliability. But let us be charitable and take the phrase for what it apparently means: that Simplicius was Roman by birth. Simplicius was not, of course, Roman but he did have a Latin name. It only takes a step from knowing that 'Simplicius' is a Latin name to supposing the Roman origin of its bearer; or, alternatively, it is easy enough to take a Roman official named Simplicius ('Simplicius' was not a rare name: Hadot mentions [13] a *magister utriusque militiae per Orientem*, who was an acquaintance of Synesius) for the mathematician Simplicius and to infer the mathematician's Roman origin and high social position.

Moreover, al-Qiftī's reference to Simplicius' *ashāb*, where «ashāb» in all probability renders «ἐταῖροι» [43], seems to be deduced from al-Nayrīzī's (865–922) so-called commentary on Euclid's *Elements of Geometry*, which is an Arabic translation of a wide-ranging compilation of Greek scholia worked over by al-Nayrīzī [see Arnzen 2002, xxxvi]. In addition to the scholia attributed to Simplicius himself, this commentary contains nine references by Simplicius to his *sāhib* (pl. *ashāb*) Agānīs, i.e., his ἐταῖρος Ἀγαθινός according to Vallat (or Ἀγάπιος, according to Tannery [1915] and Lo Bello [2009]). Reporting the views of a ἐταῖρος within a commentary has an interesting parallel

in Hermias, who mentions twice the interventions of his ‘*hetairos* Proclus’ during Syrianus’ lectures on the *Phaedrus* [Couvreur 1901, 92.6, 154.28].¹¹

As for Simplicius’ unnamed *atbā*, i.e., his successors, it suffices for a compiler, as al-Qiftī avowedly was [109], or for his source to have misunderstood a text referring to Simplicius as διάδοχος, that is, as Πλατωνικός διάδοχος. Indeed, there is a passage in Simplicius’ commentary on *On the Heavens* that suggests it [Heiberg 1894, 640.24–25 Πρόκλος δὲ ὁ ἐκ Λυκίας ὀλίγον πρὸ ἐμοῦ γεγονὼς τοῦ Πλάτωνος διάδοχος] and it would not be implausible to think that Damascius designated Simplicius as his successor, even if there was no Platonic school to lead by that time.

Be that as it may, al-Qiftī’s entry in his compilatory *Ta’rih al-hukamā* is an amalgam of information coming from different sources. It should, therefore, be treated with caution. Hadot, following Vallat [105], takes ‘the land of Hellenes’ to stand for Harran. But this seems an exaggerated, if not to say biased, interpretation. Even if such an expression was used to denote the Pagans of Harran,¹² there is nothing to suggest that al-Qiftī did not use it literally.

That a source almost as late as al-Qiftī, if not interpreted carefully, can mislead us in our reconstruction of Simplicius’ life is shown by further medieval testimony that Hadot adduces [48–49, 131], namely, the Byzantine manuscript Laurentianus pluteus 85,1 (cited as Laurentianus 85 by Hadot). This Constantinopolitan manuscript from the last quarter of the 13th century [see Golitsis 2017] known as Oceanus due to its large dimensions, contains among other commentaries Simplicius’ commentary on the *Physics*. In the title that precedes the commentary proper, Simplicius is qualified as ‘great teacher’ (Cιμπλικίου μεγάλου διδασκάλου). Hadot takes this to indicate that Simplicius’ activity as a professor, presumably in Harran, had left some traces in Byzantium. Now, this title is copied, as is the whole text in the Oceanus, from the manuscript Marcianus gr. 227, written by George of Cyprus some

¹¹ It would be worthwhile to consider whether Simplicius’ commentary on Euclid, which is attested by the Arabic sources, was an early commentary based on the seminars of Ammonius, who is referred to by Damascius as the most excellent geometer of his time [Zintzen 1967, 79.3–6].

¹² Vallat [105–106] quotes as evidence two references in the *Sancta Acta Conciliorum* and Tābit b. Qurra (d. 901), as interpreted in a forthcoming study by Tardieu. This does not seem grounds enough for such a strong identification.

years before his ascension to the Patriarchal throne of Constantinople in 1283 [see [Golitsis and Hoffmann 2014](#), 127–128]. Not being able to find Simplicius' commentary in its entirety, George has copied after Simplicius' text a collection of scholia (also copied into the Oceanus) which are attributed to John Philoponus (Ἰωάννου τοῦ Φιλοπόνου εἰς τὸ ἐπίλοιπον τῆς Φυσικῆς ἀκροάσεως), although the manuscript from which the majority of them derive, namely, Parisinus gr. 1853, contains no attribution to Philoponus. At around the same time, a literary friend of George of Cyprus, the princess Theodora Raoulaina Palaiologina, made her own copy of Simplicius' commentary on the *Physics* (the actual Mosquensis GIM 3649). Its title presents Simplicius' commentary as being 'from the voice of Ammonius' (ἀπὸ φωνῆς Ἀμμωνίου), so that Simplicius is no more a teacher but a disciple. On what grounds should we prefer George's testimony to Theodora's? Hadot also refers to four Byzantine manuscripts of Simplicius' commentary on the *Categories*, whose titles also qualify Simplicius as μέγας διδάσκαλος. She fails to notice, however, that these titles do not only say this; they also claim that the commentary on the *Categories* is 'from the voice of the great teacher Simplicius' (ἀπὸ φωνῆς Σιμπλικίου μεγάλου διδασκάλου). In other words, these manuscripts are supposed to reproduce Simplicius' oral teaching. This, of course, is not true. Simplicius' commentaries exceed the limits of any commentary actually taught at schools and Simplicius himself constantly addresses in them not real pupils but readers (οἱ ἐντυγχάνοντες, οἱ ἐντευζόμενοι).¹³ This important feature of Simplicius' exegesis, already pointed out by Praechter, is not discussed by Hadot.

We have come, at last, to Simplicius' own texts. Hadot, following Tardieu's interpretation of a passage in the commentary on the *Physics* about the conventional use of the four calendars—Athenian, Asian, Roman, and Syrian-Arabic [see [Diels 1882–1895](#), 875.19–30], where the words «ἡμεῖς ποιούμεθα» are taken by Tardieu to designate Simplicius and his auditors in Harran—states that 'it is probable that this commentary was addressed to the members of the school and the inhabitants of the city where this [school] was situated' [97]. She later concludes that all of Simplicius' commentaries on Aristotle were probably written in Harran [135]. Simplicius, however, says

¹³ See [Heiberg 1894](#), 48.22, 75.13, 102.16, 298.21, 653.9; [Diels 1882–1895](#), 88.11, 111.17, 601.13, 762.29, 1040.16, 1182.38, 1333.34; [Kalbfleisch 1907](#), 3.14, 370.6. There is no reference to readers in the commentary on *On the Soul*.

straightforwardly a few things about the people to whom he addressed his commentaries; and we need not force, once more, the meaning of a passage in order to make some reasonable guesses.¹⁴

Despite her overall commitment to the logic of the curriculum as an interpretive tool of Neoplatonic commentaries, Hadot does not address in her book a crucial question: Why did Simplicius reverse the traditional order of commenting on Aristotle's treatises, as is established by cross-references, by commenting on the first Aristotelian treatise to be studied, i.e., the *Categories*, only after having commented on *On the Heavens* and *Physics*, which themselves ought to be studied the other way round? The only compelling explanation that I can see for this anomaly [see Golitsis 2008, 200–201] is that Simplicius judged it opportune to launch his exegetical work on Aristotle with a commentary on *On the Heavens* because this treatise was the most concerned with John Philoponus' *On the Eternity of the World against Aristotle*. Quite early in the commentary, Simplicius makes clear his resolution to refute Philoponus' arguments. He describes this as an unseemly task that 'the more purified (οἱ καθαριώτεροι)—that is, philosophers who possess the high purificatory (or cathartic) virtues (e.g., Damascius)—would be unwilling to assume:

Because of his desire [this man, i.e., Philoponus] proposes to contradict the arguments of Aristotle before us in books of enormous length, not only hoping to intimidate the fools (τοὺς ἀνοήτους [i.e., the Christians]) by quantity but also deterring, I think, the majority [of us], in particular, the more purified (τοὺς καθαριωτέρους), from reading this extraordinary nonsense. As a consequence, his writings have remained unexamined, and just from the fact of his having written so many pages against Aristotle they have earned the author a reputation for wisdom (δόξαν σοφίας). [Heiberg 1894, 25.28–34: trans. in Wildberg 1987 (modified).]

¹⁴ Luna 2001, 484–488 shows that Tardieu's interpretation of this passage is untenable. Hadot's attempt [99] to defend anew Tardieu's interpretation by pointing out the use of the indicative, instead of the optative used for other examples of conventional use quoted by Simplicius is infelicitous. As Hadot says, the indicative is used to refer to historical reality. But one does not need *to be physically present* at the place where all four calendars are used nor does this place have to be unique. It suffices *to know* that all four calendars are used. In other words, the problem with Tardieu's interpretation does not lie in the reference «ποιούμεθα» but in the referent of «ἡμεῖς». As Luna points out, «ἡμεῖς» is used for all the examples quoted by Simplicius from Diels 1882–1895, 874.27 onwards.

It is clear that Philoponus, who in 529 composed his *On the Eternity of the World against Proclus*, had made himself quite a name in Alexandria by publishing soon thereafter (around 532) his *Contra Aristotelem*. By then, Simplicius was living far away from Alexandria and Philoponus' polemical works must have been brought to his attention (or, alternatively, to Damascius' attention, who transmitted them to Simplicius) by people who were worried by their contents, i.e., Alexandrian Pagans. Simplicius, who, as he says [Heiberg 1894, 26.18–19], was not aware of having ever met Philoponus, apparently refers to those people when he says, 'Now, I do not know how but Plato's works seem to please him [i.e., Philoponus], although, as they say (ὥς φασι), he had no teachers to teach him those works' [Heiberg 1894, 84.11–12]. Simplicius undertook to rebuke Philoponus' polemical discourse thoroughly so as to defend Aristotle's authority:

I thought that it would be good too to help in this way those who have, as a result of this man's [*scil.* Philoponus] recklessness, been led into a disdain of Aristotle's writings, by showing them that his vainglorious ignorance (κενόδοξον ἀπειθευσίαν) is entirely despicable. [Heiberg 1894, 26.28–31; trans. in Wildberg 1987 (modified)]

and, thus, the rightness of the traditional pagan belief in an eternal creator who is the unchanging cause of the everlasting universe. 'It is necessary', Simplicius says, 'to refute his unsound argument for the benefit of those who understand him [i.e., Philoponus] superficially (τοῖς ἐπιπολαίως ἀκούουσιν αὐτοῦ βοηθοῦντα)' [Heiberg 1894, 184.30–31]. In other words, he means to refute Philoponus' arguments for the benefit of those who were at risk of being convinced by his arguments and, we may surmise, losing their faith in their ancestral beliefs.

Simplicius' refutation of Philoponus is orchestrated in two parts: in his commentary on the first book of *On the Heavens* and in his commentary on the last book of the *Physics*. Having completed the first part, Simplicius declares his readiness to refute Philoponus' arguments against *Physics* 8 'beginning from another starting point (ἀπ' ἄλλης ἀρχῆς)', i.e., through commenting on the *Physics* [Heiberg 1894, 201.3–10]. This concerted effort against his adversary's case for creationism explains, in my opinion, why the first Aristotelian treatise to be studied in the Neoplatonic curriculum, that is, the *Categories*, was commented last by Simplicius.

Simplicius makes in his commentaries a distinction between the educated (οἱ πεπαιδευμένοι) and the uneducated (ἀπαιδευτοί). Whereas he considers the first to be immune to Philoponus' unsound arguments,¹⁵ the latter risk being tempted by Philoponus' innovative philosophy, which casts into doubt the 'ancient glory (παλαιὰ εὐκλεία)'. It is for the sake of these people, i.e., uneducated or less educated Pagans and Christians alike—there existed, of course, students who wavered between Hellenism and Christianity—on condition that they are 'lovers of learning (φιλομαθεῖς)',¹⁶ that Simplicius sets forth his refutation of Philoponus:

And as for me, in setting myself to elucidate Aristotle's treatise *On the Heavens* to the best of my ability, I thought I should not pass over this man's [i.e., Philoponus'] objections, which will disturb no educated men but rather the uneducated, in particular those who always take pleasure in unusual things and are oppressed by the glory of the ancient [philosophers], and still more those who think they serve God if they believe that the heavens which, as they say, came into existence for the service of man, possess nothing exceptional in comparison with the things below the moon, and if they take the heavens to be perishable like them. For in the belief that [Philoponus'] objections support their opinion about God they hold them in great esteem, although they know nothing about these things and still less about the writings of Aristotle, against which they dare to raise the objections, but boast to each other and say to us [i.e., Hellenes] with youthful insolence that the doctrines of the philosophers have been overturned. Thus, for the sake of these people [i.e., the uneducated Christians] and of those [i.e., those Hellenes] who are easily misled [in their interpretation of the ancient philosophers], and so that Aristotle's treatise *On the Heavens* and the religious conception of the universe should keep their ancient glory unrefuted, I decided to set forth these objections and to refute them to the best of my ability. For it

¹⁵ Heiberg 1894, 180.23–27 [trans. in Mueller 2011 (modified)];

Let no one of the more purified (τῶν καθαρωτέρων) [scil. philosophers] blame me for pursuing inappropriate leisure if I choose to quote so much of this sort of thing from this person. Rather let him blame those who attach themselves uncritically to what this person says and those who will doubt at times that someone wrote such things and spoke so shamelessly [against Aristotle].

See also Heiberg 1894, 184.31–185.2.

¹⁶ These people must be distinguished from the fools (ἄνοητοι), i.e., the ignorant Christians, whom Simplicius considers to be incurable. The latter are bound to be impressed by the mass of Philoponus' work since they are wholly unable to go through its content.

appeared to be more suitable to combine the objections and their refutation with the comments on the treatise. [Heiberg 1894, 25.36–26.17: trans. in Wildberg 1987 (modified)]

Simplicius presents his refutation of Philoponus' arguments as being aside from his main task, that is, his commenting on *On the Heavens*, but it is clear that his lengthy rejection of Philoponus (both in his commentary on *On the Heavens* and in his commentary on the *Physics*) constitutes an essential part of his exegesis. His wish to treat Philoponus' objections within a commentary proper suggests a two-fold strategy:

- (a) rebuttal of the opponent's arguments by showing them to be based on an inadequate understanding of Aristotle's text, and
- (b) establishment of Aristotle's true doctrine by correct interpretation of his text.

Simplicius' commentaries on Aristotle aim at providing a model of how to perform philosophical exegesis correctly, so as to secure the irrefutable truth that is contained in Aristotle's texts. In his commentary on the *Physics*, Simplicius calls his readers to intellectual resistance:

What, then, would we say that so many great men were mistaken in their doctrines about place, putting forward our difficulties as an unfortunate feast for those [i.e., Christian Apologists] who are accustomed to abuse at pleasure the apparent contradictions of the ancients? [Diels 1882–1895, 640.12–14: trans. in Urmson 1992 (modified)]

In his commentary on the *Categories*, he invites his readers to follow his model and do away with claims about Aristotle's instantiating, through his criticisms of Plato, the internal contradiction of ancient philosophy:

The disciple must also be sufficiently good and virtuous, and above all he must carry out, both by himself and with other *philomatheis*, the in-depth examination of Aristotelian concepts, while he must guard against the disputatious twaddle into which many of those who frequent Aristotle fall. [Kalbfleisch 1907, 7.33–8.2]¹⁷

In sum, if we are to make full sense of Simplicius' Aristotelian commentaries, we have to discard Hadot's reconstruction of the historical circumstances in which they appeared. Simplicius' commentaries were addressed to people

¹⁷ For a passage stressing Aristotle's opposition to Plato, see Philoponus, *De aeternitate mundi contra Proclum* [Rabe 1899, 29.2–13].

who were affected, in one way or another, by Philoponus' polemical treatises and, more generally, by Christian writings against Hellenic philosophy, and who were therefore daring to abandon their ancestral beliefs. It is evident that no such readership existed in Harran, Hadot's and Vallat's 'terre des Hellènes'. In addition to their being 'spiritual exercises' for himself, Simplicius' commentaries were meant to be read and used as models of correct philosophical exegesis in Alexandria, where Christian apologetics were becoming all the more robust. This explains the transmission of Simplicius' commentaries together with texts of undisputed Alexandrian origin in the so-called philosophical collection, i.e., a collection of philosophical manuscripts copied in Constantinople in the late ninth century. In virtue of their not being linked to actual teaching, Simplicius' commentaries do not, and need not, obey the logic of a real curriculum. In order to illustrate the constraints imposed by the curriculum, Hadot quotes passages from Ammonius, Philoponus, and David [142–145] but not from Simplicius himself. She adduces as evidence for her claim [147, 158] a phrase from Simplicius' commentary on the *Categories*, 'the ears of the beginners do not support precision' [Kalbfleisch 1907, 67.10–12]. But this phrase is quoted out of context, since it is said in defense of Aristotle—i.e., against anyone who, ignorant of the introductory character of the *Categories*, would criticize Aristotle for his lack of precision—and in no way does it mean that Simplicius' own text is introductory.

Scholars who are familiar with the entire work of Simplicius have shown that, in each one of his Aristotelian commentaries, Simplicius provides us, albeit from different starting points, with an integral interpretation of Aristotle's philosophy, which does not respect the formal ordering of the latter before the study of Plato's works.¹⁸ Simplicius quotes Plato abundantly, and several 'micro-commentaries' on Platonic passages are scattered in his commentaries.¹⁹ His commentaries on the *Physics* and on *On the Heavens* are enriched with extensive digressions that clarify difficult philosophical notions in view of the agreement of Aristotle with Plato and, in general, of the harmony reigning over Hellenic philosophy, while his commentary on

¹⁸ See many of Philippe Hoffmann's publications and Baltussen 2008.

¹⁹ Heiberg 1894, 103.28–107.23, for instance, is a characteristic micro-commentary on select passages of the *Timaeus*. Gavray 2007 is devoted to the presence of the *Sophist* in Simplicius' commentaries.

the *Categories* incorporates Iamblichus' intellectual theory, which shows, in opposition to Plotinus' criticism, in what way the 10 Aristotelian categories apply to the intelligible realm—a lesson that arguably is not appropriate for people who are supposed to be exclusively instructed in logic. It suffices to compare this commentary with any Alexandrian commentary on the *Categories* to see the difference between a properly written composition and written versions of oral teachings within a real curriculum. Simplicius' commentaries contain, in a sense, the most that they could contain. Simplicius shows himself aware of his not respecting the logic of the curriculum, when he closes a six-page digression on the theology of Parmenides [Diels 1882–1895, 142.28–148.24] with the following words:

But enough with that, as we may seem to someone [τοῖς δόξωμεν, presumably one of the purified philosophers] to have 'crossed the borders (ὑπὲρ τὰ ἐκκαμμένα πηδᾶν)', as the saying goes, by introducing the most extreme of theological doctrines into a treatise about physics.

Simplicius' role as a master without a school, composing his commentaries liberated from the restrictions of a real curriculum, invalidates one of Hadot's main arguments in favor of the authenticity of the attribution of the commentary on *On the Soul* to Simplicius. Hadot does away with indisputable differences of style between this commentary and other Aristotelian commentaries attributed to Simplicius by pointing out the pedagogical demands to which Simplicius had to conform [200]. But, practically, there were no pedagogical demands. And even if there were, theoretically, we can explain only with great difficulty and much speculation why the commentary on *On the Soul* is so different from Simplicius' other commentaries on Aristotle. The commentaries on *On the Heavens*, on *Physics*, and on the *Categories* are interrelated not only in style but also in content²⁰ and, more significantly, in spirituality. The commentaries on *On the Heavens* and on the *Categories* close with a prayer in prose (as also does Simplicius' commentary on the *Encheiridion*), whereas the same religiosity is expressed in the commentary on the *Physics* when Simplicius discusses the utility of the study of physics

²⁰ Think, for instance, of Damascius' doctrine of the μέτρα συναγωγή which confer determination to sensible things. This doctrine is fully expanded in the so-called *Corollarium de loco* and *Corollarium de tempore* of the commentary on the *Physics*. But it is also referred to in the commentaries on *On the Heavens* [Heiberg 1894, 94.8–95.16] and on the *Categories* [Kalbfleisch 1907, 364.7–35].

[Diels 1882–1895, 5.10–20]. There is nothing of the sort in the commentary on *On the Soul*.

On the contrary, there are three passages in the commentary on *On the Soul* that refer to a commentary on the *Physics*:

- (1) Hayduck 1882, 35.10–15,
- (2) Hayduck 1882, 120.24–25, and
- (3) Hayduck 1882, 198.5,

which are problematically correlated by Hadot [219–220] to passages in Simplicius' commentary on the *Physics*. In the first of them, a distinction is made between the 'complete presence (*ἀθρόα παρουσία*)' of a given disposition in the soul of a living being (so that the soul herself remains unaltered) and the 'discursive change (*διεξοδική μεταβολή*)' of the living being itself which passes from the state before the disposition to the state after the disposition. The passages in Simplicius, *In phys.* [Diels 1882–1895, 1061.25–1063.16 and 1064.28–1067.2] to which Hadot refers rather vaguely, contain none of the terms involved in this distinction.²¹ The second passage requires one to correct 'book 4' to 'book 3' only to be, once again, vaguely identified in Simplicius' commentary: 'Les passages auxquels Simplicius fait allusion se trouvent dans son commentaire au livre III. p. 408,1 sqq.'. Only the third passage, which mentions the continuity of natural time (as distinguished from the discrete psychic time), can be said to refer to Simplicius' *In phys.* [see Diels 1882–1895, 788.14–16].²² Three lines, however, cannot do justice to the author's claim that he has spoken more about that in his commentary on the *Physics* (*ἐπὶ πλέον δὲ ἡμῖν περὶ τούτου ἐν τοῖς εἰς τὴν Φυσικὴν ἀκρόασιν εἶρηται*). There is, in my view, no sufficient reason not to identify this author as Simplicius' fellow-philosopher Priscian.

Let me close this very long response with two last remarks on Simplicius' commentary on the *Encheiridion*, which Hadot thinks it is impossible to date, and on Simplicius' commentary on the *Metaphysics*, of whose existence

²¹ Note that the term «διεξοδικός» is not encountered in any other commentary attributed to Simplicius.

²² Hadot is content to refer to the *Corollarium de tempore* in its entirety:

De tout cela il est effectivement longuement question dans le *Corollarium de tempore*, *In Phys.*, p. 773,8–800,26. [220]

Hadot is convinced. Hadot rightly rejects [167] Alan Cameron's understanding of « τοῖς παροῦσιν », mentioned by Simplicius in the epilogue of his commentary on the *Encheiridion*, as a code-word (« τὰ παρόντα ») referring to the oppressions of the Athenian philosophers by the Christian regime in 529–531 [Cameron 1969]. Indeed, the expression « εὐχῆ... τοῖς παροῦσιν οἰκεία » is meant to introduce Simplicius' final prayer, which culminates in 'the mist over the eyes of the soul' that the 'father and sovereign of human *logos*' is asked to take away, and must refer to Simplicius' finishing a text about the purification of the human soul. It probably means, therefore, as Hadot suggests, 'a prayer... conformable to the present discourse'.²³ Still, before introducing his prayer, Simplicius refers to his explication of the *Encheiridion*, which he

carried out at an appropriate opportunity during a situation of tyranny.

ἐν προσήκοντι καιρῷ μοι γινομένη τυραννικῆς περιστάσεως.

Granted that it is rather improbable that the words « καιρός » and « περίστασις » refer to long term situations and, in light of Agathias' testimony that Simplicius lived a pleasant life after his leaving Persia (indeed, there are no similar statements in his Aristotelian commentaries composed after 532), there are but two tyrants to which the epilogue of the commentary can refer: Justinian, at the time of the banning of the school's activities, and Chosroes with his court, where according to Agathias the bodily passions reigned, provoking the disgust of the self-exiled philosophers. The composition of the commentary on the *Encheiridion* should, therefore, be situated in 529–532.

Marwan Rashed has shown [2000] that some Byzantine scholia and marginal annotations contained in the manuscripts Parisinus gr. 1853 and Parisinus gr. 1901, if carefully interpreted, do not support Hadot's reading according to which Simplicius wrote a now-lost commentary on the *Metaphysics* [Hadot 1987b]. In what is perhaps one of the most awkward moments of the book, Hadot counters one of Rashed's main arguments in the following way:

²³ *scil.* « τοῖς παροῦσι [λόγοις] ». Philippe Hoffmann reads « τὰ παρόντα » (and not « οἱ παρόντες ») but not as a code-word. Two parallel passages in Proclus' commentary on the *First Alcibiades* and Simplicius' commentary on *On the Heavens* suggest that Simplicius' epilogue may refer to the present historical circumstances, i.e., to the Christian empire in general, in which irrationality dominates: see Hoffmann 2012, 170–173.

[Rashed] writes, ‘*These three annotations prove one thing: that Michel Ephesus thought that Simplicius wrote a commentary on the *Metaphysics*. But if we want this first conclusion to have a value, we should require, if not a proof, at least a simple indication that we have a reason to believe that Michael did not attribute the problematic commentary on the *De anima* to Simplicius*’. If we want to understand this last sentence, we should know that Rashed finds ‘very solid’ Steel’s arguments in favor of Priscian’s being the author of the commentary on the *De anima*, which is attributed to Simplicius by the manuscripts and in which Simplicius refers twice to his commentary on the *Metaphysics*. Therefore, as Rashed thinks highly probable that Priscian is the author of the *De anima* commentary attributed by the manuscripts to Simplicius, the commentary on the *Metaphysics* to which the scholia and Michael of Ephesus refer as being a commentary by Simplicius should therefore be by Priscian too. We have said above *in extenso* (pp. 187–218) what we think of the ‘solidity’ of Steel’s theses. Since this attempt to attribute Simplicius’ commentary on Aristotle’s *De anima* to Priscian has failed, Rashed’s argument loses at the same time his *raison d’être*. [276]

It seems that Hadot’s passion to defend Simplicius’ authorship of the commentary on *On the Soul* made Rashed’s point invisible: Michael, who was a philosopher well versed in the Aristotelian commentaries, could deduce the existence of a commentary by Simplicius on the *Metaphysics* from the references made to it in the commentary on *On the Soul* [Hayduck 1882, 28.17–22; 217.23], which is unanimously attributed in the Byzantine manuscript tradition to Simplicius.

Ilsetraut Hadot has devoted a great deal of her scholarly research to Simplicius and this book is a useful summary of her approach. She has helpfully collected most of the secondary literature on Simplicius [289–311] but, on the whole, her book is an unsafe guide to Simplicius as approached by other scholars and, regrettably, to Simplicius *tout court*. Despite this verdict, it is my firm belief that Hadot should be thanked for all the previous work that she has done, not at least because it is also thanks to her that younger scholars have been able to take different ways towards understanding better one of the last great philosophers of late antiquity.

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Medical Ethics: Premodern Negotiations between Medicine and Philosophy edited by Mariacarla Gadebusch Bondio

Stuttgart: Franz Steiner Verlag, 2014. Pp. 239. ISBN 978-3-515-09835-9.
Cloth €46.00

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In recent decades, historians have shown a growing interest in early medical ethics while biomedical ethicists see a widening gap between past reflections and present issues—a paradox that is but one manifestation of the pervasive shift from humanist comprehensiveness to scientific focus. It is still possible, however, to find elements of continuity, especially in areas where medicine ‘negotiates’ with philosophy. Some of these areas are elucidated in *Medical Ethics*, together with the exploration of more tangential aspects from humor to vegetarianism. The volume, which originated in a 2010 colloquium, is more collage than mosaic, as is not unusual for such collections. There is limited cohesiveness among the 15 chronologically arranged articles (eight in English, five in German, and two in French). In addition, the contributions vary greatly in content, angle, method, and quality—and they are too disparate to receive equal attention in a manageable review. The editor of the collection remedies the fragmentation, at least partially, by summarizing and framing the articles in a thoughtful introduction. She also highlights the theme of philosophy, which is less constant in the book than one might expect from the title.

The most striking feature of *Medical Ethics* lies in the bookends: two articles in which past and present are linked most expressly, and historical conceptions correlated most methodically with current biomedical ethics. It is worth noting that the catalyst for both essays lies in recent German history. In the first, Christian Schulze opens his discussion of ancient attitudes towards treating hopeless cases with a citation of Paragraph 323c of the German Penal Code (as ‘StGB’, the abbreviation for *Strafgesetzbuch* which will be unfamiliar to most readers). The paragraph on *Unterlassene Hilfeleistung* implies that ‘failure to provide assistance’ is a delinquency that triggers not only legal liability but also moral culpability. This notion did not

have an equivalent in Greek and Roman antiquity. Although the provision of help was a basic obligation in the Hippocratic foundations of medical practice, practitioners were repeatedly advised to take care of themselves by not treating hopeless cases. Schulze proposes that such advice, which he characterizes as most ‘irritating’ to today’s sensitivities [19], should be viewed with awareness of stereotypical reports; it should also be balanced with contradictory injunctions to take care of the incurable in the Hippocratic corpus as well as in the writings of Aristotle. In the volume’s closing article, Mariacarla Gadebusch Bondio introduces her observations on the historical *topos* of the physician’s veracity with the views of German philosopher Karl Jaspers (1883–1969). Jaspers was a leading interpreter of 20th-century moral thought who affirmed the culpability of the Third Reich (*The Question of German Guilt*); he seems too little known to Anglophone readers and there is still no English translation of his seminal work on truth (*Von der Wahrheit*). This treatise guides Gadebusch Bondio through a broad survey of theories to the conclusion that, across centuries and cultures, truthfulness in medicine is secondary to the pursuit of wellbeing, and that it depends on the patient’s receptiveness and disposition, on the art’s forever uncertain knowledge, and on the doctor’s ‘deep human understanding’ [239].

The nexus between knowledge and ethics forms the background for a lucid article (marred, unfortunately, by a poor translation from Italian) in which Chiara Crisciani sketches the ‘delicate but stable balance’ [40] between medicine and philosophy from the 12th to the 14th centuries. Crisciani earlier contributed pathbreaking insights on medieval ethics, for example, as documented in formalized medical consultations (*consilia*). Here, her focus is on epistemology; nevertheless, she still expands our appreciation of the emerging structure and relative autonomy of learned medicine.

Elements and boundaries of professional autonomy are delineated with direct and indirect reference to the moral ramifications, in several articles by eminent luminaries in the history of premodern medicine. Danielle Jacquart shows that medieval physicians rarely acknowledged bonds or tensions with Christian moral teaching; they concentrated, rather, on the paramount requirements of being skilled, prudent, caring, and trustworthy. The patient’s trust, as well as the practitioner’s reputation, would suffer most from the *ignominia* of error. One firm rule for avoiding this disgrace was to refrain from categorical pronouncements, particularly on prognosis. This rule raised

the dilemma between healthful deception and upright truthfulness, which was reiterated from the Hippocratic ἀπάτη to Jaspers on *Wahrheit*; for the medieval physician, the dilemma lay between boosting the patient's hope and preparing her/him for a good death.

Vivian Nutton presents medical ethics from an external viewpoint, that is, as seen by lawyers and magistrates instead of doctors. He examines responses to the plague that were recorded primarily in the 16th century. His essay, like so many of his other studies, stimulates multi-dimensional thinking about the implications for the interaction between medicine, law, community health, public opinion, and moral criteria. In the process, Nutton draws up a broad framework for the development of ethics; moreover, he opens panoramas that risk being ignored in today's tendency to concentrate narrowly on plague as a biological event.

The pivotal article in the collection, I think, is Michael McVaugh's keen analysis of a manuscript that was written in Montpellier in the 1380s. From the 20 or so texts assembled in the manuscript, he selects three, namely, the Hippocratic *On Law* (*De lege*), a brief and apparently unique 'manifesto' (*De commendatione medicine*), and a commentary on the first Hippocratic Aphorism (*Tabula super vita brevis*) attributed to Arnau de Villanova (d. 1311). McVaugh interprets the salient motif of *honestas* as honesty, perhaps too narrowly if we consider the frequent allusions to honor with implications of decorum [84n26]. Compare the account of *ostentatio* in the article by Matthias Roick, 'Der kluge Patient' [103] and note the general application of *honestas* not only to bedside manners but also to cosmetic medicine. Be that as it may, ingenious collation of the three texts and cogent logic lead McVaugh to the crucial conclusion that the late 14th century saw the emergence of 'a self-conscious code of behavior that is distinctive of learned medicine and potentially justifies its status and authority' [85]. This carefully worded conclusion points to a deontology that formulates the practitioner's 'professional' duties or obligations, as formulated in several writings *De officiis* and *De cautelis*. By avoiding the term 'medical ethics', McVaugh's conclusion dovetails with the argument of Joseph Ziegler that the label 'appears dangerously anachronistic' [117]. In his article on the treatise *De cautelis medicorum* by Gabriele Zerbi (1445–1505), Ziegler assesses the combination of Zerbi's dependence on medieval sources and his new perspectives,

which ranged from an emphasis on precise experience to a preference for a plurality of attending or counseling doctors.

Some well-known authors, in addition to Arnau de Villanova and Gabriele Zerbi, recur in several of the articles (these authors, and the number of less known ones, would have made an index useful). Their repeated citation underscores the potential for a more integrated collection. Still, *Medical Ethics* is more than the sum of its parts in illuminating the coexistence of continuity and change, both in the codes of conduct for physicians and in the study of those codes. It is instructive to compare the volume with a collection that was published barely two decades ago, *Doctors and Ethics: The Earlier Historical Setting of Professional Ethics*, edited by Andrew Wear, Johanna Geyer-Kordesh, and Roger French [1993]. A comparison confirms the permanence of basic questions about doing harm as inherently opposed to healing but it also reveals the rearrangement of priorities, the refinement of sensitivities, and the shifting sources of authority. On balance, studies of premodern medicine accentuate our appreciation of the leap from 'medical ethics' to 'biomedical ethics' and of the contributing factors in society, science, and technology.

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Dialogues among Books in Medieval Western Magic and Divination edited
by Stefano Rapisarda and Erik Niblaeus

Micrologus' Library 65. Florence: SISMEL—Edizioni del Galluzzo, 2014. ISBN
978-88-8450-581-1. Pp. x + 193. Paper €42.00

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Dialogues among Books in Medieval Western Magic and Divination is a volume of collected scholarship—a preface and seven chapters—that emerged from a conference on divination in Erlangen in 2012. It offers a competent and thought-provoking introduction to the ways that magical texts can be historically interpreted in relation to one another and to other kinds of literature. The quality of the individual chapters and the coherence of the whole are excellent.

The value of this volume lies in its thoughtfully designed scope, the complementary relationship of the selected essays to one another, and the caliber of each contribution in its own right. A word to each of these strengths. The contributions share a common interest in understanding how texts on magic relate to one another and how other texts—on magic and otherwise—become critical touchstones for the authors of magical works. As the contributors work to explain, the significance of these ‘touchstones’ might be addressed explicitly or simply alluded to by the medieval authors. They might also relate to the magical text in a variety of ways, e.g., by underpinning, contradicting, or rivaling the magical ideas and practices contained in the books that refer to them. Several of the chapters work in detail with particular manuscripts and so offer an apparatus in narrative form to the specific text under scrutiny. The approach of the contributors in this regard is well-founded and yet, to the extent that they are asking these questions of texts on magic and divination, somewhat new: the idea that such medieval writings are worthy of meticulous evaluation has inspired this kind of scholarship only in the last couple of decades and follows upon a long silence, or even hostility, toward a careful reading of this kind of medieval literature. *Dialogue among Books* ably and clearly demonstrates how worthwhile this new appreciation is.

The seven chapters themselves hold together well. Rapisarda's first chapter sets the stage by laying out ways that books on magic can be analyzed according to their engagement with a body of authoritative texts. Rapisarda develops his notion of 'canon' with reference to Harold Bloom, while trying to extract Bloom's ideas from the distinctive context of the American culture wars. Rapisarda's backdrop gives depth and coherence to the set of chapters that follows.

