

Craig MARTIN

**SCIENTIFIC TERMINOLOGY AND THE EFFECTS
OF HUMANISM: RENAISSANCE TRANSLATIONS
OF *METEOROLOGICA* IV
AND THE COMMENTARY TRADITION**

0. Introduction

A recent study on scientific translations has called these products a result of ‘a zone of cultural and linguistic collision’¹. The crossing of linguistics and culture is particularly apparent for translations of Greek science into Latin. We have available two cultures separated by centuries that attempted to bring Aristotle’s corpus into the same language. The differences in their results can be best explained by differing cultural understandings of ideals of language. What were seen as successes in linguistic style were also rejected by others, particularly those who dedicated themselves to the study and explication, who saw medieval translations as no worse than those of their contemporaries.

Renaissance Latin translators of Aristotle sought to revolutionize scientific terminology by eliminating transliterations and what they considered to be medieval corruptions. While these translators often exaggerated the revolutionary nature of their work, their new terminology created a new textual tradition sharply divided from that of the Middle Ages. Among commentators on Aristotle, however, the success of humanist translations of *Meteorologica* IV was limited. Commentators and university lecturers most often preferred to use the vulgate version of *Meteorologica* IV, translated by William of Moerbeke in the thirteenth century, although some, while retaining the medieval translation, altered the specialized vocabulary of the book so that it matched humanist innovations². The Latin translations of *Meteorologica* IV give particular insight

1. Montgomery S., *Science in Translation* (Chicago, 2000), p. 2.

2. This limited success was not universal for Aristotelian natural philosophy. For example, Gaza’s translation of the *De partibus animalium* was the standard for Renaissance commentators, see: Perfetti S., *Aristotle’s Zoology and its Renaissance Commentators (1521-1601)* (Leuven, 2000), p. 4-5.

into Renaissance attempts to revise Aristotelian scientific vocabulary, because this book contains a multitude of technical terms for natural and artificial processes. Furthermore, the vocabulary of *Meteorologica* IV challenged translators and commentators, since even Aristotle was conscious that he was developing his own specialized vocabulary in this work and noted the inadequacy of existing Greek terminology.

By the 1260's William of Moerbeke replaced a number of the existing translations of Aristotle, many of which had been composed from Arabic, with new versions made from Greek sources. *Meteorologica* IV, however, stood out from much of the Latin Aristotle at this time, including *Meteorologica* I-III, because what had been the most widely circulated Latin version, the so-called *vetus translatio*, was produced from the Greek. Nevertheless, William of Moerbeke's translation of *Meteorologica* IV contrasts with that of Renaissance translators in its wide acceptance. Despite its similarities with Henry Aristippus' *vetus translatio*, which it replaced, commentators and scholars adopted his version soon after its completion and continued to do so throughout the early modern period. For *Meteorologica* IV, William of Moerbeke's work did little to update the terminology, it nevertheless eliminated the most glaring Arabic aspect of many of the copies of the older translation, namely the appendage of a portion of Avicenna's *Kitab al-shifa* as the final chapters of the book.

The broad acceptance of William of Moerbeke's work offers a point of comparison with respect to the role of new translations in the medieval and in Renaissance commentary traditions. While medieval scholars welcomed William of Moerbeke's translation, Renaissance commentators on *Meteorologica* IV, especially Italian ones, despite their professed concerns for textual analysis, had little regard for the humanist translations of the fifteenth and sixteenth centuries.

Renaissance translations of the *Meteorologica* arrived relatively late, some fifty years after Leonardo Bruni's *Nicomachean Ethics*. George Trapezuntius complained in a letter of 1465 that no one recently had translated this book because it was widely considered unworthy of eloquence. He also erroneously claimed that the only extant translation was made from the Arabic³. Soon after, Mattia Palmieri remedied his laments

3. Monfasani J., *Collectanea Trapezuntiana: Texts, Documents, and Bibliographies of George of Trebizond* (Binghamton, NY, 1984), p. 107: 'Cur autem pessimi homines, si nomen suum transferendo preclarum facere cupiunt, cur, inquam non transferunt que ab antiquioribus minus Latine traducta sunt? Dicent, fortassis non extare digna eloquentia sua opera philosophi non verba Latine. At Metaurorum quatuor libri perversi magis sunt quam versi nec a Greco, sed ab Arabico traducti mendose sunt.' The two most common medieval translations, William of Moerbeke's and Henry of Aristippus' of the fourth book, were both made from the Greek.

by translating the *Meteorologica* in the late 1460's. His was the first translation of this work in approximately two centuries⁴. A half century later, a wave of new translations of the *Meteorologica* emerged from printing houses.

Typically these translations were part of complete works of Aristotle, although two commentators, Francesco Vimercati (1512-1571) and Francisco Vallés (1524-1592), produced new translations that accompanied their own expositions⁵. Occasionally the *Meteorologica*, and sometimes *Meteorologica IV* alone, appeared as separate volumes⁶. François Vatable's (first printed in 1518) and Joachim Périon's (first printed in 1552) translations were printed most frequently. According to F.E. Cranz, Vatable's work was printed 36 times, and Périon's 26. Pietro Alcionio and Juan Ginés de Sepúlveda created Latin translations that were first printed in 1521 and 1532 respectively⁷. All of these works shared a general concern with *latinitas*. They were also fairly consistent in their adoption of novel technical terms.

Attempts to transform Aristotle's scientific vocabulary can be traced back to the early part of the 1400's and the efforts of Leonardo Bruni and Theodore of Gaza. Rejecting the belief that Latin lacked a sufficient vocabulary, Bruni attacked the *verbum de verbo* method of medieval translators and their adoption of Graecisms, believing that if Latin was as rich as Greek, suitable Latin terms could be found for even the most opaque terminology⁸. Gaza abhorred the medieval translations of Aristo-

4. Palmieri M., *Meteorologica*, Ms. Milano, Biblioteca Ambrosiana, L 40 sup (xv), fol. 3v-119v. This manuscript can be dated to the mid or late 1460's by its dedication to Marco Barbo, Bishop of Vicenza. He held this position from 17 September 1464 to 17 March 1470, see: Eubel C. (ed.), *Hierarchia catholica medii aevi* (Munster, 1914), vol. 2, p. 267. It is misidentified as a commentary in: Lohr C.H., 'Medieval Aristotle Commentaries', *Traditio* 27 (1971), p. 342. Eugenio Garin was familiar with an unidentified copy of this manuscript, see: Garin E., 'Le traduzioni umanistiche di Aristotele nel secolo XV,' *Atti e memorie dell'Accademia fiorentina di scienze morali 'La Colombaria,'* 16, n.s. 2 (1947-50 [1951]), p. 100; Garin E., 'Mattia Palmieri traduttore di Aristotele', in: *La cultura filosofica del Rinascimento italiano* (Florence, 1961), p. 308-312.

5. Vimercati F., *Commentarii in IV libros Meteorologicorum* (Paris, 1556); Vallés F., *In IV. librum Meteorologicorum commentaria* (Padova, 1591 [first edition Alcalá, 1558]).

6. For an example of this work as a separate volume, see: *Aristotelis Stagiritae Meteorologicorum liber quartus*, tr. Joachim Périon (Wittenberg, 1585). This, however is not the first edition.

7. Cranz F., *A Bibliography of Aristotle Editions 1501-1600*, 2nd ed. (Baden-Baden, 1984), p. 182. A word of caution should be expressed about relying on this work. Despite its usefulness, it is incomplete and contains several inaccuracies with regard to translations of *Mete.* IV.

8. For Bruni see: Hankins J., 'The new language', in: G. Griffiths, J. Hankins & D. Thompson (eds.), *The Humanism of Leonardo Bruni* (Binghamton, New York, 1987), p. 197-212. See also: Schmitt C., *Aristotle and the Renaissance* (Cambridge, Mass., 1983),

tle that simply transliterated technical terms, and attempted to render these technical words into a better classical Latin. The aim of their translations was not merely to render Aristotle's prose into a more aesthetically pleasing corpus. Rather, they attempted to make medieval commentators obsolete. Once a new vocabulary was accepted for Aristotelian science, it would only be with great difficulty that one could understand medieval comments based on a substantially different text. If successful, humanist translations could undermine the work of previous centuries and give Aristotelian science a *tabula rasa* on which interpreters, unhindered by the weight of scholastic jargon and disputations, could put forth new interpretations of the text and consequently of nature.

