Editing the Geoponica: The Arabic Evidence and its Importance

Carlo Scardino

AGRICULTURE was one of the most significant economic factors in pre-industrial societies.¹ In the Mediterranean, agricultural practices remained stable despite multiple political and cultural revolutions.² As such, technical agricultural texts kept their relevance for a particularly long time.³ But while the work of Latin authors has largely survived (Cato, Varro, Virgil, Columella), the equally rich corpus of Greek agricultural literature, with the exception of the tenth-century Geoponica from Constantinople, is almost entirely lost.

Early Greek agricultural literature

In the Homeric poems, agricultural activities appear mostly in allegorical passages, such as the description of Achilles’ shield.⁴


² On this continuity see e.g. Niehoff-Panagiotidis, Landwirtschaft 2293. Even the shift to Christianity changed little for the importance of agriculture; cf. J. L. Teall, “The Byzantine Agricultural Tradition,” DOP 25 (1971) 35–59.


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In the second part of his *Works and Days*, Hesiod describes agricultural activities in the form of a farming calendar, explaining how to work the fields over the course of the year.\(^5\)

For the period that follows, we possess no work that systematically discusses agricultural matters even if agriculture (γεωργία) had, in the Classical period, established itself as a discrete discipline in the canon of τέχναι.\(^6\) Xenophon’s *Oikonomikos*, which reports a discussion between Socrates and Ischomachus about the management of an Attic estate, does show some interest in agriculture. Section 16.9–18 of that work, a kind of systematic agricultural τέχνη in condensed form, can be taken as evidence that agricultural manuals were circulating in Xenophon’s time.\(^7\)

Evidence that a wealth of agricultural treatises was produced in the Hellenistic era comes from the source list of Varro’s *De re rustica* (1.7–10) and the slightly different list of Columella (1.1.7–14).\(^8\) At that time, technical agricultural works circulated not only in Greece and the realms of the Diadochi, but also in Carthage,\(^9\) where they were summarized and systematically collated in Mago’s encyclopedia. That work, surviving only in short citations in Varro, Columella, Pliny, and Palladius, was arguably influenced by Hellenistic scientific approaches, and probably took Greek authors into account.\(^10\)


\(^6\) As attested for example by Plato; see e.g. *Phlb.* 56b1, *Symp.* 187a1, *Plt.* 299d5.

\(^7\) Aristotle (*Pol.* 1258b39–1259a2), for his part, mentions agricultural treatises by Charetides of Paros and Apollodorus of Lemnos.


\(^9\) On Carthaginian agriculture see Martin, *Recherches* 37 ff.

Late ancient and Byzantine compilations

A large number of compilatory works were produced in the Greek-speaking part of the late empire and important agricultural compilations are likely to have been produced at this time. Of these, however, only authors’ names are known (e.g. Florentinus, Tarantinus, Paxamus), mentioned in the Geoponica as sources. Their work is entirely lost. The two most important compilations from the fourth-to-sixth century were doubtless those of Anatolius of Berytus and Cassianus Bassus Scholasticus, both lost in the original, but preserved in oriental translations.

As Ullmann rightly noted, the study of the sources and the creation of the Geoponica “die von Seiten der Gräzisten vorgenommen wurden, [sind] durch die Wiederentdeckungen der arabischen Übersetzungen der älteren Geponiker alle überholt [worden].” Thanks to the oriental translations, we can gain an idea of what Anatolius’ and Cassianus’ compilations looked like.

Anatolius of Berytus: Συναγωγὴ γεωργικῶν ἐπιτηδευμάτων (Collection of Agricultural Practices) is part of a compilation of works comprising twelve or fourteen books, put together in the fourth or fifth century by Vindonius or Vinda(nio)nius Anatolius. Almost nothing is known of Anatolius’ life. Apart from a few

11 M. Ullmann, Die Natur- und Geheimwissenschaften im Islam (Leiden 1972) 427. Similarly J. Hämeen-Anttila, The Last Pagans of Iraq. Ibn Wahshiyya and his Nabatean Agriculture (Leiden 2006) 78: “The fact that the early Greek works have been lost makes the Oriental tradition extremely important in reconstructing the tradition of Greek agronomical literature in general.”

12 In the Arabic and Armenian versions of Anatolius the number of books is given as fourteen, while in Photius it is twelve. There may have been two versions of Anatolius’ work; see the discussion in C. Scardino, Edition antiker landwirtschaftlicher Werke in arabischer Sprache 1 (Boston 2015) 129–130.


14 He may be the same person as, or at least related to, the jurist Anatolius, also from Berytus, who became praefectus of Italy, Illyricum, and Africa in the mid-fourth century. Support for identification of the jurist/politician with the agriculturalist can be found e.g. in R. H. Rodgers, “Hail, Frost, and Pests in the Vineyard, Anatolios of Berytus as a Source for the Nabatean Agriculture,”

Greek, Roman, and Byzantine Studies 58 (2018) 102–125
fragments, Anatolius’ Greek text has not survived.\textsuperscript{15} Oriental translations exist in a badly preserved Syriac manuscript,\textsuperscript{16} a summarized Armenian version probably translated from Arabic in the eleventh century,\textsuperscript{17} and an almost complete Arabic manuscript (\textit{Mašhad Riḍā’} 5762) from the fourteenth century.\textsuperscript{18} There is a further, condensed Arabic version named \textit{Sbath} after the owner of the manuscript.\textsuperscript{19} A short manuscript from Madrid (\textit{Gayangos XXX}) is closely related to MS. \textit{Sbath}, but in worse condition.\textsuperscript{20} Proof of the popularity of Anatolius’ work comes from


\textsuperscript{17} C. Brockelmann, “Die armenische Übersetzung der \textit{Geoponica},” \textit{BZ} 5 (1896) 385–409.