The first pair of chapters after Rapisarda's introduction examines later medieval official stances toward divination and evaluates the key canonical texts informing that stance. Erik Niblaeus considers the development of a patristic condemnation of astronomical divination that was derived from a particular reading of the 'canonical' Christian scriptures and would itself become canonical to later medieval thinkers. Jean-Patrice Boudet, who may be known to readers of this journal for his leading-edge study of divination in the later Middle Ages, *Entre science et nigromance* [2006], evaluates the significance of the *Centiloquium*, a work wrongly ascribed to the second-century astronomer Ptolemy, in the later medieval discussions over (and divided conclusions on) the doctrinal validity of astrology. Allegra Iafrate's chapter serves as a warning to those who imagine a univocal canon for authors of magical texts. Taking a particular manuscript of a collection of spells, she meticulously compares references in the text itself, on the one hand, and in the illustrations, on the other, and highlights the distinct and at times contradictory appeals to authority.

The next pair of chapters shows the different ways in which a given text of divination can be evaluated depending on the broader context of writings in which it is put. Thus, Katy Bernard offers a close reading of a particular book of spells and then a comparative reading of that text against other contemporary ones. Alberto Alonso Guardo examines a minor treatise of Thomas of Aquinas on the casting of lots, drafted in response to a question about the permissibility of using lots in selecting a new bishop.

The last chapter is by Julien Véronèse, who has published widely on the *Ars notoria*, a collection of exercises through which angels provide the practitioner with hidden knowledge and insight. He offers a synthesis of the scholarly literature on the *Ars* since Thorndike's notice of it in the *History of Magic and Experimental Science* [1923–1958], highlights its highly evolving

and unstable nature, and demonstrates its wide influence and popularity beyond the Middle Ages and into the 18th century and beyond.

In the final analysis, the book's overview is sober and clear. It is the last word on none of the historiographical or historical questions that it raises. Still, it provides an always factual and often insightful introduction to the history of divination, the nature of its textuality, and the problematic of its legitimacy in the history of its textuality. In this regard the volume does not reach beyond its carefully laid out grasp; and the reader, especially if new to the field, will be exposed to the most important issues, investigated skillfully. The editors, Stefano Rapisarda and Erik Niblaeus, are to be complimented for their care in compiling the volume; and the editors of the *Micrologus Library*, in which several volumes of collected scholarship on magic have appeared in recent years, are to be complimented for their inclusion of this one, to be counted among the best.

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Conformément aux observations d'Hipparque. Le papyrus Fouad inv. 267 A
by Jean-Luc Fournet and Anne Tihon with an Annex by Raymond Mercier

Publications de l'Institut Orientaliste de Louvain 67. Louvain-la-Neuve: Peeters,
2014. Pp. iv + 190. ISBN 978-90-429-3021-6. Paper €50.00

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This is not a normal book review in several ways. First, I am not attempting to review the entire book, of which part 1 consists of an edition, translation, and notes on Papyrus Fouad 267A by Jean-Luc Fournet and Anne Tihon, followed in part 2 by a lengthy commentary by Tihon on the astronomical aspects of the text. Rather, I am reviewing only the annex, which consists of tables and a summary analysis by Raymond Mercier. Second, since in the opening paragraph of his summary analysis Mercier points out that 'there is room for a concise analysis of the model, as seen from a more purely mathematical perspective', my review will of necessity have more mathematical and technical content than a normal book review. Third, my own analysis depends heavily on the analysis and reconstruction of the underlying tables in the papyrus by Alexander Jones that was circulated in 2009 and published in [2010a](#), and on a preliminary analysis of the solar model underlying the papyrus by John Britton that was circulated in 2009, both based on the report by Tihon on the investigation of the papyrus at a conference in 2007 that was published in [2010](#).

P. Fouad 267A appears to be a worked example of the calculation of the Sun's position for a date in AD 130. Two main parts of the papyrus are preserved. The first part, on the recto, gives the intermediate and final results of what is apparently a calculation from tables of the increment in mean solar longitude using three different year lengths, corresponding to tropical, sidereal, and mean (what we call Julian) years. The results are fragmented but nevertheless are complete enough to allow a full reconstruction of the mathematical basis underlying the tables [[Jones 2010a](#), 41n46]. The second part, on the verso, is even more fragmented and gives the final tropical and sidereal solar longitudes as well as a calculation from a table of ascensions

of the declination of the Sun and the length of seasonal hours on the date of the example. In particular, nothing survives regarding the computation of the equation of center connecting the mean and true longitudes. Hipparchus is prominently mentioned several times in the first part, once regarding a sidereal year length and once regarding observations related to a summer solstice in -157 .

Mercier's mathematical analysis is, as I will show below, quite unconventional. I will, therefore, first present a standard and fully conventional analysis, primarily to see if it works. The conventional eccentric solar model is shown in [Figure 1, p. 92 below](#). The Sun at S moves around the ecliptic, a circle of radius R and center C, at a constant speed as seen from C. The Earth is at O, a distance e from C, so the apparent speed of the Sun is slowest when the Sun is at the apogee A and fastest when at the perigee P. The mean anomaly α is $\angle ACS$ and the true anomaly κ is $\angle AOS$. The equation of center q is $\angle CSO$ and by convention $\alpha + q = \kappa$, so q is negative when $\alpha < 180^\circ$ and positive when $\alpha > 180^\circ$. The Earth-Sun distance $\rho = OS$ is determined by

$$\rho^2 = (R + e \cos \alpha)^2 + (e \sin \alpha)^2$$

and, by the law of sines applied to $\triangle CSO$, we have

$$\sin q = -(e/\rho) \sin \alpha = -(e/R) \sin \kappa.$$

The papyrus distinguishes three frames of reference for the solar motion. One is based on a year of very nearly $365\frac{1}{4}$ days and plays no role in the following. The frames that do play a role are the sidereal and tropical frames. In the sidereal frame, longitudes are measured from a point fixed relative to the background stars, while in the tropical frame the longitudes are measured from the vernal equinoctial point determined by the intersection of the ecliptic with the celestial equator. The sidereal speed ω_s of the Sun in the papyrus is determined from the period relation 37,473 $\frac{1}{3}$ revolutions in 37,500 Egyptian years of 365 days, and the tropical speed ω_t is determined from the relation 37,474 $\frac{2}{3}$ revolutions in 37,500 years. The difference in these speeds, $\omega_\pi = \omega_t - \omega_s$, is due to precession and is 8° in 625 years, or 1° in 78 $\frac{1}{8}$ years [[Jones 2010a](#), 29–30, 43n46].

In [Figure 1](#), the directions of the sidereal and tropical zero-points are shown. As a consequence of precession, the tropical zero-point will rotate relative to the sidereal zero-point in the clockwise direction with speed ω_π . Relative to these directions, the mean and true longitudes of the Sun are, for a longitude

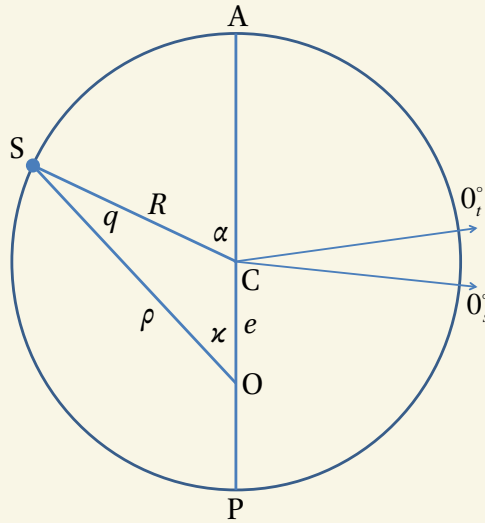


Figure 1. Conventional eccentric solar model

of apogee A , $L = \alpha + A$ and $\lambda = \kappa + A$, and so $q = \lambda - L$. Note that, for any moment in time, the numerical values of the mean and true longitudes of the Sun and the longitude of the apogee depend on the directions of these zero-points, but that the angles of mean anomaly α , true anomaly κ , and the equation of center q are independent of the frame of reference.

The papyrus computes an example for a date $T_3 = +130$ Nov 9 at 3 am or JD 1768852.625 (all dates are relative to Alexandria). The author, presumably using tables based on the period relations given above, computes the change in three mean longitudes by summing the changes in 37,788 Egyptian years of 365 days, three 30-day months, 19 days, and 21 hours. Thus, the ‘ancient’ epoch T_0 of the tables was 13,792,729.875 days earlier on $-37,632$ Jun 2 at 6 am or JD $-12,023,877.25$. It will be useful to consider also a ‘modern’ epoch T_1 37,500 Egyptian years after T_0 , which is -158 Oct 2 at 6 am or JD 1,663,622.75, and a date T_2 for a summer solstice associated with Hipparchus which is -157 Jun 26 at some ‘hour of day’, meaning during daylight, with the numeral of the hour unfortunately missing on the papyrus.

The two sums that we need have been reconstructed [Jones 2010a, 29–30, 43n46] and are the sidereal increment in mean longitude with a value of

154; 33, 53° and the corresponding tropical value 278; 15, 18°. The mean anomaly of the true Sun on the date T_3 is about 156; 15°, so we assume that 154; 33, 53° is also the value of the solar mean anomaly α . It then follows that the mean anomaly was zero at time T_0 and that the solar apogee is sidereally fixed [Britton 2009]. We further assume that the solar motion is eccentric and that e/R has the Hipparchan value $2; 30/60 = 1/24$. Then, the equation of center

$$q = \arcsin(-(e/\rho) \sin \alpha) = -1; 3; 55^\circ,$$

which is close to the equation of center of the real Sun (about $-0; 56, 43^\circ$) and, hence, $\kappa = \alpha + q = 153; 29, 58^\circ$. The papyrus gives the true sidereal longitude of the Sun as $\lambda_s = 228; 29, 44^\circ$; so the longitude of the apogee in the sidereal frame is

$$A_s = \lambda_s - \kappa = 74; 59, 46^\circ$$

and the mean sidereal longitude is

$$L_s = \lambda_s - q = 229; 33, 39^\circ.$$

The papyrus also gives the true tropical longitude of the Sun as $\lambda_t = 224; 20, 18^\circ$. Thus, we find

$$A_t = \lambda_t - \kappa = 70; 50, 20^\circ \text{ and}$$

$$L_t = \alpha + A_t = 225; 24, 13^\circ.$$

Note that by using the frame independence of α , κ and q we have been able to deduce the tropical values without ever using the tropical value $278 : 15, 18^\circ$ computed using the tables. The difference in longitude of the sidereal and tropical zero points is

$$\lambda_s - \lambda_t = L_s - L_t = A_s - A_t = 4; 9, 26^\circ.$$

The mean sidereal longitude at the ancient epoch T_0 is

$$L_s(0) = 229; 33, 39^\circ - 154; 33, 53^\circ = 74; 59, 46^\circ = A_s = A_s(0)$$

and so $\alpha = 0$ at T_0 , as assumed. Since the increment in tropical mean longitude from the ancient epoch T_0 to T_3 is $278; 15, 18^\circ$, and since the increase in precession is $123; 41, 25$, the tropical mean longitude at T_0 was

$$L_t(0) = L_t - 278; 15, 18^\circ = 307; 36, 56^\circ$$

and the tropical apogee at T_0 was

$$A_t(0) = A_t - 123; 41, 25^\circ = 307; 36, 56^\circ.$$

Once again, then, $\alpha = 0$, providing a consistency check on the entire reconstruction. The longitudinal difference of the sidereal and tropical zero points is

$$L_s(0) - L_t(0) = 127; 50, 51^\circ.$$

Similarly, at the modern epoch T_1 , we find

$$L_s(1) \& = 194; 59, 46^\circ,$$

$$L_t(1) \& = 187; 8, 55^\circ, \text{ and}$$

$$A_t(1) \& = 67; 8, 55^\circ.$$

So $\alpha = 120^\circ$ and $L_s(1) - L_t(1) = 7; 50, 51^\circ$.

At the modern epoch $T_1 = -158$ Oct 2 at 6 am the increment in mean longitude since T_0 and, hence, the value of the solar mean anomaly, is exactly 120° . The increment in precession is also 120° ; so the increment in tropical mean longitude is exactly 240° . The tropical longitude of the bright star Regulus, which was often used as a reference star in antiquity, was very near to 120° at this time. Perhaps these facts are more than coincidences and played a role in the foundation of the solar model; but if so, the details of the connection remain obscure, at least to me. It is also the case that exactly five days prior to T_1 , hence, on -158 Sep 27 at 6 am, Hipparchus reported an autumn equinox according to Ptolemy's account in the *Almagest* [Toomer 1984, 133]; and indeed the conventional model we are discussing as well as Mercier's model discussed below agrees very closely with the report of Hipparchus. Mercier suggests that the foundation of the solar model might have been somehow connected to that event but once again the connection remains obscure.

The papyrus gives the date but not the hour of the summer solstice in -157 ; so we have to pick the hour that results in $\lambda_t = 90^\circ$. That hour is about 9 pm; so $T_2 = 1, 663, 890.375$. This hour conflicts with the papyrus phrase 'hour of day' which seems to suggest that the solstice occurred before sunset.

Mercier's analysis begins with a discussion of the tabulated sums in the papyrus. He gives the period relation underlying the speed in precession, ω_π but for the sidereal and tropical speeds he gives only the numerical values $\omega_s = 0.9856$ and $\omega_t = 0.985635068493$, both in units of degrees per day. Both numbers are correct but it would surely have been more informative to give the underlying period relations, which are simple rational fractions. Next, Mercier assumes that the sidereal quantity $154; 33, 52^\circ$ is the mean

anomaly of the sidereal Sun and then, assuming an eccentric model, he finds a sequence of (E, A_s) pairs, with $E = R/e$, that are solutions to the equation

$$\alpha + A_s = \lambda_s + \sin^{-1}(\sin(\lambda_s - A_s)/E),$$

which is simply the equation $\alpha + q = \kappa$ given above. Mercier solves his version of the equation by iteration, even though it is simple to solve directly as shown above. For values of E between 22 and 26, and so for values of e between 2.31 and 2.73, the only resulting value of A_s that is near an integer, namely, $A_s = 74.997^\circ = 74; 59, 49^\circ$, is paired with the Hipparchan value $e/R = 1/24$. He then concludes that the sidereal apogee must be exactly 75° , so that the mean longitude is

$$L_s = \alpha + 75^\circ = 229; 33, 52^\circ.$$

Turning to the tropical quantity $278; 15, 18^\circ$, Mercier recognizes that this is far too large to be a mean anomaly if the true longitude is the papyrus value $\lambda_t = 224; 20, 18^\circ$; so he subtracts 120° from it and gets a value $158; 15, 18^\circ$, which he then treats as a mean anomaly α' in the tropical frame. He then proceeds to solve

$$\alpha' + A_t = \lambda_t + \sin^{-1}(\sin(\lambda_t - A_t)/E).$$

Once again he finds that for $22 < E < 26$, the only value of A_t close to an integer is

$$A_t = 67.003^\circ = 67; 0, 11^\circ.$$

Since this A_t is also paired with $E = 24$, he concludes that the tropical apogee must be exactly 67° , so that the mean tropical longitude is

$$L_t = \alpha' + 67^\circ = 225; 15, 18^\circ.$$

At this point Mercier has departed far from any conventional solar model. He has assumed that, at the same moment in time, $T_3 = +130$ Nov 9 at 3 am, the Sun has two mean anomalies, $154; 33, 52^\circ$ and $158; 15, 18^\circ$ and, hence, two values of the equation of center q , $-1; 4, 8^\circ$ and $-0; 55, 0^\circ$, and true anomaly κ , $153; 29, 44^\circ$ and $157; 20, 18^\circ$. He also assumes that both apogees, $A_s = 75^\circ$ and $A_t = 67^\circ$, are fixed in their respective frames for all time. Since those frames move with respect to each other with the speed ω_π , the Sun in this scheme will in general have two distinct apogees. For example, at the time T_3 of the example, the sidereal apogee A_s is 75° and the zero-points of the sidereal and tropical frames are, in Mercier's scheme, $L_s - L_t = 4; 18, 34^\circ$ apart; so the tropical apogee A_t is, relative to the sidereal zero-point, at

$$67^\circ + 4; 18, 34^\circ = 71; 18, 34^\circ.$$

But since the direction of the apogee is a unique direction in space that all observers would agree upon, namely, the direction in which the Sun has the slowest angular speed, this is a physically impossible situation.

In any event, Mercier's relations for the time dependence of the mean longitudes are

$$\begin{aligned} L_s(t)\& &= 229; 33, 52^\circ + \omega_s(t - T_3), \\ L_t(t)\& &= 225; 15, 18^\circ + \omega_t(t - T_3), \text{ and} \\ L_{\pi}(t)\& &= L_t(t) - L_s(t) \\ \& &= 4; 18, 34^\circ - \omega_{\pi}(t - T_3). \end{aligned}$$

However, when these equations are used to compute the true longitudes at T_3 , one finds

$$\begin{aligned} \lambda'_s &= 228; 29, 57^\circ \text{ and} \\ \lambda'_t &= 224; 20, 6^\circ, \end{aligned}$$

which do not match the papyrus values $228; 29, 44^\circ$ and $224; 20, 18^\circ$. Since the papyrus gives the mean and true longitudes to two fractional places of precision, this sort of discrepancy must be expected from the rounding of the apogees, which by Mercier's calculation differ from integers in the second fractional place by about $0; 0, 11^\circ$. However, at the time T_0 of the ancient epoch, Mercier's relations yield

$$\begin{aligned} L_s(0)\& &= 75^\circ, \\ L_t(0)\& &= 307^\circ, \text{ and} \\ L_{\pi}(0)\& &= 128^\circ; \end{aligned}$$

and at the time T_1 of the modern epoch,

$$\begin{aligned} L_s(1)\& &= 195^\circ \\ \& &= L_s(0) + 120^\circ, \\ L_t(1)\& &= 187^\circ \\ \& &= L_t(0) + 240^\circ, \text{ and} \\ L_{\pi}(1)\& &= 8^\circ \\ \& &= L_{\pi}(0) - 120^\circ \end{aligned}$$

All of these integer values at the two epochs are certainly more pleasing than the epoch values found above using the conventional solar model and

assuming that the papyrus values for the true longitudes have been correctly computed.

Thus, the question arises: Can something be changed in the conventional analysis so that we recover these same integer values? The answer to that question is 'Yes', if we assume some mistakes on the part of the person who computed, in the lost lines between the recto and verso, the true longitudes in the papyrus. First, the writer computed the sidereal longitude nearly correctly. At time T_3 , he would get the mean anomaly $\alpha = 154; 33, 53$ but the equation of center $q = -1; 4, 9^\circ$ instead of the correct $-1; 3, 55^\circ$ and, hence, the true longitude $\lambda_s = 228; 29, 44^\circ$ instead of the correct $228; 29, 58^\circ$. Such an error in the second fractional place of the equation q is hardly surprising and could arise from any number of ways during the relatively complicated computation of

$$q(\alpha) = \arcsin\left(\frac{-e \sin \alpha}{\sqrt{(R + e \cos \alpha)^2 + (e \sin \alpha)^2}}\right)$$

or it might be that the writer was correct but that his tables for the equation of center to two fractional places, unprecedented in antiquity as far as we know, were faulty in the seconds place.

At this point, the writer could get the true tropical longitude by simply subtracting from λ_s the effect of precession at time T_3 , which is given by $128^\circ - 123; 41, 25^\circ = 4; 18, 35^\circ$, so his computed true tropical longitude would be $\lambda_t = 224; 11, 11^\circ$ instead of the correct $224; 11, 23^\circ$. However, it seems our writer instead took the longer route of computing the tropical longitude from first principles. Knowing the increment in mean longitude at time T_3 from his tables as $278; 15, 18$, he should have computed the apogee at the same time from precession as $A_t(3) = 307^\circ + 123; 41, 25^\circ = 70; 41, 25^\circ$. But it seems that here he makes a major mistake, adding only 120° , the effect of precession from T_0 to T_1 , but omitting the precession effect $+3; 41, 25$ from T_1 to T_3 . Thus, he got $\alpha = 158; 15, 18^\circ$ instead of the correct $154; 33, 53^\circ$ and using this value for α he got $q = -0; 55, 0$ instead of the correct (for the wrong α) $-0; 55, 12$. So his final true tropical longitude is $\lambda_t = 224; 20, 18^\circ$ when it should be $224; 11, 23^\circ$.

Of course the writer—perhaps he was a student—should have realized that he was making errors when he got different values for α and then for q in the sidereal and tropical frames. Maybe that explains why he, or perhaps

more likely, his teacher tore the papyrus in half and threw it into the trash bin where it was found many centuries later.

In conclusion, Papyrus Fouad 267A introduces us to a new solar model from antiquity similar to, but differing in many details from, the solar model of Ptolemy's *Almagest*. Unfortunately, the summary mathematical analysis provided by Raymond Mercier in the annex is severely flawed. Mercier proposes a mathematical model that has several properties that are completely unphysical: mean anomaly α , true anomaly κ , and equation q have different values in different reference frames; the apsidal lines of the solar orbit point in different directions in different reference frames; and the proposed equations for the time dependence of the mean longitudes do not reproduce the actual values from which those equations were determined. Strangely enough, Mercier makes no attempt to explain these utterly unphysical features; indeed, he does not even acknowledge them. Perhaps, if the underlying mean and true longitudes found in the papyrus were really inconsistent, such departures from convention could be justified. But as shown above, all the data in the papyrus are easily explained assuming conventional ideas well known in antiquity. Therefore, while there are many reasons to commend the book by Fournet and Tihon, the contents of the annex are not among them.

After this review was submitted, two additional papers related to P.Fouad 267A appeared. First, [Jones 2016](#) contains both an English translation of the Greek text and a very extensive analysis of the astronomy found on both the recto and the verso of the document, and discusses how it fits into the context of what is known from many other solar models from antiquity. Second, [Tihon and Fournet 2016](#) translates and discusses the contents of a small fragment now understood to be the upper part of the verso of P.Fouad 267A. The paleography of the new fragment appears to date the fragment and, hence, P.Fouad 267A to the third century AD instead of the second century tentatively suggested by the date AD 130 of the mean motions.

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The Cosmic Viewpoint: A Study of Seneca's Natural Questions by Gareth D. Williams

Oxford: Oxford University Press, 2012. Pp. xiv + 393. ISBN 978-0-19-973158-9.
Paper \$45.00

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The *Naturales quaestiones* (*Natural Questions*) by Seneca is one of the most important sources on ancient meteorology that has come down to us and Gareth Williams' monograph is a major contribution to the study of this treatise.

It is divided into eight books. Book 1 deals with lights in the sky; book 2, with lightning and thunder; book 3, with terrestrial water; books 4a and 4b—of which important sections are now lost—with the Nile and with clouds, rain, hail, and snow, respectively; book 5, with winds; book 6, with earthquakes; and book 7, with comets. The original order of the books is a matter of dispute. The order 1, 2, 3, 4a, 4b, 5, 6 and 7 is only one of three possibilities found in the manuscript tradition, the other two being 1, 2, 3, 4b, 5, 6, 7, 4a and 4b, 5, 6, 7, 1, 2, 3, 4a. As Williams explains, the latter, also known as the *Grandinem* order, is

demonstrably the order of the archetype from which the extant manuscripts descend, and this order is still upheld by some scholars. [13]

However, a fourth possible ordering—proposed by Carmen Codoñer and Harry Hine independently—is 3, 4a, 4b, 5, 6, 7, 1, 2. This is the order adopted by Williams in his study:

the position taken here is that the case for [this order]...is overwhelming: the preface to book 3 reads naturally as an introduction to the whole work, the displacement of books 3 and 4a in the archetype is readily explained, and the internal evidence derived from cross-comparison of the books further consolidates the overall case. [13]

The argument of *The Cosmic Viewpoint* follows closely the structure of the *Nat. quaest.* according to this ordering. Williams' analysis of books 3 and 1,

the first and the penultimate in the Codoñer-Hine sequence, is spread over several chapters. But he devotes individual chapters to each of the remaining books. After two initial chapters that tackle general questions of interpretation, chapter 3 concerns book 4a; chapter 4, book 4b; chapter 5, book 5; chapter 6, book 6; chapter 7, book 7; and chapter 8, book 2.

The place of *The Cosmic Viewpoint* in the existing scholarly literature on the *Nat. quaest.* is well explained in the introduction. First, following a line of interpretation suggested by Margaret Graver [2000] in a discussion of Brad Inwood's influential paper 'God and Human Knowledge in Seneca's *Natural Questions*' [pub. 2001], Williams argues that the *Nat. quaest.* is a work driven not primarily by concerns about epistemology and theology but by a genuine desire to study the cosmos from the perspective of meteorology as a distinct branch of knowledge in accordance with Aristotle's project in the *Meteorologica* and the subsequent meteorological tradition.

Second, complementing Graver's further suggestion that the *Nat. quaest.* has a strong Epicurean flavor and clear associations with book 6 of the *De rerum natura* by Lucretius, Williams claims that this treatise is in fact 'a Stoic response to the Lucretian undertaking' [9] in which the Stoic worldview of Seneca—who sees the cosmos as a bodily continuum run by divine providence—opposes the atomistic and non-providential cosmology of Lucretius. Despite this opposition, however, Seneca borrows from Lucretius literary and scientific techniques in his study of meteorological phenomena, as is shown by Williams in chapter 6.5 [230–250]. Interesting parallels are also drawn between the *Nat. quaest.* and Pliny's own *Nat. hist.* in chapter 1.5 [48–53].

Third, Williams stresses that, even though the *Nat. quaest.* is intended by Seneca as a contribution to a distinct scientific discipline, the large number of moralizing passages throughout the eight books are 'fully integrated with their surrounding material' [11]. Chapter 2—'Seneca's moralizing interludes'—discusses this issue at length and explains in detail how this integration works: these passages are meant to refer to examples of vices displayed by moral deviants, the study of which can help us to transcend them. This thesis is carefully contrasted with that of other scholars who have dealt with this major issue in the interpretation of the *Nat. quaest.* [see esp. 54–55].

For many years, scholarly interest in Roman Stoicism was chiefly instrumental. Seneca, but also Epictetus and Marcus Aurelius, were read as sources for

early Stoicism and only in so far as they could shed light on early Stoic ideas. It was deemed that the differences between them and their predecessors did not reflect genuinely Stoic developments but were rather the expression of external influences alien to the true spirit of Stoicism. This conception of Roman Stoicism has been changing in the last three decades, however, and is gradually being replaced by the notion that these three authors, at least, are original philosophers who transformed Stoic thinking in several areas of great importance. Indeed, the subject of the place of Seneca in Stoicism is evident in *The Cosmic Viewpoint*. For instance, chapter 5.2 [174–182] is devoted to ‘Pre-Stoic and Stoic Theories of Wind’, while chapter 8.3A [319–323] deals with ‘Reconciling Prayer and Expiation with a Deterministic View of Fate’ and includes references to the early Stoic discussion of fate and free will. (Williams, however, does not take into account the recent and important work by Inwood on this specific issue, especially, Inwood’s ‘Seneca on Freedom and Autonomy’ and ‘The Will in Seneca’, both reprinted in [Inwood 2005](#).)

There are at least three central themes that Williams does not discuss in connection with Seneca’s role within Stoicism:

- (1) The idea that the study of nature is essentially related to ethics goes back not just to Epicurus, as Williams notes in connection with *Pyth.* 85 [7], but also to the earliest Stoics. And in Roman Stoicism it is present not just in Seneca but also in Marcus Aurelius in key texts such as *Med.* 2.9. It would be interesting to know how Williams construes Seneca’s position in this large debate within Stoic philosophy. This debate and its repercussion in Roman Stoicism have been intensively discussed by several modern scholars whose works are not even cited in the bibliography.¹
- (2) One central concept in early Stoic meteorology is that of exhalation (*ἀναθυμίασις*), which plays a key role in the process leading up to the world-conflagration (*ἐκπύρωσις*). These two concepts are referred to by Williams [34n44, 125n112, 127, 176–177] but nothing is said about how they are linked to each other and, in general, about how Seneca’s analysis of the phenomenon of exhalation differs from or

¹ See, e.g., [Menn 1995](#), 1–34; [Cooper 1999](#), 427–48; [Betegh 2003](#), 273–302; [Annas 2007](#), 58–87.

agrees with the early Stoic analysis. Chapter 1.2 [21–28] contains an interesting comparison between Seneca and Cicero regarding their approach to meteorology. But even though both Cicero and Seneca give a prominent role to exhalation in their account [cf. *De nat. deor.* 2.26–27, 2.42–43, 2.118; *Nat. quaest.* 3.9], this aspect of their theories is not highlighted.

- (3) Crucial to early Stoic meteorology is a theory of the reciprocal change of the four physical elements according to which they change into each other by expansion and contraction.² Williams gives a prominent role to elemental theory in Seneca's meteorology. For instance, an important passage expressing Seneca's own views on elemental change—*Nat. quaest.* 3.10.3–5—is cited and discussed in chapter 1 [19–21] and referred to further along in the book [231]. But we are left wondering how this theory is related to the early Stoic theory.

With the exceptions that I mentioned earlier, the general lack of detailed discussion of Seneca's Stoicism may disappoint readers with an interest in ancient Stoic philosophy and in the history of philosophy who are looking for a substantive account of the place of Seneca within the school.

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Histoire de l'analyse diophantienne classique. D'Abū Kāmil à Fermat by
Roshdi Rashed

Scientia Graeco-Arabica 12. Berlin: Walter de Gruyter, 2013. x + 349 pp. Pp.
xi + 349. ISBN 978–3–11–033788–4. Cloth €109.95, \$154.00

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This book presents a history of Diophantine analysis beginning with the late ninth century algebraist Abū Kāmil and continuing with al-Karājī, al-Samaw'al, al-Khāzin, al-Sijzī, Abū al-Jūd, Fibonacci, Ibn al-Haytham, al-Yazdī, and al-Khawwām. In the second half of the book, Rashed shifts to the European Renaissance and Early modern authors: Bombelli, Gosselin, Stevin, Viète, Bachet, and finally Fermat.

Diophantine analysis, according to Rashed, does not originate with Diophantus. This is a consequence of Rashed's claim that algebra was invented by al-Khwārizmī as a science of equations in the early ninth century. Since algebra is necessary for Diophantine analysis, Diophantus could not have practiced either one. Thus, the first algebraist after al-Khwārizmī to exhibit a collection of indeterminate problems gets the credit as the inventor of indeterminate analysis. That person is the Egyptian mathematician Abū Kāmil, who worked later in the ninth century.

There are many problems with this account, beginning with the fact that medieval Arabic and early modern European mathematicians unanimously recognized Diophantus as an algebraist. In my review of his *Abū Kāmil. Algèbre et analyse diophantienne* [Oaks 2014], I outlined how Rashed denies indeterminate analysis to Diophantus by emphasizing superficial differences with Abū Kāmil, and by distorting the premodern arithmetic and algebra by rewriting everything with modern algebraic symbols. Then, by interpreting Abū Kāmil's text through these symbols, he invokes a grossly anachronistic interpretation of the solutions in terms of modern projective geometry.

Rashed repeats this story in the first 35 pages of the volume under review and the problems continue as he progresses beyond Abū Kāmil. In particular, he

continues to interpret medieval indeterminate analysis in terms of algebraic geometry. It was I. G. Bashmakova who first suggested such a reading for Diophantus' solutions [1966] and Rashed applies the same interpretation to the algebraists after Abū Kāmil, starting with al-Karājī.

To keep this review short, I will focus on Rashed's treatment of the late 16th century French mathematician François Viète [174–204]. Rashed's errors here are both mathematical and historical. I restrict myself to two topics: Rashed's misunderstanding of the nature of indeterminate problems and his anachronistic reading of Viète's theorems on triangles, this time inspired by a different paper by Bashmakova.

One of Rashed's key claims about Viète's indeterminate analysis makes no mathematical sense and is not supported in the texts. He writes that Viète's analysis

admet des solutions irrationnelles pour les problèmes indéterminés. [200]

admits irrational solutions to indeterminate problems.

But if the restriction of solutions to rationals is removed, the problems become trivial! There ceases to be any classification of numbers into squares, cubes, and so forth since these terms apply to *all* (positive) numbers. A look into Viète's indeterminate problems shows indeed that all solutions are rational.

Rashed's evidence for his claim comes from a passage that he cites from a scholium to Viète's first zetetic by the translator de Vaulézar:

Il convient remarquer en ce lieu, que ce Zététique-comme aussi la plupart des suivants, se peuvent non seulement appliquer à deux grandeurs ayant longueur seulement, comme sont les côtés: Mais généralement à toutes autres grandeurs.... [176]

It should be noted here that this Zetetic, like most of those that follow, can be applied not only to two magnitudes having length only, as are these sides, but generally to all other magnitudes....

Rashed summarizes:

Autrement dit, Viète étend le domaine de l'analyse indéterminée à d'autres corps de nombres que le corps des rationnels.

In other words, Viète extends the domain of indeterminate analysis to number fields other than the field of rationals.

Even with this snippet, Rashed should have seen that de Vaultéard was talking about extension to higher dimensional magnitudes and not to irrational numbers. In fact, de Vaultéard continues:

...pourveu que la somme et la difERENCE proposée soient de mesme genre, soit que la question soit faite de plans, solides, plans plans, etc. [de Vaultéard 1630]

...for seeing that the sum and the difference proposed are of the same kind, whether the question is about planes, solids, plano-planes, etc.

De Vaultéard's remark accompanies the first problem of book 1 of Viète's *Zeteticorum libri quinque*. All problems down to the middle of book 3 are determinate, including 'this problem' and 'most of those that follow'. Viète's numerical solutions to these determinate problems are often irrational and, of course, irrational solutions had been commonplace for such problems since at least the ninth century.

Rashed repeats his misinterpretation elsewhere in the chapter:

[Viète] donne une nouvelle orientation à l'analyse de Diophante (il n'exige pas, par exemple, que les solutions soient rationnelles). [174]

and:

[Viète] a introduit les moyens et les techniques de l'algèbre dans l'étude des triangles rectangles, sans toutefois exiger que l'on obtienne des solutions rationnelles. [204]

In his *Notae priores* (written in 1593, published in 1631), Viète gives a series of propositions in which he relates the sides of a right triangle with acute angle θ with the sides of a right triangle with acute angle $n\theta$. Not surprisingly, his formulas on angular sections (*angulares sectiones*) are equivalent to trigonometric identities for $\cos(n\theta)$ and $\sin(n\theta)$. For example, given a single-angle triangle with base D , height B , and hypotenuse A , he expresses the base of the quadruple-angle triangle as $D^4 - 6B^2D^2 + B^4$, its height as $4BD^3 - 4B^3D$, and its hypotenuse as A^4 . This corresponds to our

$$\begin{aligned}\cos(4\theta) &= \cos^4 \theta - 6 \sin^2 \theta \cos^2 \theta + \sin^4 \theta \quad \text{and} \\ \sin(4\theta) &= 4 \sin \theta \cos^3 \theta - 4 \sin^3 \theta \cos \theta.\end{aligned}$$

Despite the fact that Viète acknowledges only positive real numbers in his works, Rashed follows [Bashmakova and Slavutin 1977](#) in recasting Viète's propositions in terms of operations on complex numbers. They note that Viète's formulas for the sides of the multiple-angle triangles can be read as

the real and imaginary parts of $(x + iy)^n$, and even go so far as to suggest that that is what Viète really had in mind. But this is merely a coincidence, since the sine and cosine of multiple angles appear naturally in the polar formula:

$$[r(\cos \theta + i \sin \theta)]^n = r^n(\cos(n\theta) + i \sin(n\theta)).$$

Viète's propositions are in fact about triangles and triangles only.

So how does Rashed justify this interpretation if in Viète's time no one had yet worked out such calculations on complex numbers? He writes:

Cet inconvénient historique est compensé par l'avantage épistémique de conjuguer les deux interprétations, algébrique et trigonométrique. [204]

This historical disadvantage is compensated by the epistemic advantage of combining the two interpretations, algebraic and trigonometric.