These goals provoked a certain degree of controversy and were in fact rejected by contemporaries of Gaza such as Cardinal Bessarion and George Trapezuntius, both of whom supported at least some aspects of the medieval intellectual tradition⁹. Nevertheless, Renaissance translators of *Meteorologica* IV, following Gaza's lead, eschewed transliterating Greek words. They did not, however, succeed in creating a lasting revolution. Commentators and translators more than occasionally noted that Latin lacked an appropriate vocabulary for translating the technical terminology of *Meteorologica* IV. Furthermore, the conservatism of universities, Jesuit teaching, and the revival of Thomism in the second-half of the sixteenth century ensured that medieval commentators and translations continued to be vital. The vulgate text remained extremely popular throughout the sixteenth century, and the adoption of a new set of technical terms made medieval commentators and translations neither incomprehensible nor obsolete. The persistence of William of Moerbeke's translation was particularly strong in Italian universities where it remained the standard text for Italian commentators¹⁰. The resilience of his trans-

p. 64-88 for Bruni's positions in addition to a survey of Renaissance translations of all the works of the Aristotelian corpus. On Renaissance translations of philosophical works in general see: Krayer J. 'Philologists and philosophers', in: J. Krayer (ed.), *Cambridge Companion to Renaissance Humanism* (Cambridge, 1996), p. 142-160; Copenhagen B.P., 'Translation, terminology, and style in philosophical discourse', in: C. Schmitt (ed.), *Cambridge History of Renaissance Philosophy* (Cambridge, 1988), p. 75-110; Garin, 'Le traduzioni...', p. 55-104.

9. Perfetti S., "'Cultius atque integrius" Teodoro Gaza, Traduttore umanistico del *De partibus animalium*', *Rinascimento* 35, series 2, supplement (1995), p. 253-286; Monfasani J., 'The Pseudo-Aristotelian *Problemata* and Aristotle's *De animalibus* in the Renaissance', in: A. Grafton & N. Siraisi (eds.), *Natural Particulars: Nature and the Disciplines in Renaissance Europe* (Cambridge, Mass., 1999), p. 205-247.

10. The text of William of Moerbeke's translation is embedded in the following sixteenth- and seventeenth-century commentaries: Nifo A., *Commentaria in libro De mixtis qui a veteribus quartus Meteororum liber inscribitur* (Venice, 1560); Boccadiferro L.,

lation was such that even the only Renaissance commentary on *Meteorologica* IV written in the vernacular follows his Latin translation¹¹.

In *Meteorologica* IV Aristotle outlined a number of concepts that previously lacked a systematic nomenclature. The first three chapters of *Meteorologica* IV set out to explain πέψις, its opposite, ἀπεψία, and their species. Πέψις refers to a substance's perfection, typically caused by the actualization of the substance's innate heat. Modern scholars typically translate it into English as 'concoction' or leave it transliterated as 'pepsis'. Aristotle defines three species of πέψις: πέπανσις or ripening, ἔψησις or boiling, and ὄπτησις or roasting. For each of these three species there is a corresponding imperfection. These are named ὀμότης, μόλυνσις and στάτευσις, respectively. The opposite of ripening, or ὀμότης, can accurately be translated as rawness; the precise meanings of the other two opposites, however, are trickier. The difficulty in pinning down clear definitions and translations for these terms is evident in the divergence of two of the more influential modern English translations of *Meteorologica* IV. Ingemar Düring translates μόλυνσις as 'parboiling', H.D.P. Lee as both 'half-cooked', and 'scalding'¹². Στάτευσις posed an exceptional difficulty, even when compared to its close relative μόλυνσις. Despite supplying a name for it, Aristotle called this process 'very difficult to name' (ἀνωνυμώτερον)¹³. It means something close to 'scorching'.

Many a critic of the last two-thousand years has accused Aristotle of obscurity. In the case of terminology of *Meteorologica* IV, this obscurity arises from the attempt to craft a specialized vocabulary out of everyday terms, from the self-consciousness that he was developing a new scien-

Lectiones in librum IV Meteorologicorum (Venice, 1563); Scipione Chiaramonti S., *In librum IV Meteorum commentaria* (1644); Cabeo N., *In libros Meteorologicorum Aristotelis commentaria et quaestiones* (Rome, 1644); Pallavicini A., *Explicatio paraphrastica in quatuor Libros Meteororum Aristotelis* (Genoa, 1613); Eck J., *Libri Meteororum IV, adiectis commentariis* (Augsburg, 1519). The following commentaries cite his translation: Pázmány P., *Tractatus in libros Meteororum*, in: *Opera omnia* III (Budapest, 1897), p. 415-453; Pomponazzi P., *Dubitationes in quartum librum Meteorologicorum* (Venice, 1563); Piccolomini F., *Lectiones in quartum Meteorologicorum*, Ms. Milano, Biblioteca Ambrosiana, D 396 inf. (XVI); Zabarella J., *Commentarii in Meteora* (Frankfurt, 1602); Javelli G., *Quaestiones super IV librum Meteororum*, in: *Opera Omnia* (Lyon, 1580); Cremonini C., *Expositio in IV libros Meteororum*, Ms. Padova, Biblioteca Universitaria, 1210, p. 561ff. Remarkably, Francesco Patrizi used William of Moerbeke's text to translate the Greek passages that he quoted in: Patrizi F., *Discussiones Peripateticae* (Venice, 1581), p. 116-119.

11. de Vieri F., *Trattato delle metheore* (Florence, 1582).

12. Düring I., *Aristotle's Chemical Treatise* (Göteborg, 1944), p. 39; Aristotle, *Meteorologica*, tr. H.D.P. Lee, (Cambridge, Mass., 1952), p. 293, 311.

13. 381b16.

tific vocabulary out of ordinary language. After listing the species of concoction and inconcoction, Aristotle wrote:

It is necessary to understand that these names [concoction, etc.] do not strictly belong to the subjects at-hand, for there are no terms universally accepted for these processes. So it is necessary to consider these terms as applied to these forms in general and according to common usage¹⁴.

There are, however, distinctions between the normal usage of these eight terms and how Aristotle intended to apply them. He wrote that: ‘roasting and boiling occur via artifice; there are, however, natural processes that are the same in respect to form, for their affections are similar, but we do not have names for them’¹⁵. Therefore, it was necessary to extend the usage of these widely understood terms and apply them to natural processes that do not have specific names.

These eight terms for concoction, inconcoction, and their species represent only a fraction of the scientific terminology of *Meteorologica* IV. For example, this book uses πόροι (pores) to describe the inner workings of material change. Renaissance translators departed from their medieval predecessors, opting for *meatus* instead of the transliterated term. Similarly, *putredo* replaced *putrefactio* for the translation of σήψις, or rotting. Additionally, *Meteorologica* IV.8-9 describes 18 secondary passive qualities of solid bodies, each of which has an opposite. A number of these terms are obscure, and have not played a significant role in the history of natural philosophy. Nevertheless, the obscurity of the names of these qualities presented translators with opportunities to fashion their interpretations¹⁶. Aristotle’s description of some of these qualities is not without interest for the history of natural philosophy. For example, in *Meteorologica* IV.9 he defined the term φλογιστόν (phlogiston), which eventually played a large role in eighteenth-century chemistry. He divided combustible substances (καυστά) into two kinds: those that emit flames (φλογιστά) and those that do not (ἀφλογιστά)¹⁷. The persistence of the Greek term φλογιστόν even into the late eighteenth century is indicative of the limited success of Gaza’s ideals, since revivals of philhellenism eventually swept away the linguistic reforms of the fifteenth and sixteenth centuries and transliterated Greek words remain implanted in scientific and medical vocabularies.

14. 379b14-18. My translation.

15. 381b3-5. My translation.

16. For example see the discussions of the translation of these terms in: Vallés, *In IV. librum...*, fols. 56v-86r.

17. 387b18-21.