\textsuperscript{18} F. Sezgin, \textit{Alchimie – Chemie, Botanik – Agrikultur bis ca. 430 H. Geschichte des Arabischen Schrifttums} IV (Leiden 1971) 315, and \textit{Mathematik bis ca. 430 H. Geschichte des Arabischen Schrifttums} V (Leiden 1974) 427. For a summary of the different chapters of \textit{Mašhad Riḍā’} and the other oriental versions compared with the \textit{Geoponica}, see Scardino, \textit{Edition} 63–112.


the Patriarch Photius (Bibl. cod. 163, 106b41–107a4), who mentions Anatolius as representative of all agricultural literature.\footnote{21} Cassianus Bassus: in the fifth or sixth century (or, at latest, in the early seventh) Cassianus Bassus Scholasticus\footnote{22} compiled his Περὶ γεωργίας ἐκλογαί (Selections on Agriculture).\footnote{23} It seems that Cassianus’ work was quickly translated, probably in the sixth or in the first half of the seventh century, into Middle Persian. This translation does not survive, but was itself translated, probably in the eighth century, into Arabic. Although the original Greek version is now fully lost, we can use the Arabic translation to reconstruct its layout. The Arabic Cassianus Bassus is preserved in numerous manuscripts. Varying details in the prolegomena attest to two different versions.\footnote{24} The first, translated from the Middle Persian with the title Filāha Fārisiyya (henceforth Filāha) is attributed to Qusṭūs (= Cassianus) as an ‘indirect version’. A second version by the name of Filāha ar-Rūmiyya (or Filāha al-Yūnāniyya) was, according to the prolegomenon, translated directly from the Greek by Sirğis ibn Hiliyyā in the ninth century, and is therefore referred to as the ‘direct version’. In reality, the second is simply a re-worked and expanded version of the


\footnote{23} It is unclear how many books Cassianus’ work contained, although the Arabic translation suggests twelve, and not twenty as for the Geoponica: thus Rodgers, in Byzantine Garden Culture 164; Guignard, in Die Kestoi des Julius 256; Scardino, Edition 277.

first. There are two modern Arabic editions of the text, neither of which is satisfactory; there have been no translations into European languages.

The making of the Byzantine Geoponica

In Byzantium, an anonymous editor considerably expanded Cassianus Bassus’ work by adding material from Anatolius and other authors. Either this same person or a different, pre-Constantine Porphyrogenitus editor also added a number of mythological accounts. Two important Geoponica codices, Marc. gr. 524 (M) and Pal.gr. 207 (P), retain this format. During the so-called Macedonian renaissance, a further anonymous editor (K) attempted to excise traces of Cassianus and placed the work’s pinax at the beginning of the first Book only. This edition is represented by the codices F, C, H, and L. Thus arose αἱ περὶ γεωργίας ἐκλογαί (later called simply Γεωπονικά) in 20 books.

The usefulness of the Oriental tradition I: the problem of the Geoponica’s authorial lemmata

Alongside the circa 120 citations from thirty different authors, we find, in all manuscripts of the Geoponica, approximately 490


27 These are listed in Guignard, in Die Kestoi des Julius 319–322, editor “R.”

28 Guignard, in Die Kestoi des Julius 322–324, names this editor “E.”

29 On the codices of the Geoponica see the description in the introduction to H. Beckh, Geoponica sive Cassiani Bassi scholastici De re rustica ecologae (Leipzig 1895), and Guignard, in Die Kestoi des Julius 257–258.
added author names in the genitive (again, from about thirty different authors) under select chapter titles. These author attributions were not part of the original chapter titles, since other chapters are anonymous. Older scholars considered both the in-text citations and the attributions following the chapter titles to be credible, believing them to have been added by Cassianus Bassus as his sources. However, Oder showed that only the in-text citations (where these can be verified) are reliable. The author attributions following the chapter titles, on the other hand, are generally arbitrary, inconsistent, and anachronistic. For Oder, they were added by the Constantinian editor in the tenth century. Oder’s conclusions have since been watered down and modified, but never fully discredited.

30 Gemoll, Untersuchungen 228, acts on the assumption that Anatolius gave the author of each chapter in the pinax alone, and not in the text; the mistakes in the Geoponica are put down to a scribe wrongly copying some names from this list. Gemoll believes that the author citations found within the chapters, however, are free inventions. Compare the legitimate criticisms in E. Maass, “Rezension von Gemoll (1883),” Deutsche Litteraturzeitung 3 (1884) 575–576.

31 Oder, RhM 45 (1890) 64.

32 Examples in Oder, RhM 45 (1890) 63 n.3: “Weil A bald den B, bald aber B den A anführt, kam man zu dem folgerichtigen, wenn auch ungeheuerlichen Schlusse, daß die in den Eclogen verarbeiteten Autoren alle zur gleichen Zeit gelebt und in ihren Schriften auf einander Rücksicht genommen hätten”; Oder watered down his findings in his RE article “Geoponika,” RE 7 (1910) 1221–1225. Rodgers also checked the authorial lemmata of Apuleius, Varro, Virgil, and Africanus: “As a preliminary conclusion I submit that the Constantinian editorial endeavour was no more than the starting point—if even that—for attempting a systematic pattern of chapter title + ‘name of authority’. Subsequent readers and copyists continued the process with widely differing standards and purposes. One point needs to be made emphatic: until each and every one of the authorities named in the chapter headings has been examined in light of the manuscript tradition of the Geoponika itself and in comparison to the more complicated tradition that underlies this compendium, these names ought not to be cited as if they were a reliable index of transmitted truth” (Byzantine Garden Culture 164).

33 Also Guignard, in Die Kestoi des Julius 301–302: “Les choix ne sont donc pas totalement aléatoires, mais témoignent d’un souci de vraisemblance. Tout n’est pas forcément faux. Mais les cas d’attributions heureuses, sinon
The Oriental translations, that is, the Syriac and Arabic Anatolius as well as the various translations of Cassianus Bassus, all accord with the Geoponica in terms of the citations within the individual chapters. However, none of them contain author attributions in the titles of separate chapters. Since the Oriental versions are older than the Byzantine codices, this strongly supports Oder’s hypothesis.34

The usefulness of the Oriental tradition II: the importance of the Oriental translations for the restitution of the Geoponica

The Geoponica contains large sections of text taken from Anatolius and Cassianus Bassus. The Oriental translations of those authors therefore represent a clear side-tradition that relies on manuscripts older than our medieval codices. Consequently, the text of the Geoponica (which contains many difficult passages) can be enriched and improved with variae lectiones.35 In his 1895

exactes, repositon non pas sur la connaissance précise des sources utilisées, mais sur la connaissance générale d’une tradition qui associe tel élément à tel auteur, indépendamment du cheminement précis des textes jusqu’aux Géo-
poniques.”