Two pages back he expressed the algebraic interpretation as a search for rational or irrational solutions to algebraic equations, formed mostly when studying triangles, and the trigonometric interpretation as 'an underlying search...for the trigonometric formulas':

À l'évidence, ce calcul admet deux lectures à la fois: recherche de solutions rationnelles ou irrationnelles des équations algébriques, formées pour la plupart lors de l'étude des triangles; et recherche sous-jacente, semble-t-il, des formules trigonométriques. [202]

But what need would there be to combine these two interpretations? They are perfectly compatible as they stand, so there is no reason to impose a reading with complex numbers!

He continues his defense of this interpretation:

Certains historiens que rebute le recours à un autre langage—et à une autre mathématique—que celui de l'auteur ne manqueront pas de taxer cette interprétation d'anachronisme. Mais, si on la prend pour ce qu'elle est, c'est-à-dire l'instrument permettant de dévoiler le sens du phénomène étudié, que Viète ne percevait pas encore mais dont il pouvait avoir une certaine intuition, alors elle est la bienvenue. Mais ceci suppose que l'on ne prend pas l'instrument pour l'objet auquel il s'applique. [204]

Some historians who are put off by the use of another language—and another mathematics—than that of the author, are sure to charge this interpretation as anachronistic. But, if taken for what it is, which is to say, as the instrument allowing for the development of a sense of the phenomenon studied, that Viète does not perceive but of which he might have had some intuition, then it is

welcome. But this assumes that one does not take the instrument for the object to which it is applied.

There is no evidence to back up Rashed's suggestion that Viète 'might have had some intuition' into raising $x + iy$ to powers and that he preferred to mask his discovery by presenting it with triangles instead!

There are other errors in the section on Viète that I cannot expose adequately in a short review, such as Rashed's attempt to link Viète's algebra with that of al-Khwārizmī, distancing both from Diophantus, or his misunderstanding of Diophantus' *eide* (species). And beyond Viète lies close to 100 pages on Fermat, which exhibit the same kinds of problems of interpretation.

The book could have been a handy introduction to early Diophantine analysis. But Rashed's misrepresentation of the history, together with his insistence on reading the premodern texts in terms of 20th-century mathematics, renders the whole project too misleading to be of any real use. This is too bad: the works of several Arabic authors in particular could have benefitted from a balanced treatment.

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La nature comme source de la morale au Moyen Âge edited by Maaïke van der Lugt

Micrologus' Library 58. Florence: SISMEL—Edizioni del Galluzzo, 2014. Pp. vi + 442. ISBN 978–88–8450–530–9. Paper €68.00

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Since 1993, Società Internazionale per lo Studio del Medioevo Latino has been publishing the vital journal *Micrologus* and the related series Micrologus' Library, bringing critically important work on all aspects of scientific and intellectual culture of the Latin Middle Ages into productive interdisciplinary conversation. *La nature comme source de la morale au Moyen Âge*, edited by Maaïke van der Lugt, is of a piece with the series' high standard of scholarship. This volume can be taken as a follow-up to *The Moral Authority of Nature*, edited by Lorraine Daston and Fernando Vidal [2004], which posited that 'nature' and 'the natural' are terms that consistently stand in for ordered, self-evident processes and values, even as the essays in that volume demonstrate the myriad and often conflicting ways in which the moral authority of nature has been constituted, evoked, and undermined across time and space. That volume spanned the ancient world to modernity, and across Eurasia from Japan to Germany. *La nature comme source de la morale au Moyen Âge*, as its title suggests, takes many of the questions that animated Daston and Vidal's edited collection and applies them to the Latin Middle Ages in areas of philosophy, political theory, ethnography, art, medicine, poetry, astral science, and legal writing.

As this breadth of fields, methods, and texts suggests, the 13 essays in this volume reveal that the meaning and moral authority of nature was unfixed, polyvalent, and context-dependent in medieval Latin culture.

Les médiévaux mettent sur un piédestal la Nature – parfois représentée comme une reine qui juge, ordonne, arbitre, ou gouverne –, mais ils parlent aussi de la nature d'une espèce, d'un sexe, d'un peuple, d'une personne. [5]

Medieval people placed Nature on a pedestal—often represented as a queen who judges, organizes, arbitrates, or governs—but they referred also to the nature of a species, of a sex, of a people, of an individual. [my trans.]

As van der Lugt articulates in her essay, nature was often invoked to confirm religious, legal, and social norms; but could also be a profoundly disruptive force that exposed the inherent inconsistencies and failings of those norms. Nature could be appealed to as a fundamental rule or as something to be overcome or suppressed *via* discipline and habit, and habits could become so internalized as to become ‘second nature’ [33]. Latin texts reveal these two incommensurate ways of thinking about nature as they stressed the sharp distinction and easily breached barrier between nature and culture (or civilization) and also the adaptability of animals and humans to their environment. ‘Natural’ differences between genders could be grounds for subjugation [20] in some areas and in others could be seen as necessary to form a perfect union between man and woman, as Francesco Sarti demonstrates in his essay about Hugh of St Victor’s position on same-sex marriage. Danielle Jacquart touches on similar themes from a different angle in exploring medical writings on generation and the role of female orgasm in human reproduction. Yet, as Jacquart notes, anatomist Mondino de’ Liuzzi discussed female pleasure in vivid and sometimes coarse detail when lecturing to his students; but with his female patients he treated the subject matter with considerably more circumspection: the nature of his audience shaped his message.

Several of the essays take up different aspects of Scholastic philosophy and the relationship between nature and theology. Roberto Lambertini explores commentaries on the *Sentences* of Peter Lombard that focus on the question of whether a state of nature can exist in a postlapsarian world. Is nature alone the cause of coercive power or does the enormous change wrought by original sin make it impossible to determine if domination is natural? Likewise, Alain Boureau takes up the question of evil and its effect on nature in commentaries on the *Sentences*. According to Albert the Great, Bonaventure, and Thomas Aquinas, original sin fundamentally changed the nature of the elements, although each articulated different kinds of change in his commentaries.

The sinful nature of humanity is also taken up by Benoît Grévin in his exploration of the relationship between civil and canon law and rhetoric in the late 12th and 13th centuries. The emergence of the field of rhetorical

study known as *ars dictaminis* in conjunction with renewed and expanded interest in legal studies takes on new urgency in Grévin's essay as he teases out the underlying connection between the two areas: rhetoric could be a tool for redressing—or perfecting—natural language, just as the law could be a tool for the rehabilitation of humankind. However, in late medieval ethnography and ethno-geography, nature was invoked as a way to describe the particular characteristics of different groups of people (the Welsh, the Mongols) but rarely as a way of assessing the morality of their behavior. According to Joan-Pau Rubiés,

cultural diversity had its own descriptive language of usages and customs, concerning ways of living and ways of doing practical things, and any strange behaviour—the marvels of the human world—could often be rationalized. [230]

Yet in the fictionalized *itinerarium*, *The Book of John Mandeville*, which, as Rubiés notes, 'introduced to vernacular geography many of the notions of natural philosophy and scholastic theology', nature figured as a way to assert Christian morality [231]. Rubiés identifies a critical difference between descriptive works such as those of Gerald of Wales and Marco Polo, based on first-person observation, and those, like *Mandeville*, based on other texts: the latter use nature to propose and uphold universal moral norms, while the former invoke nature as the cause of diversity in natural phenomena as well as human behavior and belief.

Echoing van der Lugt's assertion that many medieval texts present nature as a powerful force that is potentially destructive to human society, Christian Kiening explores how in short literary narratives—*Mären* and *fabliaux* alike—nature exerts pressure from within, barely checked by courtly conventions. People are often at the mercy of their basest impulses and desires, and courtly morals—however fragile—are articulated in response to these internal forces. However, at the same time, in a different mimetic art form—drawing—nature became a model for artists, as drawing directly from nature re-emerged as an artistic practice. Jean Wirth explores the particular resonances of this practice with regard to concepts that had both technical and philosophical resonances, like *imitatio naturae*, and with especial focus on the sketchbook of Villard de Honnecourt (ca 1230s).

Despite the wide range of these essays, *La nature comme source de la morale au Moyen Âge*, can—and should—be read as a single book. Themes and ideas about nature in the Latin Middle Ages develop across essays, as

though the authors have honed their work in colloquy with one another. Medievalists—and early modernists—working in a number of fields and sub-fields will find in this volume an erudite collection of essays that is greater than the sum of its parts.

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Blood, Sweat and Tears: The Changing Concepts of Physiology from Antiquity into Early Modern Europe edited by Manfred Horstmannshoff, Helen King, and Claus Zittel

Intersections: Interdisciplinary Studies in Early Modern Culture 25. Leiden/
Boston: Brill, 2012. ISBN 978–90–04–22918–1. Pp. xxvi + 772. Cloth \$297.00

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In their introduction, the editors of this immense volume affirm at once that their topic, the physiology of the human body, though known and seemingly banal, has been set aside for too long. Unlike human anatomy, which has for a long time been the subject of repeated publications and numerous detailed studies, this essential aspect of medicine has remained neglected in recent historiography, at least from antiquity to the early modern period. The reasons for this disdain are probably evident and some of them are evoked in the introduction: the necessarily abstract, even philosophical character of discussions surrounding it; the absence of significant discoveries as compared with advancements that exist in other medical fields; and the complicated relationship between observation and interpretation.

The book thus seeks to fill a void; yet it reaches beyond its own purpose. The volume as a whole—resulting from a colloquium held at the Netherlands Institute for Advanced Study in the Humanities and Social Sciences in April 2009—is founded on strong historical stances: foremost, the idea that it is appropriate to define physiology diachronically, given how this term—of ancient origin but intermittent usage—has seen its meaning change over time, just as the global framework it is supposed to cover has changed. In its most basic sense, physiology is indeed the study of the functions of the human body. It includes, but is not limited to, anatomy. By its very nature it covers the contributions of other sciences, particularly natural philosophy (what we would call biology today) and even pure philosophy in the case of the relationship between the body and the soul. The first question that the authors of this volume had to answer was, therefore: What is a strictly *medical* physiology from antiquity to the early modern period?

The second, more precise, question also stems from another stance—and rightly so, in my opinion—whose impact can be seen in the editors' choice of articles. It is the idea, asserted in the introduction, that the difficulty in distinguishing functions in the human body and in concretely identifying them led doctors to resort to numerous analogies or metaphors in physiological discourse, analogies and metaphors whose functions were often not only illustrative or didactic but also genuinely argumentative. This perspective incited the contributors of this volume to take a particular interest in medical writing, both as logical discourse and also, more generally, simply as discourse. This approach, which one could classify as literary—or at times linguistic—can be found in many articles written by historians and has resulted in the integration of multiple texts that are explicitly focused on literary works. *Blood, Sweat and Tears* is thus situated in a rich historiographic movement, aimed not at superficial interdisciplinarity but at the analysis of medical discourse as a genre, with writing styles, rational structures, and limits.

These significant orientations, of course, do not exhaust the richness of this book, which consists of 28 articles presented in five parts of unequal size. Before highlighting certain aspects that seemed particularly interesting to me, and before attempting an impossible summary, it seems essential to present them one after the other, though without necessarily respecting their order.

The first part, entitled 'History of Physiology in Context: Concepts, Metaphors, Analogies', concerns specifically the two aforementioned questions: the difficult definition of physiology and the question of its writing. Vivian Nutton addresses the term 'physiology' itself, whose use he has found among the Greeks but whose meaning he shows is linked to the study of nature in general; above all, he insists on the fact that during the Renaissance, *physiologia* does not perfectly align with how we would define this term. Anatomy in particular is just a part of it and is not clearly distinguished: according to Nutton, it is not until roughly 1850 that we can distinguish two distinct domains.

In her analysis of the analogies and metaphors used to explain Earth and the cosmos, Liba Taub notes that many of them are linked to the functions of the human body, such as digestion, leading Epicurus and Lucretius, though denying its animation, to compare the cosmos to a living being. This comparison of animate and inanimate material turns out to be quite interesting and we do not know if the analogy simply held an illustrative role or if it leaned towards a logical explanation. Later in the volume we can find the

same type of analysis in the article by Fabio Tutrone, who is able to identify in Lucretius' *De rerum natura* a true physiology, whose influence is felt until the Renaissance.

The articles by Elizabeth Craik and Michael McVaugh treat the functioning of certain organs from antiquity to the beginning of the early modern period. Craik, following the reception of the Hippocratic treatise *On Glands*, notes that the text, though well known, has been nonetheless overlooked, which she explains by its lack of humoral theory and the inclusion of a flux theory, which, together, present effectively the opposite of what was in fashion during the early modern period. McVaugh devotes his article to the description of the kidney, starting from Galen and going on to analyze debates from the 13th to the 17th century. He notes a tension between two types of explanations, mechanical and functional: Galen and others after him try to explain the functioning of the organ through a purely mechanical description but this explanation must end when it is no longer sufficient; then come the faculties, and more exactly the attractive faculty, as a principle of explanation.

To explain the global functioning of the human body, recourse to analogies, as we have seen, is another method. Sergius Kodera explores the use of distillation as a model, which, according to him, starting in the Renaissance, begins to compete with the more classic Aristotelian model of coction. Sabine Kalf, following many other researchers, shows the endurance in the 17th century of the link between physiology and political theory through the use of illness as a metaphor for conflict, particularly in the works of Campanella and Bacon. These two cases, quite opposite in their impact—the distillation model is limited to a few authors, whereas the comparison between the political body and the human body has been a continuous classic since antiquity—show the relevance of an approach combining literature and history, even if the authors do not have the room here to develop their thoughts as much as they would like to.

In his article on the aging process, Daniel Schäfer also demonstrates the interest in following a group of analogies over the course of time in order to piece together the modes of argumentation specific to medicine. As such, he notices that authors use comparisons between the effects of time on the human body and the course of the seasons, the functioning of a lamp, and so forth. This work allows him to highlight the transition, starting around

1600, towards a more objective and less metaphorical knowledge, allowing a slow evolution of argumentative methods used in science.

Rina Knoeff's article attempts to show the importance of the physiology of the brain and nerves in the work of Herman Boerhaave. If he situates himself voluntarily and explicitly in the continuity of ancient authors and, particularly, Hippocrates, Boerhaave makes consequential shifts in his physiology. Although he conserves the Hippocratic method focused on observation, he integrates the ideas of William Harvey concerning circulation and the latest anatomical advances into the global framework of the 'old' physiology. Here, these discoveries lead not to a complete revolution but rather to a slow evolution.

The last two contributions to this part concern the links between physiology and philosophy in the 18th century, through the thoughts of David Hume (Tamàs Demeter's article) and Jacques Diderot (Tomas Macsotay's article). In the first case, it appears that the explanation of the functioning of the human body by the Scottish philosopher owes less to a Newtonian, mechanical point of view than to the vitalist vision of Scottish Enlightenment thinkers, particularly the chemistry of William Cullen. Demeter demonstrates the existing links between the thinker and the medical school of Edinburgh from the second half of the century, which allow Hume to understand the mind by laying out the fundamental principles taken from the phenomena of interconnection between perceptions. Macsotay notices that Diderot also abandons the mechanical explanation for a vitalist interpretation, relying on the relationship between medicine and art for the philosopher: it is as such that Diderot criticizes a sculpture of Falconet (1774), studying the physiology of pain.

This long first part thus shows the interest of a global study of physiology through the analysis of medical discourse and the shapes it takes. The following three parts are dedicated to more pointed approaches, focusing on the three elements of the title: blood, sweat, and tears. Logically, given the importance of the subject, the part on blood is the longest, containing seven articles. The first two show that the examination of blood, though probably frequent during a time when bloodletting was one of the most common methods of medical therapy, remains nevertheless incomplete: Hans L. Haak remarks that descriptions of blood outside of the body are particularly uncommon in medical literature. The article written collectively by Barbara Baert, Liesbet Kusters, and Emma Sidgwick addresses the iconography of the

healing of a bleeding woman as described by the Gospels; however, although representations of the scene are depicted across many media—paintings but also gems and amulets—blood is never directly shown.

Three articles remain focused on fundamental physiological questions linked to blood. Rainer Brömer touches upon what has been for decades an extremely debated topic, namely the reception of Ibn al-Nafis' 13th-century hypothesis on the passage of blood between the two ventricles of the heart by the lungs and not by the central wall of the organ. He insists, following the recent work of Nahyan Fancy, on the necessity of re-situating Ibn al-Nafis in the larger context of the Islamic world at the time; most importantly, he shows that the Damascene doctor's proposal was not forgotten and that, on the contrary, it was well known in the Muslim world during the Ottoman era, citing as an example the illustrated treatise on anatomy by the Ottoman doctor İtaki (1632) or the works of Ḥassan al-'Aṭṭâr (ca 1801).

Karine van't Land is interested in the division of spermatic members (theoretically from male sperm: bones, nerves, arteries, and so on) and blood members (from menstrual blood, particularly flesh), which originates in antiquity and presented problems for medieval authors who attempted to connect these distinctions at once to the question of the origin of the embryo, the aging process, and the difference between men and women.

In keeping with the questions raised by this last point, Barbara Orland focuses on the common analogy between blood and breast milk, which represented blood as a red milk and milk as a white blood. Such an idea was commonplace until the 19th century. Despite being called into question in the 17th century, notably with the emergence of the idea, based on experimental physiology, that milk came from chyle, the strength of this analogy explains the survival of this connection even among educated doctors well after its theoretical questioning.

These three contributions show the vigor and richness of debates provoked by certain impasses in physiological theory inherited from antiquity. The last two articles of this part discuss the relationships between medicine and other fields, which are obvious when it comes to the topic of blood, a humor that has always been characterized by implicit and explicit connotations. Jacomien Prins notes sources linking music and pulse in Marsilio Ficino's commentary of the *Timaeus*, not only from his description but also from a purely therapeutic point of view: musical harmony can, according to Ficino and

some of his predecessors (notably Avicenna), constitute a real remedy. Catrien Santing points to the increasing proximity between medicine and religion on the question of blood, showing that the 16th-century doctors Lemnius and Cesalpino tended to spiritualize blood, linking it to the *spiritus universalis*.

The third part, with only three articles, concerns sweat and skin. It opens with a precise and complete article by Valeria Gavrylenko on the notion of skin in Homeric poetry, illustrating the editors' aim of a multidisciplinary approach. Based on exhaustive lexical research and set in comparison to the vocabulary used by ancient Greek doctors and philosophers, she reveals the absence of a true concept of human skin, since the terms used are often vague or linked to animals, whereas the boundaries of the body seem unclear and allow for interpenetrations with the environment.

Michael Stolberg proposes a useful and clear panorama of the conceptualization of sweat between 1500 and 1800, addressing medical discussions along the continuity of Galen's positions as well as popular representations whose traces we can find in the accepted notions surrounding the therapeutic utility of perspiration: sweat has been charged with positive and negative connotations since ancient times both in scholarly thought and popular wisdom.

Mieneke te Hennepe's article, somewhat reducing the focus, concentrates on the long 17th century, examining the role of the microscope in the reevaluation of the role and functioning of skin. The dominant metaphor until then, the fishing net, slowly but surely concedes its place to the more precise image of a skin pierced with a multitude of pores and comprised of many glands. However, the greatest precision in the description does not lead to a new practice: as Stolberg demonstrates, representations and theory remain remarkably stable despite discoveries.

In the fourth part, three articles examine the subject of eyes and tears. Véronique Boudon-Millot makes a clear and synoptic point about Galen's physiological theory, developed in many parts of his work and often somewhat unclear, by focusing on argumentation: Galen, who attributes an important place to the role of *pneuma* in the process of vision, affirms that it is impossible to understand it *via* dissection and recognized that it can only lead to a plausible theory, one that is probable but not certain.

Katrien Vanagt, moving forward several centuries in time, shows that the problems and questions that Galen addressed remained relevant until the

17th century but that the emergence of experimental devices (such as the *camera obscura*, which she examines in her discussion of V. F. Plemius' treatise *Ophthalmographia*), allowed for evolutions that were not always unequivocal but which depended on the framework in which these discoveries were integrated, a theoretical framework generally presented as Galenic but sometimes, when examined more closely, quite original.

Finally, Frank W. Stahnisch addresses the example of the illness that affected Herder, whose lachrymal ducts were blocked. Having studied medicine himself as well as having undergone numerous surgical operations, Herder takes a precise look at the role of tears and, as much a physiologist and theologian as a philosopher, declares himself a 'physiologist of the soul and of the human body'.

The fifth and final part arrives at the fundamental point, nearly always present in the preceding articles: the question of the relationship between body and soul. Julius Rocca returns to the question of *pneuma*, showing from a long study the conditions of the emergence of a 'natural pneuma', a type of *pneuma* that was only mentioned incidentally by Galen, who did not consider it useful. The notion was introduced when Greek texts were being translated into Arabic, above all for the sake of being coherent; and though natural *pneuma* was hardly needed to explain the functioning of the body, doctors tried to find a need for it over the course of the medieval and modern periods.

Next, Marlen Bidwell-Steiner compares two 16th-century authors, Telesio and Olivia Sabuco, attempting to show that the latter was influenced by the radical simplification of Aristotelianism by the former. Sabuco, in *Nueva filosofia de la naturaleza del hombre* (1587), undertakes nonetheless an even larger shift, proposing a gynocentric model of the world or at least an egalitarian model of men and women.

Marion A. Wells then addresses the links between maternal voice and melancholy in Webster's *Duchesse de Malfi* (1614), showing the influence and the limits of medical theories on literature in a particular example—involving emotions—and echoing issues that Macsotay raises in his article on Diderot.

Finally, Diana Stanciu explores the concept of 'plastic nature' set out by Ralph Cudworth in *True Intellectual System of the Universe* (1678). This sometimes-vague concept, introduced as a mediator between the corporeal and incorporeal, is re-situated in its textual (notably Aristotle's vegetative soul)

but also polemic and contemporary context (the struggle against Descartes' ideas). The point here is to see that the dynamic reconstructions of concepts are sometimes unfinished and incomplete, whether due to the difficulty of ancient sources or a deliberate wish not to linger on the coherence of choices—a reality that the historian of science, bound to respect the principle of charity, sometimes has difficulty accepting.

This long enumeration of articles will possibly have made us lose track of the larger questions that permeate *Blood, Sweat and Tears*. Let us try to summarize. First, this work insists on the importance attributed to physiology itself: despite the difficulty of certain subjects, despite the aridity of several themes, despite the apparent absence of a scientific revolution during the period in question, physiology constitutes the base upon which the entirety of medical production is built until the heart of the 19th century. The subject being partially new, one can particularly appreciate the synoptic presentation of lesser-explored topics, such as certain organs (the kidneys), certain functions (sight), or even certain bodily productions (sweat). These elements make *Blood, Sweat and Tears* an indispensable reference. But the volume exceeds this aim in indicating the methodology and questions of future research by creating a fundamental space for argumentative methods used, by considering methodological contributions from other disciplines such as literature, by studying the relationships between medical discourse and other productions, learned or not, and, finally, by not limiting itself to a single period and covering an impressive continuum from antiquity to the 19th century.

We can nevertheless express a few regrets. If the accumulation of articles allows for a multitude of points of view and generally enriches our overview, it hinders a complete, if quite instructive, reading and most likely condemns the book to be seen primarily as a juxtaposition of independent contributions. To facilitate the reader's comprehension of the unity behind this diversity, a substantial conclusion could have helped, though this idea may be met with rejection, perhaps rightly so, for the reason that it would have added even further to the size of the volume. The other reproaches (if we can truly use that term) are more isolated. Obviously, as in all undertakings of this nature, certain articles seem less interesting or less integrated in the general aims and questions of the book. However, these are rare exceptions and we must be thankful to the editors who chose the authors and oriented their contributions. At times, we might also point to the use of images, which embellish

certain articles but serve a purely illustrative purpose without being subject to analysis. Of course, this is not the case for all of the contributions but, when it is, the images lose their interest and frustrate the reader who would like to see them discussed. Lastly, we might note a slight overrepresentation of the early modern period (15th–18th centuries) mostly for certain themes, though this is perhaps inevitable in an undertaking of this magnitude.

These few remarks should not distract from the quality of the book. Its ambition, characterized by an interdisciplinary research approach and the study of a selection of strong issues over a significant period of time, makes it a fundamental work on the topic—and one which will surely encourage new research.

Alexandre d'Aphrodise. Commentaire perdu à la Physique d'Aristote (Livres IV–VIII). Les scholies byzantines. Édition, traduction et commentaire by Marwan Rashed

Commentaria in Aristotelem Graeca et Byzantina: Quellen und Studien 1. Berlin/Boston: De Gruyter 2011. Pp. vi + 660. ISBN 968–3–11–018678–9. Cloth \$154.00

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Most of what survives of Alexander's commentary on Aristotle's *Physics*, as in the case of Alexander's commentary on the *De caelo*, comes from citations that we find in later commentators, particularly, Themistius, Philoponus, and Simplicius. Our current knowledge of Alexander's writing on Aristotle's *Physics* and *De caelo* is, therefore, largely confined to these references in the indirect tradition. However, there exists scholiastic evidence in addition to those sources. In fact, Marwan Rashed has demonstrated that the conspicuous number of scholia listed as marginalia on MS Parisinus suppl. gr. 643 and MS Parisinus 1859 must be related in a more or less immediate way to this greatest among the commentators of the late antiquity; and he now presents in a noteworthy annotated edition the corpus of the scholia on *Phys.* 4–8.

The volume is comprised of a massive introduction divided in two parts, which are further subdivided into a history of the text and a doctrinal introduction. The discussion explores three aspects: the archaeological, the historical, the systemic. In his *avant-propos*, Rashed first calls our attention to the systemic aspect, that is, to Alexander's attempt to explain Aristotle's *Physics* in an existential sense by showing the certain and central role of form in relation to the concepts of desire (ἔφεσις) and perfection (τελειότης).

Two manuscripts contain the corpus of scholia explored by Rashed. The first, the codex Parisinus suppl. gr. 643 (S: first half of the 14th century) breaks the text of the *Physics* into two parts: books 1–3 and books 4–8. These latter books, however, as Rashed shows, have their complement in the MS Laurentianus 87.20, which contains books 1–3 copied by the same hand that

copied books 4–8 in Parisinus suppl. gr. 643 (S). Moreover, since in the margin of Laurentianus 87.20 there are no traces of the corpus of scholia that we find in Parisinus suppl. gr. 643, the separation of books 1–3 and 4–8 was certainly very ancient. The other manuscript, Parisinus 1859 (P), dating from ca AD 1300, is possibly part of a corpus related to the work of George Pachymeres and has no value for the *constitutio textus* because its marginalia have been revised.

We find a comparison of the scholia on the *Physics* with those on the *De caelo* in MS Laurentianus 87.20, which shows that the scholia derive from an age in which Alexander's commentaries on the *Physics* and a commentary of an Alexandrian author on *De caelo* were still available. The common archetype of MSS Parisinus suppl. gr. 643 (S) and Parisinus 1859 (P) may be older than the first half of the ninth century. *Inter alia*, a mistake in S which is correct in P should confirm this supposition. Additionally, the dislocation of some scholia in respect of their reference *lemmata* confirms the hypothesis that their transliteration should be dated back to the ninth century. So Rashed imagines that the disappearance of Alexander's commentary took place in about the same period (as indicated on other grounds as well).

At the beginning of the second chapter, Rashed considers the arguments for attributing the scholia to Alexander's lost commentary on the *Physics*. Among these, some seem to be conclusive. First of all, Rashed eliminates the hypothesis that the corpus of the scholia is due to a copyist's recasting Simplicius' commentary: he cites Alexander's exhibiting his citations as derived from his own commentary. The scholia are not easily explained as accurate selections from the quotations of Alexander in Simplicius' commentary. One may also consider *inter alia* the fact that in three of seven cases in which the authority of Alexander is expressly cited, it is contrasted with that of other authorities (Aristotle himself, Galen, and anonymous commentators). Note, however, that we find the same thing in the corpus of the scholia on *De caelo* recorded in ms Parisinus Coislinianus 166, where Alexander's interpretation is expressly given when it departs from the views of other commentators. [cf. fr. 29, 47, 121, 122, 339, 371, 435, 539].

We may imagine that the first step between Alexander's commentary and the corpus of the scholia as we have it might be traceable in some commentaries of the Alexandrian school. This would easily explain the oscillation within the corpus of its diction and so forth, an oscillation that can be traced back

at times to Alexander himself and at times to the Alexandrian technical and scholastic lexicon. It is true that there is nothing conclusive in this; still, we can add to Rashed's list some cases which seem to show in their form the presence of Alexandrian material.

In fr. 126, the introductory «ἀπεικίωπησε» is found only in Philoponus [Wallies 1905, 405.7, 407.24] and Olympiodorus [Busse 1902, 148.11].¹ In fr. 129, «ἀντιπεπονθότως», which glosses «ἀντετραμμένως», is typical of the Alexandrian school. The phrase «διὰ τούτου δείκνυσιν» in fr. 136 is in this form also typical of Alexander [Hayduck 1891, 259.24; Wallies 1883, 362.20], as are «ἔδειξε διὰ τοῦ δεῖξαι» [Hayduck 1891, 279.18, 409, 30] in fr. 647 and «νῦν δεικνύναι πρόκειται» [Hayduck 1891, 263.20–21] in fr. 648. Moreover, in fr. 296, «μετὰ τὸ δεῖξαι δείκνυσι νῦν» is found only twice in Simplicius but on the second occasion he is quoting the *ipsissima verba* of Alexander [Diels 1882–1895, 1009.3–6]. In fr. 297, «ὁ νοῦς οὕτως», if not a mistake, is found only in Philoponus [Vitelli 1887–1888, 833.21] and in this case one should consider whether the scholium and the *exemplum* were read in Philoponus [Vitelli 1887–1888, 798.14–799.2] (quoted also by Rashed) or whether they are complementary and go back to the same exegetical source. In fr. 231, «ἐπεξηγείται» is also in the style of the school of Alexandria, as it is for the interesting «νόησον» in fr. 234 (Philoponus [Wallies 1883, 481.8], Olympiodorus [Stuve 1900, 190, 14]). The phrase «νῦν βούλεται δεῖξαι» in fr. 316, apart from Olympiodorus, is proper to Philoponus [Wallies 1883, 115.28, 240. 29, 437.4, 441.24; 442.9, 446.13], as is also the locution «ἀπορήσας ἐπιλύεται λέγων» in fr. 517 [Hayduck 1903, 44.18].

However, as in the case of the scholia on *Physics* studied by Rashed, such observations, although standard, will never lead to certainty. On one side, in fact, as we have seen, we can record words, phrases, and introductory locutions that are typical if not exclusive to Philoponus; on the other, we note expressions that can be traced back to Alexander. This suggests the hypothesis that there was a corpus formed in late antiquity, perhaps the result of a selection of material due to Alexander, that was still present in the commentaries on the *Physics* produced in the Alexandrian school. A confirmation of this supposition can be found in a scholium cited by Rashed at 18n45 in which he recognizes Philoponian paternity.

¹ In Simplicius [Diels 1882–1895, 670.24], we have «παρήκε ζητεῖν».

The general introduction is a sort of fresco and its descriptive and analytic features make any attempt to further summarize its content useless. It would be more advantageous if we concentrated attention on some of the fragments collected by Rashed in the hope of making further progress in our knowledge of Alexander and confirming some of Rashed's positions. In doing so, I will refer to the document which is nearest to the *disiecta membra* on *Physics*, viz. to Alexander's lost commentary on *De caelo*.

The comparison between the contribution of the scholia and what we can gather from Alexander's commentary preserved by Simplicius, Themistius, and Philoponus is also interesting in regards to the section of the corpus which lists doxographical fragments about the void. The incoherent oscillation which, according to the indirect and scholiastic exegetical tradition, Alexander exhibits when he refers respectively to the «χωριστὸν κενόν», the «ἀχώριστον κενόν», and the «παρεπαρμένον κενόν», prompts Rashed to suggest the emendation 'Πλατωνικούς scribendum', instead of «Πυθαγορείους» in fr. 103.2.

When Rashed hypothesizes «Πλατωνικούς» instead of «Πυθαγορείους», he notes the contradiction that arises from attributing to the Pythagoreans the thesis of the ἀχώριστον κενόν (the not-separate void), since this conflicts with a previous scholium which, in referring to Pythagorean ideas, uses the same terminology to designate the interstitial atomistic void, i.e., the separate void (χωριστὸν κενόν) [95]. But the interchangeability and complexity of the terminology used by Aristotle and his commentators calls for more caution. For example, in his commentary on the *Physics* [cf. Simplicius: Diels 1882–1895, 648.17–22], Porphyry attributes to Democritus alone the thesis of the ἀχώριστον κενόν, which goes against the reconstruction proposed by Rashed. Evidently Porphyry, as Simplicius elsewhere, reduces a very complex terminological system by dividing it into two: the *not separate void*—probably the equivalent of the παρεπαρμένον κενόν, which might be understood as the void which breaks continuity in bodies by mixing together with them and is thus called *not separate*—and the *separate void* which is outside the universe may be conceived of as absolutely separate from bodies. But both in the case of the interstitial atomistic void and in the case in which we may think, as Rashed does, of a reference to the Platonists quoted in Simplicius, it should still be possible to refer to the Pythagoreans and the ἀχώριστον void in the scholium. The passage echoes the quasi-speculative one

in Simplicius' commentary [Diels 1882–1895, 648.17–22], where he refers to Porphyry's exegesis of Democritus. Porphyry describes the ἀχώριστον κενόν as παρεπαρμένον κενόν, viz. as void not separate from bodies but at the same time as void responsible for their discontinuity. We shall, therefore, have to establish whether Alexander's *usus auctoris* permits interpreting «ἀχώριστον κενόν» in fr. 103 as the void which causes discontinuity in bodies. If the two exegetical tracks both go back to Alexander's commentary, the patent incoherence of one of them could be easily explained by reason of comparison.

When Rashed illustrates how Alexander explains the relation between the first mover and the universe [126–161], we find also the attempt to show how Alexander argues the role of the first mover as αἴτιον τελικόν. After having recorded the complex, direct, and indirect tradition of *Meta.* 12.7, 1072b2–3, and having reminded us of the most recent literature on the subject, Rashed recalls the concept of normative ends or final causes. In doing so, he quotes a fragment of Alexander's commentary on *Meta.* 12 (in the Arabic redaction preserved by Ibn Rushd) from which we may infer that Alexander had conceived the final cause of something as an external substance for the things that want to assimilate themselves to it. According to Alexander, the first mover represents the final cause, just as the master does in respect of his slaves and the king or the sire in respect of subjects.

Now, to confirm this and to advance the reconstruction of Alexander's exegetical strategies, it is interesting to quote two other documents not considered by Rashed. There is, in fact, in addition to the fragment preserved by Ibn Rushd, Themistius' paraphrase to *Meta.* 12.7, 1072a30–b1 [Landauer 1902, 19.25–20.37] where we find, together with the νόμος motif, the Aristotelian examples of the general and of the king to show how the role of the final cause must be conceived as the normative finality of the first unmoved mover. But what we get here from Ibn Rushd and Themistius can be also found in Alexander's so-called *De principiis* [128–129]. Thus, we should no longer doubt the origin of the scholium fr. 836 in Alexander's commentary.²

The question is real and, if the fragment goes back to Alexander, it should be added to the other testimonies of the commentator that are available on

² At 127n234, Rashed, citing also fr. 826, notes the identification of the concepts of αἴτιον τελικόν and αἴτιον ποιητικόν (efficient or productive cause), both predicated of the first unmoved mover, which Alexander may have favored.

the subject. Indeed, we have some documents in which Alexander's position seems to be somewhat uncertain and vacillating. Rashed thinks that the confusion, which Alexander exhibits occasionally, depends on the fact that the first unmoved mover moves *ὡς ἐρόμενον*, i.e., as final cause, while the *primum mobile*, which is moved by the thing it desires, imparts in turn movement to the subsequent spheres. Hence, the first and unmoved mover, which is the thing desired, indirectly covers the role of *αἴτιον ποιητικόν*. Rashed quotes two passages: Diels 1882–1895, 258.14–25 and 1254.31–35. In the first, which is more relevant for our purpose, Simplicius cites Alexander's commentary and confutes those who charge Alexander with taking the *αἴτιον τελικόν* as the exclusive role of the first and unmoved mover, by pointing out that, as mover of the *primum mobile* (the *πέμπτον σῶμα*), it is also an *αἴτιον ποιητικόν*. It is perhaps this kind of indirect action on the sublunar world that allows us to consider the first and unmoved mover as an *αἴτιον ποιητικόν*.