1. Medieval Translations

Medieval translations of *Meteorologica* IV were not as homogeneous as one might expect (see Appendix I). There were in fact four Latin translations that circulated in the thirteenth and fourteenth centuries¹⁸. A fragment of a fifth exists as well, although it is unclear whether this fragment represents part of a completed work or is merely the start of an unfinished project¹⁹. Henry Aristippus made the first complete Latin translation of *Meteorologica* IV from the Greek text in the late twelfth century²⁰. His work formed the final chapter of what has become to be known as the *vetus translatio*. Gerard of Cremona was responsible for the translation of the first three books of the *vetus translatio* of the *Meteorologica*, all of which were the product of a *verbum de verbo* method from Ibn al-Bitriq's Arabic paraphrase that differed significantly from the Greek text. Gerard began translating *Meteorologica* IV, but stopped just before the end of the first chapter. Why he stopped is unknown, but it is possibly the result of learning of the existence of Henry's translation from the Greek²¹.

William of Moerbeke's translation, which was also made from the Greek, made the *vetus translatio* obsolete by the 1260's. His translation was widely available in the Middle Ages, and even in the sixteenth century his translation remained among the most widely circulated translations. William of Moerbeke also translated Alexander of Aphrodisias' commentary on the *Meteorologica*. Fragments of Aristotle's text are embedded in that commentary and do not vary greatly from William of Moerbeke's other translation²². In addition to these works, an anonymous translation of Ibn al-Bitriq's Arabic paraphrase, almost always accompanying Averroes' commentary on the *Meteorologica*, circulated beginning

18. Fobes F., 'Mediaeval versions of Aristotle's *Meteorology*', *Harvard Studies in Classical Philology* 10 (1915), p. 297-314; Minio-Paluello L., 'Henri Aristippe, Guillaume de Moerbeke et les traductions latines médiévales des *Météorologiques* et du *De Generatione et Corruptione* d'Aristote', in: Id., *Opuscula* (Amsterdam, 1972), p. 57-86 (= reprint from *Revue Philosophique de Louvain* 45 (1947), p. 206-235); Lacombe G., *Aristoteles Latinus Codices: Pars prior* (Rome, 1939), p. 56-57.

19. Schoonheim P., *Aristotle's Meteorology in the Arabico-Latin Tradition* (Leiden, 2000), p. 144-150.

20. He apparently only translated the fourth book of this work.

21. Schoonheim, *Aristotle's Meteorology...*, p. xxxiv.

22. Alexander of Aphrodisias, *Commentaire sur Les Météores d'Aristote*, ed. A.J. Smet (Leuven, 1968); Vuillemin-Diem G., 'Zu Wilhelm von Moerberkes Übersetzung der aristotelischen Meteorologie,' in: R. Beyers, J. Brams, D. Sacre & K. Verrycken (eds.), *Tradition et traduction* (Leuven, 1999), p. 115-166.

in the thirteenth century and was printed numerous times in the Renaissance, most famously in the Giunta editions²³. This translation is the most corrupt of all medieval versions, lacking many substantial passages altogether.

The broad acceptance of William of Moerbeke's translation of *Meteorologica* IV was accompanied by a redefinition of the book's contents. Led by the Arabic translation and by Gerard of Cremona's translation from the Arabic of *Meteorologica* I.1, which erroneously mentioned an Aristotelian work on minerals, copyists of the *vetus translatio* often appended three chapters of Avicenna's *Kitab al-shifa* to *Meteorologica* IV translated by Alfred of Sarashel²⁴. These three chapters became to be known as the *De mineralibus*. In the first half of the thirteenth century Latin scholars generally accepted them as part of the Aristotelian corpus. For example, Adam of Buckfield's commentary on the *Meteorologica*, written probably around the middle of the thirteenth century, included comments on the *De mineralibus* without distinguishing it from the rest of *Meteorologica* IV²⁵. In Roger Bacon's commentary on the *Physics* we find citations and even quotations of the *De mineralibus* that he identified as coming from *Meteorologica* IV²⁶.

William of Moerbeke's work did not contain the errors found in the Arabic version of *Meteorologica* I.1, in addition to cutting the *De mineralibus* from the work. By the middle of the thirteenth century, a number of scholars, including Vincent of Beauvais, questioned the authorship of the *De mineralibus*. When William of Moerbeke's translation became available in the 1260's scholarly opinion on this work changed as a whole²⁷. For example, Bacon reversed his opinion on the authentic-

23. Averroes, *In quantum librum Meteorologicorum* (Venice, 1562-1574).

24. Gerard of Cremona's translation from Yahya ibn al-Bitriq's Arabic translation of Aristotle's *Meteorologica* reads: 'Quando ergo narraverimus de illis, dicemus mineras et animalia narratione universali et particulari, et communicabimus sermonem.' Cf. Schoonheim, *Aristotle's Meteorology*..., p. 4-5. Aristotle's text, however, speaks of plants and animals, not minerals (339a7). They were perhaps also persuaded by opinions such as al-Farabi's that included a work on minerals in his classification of Aristotelian science. See: Al-Farabi, *Catálogo de las Ciencias*, ed. and tr. Á. Palencia (Madrid, 1953), p. 60-61 for the Spanish translation of al-Farabi; see p. 162-163 for Gerard of Cremona's Latin translation of al-Farabi.

25. Adam of Buckfield, Ms. Bologna, Biblioteca Universitaria, 1180 (2344) (XIII), fol. 202v-204v.

26. Roger Bacon, *Quaestiones supra libros quatuor Physicorum Aristotelis*, ed. F. Delorme, (Oxford, 1928), p. 119.10: 'scribitur.4. *Meteororum* quod multa facit natura que non potest ars facere, etsi multum laboret' is a paraphrase of Avicenna's: 'ars est debilior quam natura et non consequitur eam quamvis multum laboret.' See also: 128.35-129.5.

27. Williams S., 'Defining the Corpus Aristotelicum: Scholastic Awareness of Aristotelian Spuria in the High Middle Ages,' *Journal of the Warburg and Courtauld Institutes* 58 (1995), p. 38-40.

ity of the *De mineralibus*. In his *De erroribus medicorum*, Bacon faulted physicians for their reliance on poor translations and their incomplete knowledge of Aristotle's works in general. For example, he claimed that these ignorant doctors relied on 'a brief little chapter that is added onto the end of the *Meteorologica*, and is not derived from Aristotle's text,' that is the *De mineralibus*²⁸.

That the *De mineralibus* was widely rejected as inauthentic by the end of the thirteenth century is born out by the medieval commentary tradition. There is no extant medieval or Renaissance commentary explicitly on the *De mineralibus*, although a small number of commentaries on *Meteorologica* IV, all from the thirteenth century or early fourteenth century, address Avicenna's work as part of *Meteorologica* IV. Boethius of Dacia cited his own *Quaestiones* on the *De mineralibus* in his *Quaestiones super Topica*; although his work on minerals has never surfaced²⁹. It is possible that this self-reference is to his final two questions of his *Quaestiones super quartum Meteorologicorum*, which addressed topics found in the *De mineralibus*³⁰. However, being familiar with William of Moerbeke's *translatio nova*, he recognized Avicenna as the author³¹. Giles of Rome, who died in 1316, supposedly wrote a commentary on the *De mineralibus*, although it has yet to be discovered³². Beyond these there is no evidence that scholars treated the *De mineralibus* in commentaries

28. Roger Bacon, *Opera hactenus inedita Rogeri Baconi*, Fasc. IX, ed. A. Little & E. Withington, (Oxford, 1928), p. 159: 'Liber de corporibus inanimatis totaliter deficit, quia pauca capitula, que addita sunt in fine Meteororum, non sunt de textu Aristotelis, sicut ex alia translatione notum est.' William R. Newman notes that by the 1260's Bacon considered the *De mineralibus* to be in the domain of fools: Newman W., *The Summa Perfectionis of Pseudo-Geber* (Leiden, 1991), p. 20-25. E.J. Holmyard and D.C. Mandeville identify the date of Bacon's reversal as 1266: *Avicennae De congelatione et conglutinatione lapidum*, ed. E.J. Holmyard & D.C. Mandeville (Paris, 1927), p. 10.