34 Scardino, Edition 57–58. On the basis of the Oriental versions of the Filāḥa known at the time, V. Rose, Aristoteles Pseudepigraphus (Leipzig 1863) 269, considered the authorial lemmata to be the unsuccessful additions of a late editor.

35 The same has been suggested by D. Gutas, “Introduction: Graeco-Arabic Studies from Amable Jourdain through Franz Rosenthal to the Future,” Intellectual History of the Islamicate World 3 (2015) 1–14, esp. 8 regarding Arabic translations of philosophical and scientific texts: “the Arabic translations constitute the most neglected evidence in the establishment of the Greek text for those works for which such translations exist, for patently no modern edition of such a Greek text, some very few recent exceptions apart, has used to any appreciable degree, if at all, the evidence in an extant Arabic translation. As is well known, the Arabic translations … were based on Greek manuscripts that were either older than, or at least as old as, the extant Greek manuscripts, and these Greek exemplars of the Arabic translations were either manuscripts in uncial and thus dating at the latest to the sixth century, or transliterations in minuscule, copied in the ninth, usually from archetypes different from those from which derive our extant Greek manuscripts … Such analyses of the Arabic translations of Greek works will yield independent
edition, Beckh did consult the mangled and incomplete Syriac Anatolius and was able to improve the text in some places. In the introduction to his Greek-Arabic dictionary, Ullmann was also able to make conjectures on the text of the Geoponica on the basis of the (highly unreliable) modern Arabic editions of the Filāḥa. However, the three most recent annotated translations of the Geoponica have ignored the Oriental evidence.

In what follows, I use several examples to show the significance of the Arabic Anatolius (better and more complete than the Syriac translation, and representative of the Arabic tradition) for the constitutio textus of the Geoponica.

(1) At Gp. 5.28, which, as the Oriental versions reveal, stems entirely from Anatolius, the author speaks about the removal of superfluous vine sprouts.

witnesses to the text beyond those available in the extant Greek manuscripts, or, at the very least, variant readings not transmitted or corrupted in those extant.”

36 Beckh, Geoponica vii–xxiv, looks at approximately forty problematic passages, but can partially improve only a small number on the basis of the Syriac version.


Beckh’s text ἔτι δὲ αὐξοῦσα ἡ ἄμπελος ὀφείλει σκάπτεσθαι has been adopted by all modern translators without mention of the fact that Beckh replaced the MSS. ἀνθοῦσα (“blossoming”) with αὐξοῦσα (“growing”). Beckh thought it made little sense to dig around the vines during blossom. The extremely literal Syriac translation seems to offer support for Beckh’s text, even if mareḡ (“weak”) does not really correspond to αὐξοῦσα. The Arabic translator, on the other hand, provides quite a different interpretation. He did not read αὐξοῦσα, but rather the ἀνθοῦσα preserved in the manuscript tradition of the Geoponica.

Semantically, the Arabic word satara (“cover”) is quite unlike both the Greek σκάπτεσθαι (“dig”) and the Syriac meplah (“plough, farm”). And yet, Anatolius himself says (5.14.4):

Some people in the warm and dry countries cover (yasturi) the grapes with spikey thorns, and do not limit themselves to covering them only with leaves.

This corresponds to Gp. 5.29.5 τινὲς δὲ ἐν τοῖς θερμοτέροις καὶ ἕξιροτέροις τόποις καὶ σκέπουσι τὸν καρπὸν φρυγάνοις καὶ ἀκάνθαις, οὕτω ἀρκουντων τῶν φύλλων. This example shows that the Arabic translator gives satara as the equivalent of the verb σκέπειν or the medio-passive σκέπεσθαι (“cover”). So, the Arabic translator read ἔτι δὲ ἀνθοῦσα ἡ ἄμπελος ὀφείλει σκέπεσθαι (“while the vine is in blossom it must be covered”). It is therefore possible that σκάπτεσθαι is a corruption of the original σκέπεσθαι. Unlike Beckh, it seems sensible to preserve the transmitted ἀνθοῦσα and to replace σκάπτεσθαι with

<table>
<thead>
<tr>
<th>Gp. 5.28.5</th>
<th>Anat. Arab. 5.13</th>
<th>Anat. Syr. 6.12</th>
</tr>
</thead>
<tbody>
<tr>
<td>ἔτι δὲ αὐξοῦσα ἡ ἄμπελος ὀφείλει σκάπτεσθαι.</td>
<td>وَاَمَا الْوَقُتُ الَّذِي تُزَهَّرُ فِيهِ الْكَرَمَةَ فَيُبْيِغُ أَنْ تَسْتَرِ.</td>
<td>مَهْ مَهْ لَمْ لَحْفَلْسَ.</td>
</tr>
<tr>
<td>The vine should be dug up even when it is still at the growing stage.</td>
<td>But at the time when the vine is in blossom, it must be covered.</td>
<td>In turn, we must also work the vine as soon as it becomes weaker.</td>
</tr>
</tbody>
</table>
(2) At Gp. 6.14 we find instructions about how to prepare wine vats to prevent must from spilling out. In the Greek, at §2, there is a noticeable difference between the pre-Constantine version preserved in M and the later version in F. This chapter survives in both Syriac (8.30) and Arabic (7.19):