Yet, it seems problematic that Alexander might have thought that the role of the *primum movens* as *ποιητικόν* concerns the existence of the *primum mobile* and of the body of the heavens. There are in fact cases, which are taken into account by Rescigno [2004, 421–436] in which this possibility can be eliminated [cf. esp. Diels 1882–1895, 1362.11–15]. This exegetical crux is closely joined in the commentary tradition with the name of the *διδάσκαλος* of the Alexandrian school, Ammonius, who, according to Simplicius [Diels 1882–1895, 1363.8–10], wrote a book on the subject [cf. Verrycken 1990, 217–219]. So, if fr. 826 becomes somehow puzzling, this may suggest a different background. What Rashed calls Alexander's anodyne thought about the attribution of the role of efficient cause to the first and unmoved mover could simply be explained as the presence of a Neoplatonic component or, less simply, as the hypothesis that Alexander had thought of a sort of efficient but non-energetic role of the *primum movens*.

The length of fr. 826 would actually make it impossible to consider it as a useful element in deciding this question and Rashed's claim about Alexander's vacillation on the subject is not too far from proposals made in recent literature.³ The principle of the persistence of reality, which is closely linked

³ Cf. Bodnár 1997, 110n50 and Sharples 2001, 19–20nn94–96, where the author notes the inconsistency deriving from the comparison of the contrasting views which Simplicius attaches to Alexander.

to the ceaseless motion of the spheres in that this is due to the work of the αἴτιον τελικόν, can be seen alternatively as the principle of existence and, therefore, as an αἴτιον ποιητικόν. This solution, which has also been advanced by Judson [1994] and Matthen [2001], also looks in the direction of a non-energetic and, hence, mediated efficient causality. So the charge of inconsistency in the thought of Alexander on this subject, which derives when certain fragments are juxtaposed, may be dismissed.

To continue consideration of the ontological status of the *quinta substantia* and, in particular, of the possibility that the πέμπτον σῶμα, because of its ethereal constitution, should somehow not be susceptible to any affection (ἀπαθέε), let us turn now to fr. 598. The apparent inconsistency of *Phys.* 8.4 255b31 and *De caelo* 1.3, 270b2–3, the so called *inconstantia auctoris*, does not arise in this fragment thanks to the specification that circular motion does not cause any real affection in celestial bodies (in this case, because circular motion does not include contrariety nor limits). Alexander, in his commentaries on the *De caelo* and *Meteorologica*, justifies circular motion as the only type of affection that is appropriate to a celestial body and can account for its semi-pathetic nature. At Hayduck 1899 18.28–19.2, Alexander argues that movement in general, and not exclusively circular motion, makes the celestial body susceptible to some sort of qualification or modification (πάθος). But Alexander, especially in his *In de caelo*, derives the presence of a minimum set of qualifications in celestial bodies by means of complex demonstrations. The most representative among the fragments of Alexander's *In de caelo* in which the question is discussed is undoubtedly Heiberg 1894, 442.4–444.15 [Rescigno 2004, fr. 147c]. Here Alexander argues, in strict mode, the relative impassivity of a celestial body despite its circular motion.

Even when Rashed poses the question of the credibility of the scholia 79 and 81, which seem to contain some vestiges of the Aristotelian theory of natural places and, therefore, a probable opening to the principle of like to like (ὅμοιον πρὸς ὅμοιον), he might have taken into account the ancient literature on this subject, especially as it bears on Alexander's lost commentary on *De caelo*. Compared to fr. 79, Simplicius' commentary on *De caelo* which reports Alexander's position, seems to authorize the principle of like to like when one part is separated from its whole. If this fragment is also traceable to Alexander, one should recall two nearly parallel passages preserved in

Simplicius in which Alexander is credited with the same ἀπορία but with a different hypothesis within the discussion of the question of natural places.

The first passage refers to the objections that Alexander directs against Xenarchus [cf. Heiberg 1894, 20.10–23. 6].⁴ Xenarchus' thesis was that, when the εἶδος is fully realized, the simple bodies would be destined to quiescence or to curvilinear motion, which is in apparent disagreement with Aristotelian theory according to which (even after the transition from δύναμις to ἐντέλεια and, therefore, even after reaching their natural places) the simple bodies would have the tendency which determined their preceding motion. Hence, we have the argument of Alexander, who proves Xenarchus' thesis untenable: even after the actualization of their εἶδος and the achievement of their natural place, the simple bodies would continue to move according to the defined simple motions (ἀπλὰι κινήσεις). That is, when something is dislodged from its natural arrangement, namely, when the Earth is moved from its place, the cosmic center (τὸ κάτω) which it currently occupies and which determines its full realization (τελειώτης), it, or a part of it, would nevertheless continue to move towards the center and so to show this natural kinetic tendency as proper to it.

Alexander's argument is completed in a second parallel passage in his commentary on *De caelo* that is preserved by Simplicius [Heiberg 1894, 694.10–695.21]. Alexander, following Aristotle's hypothesis at *De caelo* 4.3 310b2–5, imagines that the Earth is dislodged from the place where its εἶδος is realized into that of fire where it will be held, and that fire is displaced downwards. Now, adds Alexander, if you separate a portion of earth from the whole, you may wonder what kind of movement it would naturally have. If, in fact, as part of it, it is directed to the whole, then a heavy body would not have downwards (τὸ κάτω) as its proper place. Nonetheless, if you bring it down, would not it be truer to say that to move according to nature to its natural place is to move towards what is similar (τὸ ὅμοιον), and so perhaps to decide whether the part seeks to be in contact with the surface of its surroundings or to participate in the rearrangement that the demiurge made? These two possible answers—motion as made to the place where it would go according to nature and motion as made to the residual mass of earth similar to it—are both incongruous. The first answer violates the

⁴ Rashed also refers to Xenarchus, i.e., to the thesis that the εἰδοποιία of a body is closely linked to its spatial dislocation.

principle that the similar moves toward the similar; and the second would no longer respect the physical principle according to which heavy bodies move naturally downward so that the movement depends on the causal efficacy of the external place. In Heiberg 1894, 695.3–6, in fact, a solution seems to be formulated: the δημιουργία, which determines the locomotion of earth, subverts the physical principles related to natural places. Even a supposed fragment of Earth, separated from the whole, would move again towards the whole for the same reason in accordance with which the whole is moved, even though this contravenes the physical condition by virtue of which a fragment of Earth does not lose its nature when an unexpected cause intervenes, viz. an obstacle, or, as in this case, the displacement of the whole Earth. So, it seems to be said, the things dislodged will move again in search of the arrangement allotted by the creator (the δημιουργία), even if it should be expected that each body seeks this result not because the natural place has some power but because it is in search of the arrangement which the δημιουργία, *ex improviso*, assigned it.

There are many scholia characterized by some difficulty, due both to the summary nature which structures the surviving fragments and to the contaminated nature of the reports in Simplicius, where Alexander's evidence is often modified with a Neoplatonic and deviant interpretation. That is the case with fr. 24, where Alexander uses an anti-Platonic argument that represents a real contribution to the theory identifying place and matter. Since the ideas, according to Plato, are not in a place, τὸ μετεκτικόν, which we must identify with place (τόπος) and matter (ὕλη), is not the place of the ideas; nor, then, does matter represent the place (οὐδ' ἂν ἄλλου εἴη τόπος). Fr. 27 is considered difficult by Rashed as well; but even in this case, as the editor shows through a very thorough comparison of the results of the exegetical tradition (Themistius, Philoponus, Simplicius, Averroes), Alexander's presence may be concealed.

Fr. 45 is an example of how the comparison of Simplicius, Philoponus, and the scholium forces us to postulate a common exegetical feature at their base, a feature which could be due to Alexander.

Fr. 67 opens a succession of fragments on *Phys.* 4.5 and deserves attention because Rashed notes the contrast between the interpretation of Themistius and that of Alexander, a contrast which is unique in relation to the later exegetical tradition and also to Themistius. The scholium explicitly quotes

Alexander and this fact represents a way of proceeding that is strange and perhaps different from that found in scholia in which the name of Alexander is mentioned *expressis verbis*⁵ Alexander is engaged in the demonstration that the sphere of the fixed stars is unlike the other spheres because it is not in a place; whereas they, since they are limited by an outer sphere, are located in a place. His argument avoids locating the sphere of the fixed stars by noting that this sphere is not limited. Hence, in response, there is the solution by Themistius that will prevail in the later Arabic exegetical tradition, namely, the argument that the inner sphere is productive of place in relation to the sphere enclosing it. In the same vein, the disagreement between Themistius and Alexander, who refused to be associated with a line of interpretation that takes the sphere of fixed stars to be in one place by virtue of the fact that its continuous parts constitute the place of each other, can be found also in relation to Themistius' exegesis of *De caelo* 1.9 279a18–22. We can infer from his paraphrase [Landauer 1902, 55.14–56.3] that Themistius, unlike Alexander, still proposed to resolve the ἀπορία about the location of the sphere of the fixed stars (the ἀπλανῆς οὐρανός) by taking this sphere to be a topological reality or place; in other words, that Themistius extends to the *De caelo* the thesis that the heavens, understood as the outermost of the celestial orbits, *scil.* the sphere of fixed stars, is in a place because its parts are there.

We can bring in some additional elements to reaffirm the authorship of fr. 70. The fragment has in common with the comment *ad loc.* of Philoponus the distinction between φορά and περιφορά, between τὸ φέρεσθαι and τὸ περιφέρεσθαι. Circular locomotion escapes the topological characteristics of locomotion and is proper to the sphere of fixed stars which is without place. The distinction, it should be added, is used by Alexander for the same purpose, i.e., to distinguish the characteristics of the locomotion of the sphere of fixed stars and the characteristics of the locomotion of other realities. It is again Alexander, quoted by Simplicius [Heiberg 1894, 288.3–5] regarding the location of the sphere of the fixed stars, who distinguishes the use of «φορά» as predicated of the motion of bodies which move along a straight line (transfer) from the use of «περιφορά» as predicated of the motion of

⁵ For example, as in the case of fr. 191, where Alexander is quoted along with Aspasius (undoubtedly still present in Alexander's comment) in opposition to Aristotle. But note what Rashed writes about the explicit citations by Alexander on pages 13–14.

bodies which move along a circle (revolution/rotation) [cf. Diels 1882–1895, 580.12–16].

Fr. 75, on speculative interpretation, is one of the few cases where Rashed returns to a position expressed in the first edition of the scholium. Once it is admitted that the scholium and Simplicius derive from Alexander but independently of one another, the point is to establish which of the two expressions—Simplicius' «τινα καὶ ἀκόματα εἶδη» or the scholium's «νοήματα»—in the scholium better represents Alexander's text. Rashed claims now that in the first expression there is a reference to the first movers as pure forms, which in a sense should be understood inside the totality of the universe; while in the other, such an interpretation is not possible. If this interpretation were to be applied, there might be an interesting relationship between the expressions «ἀκόματα εἶδη» / «νοήματα» specified by Simplicius / the scholium about what that would be outside the universe, and the exegetical tradition on *De caelo* 1.9 279a18–22, again recorded in Simplicius' commentary [Heiberg 1894, 287.19–292.7]. Even in this last case it would be necessary to give some meaning to the word «τὰκεῖ». Aristotle would refer to unspecified objects placed beyond the most extreme translation (τὰ ὑπὲρ τὴν ἐξωτάτω φορᾶν) in opposition to Alexander who invoked the authority of *Phys.* 4.5 212b3–21 and read in the expression a reference to the sphere of the fixed stars, which is not localizable and, therefore, beyond the last *translatio*. Alexander, however, seems to have been the only one among the commentators on the *De caelo* to favor this hypothesis [cf. Simplicius, Heiberg 1894, 287.19–288.5]. Starting from Themistius, Ammonius, the school of Alexandria, and Simplicius, the word «τὰκεῖ» was understood as referring to realities, bodies, or separate substances placed beyond the most extreme orbit of the universe.

It is interesting to note at this point that, while the exegetical tradition concerning *De caelo* [cf. Heiberg 1894, 291.27] characterizes the πρώτα εἶδη, the movers of the heavens, as αἴτια ἀκίνητα καὶ νοητά, that is, as something like ἀκίνητα καὶ νοητά, Rashed gives up the first interpretation of fr. 75, according to which Simplicius was passed over in the text of Alexander, since he limits himself to invoking abstract concepts (νοήματα) and tries to reinterpret in a Platonic sense the word «νοήματα» with the locution «ἀκόματα εἶδη». But the contrary might be true: that is, Simplicius' commentary could be closer to the Alexandrian alternative and the «νοήματα» of the scholium could wrongly reproduce Simplicius' «ἀκόματα εἶδη». The inaccuracy could be eas-

ily explained starting from the «νοητὰ εἶδη» that we read again in Simplicius' commentary on *De caelo*, if not from the corruption of «νοητά» (in place of «νοητὰ εἶδη»), which suggests the incorporeal nature of the first movers.

In fr. 120, the subversion of the *ordo verborum* in respect of the text of Aristotle must be joined with the ἀδιαφορία of distance, namely, with the view that no place is more favored than another for the movement or the quiescence of bodies.

Fr. 122, illustrating *Phys.* 4.8 214b31, seems to show the independence of the scholium from Simplicius' commentary. When Aristotle refers to the cosmological hypothesis about Earth's immobility at the center of the universe by virtue of its indifference to moving in any direction, both the scholium and Simplicius remind us of the *Platonicus locus* that is thought to have inspired him, i.e., *Phaedo* 108e4–109a6. The scholium, however, does cite this dialogue explicitly, while Simplicius, because of a *lapsus memoriae*, erroneously and generically cites the *Timaeus*. He clearly has in mind the evidence of *Tim.* 63d12–a3, which is parallel to *Phaedo* 108e4–109a6. Rashed argues from this that both the scholium and Simplicius derive their quotations from Alexander's commentary, where the Platonic source was not explicitly cited. The difference lies in the fact that Simplicius supplies something to fill a lacuna that he found in his source, while the scholiast confines himself to copying it. So Simplicius is not the model of P. This means that the scholium cannot ultimately derive from Simplicius. It must be said, however, that Simplicius has been increasingly scrupulous in that passage of his commentary on *De caelo* [Heiberg 1894, 531.34–532.12] which presents the strongest parallel to this and where Aristotle quotes Anaximander [*De caelo* 1.13 295b10–12]. Simplicius, however, might well be depending on Alexander's commentary which he quotes just above and where he might have found the Platonic reference. It is curious to note that Simplicius' mistake in his *In physics*, that is, his citation of the *Timaeus* instead of the *Phaedo*, can also be found in Themistius' *Paraphrasis* of the *De caelo* [Landauer 1902, 131.12–13], where we read the same confusion, this time with Anaxagoras instead of Anaximander. So this strange circumstance almost has four authors: Alexander, Themistius, Simplicius and the exegetical source from which the corpus of the scholia on the *Physics* has been taken.

In fr. 127, in the anti-Stoic argument about interstitial void, Alexander considers the case of an infinite extra-cosmic void, another Stoic notion. This

seems to confirm *e contrario* the paternity of fr. 89, where the same notion, in a context in which the atomists are also quoted, indicates a distinction of two categories of Stoic philosophers. For Alexander's knowledge of the Stoic concept of extra-cosmic void in a context related to the denial of the possibility of a vacuum outside the universe, see Alexander's long excursus in his comment to *De caelo* 1.9 279a11–18 as preserved by Simplicius [Heiberg 1894, 284.28–286.27].

In the case of fr. 172, at the beginning of the scholium, the sequence «ὁ χρόνος...αὐτῇ» offered by Rashed does not seem to correspond to what was to be expected. Apart from the comparison with Aristotle's text and with the commentary of Simplicius, the translation 'le temps lui meme mesure le mouvement, dans sa quantité et son être, c'est a dire son existence' does not seem completely plausible. But the concept expressed a little later, that time determines the amount of movement and its duration, is better expressed if we correct «πόσι» to «πόσην».

Fr. 176 is interesting because it shows how Alexandrian orthodoxy derives from an exegetical exercise. In this case, however, Rashed fails to record the parallel passage in Simplicius in its entirety.

Scholium 177 is valuable for two reasons. First, it may offer the most reliable example of how a comment by Alexander was reduced and reformulated by those responsible for the scholium, given that, in this case, our *terminus comparationis*, Simplicius, explicitly declares in his commentary that he is quoting Alexander *ad verbum*. Second, the use of the term «καθόδοτος» indicates, according to Rashed, that it was in a cell of the Alexandrian school during the seventh and eighth centuries that the corpus of the scholia was probably formed. This conclusion is all the more remarkable if we consider that a similar hypothesis can be formulated for the corpus of the scholia on *De caelo* by comparing the marginalia of ms Parisinus Coislinianus 166 and ms Laurentianus 87.20.

The case of fr. 184 is different. Here Alexander, in establishing an analogy between a mathematical continuum and temporal continuum, brings the concepts δυνάμει and ἐπινοία closer to each other by leaving unaddressed the questions of how points and instants are in space and time, respectively, and of the nature of space and of time. From a philological perspective, moreover, the scholium confirms that Alexander read «ὄρος» instead of «πέρας» at *Phys.* 4.13 222a12.

In fr. 218 the correction « κινεῖ » to « κινεῖται » is needed and indisputable.

The attribution to Alexander of the material collected by Rashed would seem to be confirmed even by the references to Empedocles contained in the corpus. In fr. 539, Empedocles is inserted into a list of Greek cosmologists based on a usual simplifying quadripartition. After the distinction between the defenders of an infinity of worlds and the theorizers of a single cosmos, the scholium continues by including Empedocles among the followers of a single sensible world that is generated and corruptible. Now, apart from the problematic hypothesis of an ungenerated but corruptible world, whose inclusion in the series should confirm the Alexandrian paternity of the scholium,⁶ the dislocation of Empedocles from the theorists of a single world to the theorists of a cosmic subdivision into two worlds—even if it did exclude the scholium’s derivation from Simplicius—does not confirm its derivation from Alexander. But to lend support to the autonomy of the scholium from Simplicius as maintained by Rashed, it may be added that in one occasion very close to this, namely, in the schematization of the cosmologists on the basis of the created, not generated, corruptible and not corruptible nature of the world, Simplicius explicitly distances himself from the doxographical reconstruction of his model (Alexander) and justifies his disapproval with the same Neoplatonic separation indicated by Rashed. I refer again to Simplicius’ commentary on *De caelo* 1.10, 279b12–17 [cf. [Rescigno 2004](#), fr. 96b] in which his reaction to Alexander’s chronological and cyclical interpretation of Empedoclean cosmology is motivated by Alexander’s inclusion of Empedocles among those who conceived the nature of the cosmos as periodically generated and corruptible, that is, alongside Heraclitus and the Stoics, as in fr. 539.⁷ Fr. 542, despite the forced interpretation of Aristotle, confirms that Simplicius renounced the chronological interpretation of Empedocles’ cosmology. Still, the chronological alternative of Empedoclean cosmology is evident even in fr. 543. The doxographical value of the scholiastic documents on Empedocles is also remarkable in the exegetical tradition of the *De caelo*.

⁶ By reason of its exclusion in Simplicius’ doxography and of its presence in both the scholia and in Alexander’s commentary on *De caelo* [[Rescigno 2004](#), fr. 96] as recorded by Simplicius [[Heiberg 1894](#), 293.11–295.26] and Philoponus [[Rabe 1899](#), 212.16–213.4], where the same alternative is taken into account [cf. [Rescigno 2004](#), 531–554].

⁷ See [Rescigno 2004](#), 533–535 for the other passages quoted.

I now take occasion to integrate the lamentable omission of the Greek text of a scholium from MS Laurentianus 87. 20, included among the *specimina* in [Rescigno 2013](#):

ἡνίκα, φησίν, ἐν τῷ σφαίρῳ ἦν ἡ γῆ, τίς αἰτία τοῦ τὴν γῆν μὴ ἄνω μένειν καὶ φέρεσθαι κάτω; οὐ γὰρ διαφέρει αὕτη ἡ γῆ τῆς ἐν τῷ σφαίρῳ (σφαίρῳ *schl.*) ταῖς ποιότησιν· αἰεὶ γὰρ εἶναι αἰ ποιότητες ἐν τοῖς στοιχείοις· αὐτὸς γὰρ ἔφησεν ὅτι φύσις οὐδέν ἐστιν, ἀλλὰ μόνον μίξις τε διάλλαξις τε μιν γέντων, τουτέστιν ὅτι ἐν μὲν τῷ σφαίρῳ ἠνώμενά ἐστι τὰ στοιχεῖα, ἐν δὲ τῷ αἰσθητῷ κόσμῳ διακεκρυμένα. οὐχ ἕξεισιν οὖν εἰπεῖν τὴν αἰτίαν δι' ἣν ἔμμενεν τότε ἡ γῆ· τὸ δὲ δεύτερον ἐπιχείρημα λέγει ὅτι οὐχ ὅμοιον τὸ παράδειγμα σου, Ἐμπεδοκλείς, τὸ ἐπὶ τοῦ κυάθου καὶ τοῦ οὐρανοῦ· οὐ γὰρ ὡς περὶ ὁ κύαθος ἄπτεται τοῦ ὕδατος, οὕτως καὶ ἡ δίνη ἄπτεται τῆς γῆς. [198v]

From his examination of frs. 590, 591, and 594, Rashed derives not only the independence of Alexander from Simplicius' commentary but also confirms the position of the exegete found already in other fragments.

As a proof of the independence of the scholia from Simplicius' commentary, Rashed also takes into account fr. 626. Here Alexander takes up *Phys.* 8.5 257b3–4 and distinguishes two senses of the locution «ἐν ὄν» as it appears in the phrase «ἐν ὄν καὶ ἄτομον τῷ εἶδει» ('being one and indivisible in form'). In the first sense, it denotes the αὐτοκίνητον (self-mover); in the second, its motion. Thus, Alexander opposes an interpretation found in Simplicius, *In phys.* which takes both senses to signify the motion of what moves itself [cf. [Diels 1882–1895](#), 1234.23–32]. Since the scholium mentions only the first sense, Rashed concludes that the scholium derives independently from Alexander's commentary.

This claim, however, underestimates selectivity on the part of the author responsible for the arrangement of the scholia. In fact, even if Rashed's contention that the scholia are independent of the scholia from Simplicius' commentary is correct, it does not follow that the author of the scholia, in the sense of the first individual responsible for them, had seen Alexander's comment. The scholium's incompleteness in reporting Alexander's exegesis might indicate that it is an indirect quotation, i.e., a citation of a comment in which Alexander's view was already present either explicitly or implicitly.⁸

⁸ As was perhaps the case in fr. 18, where we are in doubt whether Philoponus, whose commentary on *Phys.* 4.2, 209b5 reproduces the scholium *ad litteram*, depends on a lecture by Ammonius on the *Physics* in which Alexander was quoted. If so, the

In any case, the kinetic principle that no motion can participate at the same time in two different kinds of motion is characteristic of Alexander.

Fr. 651 and 635 represent an interesting example of the penetration of the commentaries of Alexander into Aristotle's text and should be considered within the categories described by Moraux [1954], particularly in the category showing the influence of Alexander's exegesis on the textual tradition of Aristotle.

Fr. 636 is interesting for the use of « καινοπρεπῶς » (said of Alexander's exegesis); for the absurdity which, according to Simplicius, Alexander would have gratuitously posited; and also, as Rashed thinks, for recourse to contemporary discussion with Epicureanism and Stoicism on spatial individuality. Without a mutual movement of the parts in combination with the reflexive one, the risk would be the dispersion of the whole. That the scope of the discussion is as Rashed indicates is confirmed, for example, by a section of the thoroughly anti-Stoic excursus taken from Alexander's commentary on *De caelo* and preserved by Simplicius [Heiberg 1894, 284.28–286.27]. In the same way, Rashed assumes in fr. 662 an anti-Stoic polemic in Alexander's commentary concerning the concept of motion καθ' ὁρμήν.

In fr. 640, recourse to the *interpretatio ex Aristotele* cannot demonstrate the independence of the scholium from Simplicius even if Alexander is recognized as its author.

In fr. 662, the first mover is expressly indicated as the cause of existence and movement.

In frs. 680, 681, 683, 789, we note the replacement of the more specific « κυκλοφορητικὸν σῶμα » with « αἰθήρ ».

In certain fragments, it would be a mistake to translate the periphrastic and differently declined locution « οἱ περὶ τὸν... » as denoting a plurality: e.g.,

scholium may derive independently from Alexander's commentary or, better, from Ammonius' lectures *via* Philoponus.

Fr.	Greek Text	Rashed's Translation
fr. 30	διὰ τοὺς περὶ Ἀναξαγόραν	<i>en raison des physiciens autour d'Anaxagore</i>
fr. 89	οἱ μὲν περὶ Δημόκριτον	<i>les partisans de Démocrite</i>
fr. 122	οἱ περὶ Ἀναξαγόραν καὶ Πλάτωνα	<i>les gens autour d'Anaxagore et de Platon</i>
fr. 141	οἱ περὶ Πλάτωνα (καὶ) Πυθαγόραν	<i>les gens autour de Platon, de Pythagore</i>
fr. 783	οἱ περὶ Δημόκριτον	<i>les partisans de Démocrite</i>
fr. 786	οἱ περὶ τὸν θεῖον Πλάτωνα	<i>les partisans du divin Platon.</i>

In all these cases, the context suggests that the singular is to be preferred. Thus, in fr. 30, for instance, 'because of Anaxagoras' is better.

The edition is outstanding for the almost complete absence of typographical errors. The very few that I have found do not affect the intelligibility of the text. Among them, I report the following corrections: 59.10 ἐπίνοια, n299 Ce, fr. 323.1 εἴωθεν, fr. 338.1 ἐφ, fr. 441.2: νῶν, fr. 441 test. 6 τῶν, and fr. 535 app. 2 ἦ.

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Angles et grandeur. D'Euclide à Kamāl al-Dīn al-Fārīsī by Roshdi Rashed

Scientia Graeco-Araba 17. Boston/Berlin: De Gruyter, 2015. Pp. viii + 706.
ISBN 978–1–5015–1070–0. Cloth €169.95, \$238.00

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Angles et grandeur by Roshdi Rashed involves history, mathematics, and philosophy. The subject is angle as a magnitude and it is based on Arab manuscripts dating from the early period of Arab science (ninth century) until the period of the last great Arab scholars (14th century). Having a 706-page book dealing exclusively with angles may seem odd to the general reader and one may wonder what kind of interesting information may be contained in such a book. But skimming these pages, and especially the fascinating comments made by Rashed on the manuscripts which are published here for the first time, will show that the questions discussed are among the most fundamental of those concerning classical Greek mathematics and its continuation by Arab mathematicians. It will become clear after a thorough reading of this book that the questions about the notion of angle and magnitude that are addressed here lie at the heart of mathematics. These questions had tremendous repercussions in the late philosophical-mathematical literature and a real impact in the development of geometry.

The book starts with a general review of the questions raised by the notion of angle expressed in Euclid's *Elements*. This notion was considered from both mathematical and philosophical points of view in the writings of Plato and Aristotle, since mathematics and philosophy were intricately linked at that time. The fundamental idea of science, in particular, of mathematics, that arose before Plato and included the thorough investigation of the meaning of the words 'definition', 'axiom', 'common notion', and so forth, involves in an essential way the multifaceted discussion of the notion of angle. Whether angles, lines, and so on belong to the Aristotelian categories of quantity, quality, relation, or position; whether these are magnitudes and, if yes, whether

they are *homogeneous* magnitudes; whether we can compare angles within a certain class and, if yes, what are these classes and what are the tools used in such a comparison; whether we may apply to angles the known operations (addition, multiplication, and so on), the theory of proportions, and so forth—all these questions are discussed at length in several of Aristotle's treatises; and they remained essential in mathematical thought for 2,000 years. One must bear in mind that these philosophical issues and questions were raised *because* of the notion of angle in geometry.

It is in Euclid's *Elements* that the angle finds its central place among the foundational notions that are at the basis of any treatise on plane and solid geometry. Arab mathematicians between the ninth and the 14th centuries considered this topic from both the mathematical and the philosophical points of view. They transformed it, made it their own, and developed it in a substantial way. This is what Rashed's book is about.

Before going into the details of the content of this book, let us recall a few facts concerning angles from Euclid's *Elements*.

In the *Elements*, angles are introduced in book 1. Right angles are mentioned at the level of the postulates. Postulate 4 reads 'All right angles are equal'. Angles next appear at the level of the definitions.

Definition 1.8

A plane angle is the inclination to one another of two lines in a plane which meet one another and do not lie in a straight line.

Definition 1.9

And when the lines containing the angle are straight, the angle is called rectilinear. [Heath 1956, 1.153]

We deduce from def. 1.9 that there is more than one species of angle. Rectilinear angles form a special class of angles in which the lines containing the angle are straight. The other classes include the curvilinear and the mixed. Among the latter are the so-called contact- or hornlike angles (a term used by Proclus), which Euclid considers in *Elem.* 3.16:

The straight line drawn at right angles to the diameter of a circle from its extremity will fall outside the circle, and into the space between the straight line and the circumference another straight line cannot be interposed; further the angle of the semicircle is greater, and the remaining angle less, than any acute rectilinear angle. [Heath 1956, 2.37]

This is the angle made by a circle and a tangent straight line. There is also the so-called semicircle-angle that is introduced in the proof of the same proposition.

I further say that the angle of the semicircle contained by the straight line BA [which is the diameter] and the circumference CHA is greater than any acute rectilinear angle. [Heath 1956, 2.38]

Solid angles appear in def. 11.11 and figure in props. 11.20–26. They are used in the proof of the fact that there are only five solid regular polyhedra [see addendum to prop. 13.18]. The next three definitions concern right, obtuse, and acute angles.

Definition 1.10

When a straight line standing on a straight line makes the adjacent angles equal to one another, each of the equal angles is right, and the straight line standing on the other is called a perpendicular to that on which it stands.

Definition 1.11

An obtuse angle is an angle greater than a right angle.

Definition 1.12

An acute angle is an angle less than a right angle. [Heath 1956, 153]

However, there was a precise mathematical notion of angle before Euclid that can be traced back to the Presocratic philosophers. The Pythagoreans, back in the sixth century BC, had certainly a precise notions of plane and solid angle; and they used them in their mathematical discoveries, in particular, in their work on regular polygons and the classification of regular polyhedra.

After angles, we must talk about magnitude. In Euclid's *Elements*, magnitudes satisfy a certain number of axioms. For instance:

Axiom 1.1

Things which are equal to the same thing are also equal to one another.

Axiom 1.5

The whole is greater than the part. [Heath 1956, 155]

Lines (or line-segments) are examples of magnitudes: they can be compared and the theory of proportions applies to them. But can we compare magnitudes such as a line and a curve that are not homogeneous? If yes, how? Comparison by length will not be the solution. Indeed, the reader will notice that these questions were addressed several centuries before the invention of infinitesimal calculus and that the general notion of the length of a curve

was far from being completely developed. Aristotle, in *Physics* 8 and other treatises, already addresses the difficulties encountered in comparing an arc of a circle with a straight line. There are, again in Greek philosophy, several classes of magnitudes. But to what classes of magnitudes do the various notions of angle belong? For instance, Euclid's book 5 deals with the so-called Archimedean magnitudes. Do we enter the realm of non-Archimedean geometry in order to develop the theory of angle? The magnitudes that Euclid considers include lines, areas, and solids. Dealing with angles is thus problematic. In Euclid's *Elements*, only magnitudes of the same kind are compared, added, subtracted, or multiplied by an integer. For instance, a surface cannot be compared to a line. Likewise, the theory of proportions developed in the *Elements* applies only to magnitudes.

It should also be recalled that in the *Elements* there are no computations of values of magnitudes like lines, areas, or angles. In fact, there is no computation of any distance, radius, or angle except for statements like 'the sum of the three angles in a triangle is equal to two right angles' [*Elem.* 1.32] or 'two circles are to each other like the square of their radii' [*Elem.* 12.2]. Quotients, products, and so forth of magnitudes are only compared but never computed. Furthermore, the language is geometrical. For instance, Euclid talks about the 'square on the side' and not the 'square of the side'. This point of view contrasts with that of Archimedes, who had a strong inclination for numerical computations. It is well known that he computed approximate values for π and areas under a parabola, for example.

Dealing with angles is more complicated than dealing with lines or areas. One reason is that the value of an angle in Euclid's *Elements* lies between 0 and π . So adding two angles might be problematic, if the result is greater than π . In this sense, the notion of angle does not satisfy the so-called Archimedean axiom. This was pointed out by ancient authors. Another difference is that the operations on angles cannot be made if the angles do not belong to the same class. Hence, the importance of a careful classification of angles. It is relatively easy to compare rectilinear angles. However, Euclid also considers angles which are not rectilinear: for instance, the angle of contact between a circle and a tangent. This is a mixed angle: one side is the arc of a circle and another one is a straight line. At the end of the proof of *Elem.* 1.16, Euclid declares that the contact- or hornlike angle is smaller than any rectilinear acute angle. He also shows, in the same proposition, that the semicircle-

angle is greater than any rectilinear acute angle. What is the exact meaning of such statements? These are some of the questions that puzzled the ancient mathematicians.

Let us recall that Leibniz introduced in his work a class of numbers (the so-called infinitesimals, which he also called differentials) that he postulated to be greater than zero but smaller than any positive number. He also posited rules to manipulate them by addition, multiplication, and so on. In the period between Euclid and Leibniz, Arab mathematicians treated infinitesimals in their own way. This is one subject highlighted in the book under review. Questions on the 'inclination' between two curves, on how one computes angles, and how one compares them are the direct way to infinitesimal mathematics. Topological notions are also involved: to define an angle as a region bounded by two curves, one needs to make precise the notion of the 'boundary' of a region. Other important notions that appear in the context of angles include continuity, convexity, infinite division.... Some of the questions related to these notions were raised in very precise terms by Aristotle in various treatises and they became fundamental objects of investigation in the Western world, starting from the Renaissance, and found important development during the 17th century in the works of Galileo Galilei, Wallis, Hobbes, and other scientists that culminated in the works of Leibniz and Newton. All this is well known. It is much less known that these questions were thoroughly studied by Arab mathematicians working in Syria, Iraq, Egypt, and Spain and that their mathematical and philosophical development attained an extremely high level of scholarship between the ninth and the 15th centuries.

Let us come back to the book under review. This is the first thorough essay devoted to the work of Arab scholars on this subject. It contains an analysis of the Greek writings translated into Arab on the one hand and the original contributions of Arab mathematicians on the other. Arab texts and texts by Greek mathematicians available only in Arab translation are here translated into French and analyzed. Some of the authors of the Arab texts presented were well known in the later Latin world; we find among them Ibn al-Haytham (the famous astronomer, physicist, and mathematician known in the Latin world as Alhazen), Ibn Sīnā (Avicenna, the well-known physician and philosopher), and Naṣīr al-Dīn al-Tūsī (whose work on the problem of parallel lines was known and quoted by Wallis among others). Many readers

will encounter for the first time the names of al-Nayrīzī, al-Anṭākī, Ibn Hūd, al-Sijzī, al-Samaw'al, al-Fārisī, al-Qūshjī, al-Abharī, and al-Shirāzī. All of them were important mathematicians.