29. Boethius of Dacia, *Quaestiones super librum Topicorum*, ed. N. Green-Pedersen & J. Pinborg (Hauniae, 1976), p. 256; cf. Pinborg J., 'Die Handschrift Roma Angelica 549 und Boethius de Dacia', *Classica et Mediaevalia* 28 (1969), p. 379.

30. Boethius of Dacia, *Quaestiones super quartum Meteorologicorum*, ed. G. Fioravanti (Hauniae, 1979). *Quaestio* 119 asks: 'Utrum terra pura possit fieri lapis?' which corresponds to the opening line of the *De mineralibus*, which reads: 'Terra pura lapis non fit quia continuationem non facit sed commutationem' (Cf. *Avicennae De congelatione...*, ed. Holmyard & Mandeville, p. 45).

31. Boethius of Dacia, *Quaestiones super quartum...*, p. 86: 'ut dicit Avicenna...'. For his reference to William of Moerbeke's translation see: Boethius of Dacia, *Quaestiones de Generatione et Corruptione*, ed. G. Sajó (Hauniae, 1972), p. 123: 'sed motus caeli regulat virtutes omnium elementorum, ut dicitur in secunda translatione Meteororum, in principio; ergo etc.'.

32. Müntz E. & Fabre P., *La Bibliothèque du Vatican au XVe siècle* (Paris, 1887), p. 190.

or *Quaestiones*. Thus, in cleansing *Meteorologica* IV of Arabic works, William of Moerbeke enjoyed much success in the scholarly world.

Besides redefining the accepted contents of *Meteorologica* IV, William of Moerbeke's work had a smaller impact on the language of the translation itself. Because Henry Aristippus had also translated from the Greek, the *translatio nova* does not differ from the *vetus translatio* as significantly for *Meteorologica* IV as it did for other texts. An examination of these works (see Appendix 1) shows the similarities in language and syntax. Furthermore, the *translatio nova* did not change the rendering of this book's technical vocabulary (see Table 1).

Medieval translations uniformly render πέψις and ἀπεψία as *digestio* and *indigestio*. Both William of Moerbeke and Henry Aristippus adopted transliterations for the six species of πέψις and their incompletions. On the other hand the Averroistic version, paving the way for Renaissance revisions, translated πέπανσις as *maturatio*, ὄπτησις as *assatio*, and ὀμότης as *cruditas*. Even though these translations primarily used transliteration, medieval commentators strove to find purer Latin terms for these words. Since the commentator's role is to explain words via other words, it should not be surprising that some of the earliest written efforts to clarify the Latin text of Aristotle put forth translations of these words, which remained transliterated in the translations. Two of the most influential medieval commentaries on the *Meteorologica*, those of Albertus Magnus and Ps.-Thomas Aquinas, defined at least some of these opaque Greek terms in Latin, thereby establishing synonymous Latin terms for these processes³³. The terms they used were identical, or at least similar, to those that were adopted by many of the humanist translators of the Renaissance, thereby suggesting that the continuity between medieval and Renaissance Aristotelianism was stronger than sixteenth-century scholars imagined it to be.

Albertus' commentary, which is based on his reading of the *vetus translatio*, explained the text in a straight forward manner. He counted

33. Albertus Magnus, *Liber quartus meteororum*, ed. A. Borgnet, Opera Omnia Vol. 4 (Paris, 1890), p. 705-808; Ps.-Thomas Aquinas, *In libros Aristotelis Meteorologicorum expositio*, ed. R. Spiazzi (Rome, 1952), p. 645-685. While Thomas is no longer accepted as the author of this work, it was considered authentic throughout the Renaissance. On the problem of its authorship see: Dondaine A. & Bataillon L., 'Le commentaire de saint Thomas sur les Météores', *Archivum Fratrum Praedicatorum* 36 (1966), p. 81-152; Vuillemin-Diem G., 'Anonymus Normannus (Mahieu le Vilain): Super Meteora II.9-III. Zur Identifizierung des Autors, zur Eigenart des Textes, mit einer Edition von zwei Kapiteln der noch unveröffentlichten Schrift,' *Recherches de Théologie et Philosophie médiévales* 71, 1 (2004), p. 1-130.

translation among the tools of exposition and notably used this tool to explain some of the species of πέψις and their opposites. For example, in his definition of ὀπτησις he stated that: ‘a digestion of this kind is in the manner of roasting, in which the heat acts with the dry: and it is called *optesis*, which in Latin is called *assatio*, just as *hepsesis* is called *elixatio*’³⁴. Albertus alternated between the transliterated Greek terms and the Latin translations, and used the words *epsesis* and *elixatio* interchangeably. He failed, however, to provide translations of all of the species of concoction and inconction. He translated ὀμότης as *crudum*³⁵, and defined στάτευσις at times as *semiassum* and at others as *imperfectum perassatum*, but left πέπανσις and μόλυνσις undefined. These gaps probably do not necessarily suggest an inability to translate these words. If asked, he probably would have translated πέπανσις as *maturatio* or some variation of that word, judging from the frequency of the verb ‘maturescere’ in his explanation of πέπανσις. While μόλυνσις is more difficult to translate than πέπανσις, it would have been easy to render it in the same way he did στάτευσις and call it *semielixum* or *imperfectum perelixatum*. Rather these gaps suggest that translation was only one of the keys to understanding Aristotle’s text, and Albertus’ use of translation was meant to clarify the text and was not necessarily a critique of the existing standards of translation.

2. Renaissance Commentaries and Translations

While Albertus and [Ps.-] Thomas discussed translation in *Meteorologica* IV to a limited degree, and Roger Bacon wrote polemics against those unskilled in translation and textual exegesis³⁶, medieval treatments of *Meteorologica* IV rarely emphasized the details of Aristotle’s Greek and commented on the methods of rendering it into Latin far less frequently than their Renaissance counterparts.

34. Albertus Magnus, *Liber...*, p. 726, ‘et hujusmodi digestio est per modum assationis, in qua calor agit cum sicco: et dicitur esse *optesis*, quod Latine sonat *assatio*, sicut *epsesis* *elixatio* interpretatur’.

35. Albertus Magnus, *Liber...*, p. 732: ‘Cruditas autem est *homothesis* in Graeco.... dicitur Latine *crudum...*’; p. 746: ‘Dicatur autem, si placet *statheusis*, quod sonat *semiassum*, vel *imperfectum perassatum*’.

36. On Bacon’s view of contemporary translations and translators see: Lemay R., ‘Roger Bacon’s Attitude toward the Latin Translations and Translators of the Twelfth and Thirteenth Centuries’, in: J. Hackett (ed.), *Roger Bacon and the Sciences* (Leiden, 1997), p. 25-48; Grabmann M., *Forschungen über die lateinischen Aristotelesübersetzungen des XIII. Jahrhunderts* (Münster, 1916), p. 56-73.

Following the lead of Bruni and Gaza, sixteenth-century translators of *Meteorologica* IV uniformly avoided using transliterated terms. This is also true for the only known fifteenth-century translation composed by Mattia Palmieri³⁷. While Palmieri retained the terms *digestio* and *indigestio*, sixteenth-century translators, and a good number of commentators, typically rejected these terms in favor of *concoctio* and *inconcoctio* (see Table 2).

A revolution in terminology could not take place over night, if it was to take place at all. Replacing a transliterated Greek word with a more commonly known Latin word did not necessarily clarify the text. Indeed, the multiplicity of new terms used to translate the word brought forth debate, and for the first time in the Latin tradition, commentators debated the merits of various translations of *Meteorologica* IV. Commentators, however, for the most part did not use humanist translations even though they accepted the changes of terminology. To my knowledge only four early modern commentaries on *Meteorologica* IV contain Renaissance translations; two commentators, Francesco Vimercati and Francisco Vallés, used their own, and Johannes Hawenreuter and Christoval Nuñez use Alcionio's. Vimercati and Hawenreuter provided the Greek text, thereby allowing readers to bypass the issue of translation altogether³⁸. Sixteenth-century editions of Thomas Aquinas typically included both the *nova translatio* and a Renaissance translation, usually, if not always, Vatable's³⁹; the Giunta editions of Averroes included the *nova translatio* accompanied by the Averroistic version⁴⁰. There was particular need to supplement the Averroist translation because of its numerous and large lacunae. The remaining commentaries that included a text used the vulgate translation. The vulgate, however, was not etched in stone, and many early modern commentaries emended the medieval translation so that it

37. Palmieri, *Meteorologica*, fol. 94r-94v: 'Est & enim calidi quidem digestio: digestionis vero maturitas: elissatio ad hunc assatio: frigiditatis autem indigestio, cuius partes sunt cruditas, delissatio, atque subassatio.'