<table>
<thead>
<tr>
<th>M</th>
<th>F</th>
<th>Anat. Arab. 7.19</th>
<th>Anat. Syr. 8.30</th>
</tr>
</thead>
<tbody>
<tr>
<td>τινὲς δὲ τὰ ἐσω τῶν πίθουν περὶ τὰ χείλη τῇ</td>
<td>τινὲς δὲ τὰ ἐσω τῶν πίθουν περὶ τὰ χείλη διαχρίουσιν</td>
<td></td>
<td></td>
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<tr>
<td>άλλοι δὲ πιμελὴ ταριχηρά ἐνδοθέν τὰ χείλη διαχρίουσιν</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>τίνες δὲ τὰ ἐσω τῶν πίθουν περὶ τὰ χείλη διαχρίουσιν</td>
<td>τίνες δὲ τὰ ἐσω τῶν πίθουν περὶ τὰ χείλη διαχρίουσιν</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ἄλλοι τυρῷ βοείῳ καθέξει γὰρ εἰσω ζέον τὸ γλεῦκος τοῦτο μάλιστα.</td>
<td>ἄλλοι τυρῷ βοείῳ καθέξει γὰρ εἰσω ζέον τὸ γλεῦκος τοῦτο μάλιστα.</td>
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</table>

Some […] the inside of the vats near the lips; others smear the lips on the inside with lard as used for conserving.

Then smear the opening of the vat with calamint. Some people also take salted fat and spread it on the opening of the vats from inside; And wipe down their openings with the bind-weed. But others rub fat on to the opening of the vats from the inside.

Others use cow’s milk cheese. This is the best for keeping the fermenting must inside the vat. And others spread cow dung on the opening of the vats from inside; And others cow’s butter, which is very

39 The covering of trees when in blossom is also attested at Gp. 13.3.6.

40 Transl. Dalby 157. Lelli, L’agricoltura 275: “Alcuni intorno agli orli esterni dei dogli […] altri ungono interamente con grasso salato gli orli; altri ancora con formaggio di mucca: soprattutto quest’ultimo rimedio trattiene il mosto.”
inside; its [the dung’s] special property keeps the must inside the vat while it is fermenting. helpful.

Beckh rightly concluded that M has a lacuna and that F abridges the passage. Comparison with the Syriac version did not, however, allow him to fill out the text.⁴¹ In F, it seems clear that we are dealing with a saut du même au même, since τὰ χείλη appears twice in the passage. When we take into consideration the Arabic version, which is more complete than the Syriac, we can perhaps supplement the dative object after τῇ. The predicate in the Arabic version is ḥṣmأ (amsahā), which, like the Syriac ḥफأ (kapper), can mean both “wash away” or “rub in.” In Greek, this corresponds to χρίειν or ἀλείφειν (or a compound formed from one of these verbs). The Arabic specifies as the object calamint (الفندق الجبلي), while the Syriac has “bindweed/convolvulus” (حندكة).⁴² In the Greek, mint appears in the preceding passage with two virtually synonymous terms: γλήχων and καλαμίνθη. So, in the Greek of our passage we would expect either γλήχωνι or καλαμίνθῃ, allowing us to fill in the lacuna in M postulated by Beckh with: εἴται τὰ ἐσω τῶν πίθων περὶ τὰ χείλη


⁴¹ Beckh, Geophonica vii: “Quae tum sequuntur propter variam vocis vim ad explendam codicis Maricani lacunam mihi non sufficiunt; denique pro καθέξει – μάλιστα verbis duo tradidit κάλλιστα ποιεῖ. Hoc unum videtur constare et Syri exemplar Vindanioni e nostrorum codicum archetypum hoc loco fuisset vitiosum.”

⁴² Bindweed (convolvulus) according to M. Sokoloff, A Syriac Lexicon (Winona Lake 2009) 654.

⁴³ Both plants are a type of mint (mentha); see J. André, Les noms des plants dans la Rome antique² (Paris 2010) 44 and 112.
In the second part, the Syriac has only the instruction to smear the vats with cow’s butter ܪܘܬܕ ܐܬ (= ḫēṯāṯ d-tawrā), but the γάρ clause is missing, while the Arabic replaces cow’s butter with cow dung. A closer look at the Arabic text reveals, however, that we are probably not dealing with an error of translation, but rather that a copyist mistook the Arabic word for τυρός (gin, plural ḥijān) for “dung,” which appears regularly in the text and looks similar. Like the Greek, but unlike the Syriac, the Arabic version preserves the γάρ clause.

(3) At Gp. 9.5.4, the text discusses how to transport shoots to conservatories. Beckh recognized a textual problem. He thought that an earlier editor of the Geoponica, Niclas, had wrongly tried to defend (“frustra defendere conatus est”) the transmitted ἐν οὖν μέτρῳ παχεῖ. Beckh proposed ἐν συμμέτρῳ παχεῖ (he arguably meant πάχει), but the Syriac (11.7) version poses a problem for this conjecture, since it speaks of fruit “that are thick in their circumference.” This makes no sense, since we are dealing with the circumference of the shoots and not the fruit. Beckh therefore refrained from altering the text.⁴⁵


⁴⁵ Beckh, Geoponica viii–ix: “quae quidem corrupta esse censeo, si enim premis verba, ḥijān referri debet ad ܪܝܢ; quid vero hic sibi volunt καρποὶ παχεῖς ἐν μέτρῳ? Exspectes ḥijān aut ḧājāt: ὀπὸ ἐλαιῶν (νέων deest!) εὐφόρων ἐν μέτρῳ παχεῖων, ex cuius litteris in margine suppletis nostrum corruptum esse dicas; verum etiam tum non omnia quadrant. Neque enim de arborum, sed de plantarum crassitudine agitur; cf. Geop. IX 7 φυτά … πάχος ἔχοντα στελέχους ἢ παχύτερα et Colum. V 9,2 ramos … quod comprehensos manus possit circumvenire, hoc es manubrii crassitudine; cum autem nomen crassi formam pluralem apud Syrum habeat, apud Cassianum propter vocabulum sequens ἐκπεφυκότα accipere debeat, nomen plantae in utroque praecedit forma singulari; accedit, quod similibus locis certam mensuram tradi modo vidimus. Itaque codicum lectionem quamvis suspectam retinui.”
Take into your nurseries [shoots] from young and well-fruiting trees *en own metro pachet*.\(^{46}\) The shoots that have been taken and brought to the place where the seedlings will be nurtured must be shoots from fresh olive trees that have a high yield; their thickness must be uniform. And one should not take plants from olive trees that are bearing fruit thick in circumference.