Some of the works among those that are presented in this book deserve to be especially highlighted. We mention here the work of Abū 'Alī al-Ḥasan ibn al-Ḥasan Ibn al-Haytham (d. after 1040). His profound work on infinitesimal mathematics, in continuation of the works of Archimedes and Apollonius, represents an epistemic turning point in the theory of angle.¹ Ibn al-Haytham applied his theory of infinitesimals to the setting of angles, in particular, for the comparison between a contact-angle and a rectilinear angle. His study uses the fact that these two 'magnitudes' do not satisfy *Elem.* 10.1 (they are not Archimedean). Among the arguments, Ibn al-Haytham introduced are two sequences, an increasing one and a decreasing one, the second one bounding the first one from above. With these two sequences, Ibn al-Haytham was able to compare infinitesimals [101]. It is in trying to resolve difficulties that appear in the *Elements* that Ibn al-Haytham wrote his two famous treatises, the *Explanation of the Postulates of the Book of Euclid* and the *Book on the Solution of Doubts Relative to the Book of Euclid on the Elements and the Explanation of Its Notions*. In these works, Ibn al-Haytham created a new geometry where the notions of angle and of superposition are primitive elements. From his point of view, the notion of equality (similarity) of lines and areas are based on motion—a notion avoided by Euclid (and prohibited by Aristotle, who considered motion as pertaining to physics rather than mathematics). Ibn al-Haytham addressed the difficulties that are inherent in applying these ideas to the notion of angles (in particular, to solid angle). His work was continued by several Arab mathematicians, including Naṣīr al-Dīn al-Tūsī (1201–1274) in his commentary on Archimedes' *Sphere and Cylinder* in which he addresses the question of the comparability of lines and curves, and of curvilinear angles. Naṣīr al-Dīn used in particular a notion of 'rolling onto each other' in comparing the lengths of curves [469ff].

It may be worth saying a few words on the modern period. Hilbert, in his *Foundations of Geometry* [1898], introduced the notion of angle in the setting of his congruence axioms (Group IV). These are the axioms of motion. Klein, in his *Elementary Mathematics from an Advanced Standpoint* [1908–1909]

¹ See Rashed 1996–2000 or 2011–2017 for an English translation.

discusses angles at length in relation with motion, in the third part of his essay titled *Systematic Discussion of Geometry and Its Foundation*. In Birkhoff's axiomatization of geometry [1932], which is based on the real number system (and which is, therefore, minimalistic), angles belong to the list of four undefined notions, the other three being point, line, and distance.

Let us now turn to the content of *Angles et grandeur*. Chapter 1 contains critical editions with historical and mathematical commentaries of important manuscripts that concern the notion of angle in the Euclidean tradition. The first manuscript is a text of *Elem.* 3.15,² edited from 10 different Arab manuscripts. These Arab versions of Euclid are particularly important in the present context because the Arab mathematicians whose texts are edited in the book under review relied on them. The text of *Elem.* 3.15 is followed by an excerpt of a commentary on the first book of the *Elements*, edited from the so-called Qum manuscript, by the Neoplatonist philosopher and mathematician Simplicius (ca 490–ca 560), who is also a famous commentator on Aristotle. The text concerns angles, their species, whether they are magnitudes, and whether they are qualities, for example. The author quotes his predecessors Apollonius and Aghānis.³ This text is followed by a commentary by Ibn al-Hātim al-Nayrīzī (d. ca 922) on *Elem.* 3.15. Then follows an anonymous manuscript, referred to as the *Lahore manuscript* and titled 'Treatise on the Angle', in which Euclid, Apollonius, Simplicius, and Aghānis are again mentioned. It contains a wealth of mathematical proofs and technical remarks on the divisibility of various species of angles. This memoir ends with the words:

These are things concerning angle that leave one puzzled, given that some of its states necessarily imply that it is a magnitude and others that it is not.

Chapter 1 also contains two other texts, comments on Euclid's *Elements* by al-Anṭākī (d. 987) and by Ibn Hūd (d. 1085), the latter extracted from his encyclopedia *al-Istikmāl*. This chapter, with its texts and the commentaries, gives an impressive overview of the rich subject of angles.

² *Elem.* 1.15 in the Arab manuscripts corresponds to 1.16 in Heiberg's edition and in Heath's translation.

³ The latter is referred to on page 52 in an edited excerpt: 'My friend Aghānis...'.

Chapter 2 concerns more especially the research conducted on the notion of magnitude, in particular, magnitudes that do not satisfy *Elem.* def. 5.4⁴ as well as those that do not satisfy the so-called Eudoxus-Archimedes axiom, which is extensively used in book 12 of the *Elements*. Rashed recalls that al-Sijzī (middle of the 10th century) considered the question of angles in his *Introduction to the Science of Geometry*, in a treatise called *All the Figures that Arise from the Circle*, and in an epistle on *Elem.* 11.23 which concerns solid angles. In fact, al-Sijzī worked out a classification of curves into measurable and non-measurable according to their form and to whether one can use them in the theory of proportions. He applied the same criteria to the study of plane and solid angles. Al-Sijzī also considered non-planar curves. (It should be recalled that in Euclid's *Elements*, all curves are planar; there are no spatial curves.) Thus, al-Sijzī introduced new sorts of angles that do not satisfy *Elem.* prop. 5.4. He used the notion of 'equality in power' and a process called 'continuous variation of the tangent'.

Another major author considered in chapter 2 is Ibn al-Haytham, whom we have already mentioned. His research on the angle is also part of his contribution on isoperimetry and isepiphany, in which he developed a geometry where situation is combined with measurement and where he included angles among the primitive elements of geometry. His work is both a continuation and an outcome of the work of the Arab mathematicians of the two centuries that preceded him. His investigations related to angle are included notably in his two books on the explanation and the correction of Euclid's *Elements*, in which he considers all the basic questions, such as the existence, classification, nature, and homogeneity of angles. Ibn al-Haytham also considered planar angles on convex surfaces. He discussed extensively the relation between equality and superposition, and he introduced kinematic notions in that theory. Chapter 2 contains a critical edition of Ibn al-Haytham's work on *Elem.* 15 from his *Book on the Solution of Doubts Relative to the Book of Euclid on the Elements and the Explanation of its Notions*. This chapter also contains a critical edition of a text by the algebraist al-Samaw'al ibn Yayā al-Maghribī (d. 1175) titled *Epistle on the Angle of Contact*, in which

⁴ According to this definition,

magnitudes are said to have a ratio to one another which are capable, when multiplied, of exceeding one another. [Heath 1956, 114]

Rashed gives an explanation of the non-homogeneity and the non-comparability of figures, based on the example of the angle of contact. Together with Kamāl al-Dīn al-Fārisī (d. 1319), al-Samaw'al is one of the successors of Ibn al-Haytham who continued his research on angles of contact.

Chapter 3 has a more philosophical flavor. It contains a letter addressed by Ibn Sīnā (980–1037) to another physician and philosopher, Abū Sahl al-Masīhī, who was an erudite familiar with Greek science and literature. In this epistle, Ibn Sīnā makes a systematic exposition of the notion of angle (planar and solid) with an examination of the opinions of several of his predecessors. The chapter also contains an excerpt on angles from Ibn Sīnā's famous treatise *Al-shifā'* (*Fragment of Book IV, Fifth Chapter*), in which he discusses the question of which Aristotelian category the concept of angle belongs to. He considers that angles belong to both categories of quality and quantity. Notions like quantity, quality, relation, magnitude, figure, limit, and others are considered in their philosophical aspect. Infinite divisibility of angles is also discussed. An adequate specialized metaphysical vocabulary is used that involves the distinction between 'in itself', 'by essence', and 'by accident', for what concerns the fact that angles satisfy the Euclidean definition of magnitude. Chapter 3 also contains a 'Treatise on the Angle' by Kamāl al-Dīn al-Fārisī (1266–1319), a philosopher who commented on the works of Ibn Sīnā and Ibn al-Haytham. This treatise constitutes a synthesis of the knowledge of these two philosophers on the question, using again a philosophical language. The same chapter contains fragments from Ibn al-Haytham's *Explanation of the Postulates of the Book of Euclid* which are quoted by al-Fārisī. The chapter closes with the memoir *On the Contact Angle* by 'Alā' al-Dīn al-Qūshjī (1403–1474) in which Rashed considers issues related to the continuity of angles.

Chapter 4 concerns solid angles. We recall that the study of solid angles started with the Pythagoreans who investigated regular polyhedra. The subject is also discussed in Plato's *Timaeus*. Euclid used the theory of solid angles in book 11 of the *Elements* in order to classify regular polyhedra. The theory that he developed was pursued by Arab commentators, who considered cases that were not considered by Euclid (e.g., concave angles). They also developed rules for the comparison of solid angles. For instance, Al Sijzi considered solid angles not bounded by planes. In the 11th century, Ibn al-Haytham developed the theory of solid angles in his research on

isoperimetry and equal surface areas. He was motivated by the problem of approximating the volume of the sphere by volumes of convex polyhedra in his infinitesimal approach to the sphere. In his works, solid angles are subject to the usual operations that apply to Archimedean magnitudes and to the theory of proportions. He used the work of Archimedes on the sphere but also conical projections, and spherical geometry. One may recall here that in the Western world and after the Hellenistic period, research on solid angles started only after the 17th century in works of Descartes followed by Euler, de Gua, Legendre, and Cauchy, for example.

Chapter 5 of Rashed's book contains critical editions of Arab versions of Euclid's props. 11.20–23, 11.26, from the same manuscripts used for Euclid's Proposition presented in Chapter 1. These are now the propositions that deal with solid angles. Then comes a text by al-Sijzī, his *Epistle to Resolve the Doubt Relative to the Twenty-Third Proposition of the Eleventh Book of the Elements and to Another of His Constructions*. This epistle is followed by Ibn al-Haytham's commentary on *Elem.* 11.23 in his *Book on the Solution of Doubts Relative to the Book of Euclid on the Elements and the Explanation of Its Notions*. It is followed by commentary by the 13th-century philosopher, mathematician, and astronomer al-Abharī on props. 11.22–23, extracted from his *Commentary on Euclid's Elements* and a commentary on the same propositions by Naṣīr al-Dīn al-Ṭūsī from his redaction of the *Elements*. Finally, the chapter contains an excerpt of a commentary by an anonymous writer on *Elem.* 11.23 from the Escorial Manuscript.

Chapter 5 focuses on texts concerning the comparability of angles. The general question is how to compare magnitudes while taking into account the Aristotelean ban of motion. The author reviews questions related to equality, superposition, congruence, similarity, and so on in the works of Euclid, Apollonius, Proclus, and their Arab successors. This chapter contains critical editions of fragments of the redaction of Archimedes' book *On the Sphere and on the Cylinder* by Naṣīr al-Dīn al-Ṭūsī and a *Treatise on Rolling Motion and on the Relation between the Rectilinear and the Curve* by Al-Shīrāzī (second part of the 13th century).

Rashed also includes the Arab translation by Ḥunayn ibn Isāq of the definitions of *Elem.* bk. 11 and an Arab-French glossary of words.

In conclusion, *Angles et grandeur* is extremely rich in historical as well as mathematical information. One can admire the texts by the various authors

quoted for the clarity and precision in their mathematical language. The texts presented, most of them published here for the first time together with the commentaries by Roshdi Rashed, constitute a major contribution to our mathematical, historical, and philosophical literature.

There is much still to be done. As the author remarks, there is no critical edition of the various Arab translations and commentaries of the *Elements*. Doing such a work will be an essential step in the reconstruction of the original work of Euclid. We also learn from Rashed that there exist treasures of Arab manuscripts to be studied, for which there is an urgent need of historians who are knowledgeable in mathematics and in Arabic.

Roshdi Rashed possesses a broad knowledge in mathematics and history, a deep insight in the foundations of mathematics and the interrelations between the different fields of science, and an unusual ability to transmit the important Arab mathematical texts and to comment on them. By his industrious work, he has transformed the landscape of the history of Greek and Arab mathematics. His writings render an incomparable service to science and history.

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Epistles of the Brethren of Purity: On Arithmetic and Geometry. An Arabic Critical Edition and English Translation of Epistles 1 and 2 edited and translated by Nader El-Bizri

Oxford/New York: Oxford University Press with the Institute of Ismaili Studies, 2013. Pp. xxiv + 187 + 157 (١٥٧). ISBN 978-0-19965-560-1. Cloth £52.00, \$99.00

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In a fable that appears in epistle 22 of the *Rasā'il Ikhwān al-Ṣafā* (*The Epistles of the Brethren of Purity*), the remarkable philosophical compendium dating from the fourth century AH (10th century AD), humans are compelled to defend themselves against accusations of overbearance by members of the animal kingdom. The final witness (and the one who wins the day for humans) is described as a man who is

Persian in derivation (*al-fārisī al-nisba*), Arabic in faith, Hanafi in *madhhab*, Iraqi in culture, Hebrew in lore, Christian in conduct, Syrian in piety, Greek in scientific knowledge, Indian in contemplation, and Sufi in spirituality.

Though the authorship and precise dating of the *Rasā'il* remain uncertain, the eclectic background of this fictional defender of humanity reflects well the cosmopolitan nature of Islamic society, particularly as represented by the rich cultural setting of Basra (the likely provenance of the work) at the time the book was written. The period was one that witnessed the weakening of central Abbasid power in Baghdad as well as the rise of Shi'a political fortunes—the rule of the Buyids in Iraq and Persia, and of the Fatimids in North Africa and subsequently in Egypt. The cultural productivity of this period was driven in part by an increase in the prestige of regional centers of culture in an era that witnessed, for example, the peregrinations of such extraordinary figures as al-Mutanabbī (d. AD 965) traveling in search of patronage from Aleppo to Fustat and Shiraz. Important also was an increased interest in esoteric knowledge and gnostic doctrines, particularly by followers of the Shi'a branch of Islam, a development that appears to have led, in turn, to a renewed appreciation for philosophy and the pre-Islamic sciences.

The sprawling nature of the *Rasā'il*, which holds as its aim nothing short of a scholarly presentation of every branch of knowledge known to its author or authors, is no doubt part of the challenge of editing this work for publication. More than 1,000 pages long, the work is divided into 52 epistles with 14 on mathematics and the educational sciences, 17 on the natural sciences, 10 on the psychological and rational sciences, and 11 on the theological sciences. Despite its vast scope, however, the *Rasā'il*, has seen several modern editions. Of varying quality and often silent regarding their manuscript sources, these editions—including the pioneering 19th-century work of Friedrich Dieterici (d. 1903) and a reliable multivolume set published by Dār Ṣādir (Beirut, 1957)—stand as testaments to the abiding interest in the *Rasā'il*. Given the significance of this work as a comprehensive classification of the knowledge of its era as well as its importance as a source for the subsequent development of Islamic philosophy, a new series of critical editions published under the general editorship of Nader El-Bizri by the Institute of Ismaili Studies (IIS), London, is a welcome addition to the scholarship of the *Rasā'il* and to the field of premodern Islamic history as a whole.

On Arithmetic and Geometry: An Arabic Critical Edition and English Translation of Epistles 1 & 2, which has been edited by El-Bizri himself, takes its place among previously published works in the IIS series (which include critical editions of epistle 22, *The Case of the Animals versus Man before the King of the Jinn*; epistles 10–14, *On Logic*; epistle 5, *On Music*; and epistle 52, *On Magic*). In this latest addition to the series, epistle 1, on arithmetic (for which an English translation—duly noted by El-Bizri—was published by Bernard Goldstein in 1964), presents the properties of numbers in 25 chapters using a synoptic format aimed at the novice or initiate. Rather than present the most advanced mathematical results of its era, this epistle focuses on providing a dependable basis for the subsequent presentation of other topics. Absent here, for example, are developments in algebra that occurred within the Islamic world in the decades leading to the 10th century. Influenced by the works of the Neopythagorean mathematician Nicomachus of Gerasa (d. ca AD 120), epistle 1 is heavily imbued with Pythagorean and Hermetic doctrines regarding the symbolism of numbers and the correspondence between numbers and the natural and supernatural worlds.

Epistle 1 is imbued, as well, with the soteriological properties of knowledge and its ability to free the soul from earthly bondage, a sentiment that pervades

the work as a whole. We encounter in this first epistle not only the treatment of ‘whole numbers and fractions’, ‘multiplication, roots, and cubes’, and ‘propositions from Euclid’s *Elements*, Book II’, but also a discussion of ‘arithmetic and the soul (*‘ilm al-‘adad wa al-nafs*)’ in which the soul is described as the ‘essence’ in which the various branches of the science of numbers are embedded as accidentals. A final chapter on ‘the purpose of the sciences (*al-gharaḍ min al-‘ulūm*)’ outlines the manner in which mastery of the mathematical sciences is meant to serve as prerequisite to mastery of the natural sciences, which are in turn a stepping-stone to the theological sciences and the science of the soul, all with a goal of ensuring the soul’s salvation.

Epistle 2 is inspired by Euclid’s *Elements* (books 1–8), and presents in 27 chapters various topics related to geometry, defined as the branch of knowledge that ‘inquires about magnitudes, distances, and the quantity of their kinds, along with the properties of their types (*ma‘rifat al-maqādīr wa al-ab‘ād wa kamiyyat anwā‘iha wa khawāṣ tilka al-anwā‘*)’. Included in this epistle are such unexpected features as the division of lines into

- rectilinear,
- *muqawwas* (i.e., semicircular arches outlined with a *birkār*, i.e., a *parḡār* or compass, from the Persian), and
- *al-khaṭṭ al-munḡani* (rendered by El-Bizri as ‘bumpy’ line), a composite shape consisting of an arc with two straight end pieces.

Novel, as well, is the inclusion in the section on planar angles of angles formed by the intersection of rectilinear and *muqawwas* lines or those formed by two *muqawwas* lines. The heavy Neoplatonism that permeates the work as a whole figures in chapter 11 of this second epistle in a somewhat strained discussion of how a ‘triangle is the origin of all figures.’ Chapter 18, ‘On intellective geometry’, describes the aims of the consecutive presentation of arithmetic and geometry as raising the reader from the realm of the sensible (*al-maḡsūsāt*) to that of the intelligible (*al-ma‘qūlāt*), thus fulfilling a Platonic program of re-orienting the sensibilities of the initiate from corporeal matters to spiritual ones.

For his study, El-Bizri relied on nearly two dozen manuscripts from collections in Europe, Turkey, and Iran. Digital reproductions of these manuscripts, which have been assembled by the IIS in London, represent a remarkable research tool for scholarship on the *Rasā‘il*, though use of these digital copies is limited to scholars working on future publications in the same IIS *Rasā‘il*

series. The core group of five manuscripts used for editing epistles 1 and 2 included MS Atif Efendi 1681, the oldest known surviving manuscript of the *Rasā'il*. Dated to AD 1182, this important manuscript nonetheless likely post-dates the work itself by more than two centuries, hinting at the difficulties in arriving at an authoritative *ur*-text for this important work.

In describing the core group of manuscripts, El-Bizri stresses some of the intractable issues facing scholarship on the *Rasā'il*. These include the idiosyncrasies and divergences of the language in the various extant manuscripts and the resulting difficulties in arriving at even a provisional description of the influences and commonalities between the various members of the manuscript tradition. In the absence of such evidence, El-Bizri has set the aforementioned MS Atif Efendi as his base-text, while subjecting it to a comparison with other members of the core-group as well as the 1957 Beirut edition. (Sadly, the sources for this manuscript were left unrecorded.) Given these editorial challenges, El-Bizri emphasizes as well the need for future studies to 'uncover the mysteries that surround the lineage of the manuscripts' in the hope of arriving someday at something approaching a *stemma codicum*. Here he offers instead some general observations regarding the common features of members of his core-group with respect to lacunae, appended material, and other details. It should be noted that this information, while intriguing, could perhaps have benefitted from visual evidence from the manuscripts themselves. A more substantial criticism regarding this work concerns the decision to set paragraph breaks at different points in the Arabic and English texts, a decision which appears to have been made for no discernible reason. Besides these two quibbles, there is little else in El-Bizri's admirable work to fault.

Imbued with a rare spirit of tolerance for various philosophical schools that preceded it, the *Rasā'il* often surprises the reader with its readiness to consider and give credence to these inherited knowledge-systems—as can be seen, for example, in the fable of the animals and the exemplar of humanity and his unorthodox intellectual and philosophical pedigree mentioned in the opening paragraph. In epistle 2, we see the purpose of the educational program of the Brethren of Purity and their *Rasā'il* laid out cogently as

salvation from this world, which is the realm of generation and corruption, and from the sufferings of hell and the company of demons and *Iblis*' soldiers and by way of ascending to the domain of the celestial spheres and the vastness of the

heavens [with the help of those] who are brothers to you, who are counsellors to you and virtuous friends...who are knowledgeable about the articles of faith and are knowers of the truth of things.

Epistles 1 and 2 of the *Rasā'il*, now available in a new edition and translated into English by El-Bizri, represent the critical first steps of this vast project of salvation in a remarkable premodern Islamic text that is marked by an admirable inclusivity and a laudable cosmopolitanism.

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Explaining the Cosmos: Creation and Cultural Interaction in Late-Antique Gaza by Michael W. Champion

Oxford/New York: Oxford University Press, 2014. Pp. xii + 241. ISBN 978–0–19–933748–4. Cloth £48.00, \$74.00

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The last two decades have seen a remarkable renewal of interest in Late Antique Gaza, which contrasts positively with the recurring tragedy and isolation of the Palestinian city nowadays. Several studies have addressed different aspects of Gazan religious and intellectual history from the fourth to the sixth century. In early Byzantine Palestine, a region that became more and more Christian despite its continuing multiethnic and multi-religious environment, Gaza remained a stronghold of paganism until at least the beginnings of the fifth century. Generally, research has not dealt at once with both the pagan and the Christian Gaza of Late Antiquity, thus suggesting the picture of two separate worlds: on the one hand, the ancient Hellenistic heritage of the rhetorical school of Gaza, which in conformity with the Second Sophistic was not devoid of philosophical concerns; on the other hand, the new tradition of Christian theology and especially of monasticism that flourished in the vicinity of the city during the fifth and sixth centuries. Even in recent research, we find few exceptions to the separate treatment of these topics. The essays collected by Brouria Bitton-Ashkelony and Aryeh Kofsky in their pathbreaking volume *Christian Gaza in Late Antiquity* [2004], as suggested by its title, mainly focus on the ecclesiastical and monastic life, although they include some contributions on pagan festivals, urban games, and spectacles, as well as on the literary activity of the sophists and their social status. Shortly afterwards, the two editors produced an important monograph, *The Monastic School of Gaza* [2006], which restricts the perspective further by investigating the ascetic ideals and practices of the great spiritual masters of Gazan monasticism. A step towards a more comprehensive approach was made with the first of a series of symposia, held in Poitiers in 2004, of which the proceedings were published by Catherine Saliou [2005]. Saliou's volume

tries in particular to exploit the results of archaeological excavations (undertaken only for a short period in more peaceful circumstances than at present) and to interact with historical and literary inquiries centering on the works of the sixth-century sophist Choricius. A second conference, organized in Paris in May 2013, has sensibly enlarged the scholarly approach for the first time in order to mirror the many elements of the Late Antique culture of Gaza. Its proceedings [Amato, Corcella, and Lauritzen 2017] certainly provide a stimulus for further investigations, as already shown by the new initiatives of the organizers of the Paris conference, who have created a research group and have launched a website (<http://ecoledegaza.fr/>) devoted to their current activities.

Against this scholarly background, here essentially summarized for the sake of brevity, Michael W. Champion's book should be regarded in its scientific orientation and general structure first of all as an effort to overcome the above-mentioned duality of approaches and thus to gain a more inclusive view of the cultural and intellectual landscape of Late Antique Gaza, both pagan and Christian. More precisely, as indicated by its title, the author aims at retracing the dynamics of cultural interaction in light of a central tenet of Christian belief—the doctrine of the creation of the world *ex nihilo*—in response to the attacks on it by Neoplatonism with its idea of an eternally existent world. For this purpose, Champion takes three of the most famous authors of Gaza as crown witnesses and one of each of their works as a text of reference. In chronological order, they are:

- (1) Aeneas of Gaza and the philosophical dialogue *Theophrastus*;
- (2) Zacharias Rhetor and the *Ammonius*, a work similar in nature; and
- (3) Procopius of Gaza and his *Commentary on Genesis*.

In Champion's words,

through an analysis of how these writers seek to effect change in their local cultures, I aim to explain the distinctive features of Late Antique Gazan society and intellectual culture. [2]

Consequently, the book, after the introduction, is divided into two parts, devoted respectively to cultural history (1. 'Creating Gazan Cultures') and to intellectual problems (2. 'Explaining Creation'). A short conclusion ('Creation Creating Cultures') retraces the main lines of the investigation while providing suggestions for further research. A substantial bibliography, not

restricted to secondary literature in English, concludes the book together with an *index locorum* and general index.

The core of the book should be sought in the longer, second part, although Champion lays the ground for it through the preliminary challenge of a ‘cultural history’ of Gaza, in which the three selected authors come to play their converging roles. I speak purposely of a ‘challenge’ because I am aware that to retrace the cultural interaction of Late Antique Gaza with its multiple tensions and contrasting protagonists remains a difficult task. Therefore, I appreciate the intention of the author but the picture that he draws is far from being satisfactory.

In an introductory assessment, Champion discusses the methodological issues and rejects a too-rigid pattern of conflicting cultural and religious models:

While the Gazans thus partly construct their arguments and preferred religious identity through conflict and opposition, we also find them quietly borrowing and adapting ideas or proudly claiming other identities they share with their non-Christian neighbors. Careful examination of their works reveals elements of Gazan society more open to difference and supports a model which takes conflict as just one element in the construction of ideas and associated cultural practices and personal identities. [7]

Here, Champion reacts also to Glanville Downey’s view according to which Gaza should be viewed ‘as a place where it was thought “more suitable, and also in better taste, to keep Christianity and classical thought quite separate”’ [34n59]. He might be right so far as the authors of his investigation (and more specifically their respective works) are concerned; but the plurality of the ‘local cultures’ of Late Antique Gaza—to use the author’s terms—does not always display the openness and capacity to adapt for which he is pleading.

Let us consider Zacharias Rhetor, later bishop of Mitylene. Apart from the problem of using him and his *Ammonius* as evidence of the Gazan cultures *tout court*, in as much as his career played out mostly elsewhere, we still have to consider that his transition from monophysitism to Chalcedonian orthodoxy is not representative of the ecclesiastical situation of Gaza in the period ranging from the council of Chalcedon (451) to the reign of the philo-Chalcedonian Emperor Justin (512–527). Zacharias probably ‘had moved to the Chalcedonian camp by the early years of the reign of Justin and Justinian’ [12]. In contrast, Severus of Antioch, a former fellow student in

Alexandria and Berytus, concerning whom Zacharias wrote a biography, remained a staunch opponent of the council of Chalcedon throughout his life. With this uncompromising attitude, he continued in the Gazan monophysite movement, led by such intransigent personalities as Peter the Iberian or John Rufus. Regarding this group, which seems to have influenced the Christian communities of the Gazan region for more than half a century, we should take into account a dogmatically motivated conflictual ‘interaction’ or ‘self-seclusion’ to use the author’s terms. Occasionally, Champion proposes his own interpretative model in contrast to the reconstruction worked out by Edward J. Watts, though he surprisingly does not quote Watts’ recent monograph [2010]. For Watts, to understand Zacharias’ defense of the destructibility of the world in the *Ammonius*, one should consider his connections with Peter the Iberian and the anti-Chalcedonian monasteries of Palestine [2010, 138–142]. Moreover, as Watts says in referring to the experience of students in Alexandria and Berytus who were influenced by the Iberians,

these were young men who particularly valued truth and, perhaps for this reason, found themselves uncomfortable overlooking the cultural ambiguities that often allowed Christians to cull from pagan learning ‘whatever was useful while smiling at the myths’ [Choricius of Gaza, *Laud. Marc.* 1.2.6.1–4 = τὰ κάλλιστα συλλέγων μὲν ὅ τι χρησιμὸν ἔφν, προομειδιῶν δὲ τοῖς μύθοις]. [Watts 2010, 141]

In a similar way, Champion rejects the portrait of Procopius traced by Bas ter Haar Romeny because, as Champion sees it, the apparent fluctuation of this Gazan rhetor between the ‘pagan’ and the ‘Christian’ is to be explained in relation to the diversity of literary genres [15]. Nevertheless, he shares Haar Romeny’s conviction that the exegetical commentaries of Procopius were used for educational purposes in the rhetorical schools. But Karin Metzler, in her new edition of Procopius’ *Commentary on Genesis* [2015, xxvii–xxx], has recently formulated justified scepticism concerning such an assumption about the use of exegetical commentaries in the rhetorical schools.

A presentation of the schools in Late Antique Gaza follows the initial prosopographical sketches of the three Gazan authors. Champion attempts to retrace the larger cultural network of the city, including contacts with Caesarea within Palestine and with Alexandria and Antioch without. Actually, apart from the mention of a few names, we do not know much about ‘Caesarea’s pagan schools, which had recently been built up by figures such as Acacius, Libanius, and Orion’ [24: cf. 37]. Instead, it is reasonable to assume

the importance of the Christian library of Caesarea to the intellectual life of Late Antique Gaza, at least for the exegetical enterprise that Procopius undertook in his biblical *catenae* and commentaries [38], though we cannot exclude the impact of libraries located in Gaza and elsewhere (for instance, in Jerusalem). Champion then exploits the findings of the *auditoria* of Kôm el-Diqqa in Alexandria for his reconstruction of the settings of the schools, even if he is wisely aware of the diversities of local situations [30]. The picture resulting from this analysis largely rests on more or less generic inferences and parallels, whereas the rich literary panorama of Gaza in the fifth and sixth centuries, besides the triad of authors under examination, takes a more precise shape with the emergence of several significant figures: Zosimus of Ascalon, a commentator on Lysias and Demosthenes; the poet and rhetor John of Gaza; the sophist Choricus; the Latin grammarian Hierius; and the grammarian and naturalist Timothy of Gaza. Champion does not mention the name of another famous sophist of this period, Dionysius of Antioch, the addressee of Aeneas' *Epist.* 17 [43], who with his letters is a source comparable to Aeneas and Procopius. Nor does he recognize the direct involvement of Aeneas in the administration of justice as witnessed by Aeneas' *Epist.* 3 and 24 as well as by Procopius, *Epist.* 82–83 [Lilla 2000, 267].

To complete the description of the Gazan cultural and religious setting, Champion adds some information about monasteries, relying on Bitton-Ashkelony and Kofsky's *Monastic School of Gaza* [2006]. The connection of the intellectual *milieu* of Gaza with the monastic experience is suggested by the famous passage of Zacharias' *Life of Isaiah*, in which the sophist asks the recluse for the interpretation of passages in Plato, Aristotle, and Plotinus. Yet more caution is demanded in depicting the intellectual profile of Gazan monasticism than we find in Champion's reconstruction. According to Champion, Origenist monks supposedly settled in Gaza already before the end of the fourth century, whereas the emigration from Scetis to Palestine was more likely prompted by the attacks of nomadic tribes on the Egyptian site [39n86]. Champion refers to the monastic family of Silvanus, recorded in the *Sayings of the Desert Fathers*. But in light of this source (and of Sozomenus, *Ecclesiastical History* 6.36), there is no good evidence to support the idea that this group of monks distinguished itself as a 'cultivated circle'. Also, the portrait of Peter the Iberian, a Georgian prince and formerly a hostage at the court in Constantinople, is presented in too generic a way to allow a grasp of his education [40], in spite of the fact that he has been identified

by some with Pseudo-Dionysius the Areopagite (a controversial claim that Champion understandably does not mention, although he should have paid some attention to the work of Pseudo-Dionysius for his investigation into late Neoplatonism and Christianity). Even more relevant is the fact that the author—for the sake of his putatively ongoing ‘cultural interchange’ in Late Antique Gaza—completely ignores the events of the ecclesiastical history of the city in this period. Accordingly, as he would have it, ‘Gaza at the turn of the sixth century was a city of overlapping local cultures, where the dominant explanatory categories were exchange, interaction, and transformation’ [42]. As I hinted above, this ‘optimistic’ picture does not fit well with other narratives in which opposition and closure dominate, such as the writings of John Rufus, the monophysite bishop of Maiumas of Gaza (especially in his *Plerophories*).

To explain how the ‘local cultures affect the lives of the three’ [43], Champion addresses Aeneas’ letters in the wake of the recent treatment of Procopius’ epistolary output by Eugenio Amato [2010]. His point here consists in showing the influence of Neoplatonism, although the letters rather constitute a document in the rhetorical *paideia* of the Second Sophistic (if we should not adopt the expression ‘Third Sophistic’ precisely in view of the sophists of Gaza themselves). As such, the letters undoubtedly reflect Aeneas’ social standing and cultural connections more than the ‘dominantly Christian framework’ as stated by Champion [46]: Aeneas’ letters have apparently nothing in common, for instance, with the correspondence of the two recluses Barsanuphius and John of Gaza in the first half of the sixth century. So far, Champion does not succeed in providing a proof deriving from ‘the power of Plato and Aristotle within this culture’ [49], whereas the settings of Aeneas’ *Theophrastus* and Zacharias’ *Ammonius* point instead to the intellectual scene of Alexandria and Athens. So, for Champion,

Gaza is...a place which interacts with both Alexandria and Athens, and without minimizing the particular importance of Alexandria, the Gazans’ works seem directed more generally against Neoplatonic culture. [51]

With regard to the two Neoplatonic schools of Late Antiquity, Champion adheres to the opinion prevalent nowadays that there was no substantial difference between Athenian and Alexandrian Neoplatonism. But there are doubts that this was actually the case: I recommend Cristina D’Ancona’s careful examination of this *communis opinio* [2005]. Champion, consistent with

his approach, makes Theophrastus, the Athenian philosopher who is the pagan interlocutor of Aeneas' dialogue, the witness of 'a wider culture where Neoplatonism and Christianity were able to coexist peacefully and constructively' [54]. At the same time, he must admit the tension beyond 'peaceful coexistence' in as much as Zacharias' *Life of Severus* shows conflicts among pagans and Christians arising in the Alexandrian schools [54–55]. It does not come as a surprise if 'Aeneas and Zacharias both use the dialogue form to perform Christian victories over Neoplatonism, especially its religious claims' [59]. Apart from this common aspect, Champion notes the differences of language and argumentation between the two authors, pointing to Zacharias' resorting to stories taken as proofs of miracles from the Bible and monastic literature. I wonder whether instead of stressing in Zacharias 'the generative and regulatory role played by the Bible in the dialogue's transformed discourse' [61–62], Champion should have evaluated instead the impact of the 'plerophoric' materials so typical of some monastic sources of Gaza. As for the recourse to the dialogue-format by Aeneas and Zacharias, Champion overemphasizes the significance of this choice:

Their use of the genre asserts that Christians can write and think like Plato. It elevates Christianity above Platonic philosophy while claiming continuity with the classical past. [62]

He seems to forget the rich production of dialogues in ancient Christian literature, proving that it was a format serving mainly apologetic and polemical goals but also philosophical/doctrinal inquiries, as is the case in both the *Theophrastus* and the *Ammonius*. The author also discusses the choice made by the two Gazan authors with respect to literary genres at their disposal—such as the commentary and the questions-and-answers literature—by observing that

the dialogue genre merges into a Christian variety of question and answer literature (*Erotapokriseis*) which is designated to place power in the hands of specifically Christian teachers and form a new tradition based around the authority of Christian teachers...Procopius' *Commentary on Genesis* also tends in this direction. [64]

Once again, I would distinguish the ζητήματα καὶ λόσεις, which have a rich tradition of their own in patristic literature, from the proper genre of the dialogue; whereas Procopius' commentary may function as a 'Problemkommentar', though it is built on another distinct genre, the exegetical *catena*.

Champion concludes the first part of his book by recalling once more the interpretative line which has marked his approach from the start:

The dominant picture is one of complex interactions between different but permeable local cultures, despite the attempt on the Gazans' part to eliminate what they see as false religious claims or doctrinaire honoring of the Neoplatonists' traditional intellectual heroes. [66]

Without repeating critical remarks expressed above concerning the religious landscape of Late Antique Gaza, I would argue nonetheless that Champion does not offer a persuasive picture of Neoplatonism, with its philosophical discourse and religious claims, as being an effective and immediate component of the Gazan 'local culture'. On the basis of his investigation, both Aeneas and Zacharias appear to evoke an intellectual environment which is largely external to the Palestinian city itself (and perhaps even more traditional than actual), although both the authors of Gaza are involved in its dynamics.