38. Vimercati, *Commentarii*...; Vallés, *In IV librum Meteorologicorum*; Hawenreuter J., *Commentarii in Meteorologicorum libros IV* (Frankfurt, 1605); Nuñez C., *Opus... in quo commentantur tria priora capita Aristotelis ex Meteororum libro quarto* (Madrid, 1613). See also: Charpentier J., *Descriptiones universae naturae* (Paris, 1562), fol. 60v-74r, which gives glosses on Périon's translation.

39. Cranz F., 'The Publishing History of the Aristotle Commentaries of Thomas Aquinas', *Traditio* 34 (1978), p. 157-192.

40. Cranz F., 'Editions of the Latin Aristotle Accompanied by the Commentaries of Averroes', in: E. Mahoney (ed.), *Philosophy and Humanism* (New York, 1976), p. 116-128; Schmitt C., 'Renaissance Averroism studied through the Venetian editions of Aristotle-Averroes (with particular reference to the Giunta edition of 1550-1552)', in: *L'averroismo in Italia*, Atti dei Convegni Lincei 40 (Rome, 1979), p. 121-142.

reflected the recently crafted vocabulary. Thus, the translation remained for the most part the same, only the objectionable transliterations were replaced.

Commentators participated in propagating these changes in the Latin vocabulary of *Meteorologica* IV. Early attempts used equivalences to establish the new terms. Lefèvre's paraphrase on *Meteorologica* IV is perhaps the best example⁴¹. He gave notes before each chapter of the paraphrase allowing the reader to review the vocabulary before examining the text. For example his notes to *Meteorologica* IV.2 began by giving equivalents to the six species of concoction and inconcoction and continued to rephrase other longer and complex phrases⁴². Agostino Nifo's commentary, written in 1523 and first printed in 1531, went one step further and provided a chart that contains the Greek words, their transliterations, and the new translations⁴³. The existence of charts, such as Nifo's, show that the meaning of the text and the words have not changed at all. The new translation is directly equivalent to the old one, and does not necessarily pave the way for a clearer interpretation of Aristotle. Thus, these new terms could substitute the old words in the vulgate without actually improving the translation or reforming natural philosophy. Commentators, however, were aware that Renaissance translations remedied errors that had crept into the medieval tradition. For example, Nifo points out that the medieval versions translate $\mu\lambda\alpha\iota$ as 'lead' (*plumbum*) rather than

41. On Lefèvre's Aristotelianism see: Kessler E., 'The Lefèvre enterprise', in: C. Blackwell & S. Kusukawa (eds.), *Philosophy in the Sixteenth and Seventeenth centuries: Conversations with Aristotle* (Brookfield, Vermont, 1999), p. 1-22; Rice Jr. E., 'Humanist Aristotelianism in France: Jacques Lefèvre and his circle', in: A. Levi (ed.), *Humanism in France* (Manchester, 1970), p. 132-149; Lohr C.H., *Aristotle Renaissance Commentaries II. Renaissance Authors* (Florence, 1988), p. 138-142; Schmitt C., 'The rise of the philosophical text-book', in: *Cambridge History of Renaissance Philosophy*, p. 795-796.

42. Here are the entire notes to *Meteorologica* IV.2: Lefèvre J. *Totius Philosophiae naturalis paraphrases* (Paris, 1521), fol. 183r: 'Pepansis / maturatio. Epsesis / elixatio. Optesis / assatio. Omotes / cruditas / & (quae pepansi opponitur) immaturatio. Sunt praeterea duae incoctiones: inelixatio opposita epsesi / & inassatio quae opponitur optesi. Proprium / naturale. Humidum & siccum naturale / uniuscuiusque mixtorum natura materia dicuntur: quod natura ex elementorum contemperamentis / secundum materiam omnia gignantur mixta. Et cum materiae sit pati / sitque compositum: ex calidorum / frigidorum / humidorum / & siccorum contemperamentis pariter coalitum / quorum duo calidum & frigidum potissimum sunt ad agendum / & duo humidum & siccum ad patiendum: hinc potius humidum & siccum / uniuscuiusque mixti / natura materia dicuntur / contemperamentaque passiva. Apostema / reollectio. graecum est. nos huiusmodi in uno loco humorum reollectionem / agglolationemque: panos & vomicas nominamus.'

43. Nifo, *Commentaria...* [1531 version], p. 548.

the more accurate ‘mill-stones’ (*molares lapides*)⁴⁴. These errors, however, were limited in number.

By the middle of the sixteenth century a new type of commentary had come into vogue that specifically dedicated itself to the problems of translation. Joachim Périon’s *Observationes*, first printed in 1552, gave notes at the end of his translation that explained the rationale of his choice of words thereby providing a linguistic foundation for students of Aristotle⁴⁵. Not surprisingly, his two notes on *Meteorologica* IV were dedicated to the explanation of the species of πέψις and the names of some of the eighteen passive qualities. Echoing Lucretius’ pleas of excuse for the inadequacy of the Latin language and implicitly rejecting Bruni’s defense of Latin, Périon noted that there are names for many things in Greek that do not exist in Latin. As a result he was compelled to use compound terms to describe ἔψησις and ὄπτησις. Cicero, and classical Latin in general, guided Périon in his choice of usage and terms. For example, he justified his choice of terms as *non plena assatio*, and *non plena elixatio* by claiming that Cicero often called what is imperfect ‘not full’⁴⁶. Following what he considers to be a more classical Latin, Périon rejected *maturatio* in favor of *maturitas*. In general he avoided transliterations, but nevertheless used *phymata* to translate φύματα, which as a technical medical term means boils, arguing that the Latin word has a proper classical provenance because it was adopted as a technical term by Aulus Cornelius Celsus, the Roman physician of the first century A.D.⁴⁷.

Both humanist translations and Renaissance versions of William of Moerbeke’s translation rejected the medieval use of *digestio* to translate

44. Nifo, *Commentaria...*, fol. 135v: ‘Quod vero ad verba attinet, μιλίαι, non plumbum, ut in antiquis translationibus legitur, sed molares lapides intelligendum est, ut Alexander exposuit.’ Nifo took the term ‘molares lapides’ from William of Moerbeke’s translation of Alexander. Alexander of Aphrodisias, *Commentaire...*, p. 327.

45. Périon J., *Pars tertia operum Aristotelis Stagiritae, libros naturalis & divinae philosophiae ordine continentes* (Basel, 1563). See also: Gesner K., *Physicarum meditationum, annotationum, et scholarium libri V* (Zürich, 1586), p. 27-54, 140-161, for a commentary on *Meteorologica* IV largely dedicated to explaining Aristotle’s vocabulary. On Périon’s explanations of Aristotle, see: Stegman A., ‘Les observations sur Aristote de Bénédicte J. Périon’, in: J.-C. Margolin & M. de Gandillac (eds.), *Platon et Aristote à la Renaissance* (Paris, 1976), p. 376-389.

46. Périon, *Pars...*, p. 156: ‘Et certe Cicero saepe id quod imperfectum est, non plenum appellat.’

47. Périon, *Pars...*, p. 156: ‘φύματα appello phymata, cum Celso, qui haec a tuberculis distinguit’. Périon states that Celsus distinguishes *phyma* from *tuberculum* presumably referring to *De medicina* 5, 28, 9. Périon’s reasoning for translating φύματα as *phymata*, however, may be on shaky ground, as elsewhere Celsus specifically identifies *phymata* as *tubercula*. See *De medicina* 6, 18, 2: ‘Tubercula etiam, quae φύματα Graeci vocant....’.