Unlike the Syriac version, the Arabic translates νέων as طري ("fresh"). From the Arabic, we therefore conclude that this refers not to the fruit, but rather to the shoots (whose thickness should be uniform). The best solution, as Beckh suggested, would therefore be to read ἐν συμμέτρῳ πάχει or ὅν σύμμετρον πάχει, for which one can find several parallels in Greek.\(^{47}\)

4) *Gp.* 10.37, half of which comes from Anatolius and half from Didymus,\(^{48}\) describes the grafting of the pomegranate tree.

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\(^{46}\) Dalby, *Geoponika* 186 n.3: “These four words cannot be translated. An earlier version of the text probably recommended what thickness the shoots should be.” Cf. Lelli, *L’agricoltura* 359: “Per i vivai bisogna prendere polloni di robusta grossezza da olivi giovani da olivi giovani e produttivi.” Grélois and Lefort, *Géoponiques* 135: “On doit prélever pour les pépinières, sur les oliviers jeunes et productifs d’une grosseur convenable, les pousses”; at n.362, but without further explanation, they adopt the conjecture ἐν συμμέτρῳ.

\(^{47}\) E.g. Gal. *De crisibus* IX 626 K. καὶ μὲν δὴ καὶ ἡ ἑρυθρὰ νεφέλη καὶ ἡ ύπόστασις ἢ τοιαύτη. καὶ χωρὶς ύποστάσεως δὲ τὸ εὔχρου ὀφρὸν ἀμα τῷ συμμέτρῳ πάχει πεπαυσθαι δηλοὶ τὴν ἁρχήν. Also Thphr. fr.4.50 Wimmer ἀγαθὸν δὲ καὶ δοκεῖ πρὸς τοὺς κόπους εἶναι τῇ θερμότητι σύμμετρον ὁν καὶ τῇ κουφότητι καὶ τῇ διαδύσει.

\(^{48}\) §§1–2 are also reproduced in both Syriac and Arabic, while §§3–4 stem from Didymus (as the twice repeated ὡς ὁ Δίδυμος ἐν τοῖς γεωγικοῖς αὐτοῦ διδάσκει [or φησιν] shows). In this case, the editor of the *Geoponica* has supplemented the chapter from Anatolius with material from Didymus.

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*Greek, Roman, and Byzantine Studies* 58 (2018) 102–125
<table>
<thead>
<tr>
<th>Gp. 10.37.1</th>
<th>Anat. Ar. 9.20</th>
<th>Anat. Syr. 9.18</th>
</tr>
</thead>
<tbody>
<tr>
<td>εἶτα κατάγουσιν ἐπὶ τὴν γῆν, οὐχ ἀπτόμενοι τοῦ ἐμφυλλισθέντος μέρους, ἀλλὰ τὸ κατώτερον τῆς ἀρμογής χοννύουσιν άσφαλ- ζόμενοι σφόδρα, πρὸς τὸ μὴ ἀναδραμεῖν, ἕως ἡ ἐνθεσις φύη.</td>
<td>θεὶς μετακινήσεως ἀδιάκριτα ἀπ' τὸν πρόδρομο τῆς ἀρμογῆς, ἀλλὰ τὸ κατώτερον τῆς ἀρμογῆς ἐπὶ τὴν γῆν, ὀχυρῶντας τὴν κάτω ἀρμογήν λαμβάνοντες ἀσφαλισμένης καταφυγῆς.</td>
<td>ἢ ἐνθησίας φύη.</td>
</tr>
</tbody>
</table>

Then they bend the stem to the ground, so as to bury not the grafted part, but the part below the join, and fix it there firmly so that it will stay in the ground until the graft takes.  

Then they lower it into the ground, without touching the side that has [already] been grafted. Rather they secure the part that is under the join [used] during the grafting, so that the seedling, which has been planted, does not come out. Then they cover it and take care that it does not slip away and rise up until the graft takes hold, becomes hard, and grows roots.

We spread it over the earth one time. In doing so, we cut off nothing from the upper section, but rather rip out anything under the grafting join so that the seedlings are not pressed together. We cover everything, so that it does not grow until, by burying also the roots, the thing we have planted adheres.

Beckh rightly identified a problem in the sentence following ἀλλὰ τὸ κατώτερον κτλ. He wanted to emend to τοῦ κατώτερον κτλ.

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49 Dalby, Geoponika 214, does not translate literally, however, since (and without giving a reason for his decision) he does not translate the word χωννύουσιν, “they cover.” Contrast Lelli, L’agricoltura 597: “Poi flettono lo stelo fino a terra, non toccando la parte innestata, ma ricoprano di terra fin sotto la giuntura assicurandola ben bene, perché non si fletta indietro fintanto che l’innesto non sia riuscito.” Grélois and Lefort, Géponiques 163–164: “On amène ensuite le tronc vers le sol sans toucher à la partie greffé, mais on butte en dessous de la jointure en la maintenant fermement, afin qu’il ne se redresse pas que l’ente n’aura pas pris.”
and make this dependent on ἁπτόμενοι, but saw the Syriac version as speaking against this conjecture. The Arabic version allows us to consider a different reconstruction. Neither χωννύουσιν nor ἁπτόμενοι governs κατώτερον, but rather ἀσφαλιζόμενοι (يُتِسْكُون), as the Arabic version suggests. In this way, the Greek πρὸς τὸ μὴ ἀναδραμεῖν was accurately translated as لنلا يجرح القصب الذي ركب (“so that the seedling, which has been planted, does not come out”). The Syriac also suggests that χωννύουσιν is in the wrong place in the Geoponica. If we follow the Oriental versions, the clause belonging to χωννύουσιν has gone missing in the Greek. In the Arabic, we find the following: ويحترسون منه لنلا يفلت فيرتفع (“and take care that it does not slip away and rise up”), corresponding to the shorter, Syriac حناتحه (“so that it does not grow”). The loss from the Greek text can be attributed either to the (inept) work of the editor who put the chapter together from the works of Anatolius and Didymus, or is the result of a saut du même au même. In the second case, the missing text ought to have said something like πρὸς τὸ μὴ ἀναδραμεῖν. The Syriac and Arabic versions show that the end of the sentence is also too short, since there is no mention of “roots.”