The second part of the book, and the longest, examines the Christian doctrine of the creation of the world and the contributions to it by Procopius, Aeneas, and Zacharias. Previously, Champion has retraced the patristic background of the doctrine while also discussing its relations with (Neo-)Platonism. He provides in general a clear, well-informed, and well-written exposition of this fundamental chapter of Christian theology and Late Antique philosophy. Unfortunately, he does not know Charlotte Köckert's *Christliche Kosmologie und kaiserzeitliche Philosophie* [2009], which is at present the best monograph on this topic. Though Köckert does not go beyond the fourth century (apart from occasional hints at the Gazan philosophers), she provides an excellent treatment of an important premise for Champion, which is also a recurring problem in his analysis: Origen's influential formulation of the doctrine of the *creatio ex nihilo* and the ensuing rejection of the (Neo-)Platonic idea of the eternity of the world.¹

Champion initially recalls that Origen opposes the notion of an eternal world as held by Platonic philosophy:

Creation was not, for Origen, an eternally willed act. While the act of creation is consistent with God's eternal nature, the act to will the creation did not always

¹ For an assessment of the results of Köckert's investigation, see the masterly review by Manlio Simonetti [2011, 464–471].

exist: it is 'realized' in the creation which, for Origen, had a beginning. [73: cf. 75, 120]

Yet this statement tends to simplify the more complex reasoning of the Alexandrian master, which Champion will partially recuperate only later on. For now, he passes over Origen's response to the traditional objection, 'Was then God inactive before creating the world?': God's goodness and omnipotence demand that he is always active; therefore, the world existing *ab aeterno*, as the product of God's perennial activity as creator, is the intelligible world (κόσμος νοητός) that exists in the Son as Wisdom.²

The further witnesses of patristic thought on creation, often depending upon Origen's reflection, help us to define the perspective elaborated by the Gazan authors. On the one hand, Basil of Caesarea, and even more so John Chrysostom, in their efforts to trace a Christian view, tendentiously mirror a philosophical horizon preceding the approach more typical of Neoplatonism, thus providing a case which is not without analogies in our authors of Gaza. For example, Zacharias explicitly follows Basil in polemically attributing to his philosophical adversaries the thesis of an automatic or involuntary creation of the world. As Köckert notes with reference to the notion of the world as παρακολούθημα in the *Ammonius* [Köckert 2009, 528–534 = Minniti Colonna 1973, 112]:

Basilius und Zacharias zielen beide darauf, die gegnerische Position so darzustellen, daß in ihr Gott nur indirekt oder gar nicht als Ursache des Kosmos erscheint. [Köckert 2009, 339]

On the other hand, Aeneas and Zacharias, when compared to the two Church Fathers, address an audience demanding 'a different sort of engagement with the biblical text and with contemporary Platonism' [80]. In fact, a main issue of this second part of Champion's book consists in the problem of the extent of dependence or, alternatively, of originality that one should assign to the Gazan authors. Champion betrays at times mixed feelings: 'Perhaps the Gazans' knowledge of contemporary Neoplatonism was limited and indirect, mediated through other, better informed Christians' [84]; however, 'a general familiarity with Proclus' ideas seems to be a plausible stimulus for their

² See *De princ.* 1.4.3–4, a passage that Champion will quote on page 141, belatedly recalling 'Origen's important contribution that the creation of an intelligible cosmos before time rebuts charges that God was ever inactive'.

creation-oriented works' [85]. So Proclus especially appears to play the role of their polemical counterpart. But, before dealing with the philosophical/theological discourse of the Gazan triad, Champion completes his picture of the Neoplatonic doctrines with an accurate presentation of the ideas of Hierocles and Ammonius, his aim being to outline the immediate background for the debate that the three Christian authors engaged in with their pagan partners, thus complementing the work of Elias Tempelis [1998].

The overview of this critical confrontation begins surprisingly with Procopius of Gaza, who is chronologically the last in the triad. The reason is that Procopius' *Commentary on Genesis* 'provides a useful framework and introduction for analysis of their [*scil. Aeneas*' and *Zacharias*]' works' [105]. In short,

Procopius reframes Neoplatonic arguments about creation, making the creation of the cosmos part of an encompassing story about God's divine plan for human salvation. [106]

But Champion's analysis of the *Commentary* does not consider its particular literary physiognomy: an epitome resulting from a previous *catena*-commentary and reusing as such materials from other interpreters. As shown in Karin Metzler's new edition, the commentary starting with the prologue unveils a complex stratigraphy of sources [2015, xciii–cxxxiii].

Moreover, the rendering of the Greek text of the preface appears problematic: Champion paraphrases the passage « οἱ προφήται καθάπερ κάλαμον τὴν γλῶτταν ὀξυγράφῳ παρέχονται γραμματεῖ » [Metzler 2015, 1.4–6 = PG 87.24A] as 'The prophets act like a flute through whom God breathes' [107]. Yet, in conformity with the quotation of Ps. 44(45):2, which Champion does not notice, it should be translated, 'The prophets lend their tongue (to God) as the pen of a quick scribe'. Another passage shortly afterwards is misunderstood as well: « ...θεοῦ τὰ λόγια παρ' ᾧ ψεῦδος οὐδὲν ἢ ἄλογον. καὶ δεῖ ὅσα μὲν εὐσεβῶς δυνήσῃ νοῆσαι κρατεῖ » [Metzler 2015, 2.8–9 = PG 87.24B]. Champion interprets it as follows: 'it is necessary to control oneself and be pious as possible when thinking about Scripture' instead of 'you should retain what you will be able to understand conforming with piety', inasmuch as Scripture consists of 'the oracles of God, in which there is neither lie nor anything irrational'. Furthermore, he lacks precision when he extrapolates that 'Moses had direct knowledge about God's plan to send Jesus to redeem the world' [108]. Instead, Procopius, relying on a traditional interpretation, says that Moses saw God

through the fissure of a rock; that is, he received the knowledge of the Father granted by the Incarnate Son (typologically the ‘fissure of a rock’): «ὅτι ἡ δὲ πέτρας ἢ διὰ τοῦ σαρκωθέντος δι’ ἡμᾶς υἱοῦ γνώσις ἐστὶ τοῦ πατρὸς» [Metzler 2015, 2.17-18 = PG, 87.24B].

Metzler, in her apparatus to these passages, refers, among the possible sources, to Origen, *Hom. in Ieremiam* 16.2, while suggesting more generally a dependence of Procopius on the Alexandrian author:

wegen der Parallelen zu Origenes, Philon und Johannes Philoponus vielleicht ganzer Absatz nach Origenes, comm. in Gen. [Metzler 2015, 2: cf. cxvii].

Yet Champion seems to be less attracted by an accurate reading of the text than by the venture of its interpretation. After identifying, perhaps too hastily, ‘a rebuttal of Origenist ideas taken from the Gazan monasteries’ [109] with respect to Procopius’ comments on the creation of the angels, he does not ask who might be the adversaries claiming that the ‘darkness’ of Gen. 1:2 [Metzler 2015, 15.40–42 = PG 87.44B] ‘referred to an ungenerated principle of cosmic evil’ [111]. This passage, following an argument of Basil [*Hom. in hexaem.* 2:4], contains a clear allusion to Manichaeism, the presence of which in Gaza is attested by the *Life of Porphyry and Zacharias’ Capita VII contra Manichaeos*.³ Yet Procopius could also mean the notion of the eternal matter as a principle of evil that we find, for instance, in Middle Platonists (Plutarch and Atticus) or in Numenius. According to Köckert, for Numenius

wie Gott seinem Wesen nach aus sich selbst heraus gut und Ursache alles Guten ist, so ist die Materie an sich und aus sich selbst heraus böse und Ursache aller Übel. [Köckert 2009, 108]

Without trying to define the polemical targets in more precise terms, Champion resorts once more to a problematic generalization:

When I claim that Procopius is directing an argument against ‘Neoplatonists’, I mean both Neoplatonists who would not identify themselves as Christian, and people who would identify as Christians, but whose allegiance to Neoplatonism leads them, in Procopius’ view, to hold beliefs which set them outside established Christian orthodoxy. This is another instance of the problem of fluid identities and cultural transitions which characterized Gazan life in the fifth and early sixth centuries. [111: cf. 115]

³ On the connection between anti-Manichaean polemics and Neoplatonism, see Bennett 2015, pages 19–33.

My impression, however, is instead that at issue here is the ‘stability’ inherent in topical discussions of the schools, in which a traditional set of arguments plays a greater role than actual developments by groups or individuals—the assembling of previous exegeses in Procopius’ *Commentary* might be regarded as an eloquent symptom of that. As a consequence of his approach, Champion hesitates now and then regarding the specific public that Procopius is addressing, in as much as he is led to recognize that the Gazan rhetor does not mirror properly the philosophical tenets of current Neoplatonism:

Yet the argument surely works most forcefully against Christians in the schools tempted to give up on Christian distinctions between creator and creature, and the subsequent identification of eternity and necessity, than against an audience already committed to the detail of Neoplatonism. [123]

But the prevalence of a Christian audience could be argued more simply in light of the format chosen by Procopius: a biblical commentary that essentially reworks the exegeses of other Christian interpreters.

The final chapter is devoted to the cosmological thought of Aeneas and Zacharias. The presentation of the former stresses his convergence with Procopius on many points (such as the rejection of the temporal equivalence between creator and creature or of the Stoic idea of eternal return). Aeneas’ discourse, however, is mainly directed against contemporary Neoplatonism. Its polemical target is especially Proclus with his hierarchy of creative causes supporting the emanation process. Champion shows how Aeneas is able to recuperate Origen’s motif of the intelligible world as an argument to support God’s perennial activity, whereby ‘the idea of the original creation of an intelligible realm’ is not

analogous to Proclus’ paradigmatic cause, because the intelligibles thus created have no necessary part in the creation of the perceptible world. The perceptible world is dependent on God’s will alone, not on the intelligible creation. [147]

Aeneas’ distinctive contribution is stressed also by comparing it with Zacharias’ approach. Champion lists three major points emphasized by the latter:

First, he uses more explicitly orthodox language....Secondly, he brings the argument back more consistently to Plato, rather than contemporary figures. [147–148]

The third and final difference between Aeneas and Zacharias on the question of matter concerns the relation between the intellectual and the material worlds. [150]

In this regard, Zacharias shows a greater continuity with Origen since ‘the creative principles are eternally in the Creator’s mind and set within matter to order it’ but God ‘creates willingly and freely on the basis’ of these principles [150]. Also in this case, if I am not mistaken, we need to emphasize a feature that comes to light in the following section dealing with the relation between the doctrine of creation and the Trinity, namely, that Zacharias, unlike Aeneas, ‘uses credal language and language authorized by Church Fathers more prominently than Aeneas in his account’ [164]: note his explicit reference to Gregory of Nazianzus on the procession of the Spirit from the Father [165].

A final paragraph investigates the influence of ‘Origenist ideas about creation’ in Aeneas’ dialogue, in as much as ‘Gazan monasteries...were a possible source’ [175] for their rise. From the *Correspondence* of Barsanuphius and John, we do indeed have evidence that Origen was also read in Gaza, although the Palestinian ‘Origenism’ of the sixth-century refashions Origen’s doctrinal heritage through Evagrius and finds its adepts mostly among the monks of the Judean Desert. Champion thus goes back again to a theme that we have already met more than once: Origen’s idea of an intelligible world related to the Son both as the paradigmatic or formal and as the efficient cause of creation. He bases himself on *De princ.* 1.1.1–6; *Comm. in Ioh.* 8.42 and *Contra Celsum* 5.39 to assert that ‘the act of creation includes the creation of the reasons for creation’ [175]:

These created principles are understood to be in the Word of God, the second person of the Trinity, who contains, but is not defined by “the *logoi* of everything which has been created” (*CC* 5.39). [175]

After that, Champion resumes the well-known ‘narrative’ of the fall of the pre-existent intellects and the creation of the material world through which time comes into existence. Still, due to the loss of the *Commentary on Genesis*, it is difficult to solve all the issues raised by Origen’s account of the worlds creation (κοσμοποιΐα), as Champion must admit himself [175–176].

Now, in Evagrius’ reshaping, ‘Origen’s *logoi* are understood as pure, invisible, and rational creatures which were created and existed in a perfect unity with God’ [177]. Against this *vulgata* of Origen’s and Evagrius’ views (which should be further differentiated as far as the former is concerned with an

eye to to Köckert's monograph), Champion cannot extract any really helpful information on the supposed Origenism of Gaza from the *Correspondence* of Barsanuphius and John, apart from the reading of both Origen and Evagrius in the cenoby of Seridus.⁴ On the other hand, after observing that Aeneas seems to be more acquainted with Origen than with Evagrius [181], he wonders whether the *Theophrastus* has its real target in the Palestinian Origenists in a disguised way; that is, by 'taking Neoplatonists as his explicit opponents' [182]. Not content with this explanation, he moves to another risky hypothesis:

The increased number and urgency of debates about creation at the turn of the sixth century, for which the works of Aeneas, Zacharias, and Procopius are evidence, may provide one stimulus for renewed controversies over Origen's account of creation. Aeneas' dialogue and the associated works by Zacharias and Procopius may therefore be one stimulus for the sixth-century Origenist controversy. Further work remains to be done on this question. [182]

I agree with the final sentence. But so far as we know, the 'Origenism' of the sixth century was concerned with Christology and anthropology more than with cosmology.

Champion has written an orderly and readable book about a major subject and an interesting 'location' which nowadays attracts the specialists of Late Antiquity for its complex cultural visage. He undoubtedly displays a good ability for synthesis, especially in the second part of his work, by summarizing and positively exploiting previous research. However, his picture, in consequence of his synthetic and comparative overview of the Gazan triad, falls into generalities. He is to a large extent right when he pleads for a reevaluation of the three Gazan authors as philosophers instead of regarding them essentially as sophists [193] and the book will certainly provide a useful introduction to their future study. Yet the combination of cultural and intellectual history, which structures the investigation, is developed by Champion in too schematic a way. The search for the cultural interaction of the Christian discourse on the creation of the world in Late Antique Gaza is commendable, even if occasionally it betrays a contemporary sensibility. But too often it leads the author to schematic or speculative interpretations. To

⁴ Not only were Evagrius' 'practical' writings appreciated by the monastic communities as Champion assumes [180], but also his 'gnostic' writings.

cope with the different 'local cultures' of Gaza, both Hellenistic and Christian, demands further work.

Errata with corrections

I append a selection of errata with corrections and some minor remarks:

- page 9 'Palestina Prima' → 'Palaestina...'
- 13n33 'Devros' → 'Devos'
- 16n52 'Devreese' → 'Devreesse'
- 22 'the letters of St Jerome offer a fleeting perspective on Gaza in the early fifth century' (What evidence? On page 37 there is just a quotation of *Epist.* 34.1 with regard to the library of Caesarea.)
- 23 'Marcion' → 'Marcianus'
- 23 'stabilization after second- and third-century conflicts'—with regard to Palestine, one should write '...first- and second-century...'
- 27n27 'Tsafir' → 'Tsafirir'
- 32n49 « διατρίβη » → « διατριβή »
- 33n58 « Ἄραβι » → « Ἄραβι »
- 39n83 'The other monk with a claim to being the father of Gazan monasticism is Chariton' → '...of Palestinian monasticism'
- 71 'Judeo-Christian thinkers' → 'Jewish and Christian thinkers'
- 73 « ἕτερόν τινα » → « ἕτερόν τινα »
- 73n9 'Exposita in Proverbia' → 'Expositio in Proverbia'
'Selecta in Psalmi' → 'Selecta in Psalmos'
- 76 'Praeparatio Evangelia' → 'Praeparatio Evangelica'
- 85 'Minitti Colonna' → 'Minniti Colonna'
- 89 « λογός » → « λόγος »
- 95 « αἰώνιον » → « αἰώνιον »
- 96 « ἄϊδιον » → « αἴδιον »
- 111 « εἰσάγοντες » → « εἰσάγοντες »
- 125 « καθ' αἰτίαν » → « κατ' αἰτίαν »

- 129 Champion emends the text of *PG* 87.33A: « εἰ ἅμα κόσμος <ὁ Θεὸς> » but he should reconstitute it as « εἰ <ἅμα Θεὸς> ἅμα κόσμος », as clearly suggested by the parallelism with the analogous formulations following in Procopius' text (in fact, Metzler's edition now reads « εἰ ἅμα Θεὸς ἅμα κόσμος » [8.188])
- 165 'probalea' → 'probolea'
- 210 'Devros' → 'Devos'
- 221 'Tsafrir' corrige 'Tsafrir'
- 222 'Vössing...Überleungen' → '...Überlegungen'.

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Roger Bacon's Communia Naturalium: A 13th-Century Philosopher's Workshop edited by Paola Bernardini and Anna Rodolfi

Micrologus' Library, 64. Florence: Sismel—Edizioni del Galluzzo, 2014. Pp. vii + 221. ISBN 978–88–8450–573–6. Cloth €45.00

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Roger Bacon (1214/1220–1292) is predominantly known to historians of science for his contributions in the fields of optics, medicine, and astronomy. However, he was also an important philosopher, very well trained in many aspects of Aristotle's thought and with a special interest in natural philosophy.¹ He not only taught Aristotle's *Physics* (the standard scholastic textbook of natural philosophy) at an early stage of his career as Professor of Philosophy at the University of Paris (ca 1235–1240) [Delorme 1935], he also returned to this subject later in his life and devoted to it an independent treatise, entitled *Communia naturalium*, a more mature work written between ca 1260 and 1270. As Bacon declares in the prologue to the *Comm. nat.*, his intent in this treatise is to give a science *de communibus naturalibus*; that is, a general science about natural things which deals with aspects common to all of them, as contrasted with a special science which deals with some particular aspects.

Regarding the Aristotelian sources of such a general natural science, Bacon maintains that these include not only the *Physics* but also Aristotle's *De caelo* and the zoological treatises (*De animalibus*) [Steele 1911, 3–5]. In accordance with this general program, the *Comm. nat.* not only deals with the fundamental topics from Aristotle's *Physics* (such as matter, form, nature, the four causes, motion, infinity, place, the void, and time) [Steele 1911, 50–239], it also contains a very extended section on the generation of natural things (both living and non-living) [Steele 1911, 240–308] and a whole book on

¹ The overview of the modern scholarship on Bacon given by Jeremiah Hackett 2015 is the most updated and comprehensive introductory study on this thinker.

celestial bodies [Steele 1913]. Thus, Bacon's approach to natural philosophy in the *Comm. nat.* is much more comprehensive than that of Aristotle's *Physics*. Furthermore, although the influence of Aristotle's philosophy is so pervasive that the *Comm. nat.* can be classified as a work of Aristotelian natural philosophy, it also contains very significant non-Aristotelian elements; the most notable one is a doctrine of natural agency based on the emission of intentional species from the agent and their propagation through a medium [Steele 1911, 16–49]. Because of both its range and the originality of its approach and contents, it is clear that the *Comm. nat.* is the fundamental source for the study of Bacon's own view on natural philosophy and, more generally, a very important document of the medieval reception of Aristotle's natural philosophy.

The *Comm. nat.* was edited by Robert Steele in the series *Opera hactenus inedita Rogeri Baconi* more than a century ago.² It has remained, however, largely unstudied until the present time. Actually, the collection of essays under review is the first comprehensive publication devoted specifically to the *Comm. nat.* It is a very commendable pioneering work, which focuses on a selection of important issues and offers an in-depth study of each. Although it is far from filling the gap in the scholarship on the *Comm. nat.*, it makes a promising first step in that direction.

With the exception of Jeremiah Hackett (a world-leading expert on Bacon), the contributors to the volume are Italian scholars of medieval philosophy who share a methodological approach characterized by a careful reading of the primary sources and great attention to the historical context of the medieval philosophical debates, but who have different research topics. This combination of common methodology and different specific areas of competence greatly adds to the scholarly value of this collection, since it has made it possible to put together a collected volume that covers a good variety of topics and at the same time deals with them in a uniform language. Furthermore, this group of scholars worked as a team in preparation of this volume; it originates from a reading and research seminar on *Comm. nat.* held at SISMEL (Florence) in the years 2009–2011, in which they all took part. This is the kind of collaborative enterprise that should be encouraged in the investigation of complex medieval works like the *Comm. nat.* The result in the present case is a contribution of first-class quality.

² The first book of the treatise appeared in 1911 and the second in 1913.

Because the material presented in this collection is largely unstudied, the reader will find it useful to have a short description of the contents of each of its eight essays.

In an introductory essay, Chiara Crisciani and Michela Pereira give an extensive account of what the two-year reading and discussions of the *Comm. nat.* have identified as the main general quality of this work: its being a ‘philosophical workshop’ or ‘intellectual laboratory’, which, as they explain, is

a container, in which ideas and intellectual needs of Roger Bacon were elaborated and compared to materials of the philosophical tradition and contemporary debates. [5]

The two authors present a number of features of the *Comm. nat.* in support of this general assessment. They rely especially on the prologue to the *Comm. nat.*, in which Bacon outlines his project/program, and they compare this program with its actual implementation in the two books of the *Comm. nat.* Although a full appreciation and evaluation of many aspects of the account by Crisciani and Pereira are difficult to achieve without a good preliminary knowledge of the *Comm. nat.* (as well as of other works by Bacon), the authors succeed in conveying even to a non-specialist reader a clear sense of the kind of intellectual enterprise that Bacon embarks on in this treatise.

In the second essay, Roberto Lambertini and Romana Martorelli Vico examine the textual tradition of the *Comm. nat.* There is only one complete manuscript copy of this work, a Parisian manuscript (M) used by Steele as the base text for his edition, and two other manuscripts—an Oxford manuscript (D) and a London manuscript (F)—transmitting only a fragment of the text. On the basis of an accurate textual comparison of F and D with M, the two scholars conclude that there are differences between these manuscript-copies that cannot simply be explained by the standard channels of textual transmission within a unitary tradition. Rather, they point to the existence of different versions of the text. The working hypothesis formulated by the two scholars is that the two fragmentary manuscripts, D and F, actually transmit earlier stages of the development of the text whereas the complete copy, M, transmits a later one. In their view, these different stages should be interpreted as the result of Bacon’s constant effort to improve his text by adding or removing passages and rewriting some sentences. Thus, the *Comm. nat.* displays not only a philosophical laboratory but also a textual one.

In the third essay, Crisciani discusses Bacon's view on the relationship between universals and particulars, a subject to which Bacon devotes a small treatise within the *Comm. nat.* [Steele 1911, 92–107]. Crisciani offers a detailed presentation of this treatise, which shows that Bacon is indeed a realist about universals, that is, Bacon believes that they have extra-mental reality but also stresses the priority (in several senses) of the individual over the universal and the inseparability of the universal from the individual. Crisciani then singles out for a more in-depth investigation the epistemological aspects of Bacon's thesis of the priority of the singular over the universal. One such notable aspect is that, according to Bacon, while a singular cannot be known through a universal, a universal can be known through a singular in which it is embodied. Crisciani also remarks that—in comparison to earlier treatments of this issue—in the *Comm. nat.*, Bacon emphasizes the epistemological priority of the singular. She concludes that Bacon's emphasis is due to the fact that this epistemological priority provides the best justification of the *scientia experimentalis* as the true science, a view to which Bacon was strongly committed at the time of the *Comm. nat.*

The following two essays are about the notion of matter, a central one in Aristotelian natural philosophy and one to which Bacon himself devotes a great deal of attention in the *Comm. nat.* [Steele 1911, 50–91]. The first of the two essays, by Anna Rodolfi, mainly deals with the notion of prime matter, which is the most proper kind of matter in Bacon's view. According to his definition, this is the kind of matter that is a constituent of every composite substance, being the counterpart of the formal components of such a substance: prime matter is what remains when every form is removed from a substance. Bacon supports the thesis of universal hylomorphism, according to which every created substance, be it terrestrial or celestial or spiritual, is a composite of prime matter and form. Thus, in his view prime matter is present everywhere in the created world. As Rodolfi rightly underlines, it is because of his adherence to universal hylomorphism that Bacon distinguishes prime matter from what he calls natural matter, that is, matter in the Aristotelian sense as a principle of natural change. Rodolfi then focuses on the question of the ontological status that Bacon ascribes to prime matter. Like others of his contemporaries, Bacon maintains that prime matter has an actuality of its own, which makes it a genuine reality in itself, but an actuality that does not derive from a form, given that prime matter lacks any form. While prime matter is indeed in potency to any form, it does not

follow from this that prime matter is pure potentiality because there is a kind of actuality that does not depend on a form. Thus, an essential ingredient of Bacon's account of prime matter is the divorce of actuality from form, which is a remarkable departure from the Aristotelian metaphysical framework. Rodolfi also gives a very lucid overview of other important issues related to prime matter, like God's knowledge of prime matter and the conditions of its creation by God, its unity and plurality.

The second of the two essays, by Pereira, deals with the notion of natural matter, that is, the kind of matter that is a principle of natural change and thus exists only in terrestrial substances (those subject to generation and corruption). One important preliminary issue to which Pereira devotes great attention is the complex way in which Bacon draws the distinction between prime matter and natural matter. Bacon's approach to this issue is highly metaphysical, being based on a sort of descent in the ladder of creation from prime matter viewed as a metaphysical and most general genus, through various ontological degrees, to natural matter, which lives at the level of sublunary bodies (from the elements to man), an approach analogous to that of the Hebrew philosopher Ibn Gabirol. Pereira then focuses on Bacon's conception of natural matter as something active and apt to operate, which is a clear departure from Aristotle's notion of matter. She convincingly argues that it is Bacon's interest in alchemical practice and theory that stimulated or fostered this non-Aristotelian view.

In the sixth essay, Paola Bernardini examines Bacon's position in the 13th-century debate about the creation of the human soul [Steele 1911, 281–302]. While at that time there was common agreement that the intellectual faculty of the human soul is produced by God, the controversial issue was that of the coming into being of the lower faculties of the human soul (the vegetative and sensitive faculties). The question was whether these faculties are also created by God together with the intellect (co-creation of all the human faculties) or whether they preexist and survive the divine creation of the intellect and come about by natural causes, so that only the intellect is created by God. Bacon rejects the view of the co-creation of all human faculties and sides with the opposite view that only the intellect is created by God. Bernardini gives a concise presentation and assessment of Bacon's arguments against the thesis of co-creation in the *Comm. nat.* She then deals extensively with some doxographical questions and proposes tentative identifications of the

English theologians and philosophers to whom Bacon refers in support of his view as well as of the polemical target of his discussion.

The seventh essay, by Cecilia Panti, deals with Bacon's discussion of the continuity of physical bodies in the second book of the *Comm. nat.* (the book on celestial bodies) [Steele 1913, 309–322]. Although the Aristotelian thesis that physical bodies are continuous was almost universally accepted at Bacon's time, Panti points out that Bacon has a special motivation for providing the strongest possible arguments in its support. Indeed, physical continuity is required for the action of radial species, which is a fundamental ingredient of Bacon's non-Aristotelian view on natural agency. Bacon believed that the strongest arguments in support of continuity come from geometry. Panti gives a detailed presentation and assessment of Bacon's appeal to one of these geometrical arguments, the so called 'proof of the square' (taken from the Arabic philosopher Al-Ghazali), which aims to show that the hypothesis of the composition of magnitudes out of indivisibles leads to the absurd conclusion that the side and the diagonal of a square have equal length.

The eighth and last essay, by Jeremiah Hackett, deals with Bacon's discussion of motion and time in the *Comm. nat.* [Steele 1911, 138–182]. The author addresses the question of the dating of this discussion and, on the basis of a careful comparison of it with those in other works by Bacon (*Opus majus*, *Opus tertium*, *Opus minus*), he suggests that it may have been written at a late stage in the composition of the *Comm. nat.* (after 1268). He points out that this late dating has implications for the relevant context of Bacon's discussion in the *Comm. nat.*, which should be looked for in the theological debates on these issues at the University of Paris during the late 1260s. In the second part of his essay, Hackett gives a helpful presentation of the content of Bacon's account of time and motion in the *Comm. nat.*

Many other important issues are discussed in the *Comm. nat.* that are not covered in the present collection of essays, and a great deal of further work is required to fill in the gap in the scholarship. The present volume, however, provides an excellent model for future investigation into this very rich and complex material.

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Recherches médiévales sur la nature humaine. Essais sur la réflexion médicale (XIIe–XVe s.) by Danielle Jacquart

Micrologus' Library 63. Florence: SISMEL—Edizioni del Galluzzo, 2014. Pp. xii + 477. ISBN 978–88–8450–578–1. Paper €85.00

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The subject of humans with reference to knowledge of ourselves and our relationship with the natural and also supernatural world that surrounds us has been the preserve of numerous medical works from antiquity to the advanced modern age.

Danielle Jacquart's book, *Recherches médiévales sur la nature humaine. Essais sur la réflexion médicale (XIIe–XVe s.)*, brings together a total of 18 articles written over a period of roughly 20 years, 16 of which have already been printed in other miscellanies by the same publisher (SISMEL). This, however, does not compromise the book's topicality as high-impact research. Though subdivided into articles written at different times, the unity of the work is defined by a guiding thread, the perception and description of human nature in the Middle Ages, that links all the pieces, which tend to refer one to the other and thus provide clarifications for the reader's benefit.

The book's theme is complex, since it is set within the framework of a medical argument that intersects with philosophy and theology as well as with the accessory sciences strictly connected with medicine, such as astronomy/astrology, alchemy, and physiognomy. With the expository clarity that distinguishes her, Jacquart succeeds in leading the reader step by step, allowing us to penetrate by degrees into the work of the authors and their intellectual itineraries. She succeeds perfectly in her intent, even with works that are certainly not easy to approach, such as Peter of Abano's *Conciliator*. One of the most complex and discussed medieval authors, he is extensively studied in various articles in the book. The other authors chiefly dealt with are among the most important protagonists of medieval medicine, including Jacques Despars (on whose monumental work, the commentary on the *Canon* of

Avicenna, Jacquart is the leading expert [1980]), Michele Savonarola, and Bernard of Gordon. There is no lack of little known or obscure authors such as Angelo dell'Aquila and others who, though not physicians, developed their own thought on different aspects of human nature, such as Michael Scot and William of Conches. Not only does Jacquart contextualize the texts studied within their authors' cultural climate and society, she also follows the course of the medical or philosophical thought (or both) that informs these texts in explaining all the passages. In this way, she often tends to dwell upon ancient medicine and philosophy, and authors writing in Arabic. Yet sometimes she goes beyond the time-limits defined by the title of the book with incursions into texts written in the early modern period. Her acknowledged paleographic and philological expertise and her great knowledge of medical and philosophical texts in Greek, Arabic, Latin, and other languages mean that Jacquart can trace a highly coherent general outline. The book does not lack information of a philological nature, which never weighs down the narrative but suitably informs her readers and puts them in a position to seek out any avenues of future research, which, in many cases, Jacquart herself suggests. As a further enrichment, many articles are accompanied by passages drawn from manuscripts or from 16th-century editions.

There are three indexes in the book: the first gives the names of people, places, and anonymous works. This is followed by a rich and useful thematic index. Lastly, there is a list of the numerous manuscripts that Jacquart has consulted.

The article opening the collection, 'La physiognomonie à l'époque de Frédéric II. Le traité de Michel Scot', is a dissertation on the *Liber phisionomie*, the third book of the *Liber introductorius*, a work of an encyclopedic nature written by Michael Scot (1175–1232) at the court of Frederick II. The text, as Jacquart explains, was widely circulated in printed editions until the 18th century and was the first on the subject to be written in the West. In a meticulous analysis of the text, Jacquart identifies the Greek and Arab sources (in particular Rhazes' *Liber ad Almansorem*, which was translated by Gerard of Cremona) and the texts of the nearby Schola Medica Salernitana, by which it was inspired; and points out the discordances and the interesting aspects of their originality in the subject of physiognomy, which has been much debated since antiquity. Particular consideration goes to the presence in the *Liber* of a long section dedicated to generation, to the embryo and to the role of women in conception.

Ideally linked to the work of Scot, the second article, 'La morphologie du corps féminin selon les médecins de la fin du Moyen Âge', is dedicated to the way in which the morphology of the female body was perceived by physicians. Jacquart brings together various medieval works, including Peter of Abano's *Liber compilationis phisionomie* and its Arab and Greek sources. Except for a few allusions to their physiognomy and anatomy, these texts focus on the maternal function of women. Michele Savonarola's *Speculum phisionomie*, which establishes a bridge between the medieval tradition and the humanist one that sets humans at the centre of space in the universe, demonstrates greater attention to the female body than was given by his ancient and medieval predecessors. His text preserves the Aristotelian tradition in assessing (the inevitable) imperfection of the female body. As Jacquart specifies, this perception of the female body persists until the 16th century, when a change in the theoretical foundations of anatomical studies also changed the view of women.

'Médecine et morale. Les cinq sens chez Évrard de Conty († 1405)' is devoted to Évrard de Conty, personal physician to Charles V in the second half of the 14th century. It describes the outlook of this physician who turned moralist. His work in the vulgar tongue is of an encyclopedic nature and written in a wisely structured literary form. This work, which recent publishers have entitled 'Livre des Eschez amoureux moralisés', deals with the five senses on a medical and, especially, on an ethical plane.

The fifth article, 'Cœur ou cerveau? Les hésitations médiévales sur l'origine de la sensation et le choix de Turisan', is a study of the compromises which medical authors implemented in order to reconcile the greatest philosophical authority, Aristotle, along with his medical counterpart Galen, and the doctrine of the centrality of the heart or the brain. To arrive at the work of Peter Torrigiano, celebrated for an often-criticized mechanistic explanation of the heart, Jacquart tackles the problem by setting out from Galen's works and skipping the whole arc of medieval theories with Avicenna, Arnaldo da Villanova, and Averroes to face a question concerning problems of a medical, philosophical, and theological kind. From Galen, we come to the theory taught in the 12th century of the existence of three corporeal forces or virtues driven by three spirits, which are referred to the three main organs: liver, heart, and brain. Starting out from the presupposition that, in the Christian context and in conformity with the predominant system of Avicenna, it was

generally admitted that corporeal faculties were an emanation of the soul, the challenge was to make the three corporeal faculties correspond to the three hierarchical levels of the soul's power, that is, the rational, the sensitive, and the vegetative. The rational power, however, was excluded because it was understood as purely spiritual and this without a direct corporeal organ. Hence, the problem became that of determining the role reserved for the heart.

The sixth article, 'Calculus et pierres, suivi de note additionnelle. Le mode d'écriture d'Angelo de Aquila', concerns the description of a special, little-known, untitled work contained in the MS. BnF. lat. 4120, which was written in 1415 in Paris by Angelo dell'Aquila. The text brings together most of the remedies well known at the time for curing kidney stones, remedies ranging from those most rationally justifiable to the most incongruous such as applying the blood of a he-goat, which was still in vogue, as Jacquart explains, in Montaigne's day. Indubitably, the problem of curing kidney stones was widely felt, not least out of a desire to avoid a particularly bloody surgical intervention, as clearly explained in an article by Michel McVaugh [1998]. Incidentally, it should be mentioned that not for nothing was the healing of kidney stones one of the most requested miracles in hagiographic texts, in which fear of surgical intervention often emerges. Jacquart's interest in the text concerns its connection with the alchemical knowledge indicated in several parts of the text. Jacquart explains these alchemical passages clearly and thus opens up a fascinating avenue of research. In fact, as a final question, she wonders whether kidney stones might not serve in the processes of alchemical transformation and figure in the search for the elixir of life.