πέψις, opting for *concoctio* instead⁴⁸. It may not be readily apparent why Renaissance translators and commentators chose *concoctio* over *digestio*. Neither term transliterates the Greek, and both appear in classical Latin. For example, the rhetorician Quintillian employs both words⁴⁹. However, the first appearance of *digestio* in written Latin came after the Augustan era, giving it a shakier provenance than its rivals *concoctio* and *coctio*. Controversy over the replacement of *digestio* with *concoctio* began when George Trapezuntius attacked Gaza's translation of the *Problemata*, in his view Gaza was mistaken for equating these terms, when they in fact refer to separate processes⁵⁰.

While sixteenth-century Aristotelians no longer used transliterated forms of the varieties of πέψις, *digestio* remained part of the scientific vocabulary. Ambivalence, and at times confusion, reigned in regards to the replacement of *digestio* with *concoctio*. This ambivalence, perhaps, was not new and a parallel is found in Celsus' *De medicina* where it is suggested that *digestio* and *concoctio* are synonymous⁵¹. Similarly, Ermolao Barbaro's *Compendium scientiae naturalis*, composed in 1484 but first printed in 1545, labeled the chapter that summarizes the first part of *Meteorologica* IV as 'De digestionem et concoctionem'. While he joined these two words with a copula in the section's title, he made clear in the summary of the chapter that his simultaneous use of both terms is pleonastic. Thus he defined the goal of the chapter as 'Quid sit concoctio sive digestio quotque eius species sint aperiemus'⁵². Lodovico Boccadiferro's *Lectiones in quartum Meteorologicorum* written in the 1530's or 40's at the University of Bologna, used the two terms interchangeably except where he applied them simultaneously, typically separating them by 'vel' or 'seu'⁵³. These terms, however, eventually came to be distin-

48. See, for example, the translations embedded in the commentaries of: Chiaramonti S., *In quartum Metheorum...*; Cabeo, *In libros Meteorologicorum...*; Boccadiferro, *Lectiones...*

49. *Institutio oratoria*, 8, 4, 16; 11, 3, 19. Quintillian used the noun *digestio* and the verb *coquere*.

50. Mohler L., *Kardinal Bessarion als Theologe, Humanist, und Staatsmann: Funde und Forschungen* (Aalen, 1967; Reprint: Paderborn, 1923-42), p. 286-289.

51. 'Sive concoctio, sit illa, sive tantum digestio'. *De medicina*, 1 praefatio, 63.

52. Barbaro E., *Compendium naturalis scientiae* (Venice, 1545), fol. 51v.

53. Boccadiferro, *Lectiones...*, p. 15: 'omnis digestio fit a calido, & digestio est commixtio perfecta humidi cum sicco, & omnis digestio est a calido'; p. 9: 'coctio est quaedam operatio calidi, & incoctio est operatio frigidi...'; p. 65 'Dicebat Aristoteles in principio huius libri, quod quatuor erant qualitates primae, duae activae, & duae passivae: & dixit, quod intendebat declarare, quae sunt actiones activarum: & dixit, quod tres erant operationes activarum in genere, scilicet generatio, & putredo, & digestio seu coctio.' For Boccadiferro's dates and writings see: Lohr, *Aristotle...*, p. 57; Lohr C.H., 'The Aristotle com-

guished in medical literature. More or less following George Trapezuntius' critique of Gaza, Santorio Santorio (1561-1636), a professor of medicine at the University of Padova, basing his views on Galen's *De methodo medendi*, claimed that concoction refers to the transformation of food into *chylum* or blood, while *digestio* is the transmission of these newly created substances throughout the body⁵⁴. Santorio's views, which are not based on Aristotle's text, illustrate the incompleteness of the attempt to reform Aristotelian vocabulary. According to Santorio there is nothing stylistically problematic with *digestio* but it merely refers to a different process than *concoctio*.

The inclusion of Vatable's translation with William of Moerbeke's in editions of Thomas Aquinas occasionally caused confusion rather than clarification. For example, Francisco Fernandez Bexarano included in his *Super IV libros Meteororum questiones*, published in 1643, a discussion over the distinction between *digestio* and *concoctio*⁵⁵. Apparently having consulted an edition of Thomas' and Pseudo-Thomas' commentary that contains both medieval and Renaissance translation, Fernandez Bexarano found support for the existence of both concepts within Aristotle. Quoting Vatable's translation that uses *concoctio*, he cited [Ps.-] Thomas' comments that refer to *digestio*, leading him to the conclusion that *digestio* is the perfection of the principle of generation in animals, while *concoctio* refers to perfection of inanimate substances, the most notable example being the perfection of must when it turns into wine⁵⁶.

mentaries of Ludovicus Buccaferrea', *Nouvelles de la république des lettres* 1 (1984), p. 107-118; Lines D., 'Natural philosophy in Renaissance Italy: The University of Bologna and the Beginnings of Specialization', *Early Science and Medicine* 6 (2001), p. 308.

54. Santorio S., *Commentaria in primam fen primi libri Canonis Avicennae* (Venice, 1646 [first edition 1625]), p. 507: 'Praeterea notandum, per concoctionem intelligere conversionem cibi in aliam substantiam, videlicet in chylum, vel chyli in sanguinem, & non digestionem: differt enim concoctio a digestionem, ut docet Galenus 12. methodi 3. ubi ait, coctionem fieri per somnum: digestionem vero per vigiliam: digestio vero nihil aliud significat, quam delationem seu transmissionem alimenti ab una ad aliam partem sine conversione cibi ex una in aliam substantiam: conversio enim solum fit per somnum, quando videlicet calor dispersus per sensiteria revehitur ad imas partes, & cum innato calore viscerum unitur: in vigilia calor innatus seiunctus ab influente non est tantae virtutis, quantae possit convertere chylum in sanguinem, vel sanguinem in ossa.' Santorio's view is a reasonable interpretation of the passage cited. Galen writes: πέπτει μὲν γὰρ ὁ ὕπνος, διαφορεῖ δὲ ἡ ἐγρήγορσις. Cf. *Claudii Galeni Opera Omnia*, ed. C. Kühn (Leipzig, 1825), vol. 10, p. 824.

55. Fernandez Bexarano F., *Super IV libros Meteororum quaestiones* (Lyon, 1643), p. 449-452: 'Utrum coctio sit idem, quod digestio?'

56. Fernandez Bexarano, *Super...*, p. 451 cites Vatable's translation: 'Arist. cap. 3. ubi ait: *multaque alia ex hisce quae cocta sunt, eadem quidem forma, sed translatione matura dicuntur, ut tubercula.*' Cf. Thomas Aquinas, *In libros Meteorologicorum praeclarissima commentaria* (Venice, 1561), p. 222.

Boccadiferro's commentary, despite not showing a marked preference for *concoctio* over *digestio*, nevertheless marked a new role for commentaries that could only have arisen with the availability of multiple new translations. For the first time we find commentators comparing, criticizing, and offering amendments to translations of *Meteorologica* IV. In particular, the choice of Latin words for these obscure processes was a bone of contention, leading Boccadiferro to judge the relative merits of these new translations. His inability to resolve these issues prompted him to argue that in some cases it was futile to find the appropriate word in Latin. Although Boccadiferro's commentary is accompanied by a modified vulgate translation, he was familiar with both Vatable's and Alcionio's translations, which he did not find entirely satisfactory. Even though the modified vulgate that accompanies his text translated *στάτευσις* as *tostio*⁵⁷, Boccadiferro argued that this is not the appropriate word. Citing Alcionio's translation of 'tastio [sic] et frixio', he argued that these words do not correspond to Aristotle's intent, because the appropriate word does not exist in Latin. Rather he offered his own Latin phrase, which is not found in any other translation, that explains the term via negation: *diminuta assatio*⁵⁸. Boccadiferro's critiques of the new translations highlight some of the difficulties in rendering many of the new words of *Meteorologica* IV into Latin. In particular, the eighteen qualities outlined *Meteorologica* IV.9 provided difficulties for the translator. Boccadiferro praised Vatable's translation of *τητητόν* into *scissile*, which barely alters William of Moerbeke's translation of *scissibile*⁵⁹. The descriptions of these properties and the examples of them, however, posed difficulties for the translator. For example, the translation of the Greek word *στάις*, which Lee translates as dough, into *pasta* was unsatisfying and again Boccadiferro was pessimistic about Latin's ability to render Greek words with precision⁶⁰.