With help from the Arabic Anatolius, we could therefore supplement the sentence with something like the following:

ἀλλὰ τὸ κατώτερον τῆς ἀρμογῆς ἀσφαλιζόμενοι σφόδρα πρὸς τὸ μὴ ἀναδραμεῖν. <εἶτα> χωννύουσιν <αὐτὸ φυλαττόμενοι μὴ εἰς


51 Unless we accept that the Greek φύειν (which according to LSJ s.v. A.II can mean “put forth shoots”) has been generously paraphrased in both the Arabic and Syriac versions.
(5) At Gp. 10.38, where methods for conserving pomegranates are described, only §§4–8 stem from Anatolius. In §8, Beckh identified several problems.

<table>
<thead>
<tr>
<th>Gp. 10.38.8 F</th>
<th>M</th>
<th>Anat. Ar. 12.38.1</th>
<th>Anat. Syr. 4.7.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>ἀλλοι δὲ τὰς ροιὰς ἐπὶ χρόνον ἐν τῷ δένδρῳ διαμένειν ... εἰς κανίνας χύτρας ἐμβάλλουσιν ἐκάστην ροιάν, ... ὡστε μηδὲ ... ῥήγνυσθαι, ἐξουσί διαπαντὸς τός εὐθαλείς, ροιαί ...</td>
<td>ἀλλοι δὲ τὰς ροιὰς ἐπὶ χρόνον ἐν τῷ δένδρῳ διαμένειν ἐξουσί διαπαντὸς εἰς κανίνας χύτρας ἐμβάλλουσιν ἐκάστην ροιάν, ... ὡστε μηδὲ ... ῥήγνυσθαι, εὐθαλείς ροιαί ... 54</td>
<td>Εἰς ἕως ἡ ἔνθεσις φύῃ καὶ στερεὰ γενομένη ῥίζας ἔχει . 52</td>
<td>Τοξύνθε καὶ ἑυθαλεῖς ροιαί . 54</td>
</tr>
</tbody>
</table>

Some, [intending] that the pomegranates stay on the tree for a while, put each fruit into earthenware newly made ... so that they do not knock ... they get sound fruit that lasts a long time. Pomegranates ...

If you want the pomegranates to stay on the tree for a long time, put each pomegranate into a ceramic pot ... break. In this case...

When the pomegranates are on their trees, one must pick them, whereby you put each pomegranate in a new pot ... break.

52 Compare εἰς ὕψος ἀναδραμεῖν at Gp. 10.45.10.

53 Parallels for ῥίζας ἔχειν can be found at e.g. Gp. 2.23.1, 3.11.2, 4.1.2.

54 Dalby 215. Grélois and Lefort, Géoponiques 164: “D’autres, [qui préfèrent] laisser un certain temps les grenades sur l’arbre, les mettent chaquement dans une marmite neuve, ... auront toujours de beaux fruits.” Lelli, L’agricoltura 599: “Altri lasciano che le melagrate rimangano per un certo tempo sull’albero ... mettono ciascuna melagrana in pentole di terracotta appena fatte ... non ... né si rompano ... otterranno di certo frutti buoni.” Lelli (951 n.88) notes simply that something is missing in the text and that Beckh rightly inserted a lacuna.
Beckh thinks that the words (ἔξουσι διαπαντὸς εἰ) after δια-
mέένειν “insertis M locum nequaquam sanavit.” He would
prefer to fill the gap with βουλόμενου and thinks that this is
suggested by the Syriac, which he translates with ροιὰς ὀσπερ
ἔπι τῶν δένδρων εἰσί, δεὶ ἐκλέγεσθαι, even if the Syriac in fact
has no verb corresponding to βούλεσθαι. The Arabic, which
when back-translated reads something like εἰ δὲ βούλει τὰς
ροιὰς ἐπὶ χρόνον πολὺν ἐν τῷ δένδρῳ σοι διαμένειν τοῦτο
πούνον. ἐκάστην ροιὰν εἰς κεραμικὴν χύταν ἔμβαλε, does
suggest a verb of wanting. At the same time, the Arabic offers
support for the ei-clause in M. In F, ἔξουσι διαπαντὸς comes at
the end of the sentence, together with εὐθαλεῖς. We could,
however, take the nominative εὐθαλεῖς, which sits awkwardly in
the sentence, together with ρουαί in §9 and, as M suggests,
punctuate after ῥήγνυσθαι. The Syriac raγyā (“new, fresh”) corresponds neither to the Greek εὐθαλεῖς (“blooming, flour-
ishing, thriving”) nor the Arabic text, according to which a
pomegranate can be conserved for a full year. When we com-
pare the Arabic version, the substantive τοῦ ἔτους could have
fallen out in M after δὲ παντὸς, attested for example at Gp.
18.3.4: τινὲς δὲ διὰ παντὸς τοῦ ἔτους σχεδὸν ἔχειν ἀρνειοῦς καὶ
γάλα βουλόμενοι. With help from the Arabic Anatolius, we
could therefore read:

ἀλλοι δὲ τὰς ροιὰς ἐπὶ χρόνον ἐν τῷ δένδρῳ διαμένειν
<βουλόμενου> ἔξουσι διὰ παντὸς <τοῦ ἔτους>, εἰ εἰς καῖνας
χύτρας ἔμβαλλοσιν ἐκάστην ροιὰν ... ῥήγνυσθαι.