If medical knowledge can sometimes be placed in close relation with alchemy, the same is true to an even greater degree for astronomy/astrology. In 'Le soleil, la lune et les états du corps humain', Jacquart begins with a description of the *Compendium medicinalis astrologiae*, written around 1330 by Nicolaus de Paganica. This book highlights a part of Greek astrological knowledge that was mediated by its Arab counterpart and concerns the astral domination of the human body, especially by the Sun and Moon. The difficulties of integrating medical theory with astronomical knowledge created difficulties as early as the time of Galen, who scarcely managed in the *De criticis diebus* to save the Hippocratic calendar in accounting for the periodic attacks of fever. Jacquart demonstrates how the strong link in the Middle Ages between astrology and medicine was in any case superficial

since it was impossible to find a perfect agreement between Galen's theories, astronomical knowledge, and the rules of astrology, especially in relation to medical data. The two authors whom she considers, Bernard of Gordon and Peter of Abano, though contemporaries are very different from one another. While the former, in his practical manual, the *Lilium medicine*, uses astrology on a fairly superficial level, Peter was the only medieval author to attempt the impossible, that is, to find agreement between Galen's medical doctrine, Ptolemaic astronomy, and the rules of Arab astrology. His fundamental text is the *Conciliator*, which he began in Paris and completed in Padua in 1310. With great mastery, Jacquart guides the reader to the discovery of the astrological knowledge expressed in this exceedingly complex medico-philosophical work. It is interesting to observe how reference to the Sun shifts attention from astrology once more to alchemical medicine in regard to the use of gold in the medieval pharmacopeia. Pills, distillates, and gold leaf hark back to the Sun and their corresponding astral body. This argument leads Jacquart to mention medieval discussions about drinkable gold and the use of the seal with the lion's image in the treatment of kidney stones. We thus return to the alchemical value of the kidney stone already mentioned in Jacquart's description of the work by Angelo dell'Aquila.

Once more we find the much-discussed author, Peter of Abano, in one of the two previously unpublished articles that close the book. In 'La complexion selon Pietro d'Abano', Jacquart explains the author's concept of 'complexio' as it emerges from the *Conciliator* and from the *Expositio problematum Aristotelis*, a commentary on the *Problemata* attributed to Aristotle. Though it is a medical-philosophical concept with a broad tradition, it is not immediately comprehensible in Peter's works, which feature a high degree of complexity. Jacquart, however, with her full command of these works and of the tradition from which they derive, in particular Avicenna, succeeds in aiding the reader to penetrate Peter's tortuous thought.

Peter of Abano is also the subject of the article 'Autour de la *Compilatio phisionomiae* de Pietro d'Abano', which contains a discussion of MS. BnF. lat. 16089, a manuscript containing various texts of an alchemical, geometrical, astronomical, and necromantic nature. In this collection, described by Jacquart as 'quelque peu sulfureux', we find the oldest transcription of Peter of Abano's *Compilatio phisionomiae*. Jacquart outlines the chief characteristics of this work and describes Peter's attempt, in the context of

physiognomy, to unite the lower causes that are connected to physiology with the higher causes that are connected to astrology, while striving to remain within orthodoxy. We should point out that the *Compilatio* was written in Paris less than 20 years after the condemnation in 1277 of Peter's articles, which were censored by Etienne Tempier, bishop of Paris. Among the 219 indicted articles, there was one that touched directly on physiognomy.

Bernard of Gordon reappears in the article 'De la faillibilité de l'art médical aux erreurs du praticien au début du XIVe siècle. Une imperceptible marge', in which the attitudes and behavior of physicians as evidenced in their texts are considered in connection with the occurrence of error in their treatment of their patients. It is not at random that Bernard is taken into account since, as Jacquart explains, his *Lilium medicinae* of 1305 would become, in the following centuries, a reference-book on the subject of medical practice. Bernard advises prudent behavior, especially in predictions of negative outcomes. It is surprising to read, especially in relation to our own ethical and scientific criteria, that for a physician it was less embarrassing to err in offering a cure that proves unsuccessful subsequently than to identify accurately an incurable illness. Moreover, a mortal prognosis was disadvantageous in terms of therapy because it undermined the patient's trust. Interesting—above all because, as Jacquart underscores, it represents awareness of a new social responsibility—is the fact that the diagnosis of leprosy was emphasized as an error with serious consequences.

Another great protagonist in this book is Michele Savonarola from whose most substantial work, the *Practica maior*, Jacquart extracts the most original parts as she seeks its sources in the article with the eloquent title 'En feuilletant la *Practica maior* de Michel Savonarola. Quelques échos d'une pratique'. Jacquart's method of 'leafing through' in no way suggests a lack of in-depth knowledge of the *Practica* nor indeed of the entirety of Michele's writings. It is no accident that she states that the originality of the work is more discernible in the interstices of the argument than in its peremptory statements. This allows Jacquart to dwell upon a little-known and little-discussed but fascinating theme which opens up further research perspectives, such as the Savonarola's use of narcotics, notably, opium.

The book closes with an unpublished study of the process underlying the voluntary movements of the body as theorized by Jacques Despars, 'Le mouvement volontaire selon Jacques Despars († 1458)'. Its theme involves not

only medical matters but also others of a philosophical and theological nature since the voluntary movement of bodies brought in much-debated problems concerning the power and action of the human soul. Jacquart, in reinterpreting Avicenna's theories and bringing to light philosophical reflection in the centuries prior to Despars' work, penetrates the physician's thought and explains his complex system, which goes far beyond the physiology of Avicenna and the limitations imposed by medieval physiology and theology.

We find Despars once more in the article 'Où il est à nouveau question de Jacques Despars. Les marginalia du latin 6915', in which Jacquart discusses the complex philological question relating to the *marginalia* of MS. BnF. lat. 6915, which might have belonged to the physician himself, and which shows traces of his long work preparatory to his commentary on the *Canon* of Avicenna.

Despars is also widely quoted in the rich article 'Naissance d'une pédiatrie en milieu de cour'. In this article, Jacquart focuses on the most important texts which, from the end of the Middle Ages, gave birth to a genre of treatises expressly devoted to the care of children.

In certain articles, Jacquart, though citing concrete examples from medical texts, concentrates on general themes. Thus, in 'L'observation dans les sciences de la nature au Moyen Âge', she analyzes various treatises in order to understand the meaning given to observation and how the very act of observing was described since, as there was no uniformity of vocabulary, each medical author attributed different meanings to the act, while the univocal interpretation of perceptible data had created, since antiquity, difficulties due to the fact that the human body is subject to ongoing transformations. Likewise, the article dedicated to the literary genre of medical secrets, 'Du genre des « secrets » dans la médecine médiévale', sets out from the extremely ambiguous concept of the term 'secret' in the Middle Ages, which consisted in revealing what should not be revealed and which employed a rhetoric aimed at pretending that such divulgation was reserved to only a few initiates. Jacquart, beyond giving a summary of the concept of secrecy through interpretation drawn from various authors, concentrates on the work of the Arab physician Rhazes, who was decidedly against medical secrecy and thus defended a concept of medicine based on a doctrine of universal access and not the privilege of a few initiates.

In the article dedicated to the skin, 'À la recherches de la peau dans le discours médical de la fin du Moyen Âge', Jacquart clearly highlights how homeomeric parts were always paid little attention by medieval anatomists and how carrying out a study of the subject means dealing with the entire medical literature. This notwithstanding, she succeeds in giving a clear and wide-ranging picture of the subject of the skin from the standpoints of both anatomy and pathology.

Another leading figure in Jacquart's book is Mondino de' Liuzzi, whose name is linked chiefly to his famous *Anatomia*, which was written in Bologna in 1316 although, as is well known, his text did not serve to call anatomical knowledge into question. Her article, 'Au nom de la nature. Le plaisir sexuel selon le médecin bolonais Mondino de' Liuzzi († 1326)' is not another study of that work but rather a dissertation on Mondino's commentary to the chapter on the generation of the embryo in Avicenna's *Canon*, a commentary that has come down to us in a single manuscript only and in the form of a *reportatio* done in 1319 by one of his students. This is a far more original subject; and Jacquart, in placing the Bolognese physician's work in the context of the debate on generation since the last decades of the 13th century, with particular reference to the contribution of women, points out its differences with previous or contemporary works. Though giving ample space to Mondino's thought, the article also allows Jacquart to range through the theories of generation from antiquity to the Middle Ages.

Medieval medical culture not only involves texts written by physicians but is also linked to other disciplines. Jacquart reminds us of this with her article, 'Les emprunts de Guillaume de Conches aux théories médicales', on the important 12th-century philosopher William of Conches. She considers a large number of his works, including the *Dragmaticon* and the various *Glosae*, in order to understand the relationship they had with the medical works of the day, in particular with Constantine the African's *Pantegni*, and how much his calling himself *physicus* necessarily made him a man dedicated to medical practice. This article, as well as adding a tessera to William of Conches' importance in the development of medieval thought, opens a window on the philosophy of nature in the 12th century and on the way medical texts were used at the time to spread an anthropology that was of interest not solely to physicians.

With this brief survey, which does not in the least exhaust the contents of Jacquart's book, I have aimed to show how it offers the reader far more than what is promised by the title and the brief dust-jacket blurb. This is a very high-level work of great interest not only to historians of medicine, the sciences, and philosophical thought but to anyone studying medieval culture and society in general. If, on one hand, the authors studied by Jacquart asked themselves universal questions about human nature and were in constant dialogue with the oldest medical and philosophical authorities, they were, on the other hand, also representative of the cultural climate of their period and thus fully part of the social dynamics of their time, as Jacquart herself clearly notices in giving concrete examples.

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Seeking Truth: Roger North's Notes on Newton and Correspondence with Samuel Clarke c. 1704–1713 by Jamie C. Kassler

Farnham, UK/Burlington VT: Ashgate, 2014. Pp. xii + 374. ISBN 978–1–4094–921–8. Cloth \$ 144.95

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That early modern theories of natural knowledge had dramatic theological implications may seem obscure to the modern-day reader. Nonetheless, the reception of Newtonian physics at the turn of the 18th century reveals an interconnection between epistemology, the nature of reality, and early modern concepts of God and nature. And, in the case of a provincial English intellectual named Roger North, it reveals a growing apprehension regarding the Newtonian vision. Jamie Kassler's new edited volume of North's writings exposes the reader to the wider context of the contemporary response to Isaac Newton's ideas, from North's critical notes on his reading of Newton's natural philosophy to his correspondence with Samuel Clarke, one of Newton's close disciples, on matters of physics and theology.

Roger North (1651–1734) is of historical interest both for his autobiography, *Notes of Me*, and for his scientific analysis of music in his comments on his brother Francis North's *Philosophical Essay of Musick* (1677). Of particular interest to the history of science, however, is Roger North's 'probabilistic' style of reasoning in natural philosophy, drawn from his training in common law and a combination of inductive and hypothetico-deductive method. North, the youngest son in a financially struggling aristocratic family, trained in Cambridge and then London as a lawyer and, after a number of familial tragedies (including the deaths of all of his older brothers), left his public appointments in London and became the lord of a manor in Rougham, Norfolk, permanently settling there in 1696. For the remainder of his days, North pursued the life of a provincial intellectual, remaining current with new ideas in natural philosophy and engaging in a program of self-critical reflection on the 'New Philosophy'. This was coupled with a number of correspondences that 'supplemented his method of critical reflection with a

method of contradiction modeled on the adversarial method he had learned' as a practitioner of law [3–4].

Seeking Truth follows the narrative of North's encounter with the New Philosophy (Cartesian and then Newtonian), his critical responses to it, and his possible association of Newtonian non-mechanical powers with Newtonian heterodoxy in his correspondence with Clarke. North first encountered the New Philosophy in Cambridge, where he purchased and read Descartes' collected works and learned the Cartesian method of suppositions or hypotheses derived from *a priori* principles. However, North's legal training introduced him to a means of inductive reasoning that took the form of a 'put-case', in which an argument proceeded 'from an hypothesis derived from experience, not from *a priori* principles' [38]. North applied this form of reasoning to natural philosophy, adopting a probabilistic method that proved a theory by reasoning out its essential consequents and verifying those consequents in experiment and experience. Unlike Descartes, who also presented his suppositions as experientially verifiable, North did not consider them deducible from *a priori* principles but used deduction by analogy from previously (experientially) established knowledge and repetition of instances (a form of inductive sampling) to establish his suppositions. In this way North derived reliable, yet probable, natural knowledge in a similar manner to how one formed a legal ruling based on the evidence of witnesses and prior rulings in the tradition of common law.

Additionally, for North, 'nature has limited our sensori-motor capacity for information processing' such that 'we must continually live with the risk of being in error' [44–45].¹ Hence, knowledge of the natural world consists 'in different degrees of probability' and we can only know our immediate sensations (appearances) with absolute certainty [45]. Nonetheless, North was still committed to an ontological reality and to nature as rule-governed, based on his belief in the Christian doctrine of Creation. This scepticism combined with fideism, Kassler suggests, derived from his reading of Michel

¹ North's distrust of our sensori-motor capacity came from his study of the mind's perception of sound and music. Essentially, the sensorial system can be overwhelmed with input and thus the mind adjusts and compensates by determining superstructures (tone, pitch, etc.) from the sensorial inputs. This means, for North, that the ideas of things do not emerge directly from the real/external/corporeal entities or natural things themselves but from the modes of the mind as it processes external 'data'.

Montaigne's *Essais*.² For North, knowledge of natural phenomena (appearances) was directly attainable *via* probabilistic reasoning. Additionally, the assumption of the reasonableness of the natural world (*via* God's creative and sustaining power) implied that 'knowledge of reality [truth] is a kind of knowledge that may be rendered plausible or probable from the evidences of natural knowledge' (i.e., appearances) [49]. Nonetheless, such evidence could never provide an adequate demonstration of truth, as 'belief in reality (including the supreme reality) is an act of faith, not understanding' [49]. Given North's probabilistic style of reasoning, it is no surprise that his subsequent encounters with Newtonian natural philosophy, particularly its assertion of absolute (true) entities (i.e., space and time) in discussions of natural phenomena (appearances), generated a degree of gentlemanly criticism.

Kassler's edited volume builds upon the manuscript record of North's critique of Newtonian natural philosophy. She provides detailed descriptions of the manuscripts of North's self-critical notes on reading Newton's *Principia* (1687) and *Opticks* (1704 and the 1706 Latin *Optice*), assessing physical conditions, many versions, and dates of composition. Likewise, Kassler details the manuscripts of many letters by both North and Clarke in a subsequent correspondence in 1706 with Clarke on 'physiologicall matters' (i.e., physics or natural philosophy) and, some years later, on theological matters [113]. Neither North's adoption of an internal critic of himself (his 'self-critical method of reflection') nor his turning to an external 'adversary' (Clarke) to improve his own understanding appears to have moved him any closer to a fundamental acceptance of the Newtonian system. North maintains that Newton's certain mathematical demonstrations nonetheless cannot guarantee certain knowledge in physics (let alone theology, morality, or policy), which was instead obtained through 'skill in probabilities' [111–112]. Moreover, North criticized Clarke's assertion that the infinity of space and time depended on a necessarily existing substance (God), since this assertion ultimately relied on what we can or cannot imagine (*viz.* infinity without necessary being). Rather, for North, our ideas of infinity come from our senses, which 'may deceiv in this'; whereas our ideas of almighty power come from reflection

² Kassler discounts the 'constructive scepticism' of 'so-called latitudinarians' such as William Chillingworth, John Wilkins, and John Locke as a principle source [48].

[185].³ Hence, North's ontological commitment to independent realities (his realism) was epistemological, deriving from a focus on how the realities can be known, rather than metaphysical (as Kassler characterizes Clarke's realism), and on the foundation of reality as necessary existence. North's particular epistemological realism entailed a form of fideism.

North brought his fideistic realism to bear in his later correspondence with Clarke on theological matters. In 1713, North composed a response to Clarke's controversial *Scripture Doctrine of the Trinity* (1712), apparently at Clarke's request. This response, in the form of a letter, went through many revisions and was, at one point, intended for publication. In it, North defended orthodox Trinitarian belief, criticizing Clarke's attempts to provide a rational system for the relationship between Father, Son, and Holy Spirit. Clarke's strong subordination of the Son to the Father (and of the Spirit to both), coupled with his argument that there was no direct scriptural attestation for a substantial unity of divine persons, was of doubtful orthodoxy and, for North, rested on dubious foundations. North asserted that the divine nature, part of the absolute and true, was neither demonstrable *via* linguistic analysis of Scripture (or any inquiry at the phenomenal level) nor rationally comprehensible to human minds but to be taken on faith.

In her analysis of North's response, Kassler situates Clarke's *Scripture Doctrine of the Trinity* within the trend in the early 18th century towards 'a rational (discursive) basis for language' [228]. For Clarke, the language of paradox such as the divine paradox of the Trinity was inadequate for descriptions of belief. Clarke's literal approach sought the plain meaning of parabolic and symbolic biblical passages and attempted to systematize Scripture, rendering it internally consistent. Clarke conceived the language of Scripture to have a timeless and unchanging meaning representative of God's intention and discoverable through careful interpretation. Hence, Clarke wished to cleanse the language by which the Church of England expressed its fundamental doctrine.

³ North considered bodies to have a functional limit of divisibility (at the phenomenal level) but not an ultimate point of indivisibility (at the level of the real or true) as suggested by Newton's atomism. This entailed North's understanding of body as a universal extension (à la Descartes) that could be divided *ad infinitum* into 'an actual infinity of minuteness' (in the true or real state) but which in experience (the appearances) was not.

North, on the other hand, embraced the paradoxical expression of the Church's belief, conceiving language, even the language of Scripture, as subject to semantic change. As Kassler describes it, in North's view, language was an 'arbitrary invention of humans and a representation of their changing history and customary practices' [229]. As such, exact or absolute meaning was impossible to discern from spoken or written words and the interpretation of Scripture could only give probable meaning. In this allowance for the 'natural growth in a living language', Kassler argues that North demonstrated both a literary understanding of language—as opposed to Clarke's philosophical understanding—and an understanding inspired by the inevitable imprecision entailed in the use of language when practicing common law, itself entangled in the 'ambiguity that is part of life' [230]. Hence, North and Clarke's irreconcilably different epistemologies led to intrinsic divergences in their understanding of language and thus entailed conflicting approaches to biblical interpretation. And so, ultimately, these divergent epistemologies expressed in their earlier natural philosophical disagreement led to conflicting positions on the central Christian doctrine of the Trinity.

Although neither North nor his son was successful in his efforts to publish the theological correspondence, Kassler's edition and extensive commentary makes it accessible to the modern reader and sets it in the context of North's wrestling with Newtonian natural philosophy. In many ways, by arranging North's appraisal of Newtonian mechanics together with his rebuttal of Clarke's problematic views of the Trinity, Kassler's edition suggests both an association of Newtonian non-mechanical powers with Newtonian heterodoxy and North's possible awareness of that connection. North gave no direct indication that he knew of Newton's own heterodox position on the Trinity (similar to Clarke's) and while Kassler hints in her concluding remarks that his critique of Clarke's theology reveals an awareness of the connection between Clarke's theological position and his natural philosophy, she leaves it as a possibility.

Kassler's edited volume of North's encounter with Newtonian natural philosophy and Clarke's theology contributes a number of important observations to investigations of the study of nature in early modern England and raises further questions. Her detailed descriptions and editing of North's and Clarke's manuscripts give first-hand access to an otherwise obscure source of criticism of the Newtonian system. Her work provides fresh insight into epis-

temological foundations for natural philosophy deriving from traditions of common law. In many ways, North's probabilistic style of reasoning drawn from his experience with common law serves as an important parallel to John Locke's works on human reasoning, natural law, and empirical method, particularly where North's probabilistic epistemology diverges from Locke's empiricism. Kassler's presentation of North's probabilistic style reveals the inadequacy of differentiating ways of philosophizing in the early modern period into a dichotomy of 'rationalist' *versus* 'empiricist'. North's epistemology, drawing on Descartes' deductive method but using an appeal to empirical evidence based in common-law methodology, reveals the complexity involved in early modern approaches to knowledge of the natural world, as natural philosophers drew from many sources from law to theology. Indeed, Kassler's argument for the similarities between North's epistemological approach to natural philosophy and his fideistic realism in theology is well substantiated.

Furthermore, *Seeking Truth* reveals the importance of the meaning of language to Newton and his contemporaries, both supporters and critics, as seen in North and Clarke's divergent conceptions of how the language of Scripture should be read. Clarke's desire to 'cleanse' the creedal language of the Church and to discern an overall systematically consistent meaning in the language of Scripture strongly reflects Newton's patterns of scriptural interpretation and his desire to find the plain meaning behind symbolic texts of Scripture. Newton was highly dissatisfied with allegorical and metaphysical interpretations, particularly those which multiplied possible meanings of a given symbol or figurative representation in Scripture.⁴ Defenses of orthodox Trinitarianism that appealed to paradox would have been equally unsatisfactory for Newton, since paradoxes are inherently multivalent (and usually contradictory), simultaneously figurative and definitive of abstractions. Indeed, the use of paradox expressed a metaphysical worldview which operated 'at the limits of discursive knowledge' [227] and thus resembled too

⁴ See, for example, Newton's rules for interpreting biblical prophecy from an early theological manuscript that was composed in the late 1670s to early 1680s, which include the instructions: 'To assign but one meaning to one place of scripture', and 'To chose those interpretations which are most according to the literal meaning of the scriptures' [*Yahuda Ms. 1.1*, fol. 12r].

closely the proscribed use of unsubstantiated hypotheses.⁵ Newton opposed language that did not have direct associations and sought to remove mystery from theological statements. Like Clarke—and likely a strong influence on Clarke—he insisted that the true meaning of a given scriptural passage was not only clearly discernible from the language of Scripture but that this meaning could be known with certainty.⁶ Newton’s approach to theology reflected the ‘matter-of-fact’ approach to natural philosophy that characterized the Baconian method. John Locke advocated a similar approach in his theory of mind and language, which entailed ‘the elimination of all mystery and obscurity from philosophy, science, and theology, and the advancement of these subjects through reason’ [239]. Kassler’s presentation of North’s more literary—as opposed to literal—conception of language reveals the complexity of approaches to language in the period and the extension of theories of knowledge to a variety of interconnecting fields, from natural philosophy to language to theology.

Given Kassler’s central theme of epistemology in science and theology, her commentary on North’s manuscripts would have benefitted from a consideration of Jed Buchwald and Mordechai Feingold’s recent book, *Newton and the Origin of Civilization*, particularly their treatment of Newton’s scepticism regarding experimental data [2013, 44–106]. Reading *Seeking Truth* in light of Buchwald and Feingold’s work raises a couple of important questions: How does North’s probabilistic style of reasoning compare to Newton’s innovative averaging of experimental data, necessarily due to the inherent limitations of physical measurement? Does Newton’s scepticism

⁵ Newton’s famous refusal to ‘feign hypotheses’ in the General Scholium to the *Principia* is a published example of his ubiquitous dislike of metaphysics [Motte 1729, 392].

⁶ According to Newton, one of the rules to interpret the words and language of Scripture was

to acquiesce in that sense of any portion of Scripture as the true one which results most freely & naturally from the use & propriety of the Language & tenor of the context in that & all other places of Scripture to that sense. For if this be not the true sense, then is the true sense uncertain, & no man can attain to any certainty in the knowledge of it. Which is to make the scriptures no certain rule of faith, & so reflect upon the spirit of God who dictated it. [Yahuda Ms. 1.1, fol. 12r]

regarding verbal testimony, which was gained in the prosecution of forgers while Warden of the Mint, bear any resemblance to North's legal sources for his own reasoning in natural philosophy?

Moreover, in her concluding suggestion that North may have drawn the connection between non-mechanical Newtonian powers and Clarke's (and Newton's) heterodoxy, Kassler touches on an important question in current Newton studies: the degree to which Newton's seemingly clandestine non-Trinitarian statements in his published works were in fact perceived as heterodox by his contemporaries. However, Kassler's concluding suggestion would greatly benefit from a detailed consideration of this question in the literature. Larry Stewart's influential article 'Seeing through the Scholium', for example, demonstrates how Clarke's association with Newton factored heavily in certain contemporary interpretations of Newton's statements of God's supreme dominion as theologically suspect [1996, 123–165].⁷ Moreover, Kassler's implication that Newtonian natural philosophy and heterodoxy were associated for North appears to draw on Betty Dobbs' association in *The Janus Faces of Genius* [1991] between Newton's non-mechanical powers and his Arianism (as Dobbs characterized his heterodoxy) but Dobbs receives no mention.

Finally, Kassler situates North's theological correspondence in the context of the numerous epistolary exchanges that his publication of *The Scripture Doctrine of the Trinity* generated, many of which were printed in future editions (although North's was not). But she does not situate his natural philosophical objections to Newtonian mechanics—*via* correspondence with Clarke—in the context of Clarke's later, strongly-charged correspondence with Gottfried Leibniz. Much of the appeal of Kassler's edition of North's writings lies in its insight into the English context for critiques of the Newtonian system, in contrast to the more familiar Continental challenge to Newton that was spearheaded by Leibniz. A comparison between the epistemological motivations for North's objections and those of Leibniz would not have been amiss.

Nonetheless, *Seeking Truth* provides an excellent source for the intellectual response to Newtonian ideas within England regarding both natural philosophy and its theological implications. It supplies in published form an

⁷ Newton's published statements of God's supreme dominion were readily available in the General Scholium to the *Principia* [Motte 1729, 387–393].

exposition of a detailed theological argument against Clarke's *Scripture Doctrine* and the context for the irreconcilable epistemological positions of each antagonist. Kassler's in-depth commentary on Roger North's encounter with Newtonian natural philosophy reveals the theological implications of Newton's philosophical ideas, implications known even to his contemporaries, thus shifting our perception of the interaction between Newton's science and theology to an external, and not entirely receptive, audience. In the process, Kassler ably demonstrates that the interaction between Newton's science and theology is part of a larger overall web of individuals and ideas within the period and that, as such, the isolated thoughts of a backwater provincial are as important to our understanding of the period as those of the traditionally central characters. *Seeking Truth* is worth the read for historians of science focused on the early modern period, particularly those interested in the implications of Newton's views of body, space, and time in theological topics. It will be of equal benefit to those interested in the development of scientific epistemology, specifically the role that common law has played in the rational empiricism of modern scientific methodology.

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Expelling the Plague: The Health Office and the Implementation of Quarantine in Dubrovnik, 1377–1533 by Zlata Blažina-Tomić and Vesna Blažina

Montreal, PQ/Kingston, ON: McGill-Queen's University Press, 2015. Pp. xxii + 362. ISBN 978-0-7735-4540-3. Paper CDN \$100.00

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Based on remarkably rich and previously untapped archival material, *Expelling the Plague* reconstructs the development of plague-measures in Dubrovnik (also known as Ragusa) between 1377 and 1533. A vibrant city-state and hub of Mediterranean trade in modern day Croatia, its centrality made this port vulnerable to plague. In the decades following the pandemic of 1347–1350, the city soon recognized the disease as a reoccurring threat to its existence and was exceptionally early in employing preventative measures. In fact, as the book's cover advertises, it was 'the first city in the world to develop and implement quarantine legislation, and in 1390 it established the earliest recorded permanent Health Office'.

The health-officials are the main characters of this story as well as the producers of the book's most important source. At the monograph's core is the *Libro deli Signori Chazamorbi*, a manuscript containing the health-officials' administration of traders' arrivals and trials for offenders. The initial transcription was made by Dubrovnik's archivist Zdravko Sundrica (1915–1995), to whom the book is dedicated. Now Zlata Blažina-Tomić and Vesna Blažina have used this fascinating source to uncover in detail Ragusa's history of plague. This study is a contribution to the (social) histories of medicine, science, and public health; but the source-material and analysis are also relevant to a wider range of scholars, including those of urban institutional history and Mediterranean trade and exchange. The authors are in clear dialogue with historians of plague in Renaissance Italy and their in-depth study not only offers a wealth of information from another geographical area but also contrasts recent work on plague-measures in Italy with a more positive interpretation of the health-officials' impact and motivation.

The first chapter gives the necessary introduction to Dubrovnik's political organization, physical layout, and socio-economic and cultural achievements. In the spirit of the city's main chroniclers, the authors describe Dubrovnik as a Catholic, proud, and peace-loving republic ruled by patricians, a city that successfully maintained its dominance in international trade during the late medieval and early modern periods. The aristocracy protected their boundaries by strict rules of inheritance and a political monopoly. Fear of factionalism contributed to a governmental organization with continuously rotating offices divided among several governmental bodies: a rector, senate, major council, and a minor council. Commoners had very little political involvement but some organization through confraternities.

The second chapter recapitulates the state of the art regarding plague-pathology and current historiographical debates. Blažina-Tomić and Blažina argue that the focus on multi-causal narratives has pushed the impact of human interventions as a factor in development of epidemics to the background. In addition, they critique the image of Italy as a forerunner in combatting plague and public health, an image presented most influentially by Carlo Cipolla [1981] and Samuel Cohn [2010]. *Expelling the Plague* offers a different perspective on both these issues by shifting away from the Italian peninsula across the Adriatic Sea and by putting a strong focus on the state's health-practices.

Chapter 3 draws the broader horizon of Dubrovnik's health-culture. The state took on an active role in stimulating healthcare and urban sanitation. Administrators recruited both local and foreign (Italian) physicians, who were high salaried employees—learned *doctores* who earned up to 400 ducats per year. They were, therefore, prestigious citizens who could also be dispatched as diplomats and sent out to treat noblemen. Moreover, native Ragusans studied medicine with state support in Bologna. Examples of accomplished 16th-century Ragusan physicians are Donato Muzi, a reformer of classical medicine, and Mariano Santo, an innovative surgeon who developed a treatment for bladder-stones. The exposition of Dubrovnik's health-culture indicates that public health was a central component of the Republic's conception of 'the common good'. The task of protecting this common good featured prominently in the Christian-republican identity of Ragusa's ruling class and offered a motive to combat plague actively.

Strikingly, city-physicians were not expected to take on heroic roles during plague-epidemics. As the authors explain, because physicians were unable to cure it, plague was regarded as outside of their jurisdiction. Their requests to leave during epidemics, along with the majority of patricians, were often accepted. Plague was in that respect ‘more like an earthquake’ than a disease. Thus, the duty of caring for plague-patients was placed in the hands of plague-doctors (*medici pestis*), barbers, and priests within the quarantined areas.

Chapter 4 describes the development of Ragusa’s health office from the late 14th to the early 16th century. In 1377, urban administrators introduced quarantine-legislation and in 1390 appointed the first plague-officials. From 1397 on, these so-called *chazamorbi* became a permanent office with special and larger jurisdictions during epidemics. The permanence of the health-office was rather logical. Plague occurred in many areas from which tradesmen called at Dubrovnik’s port, thus trade demanded continuous monitoring. Health-officials did not receive medical training but were experienced patrician urban administrators. They were instructed to protect international trade—the city’s main source of income—as well as the health of the urban community. The health-officials believed in the communicable nature of the disease and their policy focused on isolating infected people and items. This is also reflected by the common use of the word ‘infectione’ rather than ‘miasma’ or corrupt air: while the latter concept was central in medical discourses on plague, it was not used in Dubrovnik’s urban sources.

The book’s core source, the *Libro deli Signori Chazamorbi*, documented (*arecto*) arrivals of people and goods and noted down traders’ oaths. The *Libro*’s other part (*atergo*) recorded trials for plague-related offenses. The manuscript contains 1,551 arrivals from 224 different places of origin, noted between 1500 and 1530. The health-office demanded that merchants declare under oath that they had not been in pestiferous places. If traders were coming from suspected areas, they were confined to quarantine. Punishment followed false declarations. The *chazamorbi* interrogated merchants about other merchants and relied on international intelligence networks. In the years leading up to the epidemic of 1527, more stringent supervision led to increased registration of tradesmen.

This brings us to the heart of the book: the severe epidemic of 1526–1527 [chs 6–9]. Measures against the spread of plague included issuing quarantine, burning victims’ belongings (sometimes entire houses), and confining healthy

citizens within their homes. The city hired plague-doctors, sometimes at their own initiative; and expenditure on support, including the distribution of food, added up to 40,000 ducats. A gap in urban administration during the height of the epidemic suggests a high level of social disruption. Moreover, the health-officials were not most active nor was their authority as pervasive during the worst months, but rather before and in the epidemic's aftermath. When plague hit the city hard in 1527, the health-office's usual tasks of monitoring traders were then pushed to the background. After the epidemic, Dubrovnik was bypassed by most international trades. Therefore, the health-office continued to turn its focus inward, aiming to limit the circulation of infected goods within the city and to persecute disobedient citizens, while also investigating offenses such as theft purportedly committed during the height of the epidemic.

The discussion of the trials is compelling and allows the reader to come close to the anxieties and social tensions in a city ravished by plague. Besides pecuniary sanctions, common punishments were the 'jerks of the rope' or *strappado*, which also occurred as punishment for plague-offenders in Tuscany. This and a number of other publicly executed sentences—such as lashing, riding on a donkey through town, and hanging—explicitly served as a threat to others as well. The trials expose three important biases in the policies behind persecution. First, there were severe class distinctions. Patricians received privileged treatment; they were allowed confinement in their own homes and were penalized by monetary fines and time in prison but were rarely sent to the quarantined areas. The second bias is gendered, as the 'penalties for women were always harsh'. Third, a particularly targeted and mistrusted group were the plague-survivors, the *resanati*. On one hand, the health-office used their supposed immunity for special but lowly paid tasks such as disinfecting goods and digging graves. On the other, because of their immunity, both the state and other citizens greatly distrusted the *resanati*. They accused them of spreading the disease and often suspected them of theft. This is reflected by the large number of trials and investigations of *resanati*, mainly those originating from lower classes. The officials first imposed a death-sentence in 1482 for stealing infected items. Several others followed in the first decades of the 16th century. Moreover, health-officials could still monitor and sometimes outright harassed *resanati* a year after they had been declared healthy and had left quarantine. Finally, examples of neighbors reporting on *resanati* out of fear of infection are important

indications that citizens had access to theories about the spread of plague. A particularly striking example is a neighbor's complaint about two *resanati* who by publicly celebrating their wedding had put their guests and the whole ward at risk of infection.

Related to the issue of popular knowledge, the authors make important observations about the educational value of religious celebrations. Besides information spread by public decrees, the veneration of Saint Roch—a state holiday in the early 16th century—contributed to an understanding of plague among various social classes. The construction of votive churches, such as the church of Saint Roch at the entrance of the city, was, therefore, a preventative measure but also a means to educate people about the symptoms of plague. In addition, instructing people about the risks could also motivate them to obey plague-regulations.

In the conclusion, the authors return to the forerunner debate. One of the main reasons that Ragusa quickly implemented a permanent health-office was the importance of retaining their international reputation as a safe and healthy port and, therefore, as a reliable trade-partner. A further reason was that the surrounding powers, particularly the Ottomans, would use a weakened state as an opportunity to invade. The alleged lack of plague-measures in the Ottoman empire also features prominently as a factor in the book; it was also one of the explanations why the health-officials were unable to prevent the 1527 epidemic. Moreover, as a city-state, Ragusa was able to exercise a high level of social control and had the financial means to support measures. A final identified factor was the strong civic ideals of its ruling class.

It is this last notion that perhaps deserves further analysis. The book evaluates the impact of Dubrovnik's health-office quite positively. While the conditions of quarantine could be bad and the aggression towards poorer dwellers and women sometimes cruel, plague-prevention saved many people and often successfully defended the public good at the cost of a few. This is in contrast to historiographical debates on similar offices in Italy. For instance, Jane Stevens Crawshaw [2012] proposes a less positive interpretation of the establishment of lazarettos and Sandra Cavallo [1995] has 'no enthusiasm' for Turin's plague-program. Italian states could use plague-measures to control lower classes and protect the elite's financial and power interests. While in Dubrovnik extended power and legislation were likewise an important

byproduct that increased during each outbreak, Blažina-Tomić and Blažina contend that ‘repression was not the purpose,...health was always the primary concern’. The authors thus reject the theory that patricians aimed primarily at consolidating their power through plague-measures. They argue that Dubrovnik had a less tense political landscape in comparison with Italy. The patricians’ monopoly on state encountered no serious challenge until the 17th century, when inner strife in the patriciate led to an oligarchy.