57. It should be noted that this volume was printed posthumously, and Aristotle's text may not have been identical to the one Boccadiferro used.

58. Boccadiferro, *Lectiones...*, p. 67: 'Est autem statheusis diminuta assatio, sed non bene translatum est hoc verbum a latinis: Vatablus transtulit ex...[Lacunae are in the text, presumably where Greek words belong.] Alcionius autem tastio aut frixio; sed nec... nec tostio est proprium vocabulum ipsius statheusis, quia hoc verbum ex... est quid commune ad intensam assationem & ad remissam assationem: neque etiam tostio est conveniens, ut dicit Alcionius, quia est tostio vehemens assatio; neque est frixio, quia ut infra dicemus frixio est species coctionis seu digestionis: & ideo isti non bene transtulerunt hoc vocabulum statheusis: & ideo ego credo, quod non habemus vocabulum & verbum appropriatum Latinum, sed debet circumscribi; & ideo debet dici diminuta assatio & imperfecta, & principium ipsius assationis, quia non habemus proprium verbum.'

59. Boccadiferro, *Lectiones...*, p. 216: '& transtulit Vatablus scissile & incissile, & bene iudicio meo transtulit.'

60. Boccadiferro, *Lectiones...*, p. 214: 'ita traduxit pasta, quia dicit, quod Latini carent hoc nomine proprio: & ideo latini transtulerunt, farina aqua subacta.'

Critiques, however, did not end at the simple choice of words; Boccadiferno criticized the translators for not being true to the text and interpolating interpretation that is either incorrect or beyond the literal sense of Aristotle's text⁶¹. This method of translation, however, had defenders as well as critics, as is illustrated by the works of Vallés and Vimercati.

As one might expect, the two commentators who translated *Meteorologica* IV used their commentaries to justify their translations. Vimercati, rejecting methods of translating 'word to word' and even those that 'only render the sense' of the text, wanted his translation to 'explain its sense'⁶². Thus his commentary on the *Meteorologica* is in part a justification of his translation. Accordingly his introduction promises that the commentary will note and correct the negligence and errors of other translations⁶³. Despite his self-professed care in translating, Vimercati translated the technical terms of *Meteorologica* IV with hesitancy. He appeared almost apologetic for his translations of μόλυνσις and στάτευσις as *imperfecta elixatio* and *imperfecta assatio* respectively, writing that 'we translate these words in this way because more appropriate words do not exist'⁶⁴. As a result he left these two terms in the Greek in his discussions of the species of concoction and inconcoction, in addition to providing Latin translations. Στάτευσις remained particularly problematic, and we are

61. See Boccadiferno, *Lectiones...*, p. 219: 'Exhabilia autem &c. hic sumitur, qualiter expositio Vatabli, & Alcyonii non est ad verba Aristotelis'; p. 230: 'quia Alexander dicit, sicut lignum, idest lignum viride; & sic Alcyonius transtulit lignum viride, licet hoc non sit in textu'; p. 68: '& male transtulit Vatablus, & male exposuit: sed intelligitur factum, idest actu tale ex potentia tale; & prius erat nutrimentum potentia caro, & postea factum est actu tale in fine conctionis legi verba (...) enim sic debet legi lettera.'

62. Vimercati, *Commentarii...*, preface, fol. A iiii[r]: 'In conversione id contendimus, ut nec verbum verbo, veteris interpretis more, nec verborum ulla habita ratione, quod plerique alii faciunt, sensum solum rediremus, sed media via ingressi, ita sensum explicaremus...' On Vimercati's method of translation used in his commentary on the *Physics* see: Schmitt, *Aristotle...*, p. 79-81. For Vimercati's biography and works see: Gilbert N., 'Francesco Vimercato of Milan: a bio-bibliography', *Studies in the Renaissance* 12 (1965), p. 188-217.

63. Vimercati, *Commentarii...*, fol. preface A iiii[r]: 'Complura loca a caeteris interpretibus perperam & oscitanter conversa, & emendata, fideliter, ni fallimur, reddidimus: illorumque errores interdum in Commentariis notavimus, alios ex conversione nostra, & verbis Graecis, quae singulis particulis ascribenda curavimus, diligentiae vestrae advertendos reliquimus, ne illos reprehendendi gratia novam nos conversionem edidisse videremur.'

64. Vimercati, *Commentarii...*, vol. 4, p. 23: 'Concoctionis veluti species sunt, maturitas, elixatio, assatio: inconcoctionis, cruditas, μόλυνσις, id est, imperfecta elixatio, & στάτευσις, id est, imperfecta assatio. Ita enim vocabula haec reddimus, cum magis propria non suppetant.' He repeats this claim with respect to μόλυνσις on vol. 4, p. 44: 'Eo itaque vocabulo appellantur, quod aliud commodius non habeatur, quo affectio illa exprimitur.'

presented with three alternative translations: *imperfecta assatio*, *prava assatio*, and *tostio*. Vimercati traced his inability to find the precise Latin words back to Aristotle himself, because he claimed that these processes lack proper names⁶⁵. In these cases, the meagerness of Latin mimics the meagerness of Aristotle's Greek.

In contrast to Vimercati's promotion of his translation that sought to give a better interpretation of the text, Vallés promoted his translation by openly attacking the interpolations of Alcionio. In Vallés' view, Alcionio overstepped his role as translator by rearranging the text and adding words that are not in the Greek version⁶⁶. While in some instances Alcionio's editorializing expressed the essence of Aristotle's words, in other instances it alters the sense of the passage or is just plain wrong according to Vallés. For example, Alcionio, apparently unsatisfied with the sense of the text, translated ἐξίοντος τοῦ ὑγροῦ as 'per egressum caloris'⁶⁷. Vallés, who rendered these words with the much more literal phrase 'exeunte humido', noted that Alcionio's translation 'reads not without a large corruption of the sense of the words'⁶⁸. Less egregious alterations did not escape Vallés' scrutiny. For example, he noted that Alcionio has inserted the word *calefacta* to his translation of the sentence that reads: ὕδωρ γὰρ οὐ παχύνεται μόνον τῶν ὑγρῶν ('water is the only wet substance that does not thicken'), so that his translation reads 'aqua enim rerum humidarum sola calefacta non crassescit'⁶⁹. Vallés' translation more closely follows the Greek text, reading: 'aqua enim sola humidarum non crassescit'. In his eyes, Alcionio's addition interpreted rather than translated the text. The addition of the word *calefacta* suggests that while water does not thicken when heated, it does solidify under the influence of the cold⁷⁰. Thus, Vallés, following a method of translation contrary to Vimercati's, criticized

65. Vimercati, *Commentarii...*, vol. 4, p. 48: 'Id cum fit, concoctionis quamdam inaequalitatem sequi necesse est, quam inconcoctionem Aristoteles nomine magis vacare asserit, quam inconcoctionem elixationi oppositam, quam dixit μόλυνσιν nominari. Similem tamen esse στάτευσις, hoc est pravae assationi, aut etiam fortassis tostioni.'

66. Vallés, *In IV. librum...*, fol. 9v: 'quod fortassis intelligens Alcyonius, qui mihi videtur pro suo arbitratu verba Arist. perunque transferre, reddidit, & quodvis simile; sensum exprimens, tamen addens dictionem illam similem, quae in graeco codice non est. quare ego malo illam explicando suppleri, quam leggendo addi.'

67. 383a20; *Aristoteles Stagiritae Opera* [Alcionio's translation] (Lyon, 1578) vol. 1, p. 769: 'Et certe mollia, eaque non liquida per egressum caloris durescunt...'

68. Vallés, *In IV. librum...*, fol. 43r: '(ubi, non sine magna sensus verborum corruptione legit Alcyonius, per egressum caloris).'

69. 380a34; For Alcionio's translation see: *Aristoteles Stagiritae Opera* (Lyon, 1578), vol. 1, p. 761.

70. If this was Alcionio's intent it does not appear justified as Aristotle repeats this claim when explaining that water solidifies but does not thicken. Cf. 383a6-13.