Some, <intending> for the pomegranates to stay on the tree for
a while, will have these throughout the entire year, if they put

55 Beckh, Geoponica ix.
56 Thus Payne Smith, Thesaurus 3806, who translates the word as “recens.”
57 Corresponding to Anat. Ar. 14.9.4.
each pomegranate into a new earthenware pot... so that they do [not] get damaged

(6) At *Gp*. 14.22, the author explains how to fatten geese. Beckh established several differences between the Greek and Syriac texts. The corrupt state of the Syriac version, which contains only §§1-8, does not allow us to improve the Greek. The Arabic version, however, is better and also contains §13.

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<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>7. ἐσθίουσι δὲ τρίτον τῆς ἡμέρας, καὶ περὶ μέσην νύκτας πίνουσι δὲ δαψιλᾶς.</td>
<td>واعتقلت منها في اليوم ثلاث مرات تشبع في كل مرة ويسقي الماء وهي تشرب أيضا في نصف الليل ماء كثيراً،</td>
<td>مَلَأَّتُهَا إِصْحَبَ جَسِيمًا مُثَّلِّكَ، حَلَصَهُ، مَلَأَّتُهَا</td>
</tr>
<tr>
<td>8. μετὰ δὲ &lt;τριάκοντα ἡμέρας εἰ βούλει τὰ ἦπατα αὐτῶν&gt; μεγάλα ποίησαι, ἵσχαδας ἵππας συγκόσιας εἰς λεπτὰ, καὶ φυράσας ύδατι, δίδου πίνειν ἡμέρας κʹ.</td>
<td>إن أردت أن تصير كبودها عظيمة فدق تناً يابساً وأعجنه بالماء وأعفها منه بعد أن يأتي لها ثلاثون ليلة، فإنها تسمى منه في عشرين ليلة.</td>
<td>مَلَأَّتُهَا جَهَلَمًا مُثَّلِّكَ حَلَصَهُ، مَلَأَّتُهَا جَهَلَمًا مُثَّلِّكَ حَلَصَهُ، مَلَأَّتُهَا جَهَلَمًا مُثَّلِّكَ حَلَصَهُ، مَلَأَّتُهَا جَهَلَمًا مُثَّلِّكَ حَلَصَهُ</td>
</tr>
</tbody>
</table>

7. They eat three times a day and in the middle of the night and are given plenty to drink. | They are fed three times per day, each time until they are full. One gives them water to drink, and also at midnight they drink a lot of water. | They eat three times a day and drink at midday and in the night. |

8. After thirty days, if you want to make their liver large, chop up dried figs very finely, mix them with | If you want to make their livers large, crush up dried figs, mix these with water, and feed it to them after | Whoever wants to make their liver grow big after thirty days, gives |

| 59 | ḫall cod.: corr. Beckh. |
water and give this to them as a drink for twenty days.\textsuperscript{61}  

At §7, the Arabic confirms the Greek text, which unlike the Syriac has “at midnight” (في نصف الليل = περὶ μέσην νύκτα) rather than “at midday” (σαββατώ). The Arabic also confirms the punctuation (καὶ περὶ μέσην νύκτα πίνουσι κτλ.).\textsuperscript{62}

At §8, the Arabic Anatolius confirms Beckh’s supplement of <τριάκοντα ημέρας εἰ βούλει τὰ ἡπάτα αὐτῶν>, made on the basis of the Syriac version. Beckh was unsure if the final δίδου πίνειν made sense, since there is no mention of a drink. On the basis of the Arabic Anatolius, we could read δίδου λιπαίνει or δίδου. λιπαίνει ἐπὶ. On the basis of the Syriac, we could replace πίνειν with ἐσθίειν. However, perhaps instead of πίνειν, the original merely had the prepositional ἐπὶ ημέρας κ’ (as in the same context at §13).\textsuperscript{63}

(7) In the section on bees and their care, in a chapter taken from Anatolius, Geoponica (15.2.12) mentions that these can be treated in different ways when suffering from diarrhea.

\begin{tabular}{|c|c|c|}
    \hline
    \hline
    Tranl. Dalby & Tranl. Scardino & Tranl. Beckh \\
    \hline
    δεῖ αὐτὰς τε ἰᾶσθαι & ويعالج النحل & ملأيم نظمة \\
    \hline
\end{tabular}

\textsuperscript{61} Dalby 292. Lelli, L’agricoltura 781–782: “Mangiano tre volte al giorno, e verso la mezzanotte; bevono in abbondanza. Dopoa trenta giorni, se si vogliono rendere grandi i loro fegati, dài loro da bere per dieci giorni fichi secchi tagliuzzati e impastati con acqua.” Grélois and Lefort, Géponiques 235: “Elles mangent trois fois par jour et au milieu de la nuit, et elles boivent abondamment. Après trente jours, si l’on veut que leur foie devienne gras, couper menu des figues sèches, les pétrir avec de l’eau et les leur donner à boire pendant vingt jours.”

\textsuperscript{62} This corresponds also to Palladius 1.30.4: tribus per diem vicibus potu adiuvant, media quoque nocte aquam ministrant.

\textsuperscript{63} This is also Palladius’ version (1.30.4): peractis vero triginta diebus, si, ut iecur his tenerescat, opitabis, tunsas caricas et aqua maceratas in offas volutabis exiguas et per dies viginti continuos ministrabis anseribus.
and to treat them, ἰῶνται αἱ μέλισσαι

<table>
<thead>
<tr>
<th>Greek</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>ῥοιᾶς τοῦ καρποῦ τὴν σκέπην by grinding the skin of pomegranate,</td>
<td>μελισσαίον σκέπην κραμφρο ῥοιᾶς</td>
</tr>
<tr>
<td>τούτεστι τὸ κέλυφος, the skin that is,</td>
<td>τὸ κέλυφος κραμφρο ῥοιᾶς</td>
</tr>
<tr>
<td>κόψαντα</td>
<td>(\text{κηκίδες} )</td>
</tr>
<tr>
<td>καὶ διὰ λεπτοῦ κοσκίνου σήσαντα sifting it through a fine sieve</td>
<td>καὶ διὰ λεπτοῦ κοσκίνου σήσαντα</td>
</tr>
</tbody>
</table>