Instead of portraying the state and its health-officials as acting in a spirit of sacrifice and as guardians of a common good, perhaps their motives can also be interpreted in a more political way: namely, that a strong civic ideology helped to justify the protection of certain interests of the ruling class. The book offers much material for further debate on these issues. One way of gaining deeper understanding would be to define and problematize the use of key concepts such as (public) health and the common good as well as the ways in which the urban sources use the terms ‘infection’ and ‘contagion’. Finally, the book shows the need for research into the (absence of) governmental reactions to plague in the Ottoman Empire.

To conclude, *Expelling the Plague* is the clearly structured and carefully written end-result of extensive archival research. It is also a book that launches the history of plague into new geographical territories and institutional and cultural contexts, which hopefully in the future will be further explored.

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Il libro Lambda della Metafisica di Aristotele by Silvia Fazzo

Naples: Bibliopolis, 2012. Pp. 308. ISBN 978–88–7088–618–4. Cloth €35.00

Commento al libro Lambda della Metafisica di Aristotele by Silvia Fazzo

Naples: Bibliopolis, 2014. Pp. 415. ISBN 978–88–7088–624–5. Cloth €35.00

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Undoubtedly, *Metaphysics* Λ is among the most fascinating and influential treatises of Aristotelian writings. Because it contains Aristotle's theory of the prime mover, described as an intelligible substance and a divine intellect, it has been examined thoroughly and continually since antiquity in order to determine the very nature of Aristotle's theology and its relation to metaphysical science.

With these two books, grown from a doctoral thesis (Trento and Lille, 2009), Silvia Fazzo provides a new, innovative, and wide-ranging study of book Λ . The first volume, published in 2012, contains a new edition of the Greek text with an Italian translation. The second volume, which appeared in 2014, presents a detailed commentary. Both constitute a very rich, learned work that is based on a precise knowledge of the text and an extensive bibliography. Both volumes also form a strong unity which perfectly exemplifies Fazzo's aim to link the task of establishing what Aristotle really says with the understanding of why he says it [1.12]. In this regard, many of the most significant interpretations that she develops in the second volume stem directly from either the text or the translation that she adopts in the first; conversely, some aspects of her edition constitute in themselves a doctrinal interpretation. The major characteristic of these two works is their deep originality. Fazzo often states that she wishes to dispose of the previous editorial and exegetical tradition [e.g., 1.14, 28; 2.11, 25, 40–42] in order to study *Metaphysics* Λ in itself and not as it has been subsequently perceived, interpreted, or even reconstructed. This basic methodological principle, which runs across both volumes, leads Fazzo to elaborate some radical views, often in contradiction with the standard interpretation of the text.

The edition

Let us consider first Fazzo's critical edition of the text. In the extended introduction to the first volume [1.35–165], she discusses and justifies her editorial choices against the background of the history of the textual tradition. Her main goal is to build an edition on a new and complete stemmatic basis [1.19]. To begin, she dismisses both the use of conjectures and the indirect tradition, whose variant readings are inaccurate and, in some cases, impossible to reconstruct through the Arabic or Hebrew texts [1.134–136, 152–154]. In doing so, she signals a difference from the previous editions and particularly from [Jaeger 1957](#). As far as the manuscript tradition and the *stemma codicum* are concerned, Fazzo's edition also takes a very different approach. It is the first edition of book Λ that is based on a more complete textual ground in that it takes into account two manuscripts—Ambrosianus F 113 sup. (M) and Taurinensis VII B 23 (C)—which have not been collated by previous editors of book Λ . Furthermore, it tries to distinguish clearly the different hands at work in the MSS E (Parisinus gr. 1853) and J (Vindobonensis phil. gr. 100), and especially to establish the difference between the copyist of J and another scholar (named J²), who, says Fazzo, corrected the text of J and has remained unnoticed up to now [1.143–152]. Finally, Fazzo's edition rests on a new evaluation of a crucial MS, namely, Laurentianus 87, 12 (A^b). Indeed, all previous editors of the *Metaphysics* have relied heavily on A^b because:

- (1) it gives a smoother and grammatically correct text;
- (2) it has been suspected since [Christ 1885](#) that it derives from a more ancient source; and
- (3) it represents one of the two manuscript traditions of the *Metaphysics*, i.e., the β -family, whereas the α -family is essentially represented by E and J.¹

Fazzo strongly denies the importance that has been traditionally assigned to A^b. She refutes the evidence provided by Christ for an ancient origin of the text transmitted by A^b [1.55–56]. Like most contemporary editors of the *Metaphysics* [[Frede and Patzig 1988](#); [Primavesi 2012](#)], she underlines

¹ Even if [Harlfinger \[1979\]](#) showed that the MS A^b changes its affiliation in Λ 7.1073a1 and belongs from this point to the α -family (being a copy of a lost MS δ , which derives from the same source as J, namely, γ), A^b still remains in principle, together with M and C, a major witness to one of the two branches of the textual tradition of Λ 1–7.

the superiority of the MSS belonging to the α -family to the smooth text transmitted by the β -family [1.118–128]. Moreover, she holds that in Λ 7, A^b has already moved from the β to the α -family and proposes to locate this change in K 8.1065a26 [1.113–118].² As a consequence, A^b , for Fazzo, has no special value for establishing the text of *Metaphysics* Λ : its agreement with the readings transmitted by J and/or E does not express any concord between the two branches of the textual tradition; and its variants, given the standardizing nature of the MS, imply no stemmatic authority.

Thus, Fazzo's edition is based on simple and clear criteria [1.154–157]:

- (1) the text of Λ has to be established on the basis of the manuscript tradition only;
- (2) only E J (distinguished from the readings added by posterior hands E^2 , E^c and J^2) and M C have real stemmatic authority;
- (3) the reading transmitted by the α -MSS is always to be preferred as long as it is tenable and when it is not, the β -reading is to be followed;
- (4) in the case of a disagreement between M and C, the reading of M must prevail; and
- (5) if the β -reading is identical to the one transmitted by the α -family, then it is possible to venture a conjecture, generally attested in the secondhand variants and in the posterior tradition.

As a result, the text edited by Fazzo strongly differs from previous editions and especially from [Ross 1924](#) and [Jaeger 1957](#), which are in common use. Her edition certainly constitutes an improvement in some important aspects since it relies on M and C and gives an updated version of the text that is grounded on the priority of the testimony of the α -family. Her *apparatus* is also more complete and accurate, thanks, for example, to her revision of the indirect tradition. But, Fazzo's text also differs from the one which could emerge using other criteria adopted by contemporary editors. Indeed, Stefan Alexandru's own edition of *Metaphysics* Λ , which was published in [2014](#), shows how different are Fazzo's editorial choices. In particular, the most crucial point lies in Fazzo's depreciation of A^b .

² Silvia Fazzo already defended this hypothesis in [Fazzo 2010](#).

Pantelis Golitsis [2015]³ has recently argued in favor of Harlfinger's stemma, showing that A^b differs from MC in *Metaphysics* K not because it is a witness of the α -family but because M and C do not faithfully transmit the text of the archetype β ,⁴ due to the fact that they have been corrected on the basis of the text of the *Physics* and of a manuscript of the *Metaphysics* belonging to the α -family, namely, H^a. Golitsis' demonstration is convincing and provides an accurate picture of the *stemma codicum* of the *Metaphysics* in that it is based on a more comprehensive view of the Byzantine way of producing new manuscripts through the collation of several versions of the same text. If Golitsis is right, the value of A^b should be reasserted and we need to be cautious with Fazzo's edition.

However, since the above point does not suffice to give a clear view of Fazzo's innovative approach to the text, it will be useful to present and discuss certain readings that she adopts, to illustrate some of her original views and some of the major doctrinal orientations upon which she builds her commentary in the second volume.⁵

At Λ 1.1069a30–33, she proposes a text which perfectly exemplifies her fourth editorial criterion. The passage discusses the distinction between two kinds of sensible substances (corruptible and eternal) and the quest for the elements (*στοιχεῖα*) of sensible substances. The problem is that we do not really know what kind of sensible substances falls under this quest. E J read:

οὐσία δὲ τρεῖς, μία μὲν αἰσθητή, ἣς ἡ μὲν αἰδῖος ἡ δὲ φθαρτή, ἦν πάντες ὁμολογοῦσιν, οἷον τὰ φυτὰ καὶ τὰ ζῶα, ἡ δ' αἰδῖος, ἣς ἀνάγκη τὰ στοιχεῖα λαβεῖν, εἴτε ἐν εἴτε πολλά.

Traditionally, since Ross at least, editors consider « ἡ δ' αἰδῖος » in 1069a32 to be a corruption and suppress it. Thus, they edit the text with the following

³ On this point of criticism and on others (e.g., Fazzo's distinction between J and J²), see also Golitsis' review of Fazzo's edition in *Bryn Mawr Classical Review* [2013a] with her response in [Fazzo 2013b](#) and Golitsis' further response in [2013b](#).

⁴ Cf. [Alexandru 2014](#), 46, which maintains that Fazzo has not proved her thesis about A^b sufficiently.

⁵ I leave aside the textual problem of Λ 7.1072b2–3 since Fazzo's edition of that passage (ἔστι γὰρ τινὲς τὸ οὐ ἔνεκα ὧν τὸ μὲν ἔστι τὸ δ' οὐκ ἔστι) is already well known [see [Fazzo 2002](#)] and often discussed in recent studies: see, e.g., [Rashed 2011](#), 128–130 or [Menn 2012](#), 422–464.

punctuation, implying that the quest for the elements concerns every sensible substance:⁶

οὐσίαι δὲ τρεῖς· μία μὲν αἰσθητή – ἧς ἡ μὲν ἀίδιος ἡ δὲ φθαρτή, ἦν πάντες ὁμολογοῦσιν, οἷον τὰ φυτὰ καὶ τὰ ζῶα [ἡ δ' ἀίδιος] – ἧς ἀνάγκη τὰ στοιχεῖα λαβεῖν, εἴτε ἐν εἴτε πολλά.⁷

However, Fazzo notes [1.231–237] that the E J-reading, strictly speaking, links the research of elements with the eternal sensible substances. She also notes that the same occurs in the M C-reading, which additionally proposes a simpler text, one that she finally decides to adopt. She reconstructs the text as follows:

οὐσίαι δὲ τρεῖς· μία μὲν αἰσθητή, ἧς ἡ μὲν φθαρτή, ἦν πάντες ὁμολογοῦσιν, οἷον τὰ φυτὰ καὶ τὰ ζῶα, ἡ δ' ἀίδιος, ἧς ἀνάγκη τὰ στοιχεῖα λαβεῖν, εἴτε ἐν εἴτε πολλά.

The text implies that the research into the elements and the problem of their number concerns only the eternal sensible substances. Since these substances, i.e., the stars, are made of a special matter whose unique potentiality is to move between two points of a circle in directions that are not contrary to one another, Fazzo maintains [1.237; 2.127–129, 220–224, 243: cf. [Fazzo 2013a](#)] that Aristotle raises here an issue concerning the number of the elements of eternal sensible substances, which are probably composed of only one element (their matter) and not of three (matter and two contraries—form and privation) as corruptible substances are.⁸ On this basis, she proposes a new understanding of several passages of Λ ⁹ and rightly underlines both the difficulty of submitting every sensible substance to the same causal pattern and the need, in response to the 10th *aporia* in *Metaphysics* B [1000a5–1001a3], to distinguish clearly the principles of corruptible substances from those of eternal substances.

This being said, we can still have doubts about this reading on doctrinal and textual grounds. On the one hand, it is clear that research into the elements and the question of their number are repeatedly linked in book Λ with

⁶ Same interpretation but with a different text in [Alexandru 2014](#), *ad loc.* and [Frede 2000](#), 79, which places a full stop after « ἡ δ' ἀίδιος ».

⁷ See [Ross 1924](#), 1.350 and *ad loc.*; [Jaeger 1957](#), *ad loc.*

⁸ This implies that « εἴτε ἐν εἴτε πολλά » has an interrogative sense [1.237].

⁹ Λ 2.1069b24–26; 10.1075a28–32, 1075b13–14.

every sensible substance,¹⁰ so that it would seem strange that Aristotle limits the scope of these two studies in Λ 1. Now, nothing prevents us, even in the MC-reading, from understanding the distinction between two kinds of substances as a parenthesis. The research-program that Aristotle presents would then concern every sensible substance. And, even asserting Fazzo's view that the stars have only one element, the alternative « εἴτε ἓν εἴτε πολλά » would not express Aristotle's single concern (to determine whether the stars have one element or many), though it would be a reminder of the two cases (for the corruptible substances which have several elements, and for the stars which have just one) in which this research program has to be, and is effectively carried on, in the rest of the book. In other words, the text would express what Aristotle really does in book Λ .

On the other hand, Fazzo's philological grounds for accepting the MC-reading seem inadequately laid out: either the MC-reading, as she puts it, is authentic, which means that E J read a text whose corruption remains to be explained,¹¹ or MC give a correction, which means that then we cannot go back to the E J-reading as she proposes since it obviously gives an unsatisfactory and corrupted text that deserves to be emended.

Another example of Fazzo's innovative editing of the text comes at Λ 2.1069b20–23, where Aristotle refers to the conception of matter held by some Presocratics. The text raises several problems and Fazzo's reading, which follows Bekker's punctuation and David Charles' too—up to a certain point [Charles 2000, 106–110]—seems very convincing. However, one aspect of her reading is unsatisfactory:

καὶ τοῦτ' ἔστι τὸ Ἀναξαγόρου ἓν (βέλτιον γὰρ ἢ ὁμοῦ πάντα) καὶ Ἐμπεδοκλέους τὸ μίγμα, καὶ Ἀναξιμάνδρου, καὶ ὡς Δημόκριτός φησιν· ἦν ἡμῖν πάντα, δυνάμει, ἐνεργείᾳ δ' οὐ.

Unlike Jackson [1904], who is followed by Ross, Fazzo [1.239–45] thinks that the reference to Democritus has to introduce a real quotation. She suggests that we interpret « ἦν ἡμῖν πάντα » as a new fragment of Democritus in which he produces a new version of Anaxagoras' famous « ἦν ὁμοῦ πάντα » in order to underline the putative stability of the physical world, since atoms have

¹⁰ Λ 2.1069b32–34; 4.1070b18–19, b25–26, 1070b30–32; 5.1071b2.

¹¹ On the contrary, as Golitsis shows [2015, 6n23], the opposite hypothesis of a correction of E J by MC is easier to explain.

always existed even if they can move, combine, or dissociate from one another. Fazzo's hypothesis is interesting and may be right but it remains highly conjectural since it lacks positive evidence and requires a real theory to be built on the basis of a very few words that seem over-interpreted.

Another aspect of Fazzo's innovations which has some significant consequences relates to the problem of subscript iotas. In her introduction [1.58], she observes that they are not systematically written down in ancient MSS, or, to be more precise, that they are either adscript or omitted. She concludes that their omission is not necessarily significant. This leads her to re-examine every occurrence of «ἐνέργεια» when the word qualifies a substance in order to determine whether it is used in the nominative or in the dative case. As a result, she judges that there is only one case in Λ (i.e., 1072a25) where none of the MSS explicitly confirms the dative.¹² She decides then to print «ἐνεργεία» systematically not only in these latter cases but in the former too, since the reading «ἐνέργεια» in 1072a25 would constitute otherwise a strange *unicum* [see also 2.55–59]. This editorial choice, she says, prevents us from interpreting Aristotle's prime mover in a wrong, though traditional, way, since nothing proves that the prime mover is a pure act. Indeed, this famous interpretation would only rely on the absence of a subscript iota (in Λ 6.1071b22), which turns out to be an incorrect reading of the text [Fazzo 2016].

Fazzo offers an interesting, new perspective which undoubtedly invites us to reconsider some passages that we may be used to reading in haste. But, even if her paleographical observations are accurate and useful, the methodology that she develops on this basis, as well as the interpretation that she gives of the theory of the prime mover as a pure act, can appear somewhat unbalanced. It amounts to printing a subscript iota in every case: if some MSS have it, then it must be accepted; and even if no MS does, it must nevertheless be accepted. In other words, it is impossible to find any counterexample.

According to Fazzo, this impossibility relies doctrinally on the Aristotelian *corpus* as a whole and on the *Metaphysics* in particular, where actuality and potentiality are always employed as correlative concepts, which apparently means two things:

- (1) that they are always relative to each other, and

¹² See 1071a8, 1071b22, 1072a5, 1072b5, and 1072b8.

- (2) that each of them is always relative to a substance, so that « ἐνέργεια » cannot be a substance but must be a way of being for a substance.

However, these two remarks are perhaps compatible with the exegetical description of the prime mover as a pure act. If we admit that the prime mover is different and superior to every other substance, even to the stars, why then should the regular correlation between δύναμις and ἐνέργεια have any value in the case of the prime mover, whose ontological status is different, since it is an absolutely first principle?¹³ Furthermore, the standard theory which describes the prime mover as a pure act does not mean anything more than this: actuality is the only mode of being of the prime mover's substance. It does not deny the essential relationship between ἐνέργεια and the prime mover's substance but only suggests that this ἐνέργεια cannot be the actualization of a previous potentiality. In addition, is it true to say that this theory only relies on the absence of a subscript iota? In fact, this theory derives from Aristotle's argument as a whole, which defends the priority of actuality to potentiality and, therefore, points to the prime mover's being a substance deprived of any potentiality. In these conditions, this interpretation does not collapse, even if it is not expressed through a nominative.

Apart from the criticisms stated above, some of Fazzo's editing choices illuminate Aristotle's text. For instance, in Λ 7.1072a24–25, Aristotle announces a very short proof of the prime mover's immobility:

ἐπεὶ δὲ τὸ κινούμενον καὶ κινῶν καὶ μέγρον, τοίνυν ἔστι τι ὃ οὐ κινούμενον κινεῖ....

The text raises several issues, as for example the repetition of « καὶ » and the motivation of this proof. Traditionally, it has been interpreted as relying on an argument developed in *Physics* 8.5, which focuses on the notion of symmetry. This argument opposes a mobile which does not move anything to a mover which is unmoved, whereas the mover and the mobile are linked with each other by something which is both a mobile and a mover. But even with this argumentative structure in mind, it remains quite difficult to understand how it could apply in Λ 7, where the symmetry seems to be truncated, which led Ross and Jaeger to suspect a lacuna.

¹³ Of course, this criticism only concerns the occurrences where Fazzo admits that the prime mover is at stake. It leaves intact her reading « ἐνεργεία » in Λ 6.1071b22 since she thinks that Aristotle is there speaking of the *primum mobile*. On this point, see below.

Given Fazzo's criterion of the agreement between the β -family (MC), which reads «ἐπεὶ δὲ κινούμενον» without «τὸ», and E, which originally had the same reading (the article is added above the line), she proposes to read «ἐπεὶ δὲ κινούμενον καὶ κινῶν καὶ μέγρον...» and interprets the text in a more economical and a more convincing way. She refers «κινούμενον» not to a mobile in general but to the first heaven, mentioned three lines before (1072a21), and she hypothesizes that this argument relies not on the notion of symmetry but on the impossibility of a *regressus ad infinitum*. Aristotle would be saying that, since the heaven is both a mobile and a mover, it is only an intermediary term and has to be moved by something which is unmoved [1.275–280; 2.89–90, 310–316]. The suppression of the article might be unnecessary and can certainly be discussed but it gives rise to a new interpretation which succeeds in giving a clear and satisfactory meaning to a text that was particularly enigmatic.

The commentary

Fazzo's commentary on book Λ follows the same methodological orientations. The volume includes an extensive introduction in which she develops her main interpretation of the book [2.11–110], and a running commentary in which she presents, chapter by chapter [2.110–189], and then lemma by lemma [2.203–415], a more accurate reading of the structure and the argumentative motivations of the text.¹⁴ Fazzo alerts us [2.13] to the selective character of her lemmatic commentary: not every aspect of the text is commented on. Indeed, such an approach seems impossible and perhaps even undesirable. However, the selection that she makes is sometimes harsh: she is silent on quite extensive or significant portions of the text. If her concern was the length of the book, she could have cut down the repetitions that occur in her abstract and outline for each chapter, replacing it with more commentary. For instance, in Λ 3, nothing is said on the quite surprising possibility that the form of natural substances exists separately [1070a17–18]. The lemmatic commentary on Λ 4 or of Λ 9 is rather empty, whereas these two chapters develop some conceptually important or difficult arguments. Aristotle's analysis of the *aporia* concerning the priority of actuality to potentiality in Λ 6 [1071a22ff.] is only clarified in the outline of the chapter,

¹⁴ This second volume also contains an *addendum* [2.191–202] to the critical edition presented in the first volume.

and no further details are given in the lemmatic commentary. Of course, for some of these points, important interpretive elements are developed in the introduction. Unfortunately, there is no *index locorum* to indicate where in the volume the reader might find supplementary information.¹⁵

As for its methodology, the second volume aims at considering Aristotle's book itself, making a clean break with the exegetical tradition which might blur or modify its real meaning [2.25]. In particular, two standard views of Λ are rejected by Fazzo. The first consists in interpreting Λ as a theological book in which Aristotle's main concern is to develop a fully elaborate conception of the divine. On the basis of a close examination of the text and, especially of Λ 7.1072b7–30 where theological motives are evoked for the first time [2.45–54], Fazzo concludes that Λ constitutes not a theological but a philosophical treatise, whose theological meaning or value is only incidental [2.31–44; 59–61]. As a consequence, book Λ , according to Fazzo, is essentially directed towards research regarding the principles of every substance and aims to provide an understanding of the intelligible and immutable principle from which the order of all things derives that is different from that achieved by the Presocratics or the Academics [2.33, 40, 44]. In other words, Λ is a treatise, Fazzo says, of first philosophy. All this appears to be true and relevant but it does not suffice to give a clear view of Fazzo's rejection of the exegetical tradition: scholars for a long time, as she tells us, have questioned the theological appreciation of book Λ to which Ross and Jaeger still adhered.

Fazzo's metaphysical but non-theological evaluation of book Λ also leads her to deny a second standard interpretation, i.e., the supposed chronological and/or conceptual isolation of book Λ from the rest of Aristotle's *Metaphysics*. Modern scholars tend to see in Λ not the fulfillment of Aristotle's metaphysical project but a peculiar and maybe early work, grounded on a different basis and making no use of Aristotle's argument elsewhere in the *Metaphysics*, especially in books $ZH\Theta$. On the contrary, Fazzo provides an extensive list of parallel texts between Λ and other physical and metaphysical treatises, and concludes that book Λ is like a synthesis of the entire *corpus* and that Aristotle probably wrote it at the end of his philosophical career [2.28–31, 82–87]. Aristotle in Λ so read re-uses his physical and metaphysical philosophy in a meta-reflexive way ('in modo meta-riflessivo' [2.63]) in order to produce on the

¹⁵ It is also unfortunate that neither of these volumes contains a final bibliography.

basis of a new theory of principles a coherent and hierarchical vision of reality as a whole [2.44, 63]. According to the categorial analysis developed in the previous books of the *Metaphysics*, book Λ would thus constitute a full ontological research that provides auto-reflexive knowledge (*scienza autoriflessiva* [2.60]) which would constitute the fulfillment of Aristotle's metaphysics.

This is in sum a strong thesis held by Fazzo on the scope and status of Λ , and it appears to be true in some important aspects. Fazzo is surely right to reject the theological scheme and she correctly insists on the metaphysical value of Λ . However, as any strong thesis, it requires, in order to be fully convincing, a detailed and accurate demonstration. Yet, Fazzo's commentary remains rather vague or silent on some points. In fact, part of her demonstration often relies on such adjectives as 'meta-reflexive', 'auto-reflexive', and 'metalinguistic' ('metalinguistico' [e.g., 2.120]), which are not, unless I am mistaken, precisely defined in the volume, though they seem to play an important role in her description of book Λ . Another vague, though crucial, element of this demonstration concerns the very nature of Aristotle's metaphysical project, which book Λ is supposed to fulfill but which is neither systematically analyzed nor defined. Fazzo strongly asserts, and often repeats, that book Λ is comprehensible only against the background of the entire *Metaphysics*. But we do not really know how its purpose is supposed to fit into the project of the science of being *qua* being that is defined in *Metaphysics* Γ and E . Some allusions are made to these passages but no detailed analysis is given. The same occurs with books $ZH\Theta$ which are repeatedly presented as a preliminary step toward Λ -research but without any clear analysis either of their aim or of the way in which they could play some role in the argument of Λ .

This is probably what the adjectives, mentioned above, are intended to express; but, as far as I can understand them, they only insist on the fact that Λ reworks in a new direction an already extant philosophical material. They do not show straightforwardly which epistemic and philosophical structures Aristotle re-uses in book Λ .

Moreover, one would have expected a more detailed analysis of the evidence on which she draws her statement regarding the chronology of Λ . She is

fully right to deny the standard approach of Λ as an isolated treatise¹⁶ but her view that book Λ comes later than every treatise of the *Metaphysics* or to any echoes of it found in other parallel texts seems to require additional proof. It obeys a rule of ‘all-or-nothing’ which is unnecessary. Every parallel between Λ and other Aristotelian texts does not necessarily imply that Λ has been written afterwards. To say so, one still has to demonstrate that Λ not only echoes some problematic or doctrinal aspects developed elsewhere but that it requires these other developments and the results to which they led.

Unfortunately, Fazzo’s commentary does not provide such analysis and only mentions the textual parallels that she is fully right to notice but whose content and context are not examined. Fazzo explains instead that so many parallels would imply that Aristotle already had in mind every important aspect he was supposed to develop later on in his other treatises, which appears to be an unreasonable hypothesis. Is that really necessary?

Most of the elements that Λ has in common with the central books of the *Metaphysics* concern basic conceptual tools (e.g., the description of οὐσία as ὑποκείμενον and χωριστόν, the notion of τόδε τι, the three meanings of οὐσία as matter, form, and composite) or introductory considerations¹⁷ or concern for important ontological problems (such as the priority of actuality, the separate existence of form or the principles of substance), which are specific not to these central books but to a metaphysical research as such. In other words, maybe Fazzo is right. But her demonstration, as it stands, seems to have proven clearly only that Λ is a metaphysical treatise in its own right, not that it represents the final synthesis of Aristotelian philosophy.

So far as Aristotle’s theory of the unmovable substance is concerned, Fazzo offers an interesting and useful study. She shows, for instance, how Aristotle progressively defines the nature of intelligible substance in Λ 7 by establishing one-by-one each of its predicates. She also highlights the conceptual tension which structures Aristotle’s conception of the principle in Λ 7 either (in an

¹⁶ In this regard, we could add, as Fazzo sometimes suggests, that Λ is closely linked to *Metaphysics* B and many *aporiae* developed in the latter are partially or fully answered in Λ .

¹⁷ See, e.g., the extensive list of parallels between Λ 1 and Z 1–2 that Fazzo gives in 2.114–115.

Academic way) as an intelligible being or (from an Ionian perspective) as an intellect.

Needless to say, it is impossible to give here an exhaustive picture of Fazzo's interpretive frame. I will conclude by presenting and discussing only some noteworthy exegetical aspects of the second volume.

Conclusion

The first concerns Fazzo's reading of the enigmatic epistemic program that Aristotle exposes at the end of Λ 1 [1069a36–b2], when he says that the study of the immovable substance will have to be produced by a non-physical science—probably first philosophy—if this substance does not have any principle in common with the two kinds of sensible (corruptible and eternal) substances. This passage has been thoroughly commented on by many scholars seeking to understand how Aristotle could manage to build a universal science of every substance [e.g., [Frede 2000](#), 73–77; [Berti 2008](#), 413–421; [Donini 2011](#), 32–34]. Fazzo takes an illuminating approach [2.228–229]. She proposes to give to the conjunction « $\epsilon\iota$ » a causal meaning and, above all, she reads the text in continuity with the first lines of the analysis of sensible substances [1069b2ff.], where Aristotle depicts them as essentially subject to physical change and, therefore, to the principles of change (matter and contraries). Thus, she states that Aristotle here, rather than asking for a universal principle of every substance, probably takes for granted that such a principle does not exist: the sensible substances are mutable; the unmovable substance is not.

She interestingly assumes that intelligible substance cannot share any common principle with sensible beings. Furthermore, she proposes an original reading of the context of this passage in underlining its continuity with the following lines, which are commonly considered as extraneous to this passage. One regrets, however, that she does not give more information about the epistemic architecture that she assumes Aristotle to evoke here. In fact, it would be important to know how these two sciences are supposed to be coordinated in Λ and how, more generally, they might fit within the project of a universal ontological science.

A second important element of Fazzo's interpretation of Aristotle's theory of intelligible substance indirectly concerns her reading of Λ 6. This chapter has been interpreted almost unanimously as providing for the first time in

Λ an important doctrinal clarification with respect to the prime mover: the demonstration of its existence and its substantial identification with ἐνέργεια. Fazzo proposes instead, however, a new interpretation, according to which Λ 6 exclusively concerns the *primum mobile* [see also Fazzo 2009].

This approach relies on some precise textual or linguistic observations [1.267–270; 2.100–101, 141–143, 290–295]:

- (1) in the Aristotelian corpus and in Λ in particular, the verb « μεταβάλλειν » regularly has an intransitive meaning, which suggests that the principle of change mentioned in 1071b15–16 concerns something capable of being changed;
- (2) there is a parallelism between the phrase « τις δυναμένη ἀρχὴ μεταβάλλειν » in Λ 6 and the description of matter in Λ 2 « μεταβάλλειν τὴν ὕλην δυναμένην » [1069b14–15];
- (3) the verb « ἐνέεται » [Λ 6.1071b15] usually indicates a material substrate; and
- (4) there is a close parallelism between this section in Λ 6 and the description of the actuality and potentiality of the stars in Θ 8.1050b6–30.

On the basis of these propositions, Fazzo assumes that the whole chapter constitutes a description of the first heaven. Having established the existence of an eternal movement, which necessarily belongs to an eternal substance, Aristotle then turns to the description of the moving element of this substance, showing that it has to be effectively and eternally moving, both conditions that would be satisfied by Aristotle's conception of ὕλη τοπικὴ (topical matter). Because such matter has potentiality, it would permit the moving element of the heaven to be active, since there would be something in it on which its power could be exerted. Yet, because the only potentiality of this matter concerns local change, it would also prevent this moving cause from ceasing to move. As far as the immateriality of the mover is concerned, which is stated at the end of this section, it would not contradict this analysis—Fazzo adds—given that this topical matter has a very special nature (it is not submitted to substantial change) and then is sometimes considered by Aristotle as not really being a matter [see, e.g., H 5.1044b27].

Fazzo's argumentation is original, interesting, and based on textual evidence. Be that as it may, however, one may well wonder whether it gives more importance to single words and phrases than to the argumentative and conceptual motives of Aristotle's text. For Fazzo, the most crucial evidence

concerns the phrase « τις δυναμένη ἀρχὴ μεταβάλλειν », which she supposes to indicate matter. However, this phrase occurs in a short criticism of Platonic Forms, the meaning and objective of which seem impossible to understand if we accept this new reading. Why would Aristotle think it necessary or even useful to mention the Forms here? Obviously, because they are presented as Plato's misguided attempt to define them as a cause of physical change. But, in the context of Λ, they also stand for an alternative conception of the immutable substance which Aristotle's prime mover is intended to replace. How then can we not conclude from these two observations that Aristotle mentions Platonic Ideas here in order to make room for his own conception of the unmovable and non-sensible substance? In these circumstances, the principle of change that these Platonic Forms lack probably has an active rather than a passive meaning. Furthermore, the mention of an active principle (κινητικόν or ποιητικόν) a few lines before helps us to interpret the verb « μεταβάλλειν » in a transitive sense.

Fazzo's interpretation of Λ 10 applies the same careful and original reading of a phrase or a sentence, from which stems a new understanding of its context. In the first demonstrative step of this chapter [1075a11–15], Aristotle builds an alternative between two modes of existence of the good in the universe [1075a11 ἢ τοῦ ὅλου φύσις]. This alternative is traditionally understood as opposing an immanent good existing inside the universe such as its order (τάξις) and a transcendent good corresponding to the prime mover. Aristotle shows that both members of this alternative are true, as they are for an army whose good is both its commander and its order. Scholars usually interpret this solution to mean that the transcendent good, namely, the prime mover, is a primary good for the universe and the cause of its immanent good, i.e., its order. But according to Fazzo, this interpretation is wrong and impossible since Aristotle does not say in 1075a14 that the good is both in the order and in the commander but that both the good (understood as immanent) and the commander are in the order: « καὶ γὰρ ἐν τῇ τάξει τὸ εὖ καὶ ὁ στρατηγός ». The alternative that Aristotle develops would not concern the immanence or the transcendence of the good but its mode of being: does it exist in the order of the universe as a quality, i.e., as a non-substantial being, or as a separate being, that is, as a substance? In showing that both solutions are correct as in the case of an army, Aristotle would then mean that a non-substantial good as well as a substantial good both exist inside the order of the universe. And this latter good would belong even more deeply to the order of the universe

in that it is the cause of its well-ordered parts [see 2.173–180, 387–395]. As a result, Aristotle's point is that, contrary to Academic positions, the good and the principle of the good do not belong to another realm of being.

Strictly speaking, this new interpretation, which has been recently developed in [Fazzo 2017/2018](#), does not invalidate the standard one: it does not amount to saying that the prime mover is not separate from the sensible beings; it only claims that its transcendence is not at stake in this text. Accordingly, it assumes that this passage has to be read in continuity with the priority of substance to every other being, so that the separate existence mentioned by Aristotle at the beginning of the passage is to be understood as the separate existence of a substance, not as the separate existence of an immaterial being. Fazzo thus proposes an interesting reading: undoubtedly, the prime mover is a substance and it cannot belong to another realm of being. However, two interpretive elements might prevent us from immediately adhering to it.

The first one concerns the meaning of the phrase « ἡ τοῦ ὅλου φύσις » at the beginning of the text [1075a11], which is usually interpreted as referring to the physical universe but which has to indicate, according to Fazzo, reality as a whole—the entire realm of being and not only its physical part. This may be true but it remains to be proved convincingly and made compliant with other textual evidence that suggests that Aristotle here considers the physical world. For it is to some kinds of sublunary living beings (πλωτὰ καὶ πτηνὰ καὶ φυτὰ at 1075a16–17) that he alludes to later on in this argumentative section. And, if we admit that the second part of Λ 10 is not totally unrelated to this first one, then we should remark that the existence of a transcendent, non-sensible, principle of the order (τάξις) of the universe is obviously a major concern for him [1075b24–27]. Of course, this does not prove that this problem is the one raised in the first part of Λ 10 but only that it would not be surprising if it were so.

Above all, it would seem that this new reading conceals the purpose of this passage, which is probably to determine the relationship between the good and the principle in light of Aristotle's criticism of the Academics as developed in *Metaphysics* Λ 7 [1072b30–1073a3] and N 4–5 [1091a29–1092a17]. In these two texts, Aristotle insists on the necessary identification of the good with the principle itself: the good is much more in the principle than in its effects since the principle of the good is necessarily better than the good things it produces. This is precisely what Aristotle apparently intends to

underline in Λ 10 by saying that the general is the cause of the universal order and that a particular attribute or quality (the good in this perspective) belongs to him more deeply than to the universal order itself. Of course, Fazzo's interpretation does not preclude this reading but makes it more implicit and secondary. Again, this remark does not prove definitively that the standard interpretation of this section is the right one. But it does show which converging set of texts supports it since it could more properly answer to the problem of the relationship between the good and its principle, which seems to be at stake here.

This critical remark, like others that I have made here, is not meant to deny that Fazzo's interpretation merits our attention. On the contrary, its purpose is to highlight how Fazzo can renew our vision of *Metaphysics* Λ . All in all, every study of this fascinating book of the *Metaphysics* will now have to take into account these two major contributions to Aristotelian studies that Fazzo offers.¹⁸

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¹⁸ I thank Gweltaz Guyomarc'h for his helpful comments on a first draft of this review. I am particularly grateful to Ioannis Papachristou who revised my English and provided many valuable suggestions.

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