Lacunam posuit Beckh

<table>
<thead>
<tr>
<th>Greek</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\text{lacunam posuit Beckh})</td>
<td>(\text{lèkúnam posuit Beckh})</td>
</tr>
</tbody>
</table>

παρατιθέναι

<table>
<thead>
<tr>
<th>Greek</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>ὁδὸν βεραμαῖον ἔθηκεν καὶ μετὰ οἴνου ψυραθέντος (\text{κηκίδας} ) (\text{κηκίδας} )</td>
<td>(\text{κηκίδας} ) ψυραθέντος (\text{κηκίδας} ) (\text{κηκίδας} )</td>
</tr>
</tbody>
</table>

Beckh signaled a lacuna after σήσαντα. He notes that M adds the infinitive παρατιθέναι, but that this does not improve the text.\(^{65}\) On the basis of the Syriac 13.1 (p.99.7, given in Greek), Beckh did not, however, attempt to supplement the Greek Geoponica text. In the Oriental versions, two different recipes are given in this section: one with the skin of pomegranates, the other with oak galls.\(^{66}\) Unlike the Syriac version, wine (šarāb) appears as an ingredient in both of the recipes in the Arabic. Again, the Arabic translation is more complete than the Syriac, mentioning the fine sieve (διὰ λεπτοῦ κοσκίνου = bi-munhulin dayyiqin). This suggests that, given the similarities in the recipes, a saut du même au même occurred in the Greek archetype. We can envisage two possible reconstructions, whereby the Arabic translation again helps us reconstruct the original version of Anatolius and of the Geoponica:

(a) δεῖ αὐτάς τε ἱεράθαι, ροιᾶς τοῦ καρποῦ τὴν σκέπην, τουτέστι τὸ κέλυφος, κόψαντα, καὶ διὰ λεπτοῦ κοσκίνου σήσαντα παρατιθέναι μετὰ <οἶνου φυράσαντα ταῖς μελίσσαις, ἢ καὶ κόψαντα κηκίδας μετὰ> μέλιτος καὶ οἶνου αὐστηροῦ φυράσαντα.

(b) δεῖ αὐτάς τε ἱεράθαι, ροιᾶς τοῦ καρποῦ τὴν σκέπην, τουτέστι τὸ κέλυφος, κόψαντα καὶ διὰ λεπτοῦ κοσκίνου σήσαντα παρατιθέναι <μετὰ οἶνου φυράσαντα, ἢ καὶ κόψαντα κηκίδας αὐτάς παρατιθέναι> μετὰ μέλιτος καὶ οἶνου αὐστηροῦ φυράσαντα.

Whether an editor privileges the pre-Constantine (largely based on M) or the Constantine (based on FHC) version, these examples have shown that the Arabic translations of Anatolius and Cassianus Bassus, representing important branches of the tradition, cannot be ignored in the reconstitution of the Geoponica.

Conclusion

Beckh’s use of the Syriac Anatolius in the reconstitution of his text was both helpful and commendable. However, as the

\(^{65}\) Beckh, Geoponica xiii: “Παρατιθέναι quod post σήσαντα insert M, orationis duritiam non tollit, sed auget.”

\(^{66}\) Col. 9.13.7 mentions the oak apple (galla) as a remedy for diarrhea in bees.
examples above have shown, problematic passages in the Greek text can often be better understood thanks to a comparison with the *variae lectiones* offered by the more complete and more accurate Arabic translation. The Oriental versions cannot, of course, replace the Greek manuscripts. However, unlike literary works whose translation is often freer and adapted to the cultural context of the target audience (compare the translation of Greek literary texts into Latin during the Roman Republic), Arabic translators of scientific texts placed great importance on the exact reproduction of the source text. As the examples above have shown, the *variae lectiones* provided by the Oriental translations can help us fill out or improve the Greek text of the *Geoponica*. Dimitri Gutas has reached a similar conclusion regarding the Greek texts of Aristotle’s *Poetics* and Theophrastus’ *On First Principles*, which are improved by Arabic translations in approximately two places for every page of text.  

Since Anatolius covers less than half of the *Geoponica*, comparison with the text of Cassianus Bassus (which, as a direct model, covers large parts of the *Geoponica*) promises further interesting results. Only when a serviceable edition of the *Filāḥa* is available, however, will we be able fully and systematically to compare the sections of the *Geoponica* from Cassianus Bassus with the Arabic text and, where possible, make improvements. Unlike Beckh,

67 D. Gutas, “The Letter before the Spirit: Still Editing Aristotle after 2300 Years,” in A. M. I. van Oppenraay et al. (eds.), *The Letter before the Spirit: The Importance of Text Editions for the Study of the Reception of Aristotle* (Leiden 2012) 11–36; especially 29 emphasizes “the value of the Arabic translations because they provide direct and *independent* evidence for the correct reading; whereas the accurate conjectures are merely a tribute to the perspicacity in *divinatio* of Greek scholars … From this very small sample one cannot, of course generalize and conclude that for each Aristotelian treatise there will be at least two corrections per page made to the Greek text on the basis of the Arabic translation, but the point, I think has been made: the Arabic translations must constitute an integral part of the Greek editions of the philosopher, almost all yet to be made.”

68 The edition of the Arabic Anatolius is already in preparation; an edition of the *Filāḥa* is planned.
who took the available Syriac versions into account in his reconstruction of the *Geoponica*, the three most recent translations from the 21st century have not used the Syriac Anatolius to understand better the original Greek text. A new edition of the *Geoponica* should systematically take into account the *variae lectiones* offered by the Oriental translations of both Anatolius and Cassianus Bassus if it is to serve as a replacement for Beckh’s edition.\(^6^9\)

\(^6^9\) This article presents a selection of findings from my work on an *editio princeps* of Anatolius Arabicus. I was able to begin that research thanks to a generous scholarship as Martin L. and Sarah F. Leibowitz Member at the Institute for Advanced Study in Princeton (2015/6). I am particularly grateful to Prof. Manfred Ullmann (Tübingen) for useful suggestions and help in improving the Arabic text and translation. I would also like to thank Jasper Donelan for translating my work from German to English.

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