Alcionio for not faithfully translating the actual words and thereby giving the text an altered meaning⁷¹. According to Vallés, the weakness of Alcionio's translation comes not only from his loose method, but also a lack of philological sophistication: Alcionio did not follow satisfactory manuscripts⁷². The errors of translation that Vallés called an impediment to natural philosophy, in his *Controversiae medicinae*, were not confined to medieval translations and mar the works of *recentiores* as well⁷³.

Pomponazzi, Boccadiferro's teacher, even though he shared concerns over Alcionio's translation, dismissed excessive preoccupation with translation as being beneath the concerns of philosophy. Nevertheless, in his *Dubitaciones in quartum Meteorologicorum*, he noted that *tostio* is not a good translation of *στάτευσις* because it does not denote a superabundance of heat. Pomponazzi, however, cut short his discussion, arguing that this topic is not suitable to philosophers but rather 'pertains to the Grammarians. Therefore I leave it to them'⁷⁴. Pomponazzi's disdain for discussions of grammar and vocabulary is indicative of the limited success of the humanist translation movement. Among most university lecturers and commentators on Aristotle, problems of understanding natural philosophy were not limited to rendering texts into Latin. Even those dedicated to translation and grammatical issues, such as Périon, Vimercati, and Boccadiferro, defied Bruni's denial of the poverty of Latin, and confessed the impossibility of finding accurate Latin terms that correspond to Aristotle's Greek. Thus, uncovering Aristotle's intent and its relation to the truth involved more than translation, and William of Moerbeke's translation was for the most part a sufficient textual foundation for explorations of natural philosophy that utilized logic, dialectic, and the consideration of experience, rather than considerations of philology and prose style⁷⁵.

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71. Vallés, *In IV librum...*, fol. 25r: 'ut illinc constet, male ac superflue, Alcyonium interposuisse dictionem calefacta, ita legentem aqua humidarum rerum sola calefacta non crassescit, praeterquam quod verba auctoris non reddidit fideliter, sensum etiam alio transtulit.'

72. Vallés, *In IV librum...*, fol. 21r: 'Locus primus huius dictionis invenitur in aliquibus codicibus mutilis, quos sequutus est Alcyonius, non sine magna sententiae corruptione, ita dicens. Natura quam designamus (dimissis prioribus verbis) ut forma & essentia est; concoctionis enim finis nonnullis in rebus ad substratam quandam formam est. Quae verba post ea, qua antea scripserat, non video, quid pulchrum possint significare. melius itaque multo habetur in codice Aldino, quem sum secutus.'

73. Vallés F., *Controversiae medicae* (Alcalá, 1556), p. 2.

74. Pomponazzi, *Dubitaciones...*, fol. 22v: 'Hoc pertinet ad Gramaticos. ideo illis relinquo'.

75. I am grateful for comments and corrections received from Gudrun Vuillemin-Diem, Katharine Park, William Newman, John Murdoch, John Monfasani, and an anonymous reader.

Table 1: Medieval Terminology

Translation	πέπανσις	ἔψησις	ὄπτησις	ὠμότης	μόλυνσις	στάτευσις
<i>Vetus</i>	repansis	epsesis	optesis	omotes	molinsis	Stateusis
<i>Nova</i>	repansis	hepsesis	optesis	omotes	molynsis	Stateusis
<i>Alexander</i>	repansis	hepsesis	optesis	omotes	molynsis	Stateusis
<i>Averroes</i>	maturatio	[wanting]	assatio	cruditas	[wanting]	[wanting]

Table 2: Renaissance Terminology

Author	πέπανσις	ἔψησις	ὄπτησις	ὠμότης	μόλυνσις	στάτευσις	Date of 1 st ed.	# of edd.
Palmieri	maturitas	elissatio	assatio	cruditas	elissatio	subassatio	ms.	c. 1460
Vatable	maturatio	elixatio	assatio	cruditas	inquinatio	excaldatio	1518	36
Périor*	maturatio	elixatio	assatio	cruditas	non plena elixatio	non plena assatio	1552	26
Alcionio	maturitas	elixatio	assatio	immaturitas	leviscoctio	frixio aut tostio	1521	10
Vallés	maturitas	elixatio	assatio	immaturitas	levis elixatio	levis assatio	1558	3
Vimercati*	maturatio	elixatio	assatio	cruditas	imperfecta elixatio	imperfecta assatio	1556	4
Sepúlveda	maturitas	elixatio	assatio	cruditas	inquinatio	concalfactio	1532	1
Camozzi	maturatio	elixatio	assatio	cruditas	pollutio	statheusis	1551	1
Piccolomini	maturatio	elixatio	assatio	cruditas	inquinatio	tostio	1540	4
Gesner*	maturatio	elixatio	assatio	acerbitas	imperfecta elixatio	imperfecta assatio	1586	1

* Périor includes Greek words for all except πέπανσις and ὠμότης. Vimercati included Greek words for μόλυνσις and στάτευσις in addition to the Latin terms. Gesner included all of the Greek terms, his work is a paraphrase rather than a translation.

All Renaissance translators translated πέψησις and ἀπεψία as *concoctio* and *inconcoctio* respectively, save Palmieri, who retained *digestio* and *indigestio*, and Alcionio, who rendered them as *concoctio* and *cruditas*. In Piccolomini's translation of Alexander that retains *digestio* and *indigestio*. Camozzi's translations of Olympiodorus used *digestio* as well as *concoctio*.

Appendix: Incipits to translations of *Meteorologica IV*

a. Aristotle's Text (ed. F.H. Fobes (Cambridge, Mass., 1919)):

[378b10-20] Ἐπεὶ δὲ τέτταρα αἴτια διώρισται τῶν στοιχείων, τούτων δὲ κατὰ συζυγίας καὶ τὰ στοιχεῖα τέτταρα συμβέβηκεν εἶναι, ὧν τὰ μὲν δύο ποιητικά, τὸ θερμὸν καὶ τὸ ψυχρὸν, τὰ δὲ δύο παθητικά, τὸ ξηρὸν καὶ τὸ ὑγρὸν· ἢ πίστις τούτων ἐκ τῆς ἐπαγωγῆς· φαίνεται γὰρ ἐν πᾶσιν ἢ μὲν θερμότης καὶ ψυχρότης ὀρίζουσαι καὶ συμφύουσαι καὶ μεταβάλλουσαι τὰ θ' ὁμογενῆ καὶ τὰ μὴ ὁμογενῆ καὶ ὑγραίνουσαι καὶ ξηραίνουσαι καὶ σκληρύνουσαι καὶ μαλάττουσαι, τὰ δὲ ξηρὰ καὶ ὑγρὰ καὶ τᾶλλα τὰ εἰρημέα πάθη πάσχοντα αὐτὰ τε καθ' αὐτὰ καὶ ὅσα κοινὰ ἐξ ἀμφοῖν σώματα συνέστηκεν.

b. Medieval

Corpus Vetustius

Ms. Venezia, Biblioteca Marciana, Lat. VI. 47 (3464), fol. 184r:

Quoniam autem quatuor cause determinate sunt elementorum harum autem iuxta coniugationes et elementa quatuor contingit esse. Quarum sane due sunt active calidum et frigidum; due passive aridum et humidum. fides utique horum ex inductione. apparet namque in universis caliditas et frigiditas terminantes et permutantes unigena et non unigena. et humectantes et arefacientes nec non indurantes ac mollificantes. arida namque et humida formata. et quas dixit tollerantia passiones ipsaque secundum se ipsam et quaecumque communia ex ambobus corpora constant.

Fragmentum Parisinum of Gerard of Cremona (apud Schoonheim, p. 144):

Capita primitiva elementorum quattuor, sicut elementa composita, ex quibus sunt duo elementa agentia et duo elementa patientia. Verum duo elementa agentia sunt caliditas et frigiditas, et duo quidem elementa patientia sunt umiditas et siccitas. Illius vero demonstratio est quod caliditas et frigiditas sunt distinguentes res et componentes eas et mutantes generata convenientia in genere et indurantes et umectantes. Umiditas autem et siccitas patientes sunt per se ipsas, et patiuntur propter eas omnia corpora composita ex eis.

Nova translatio from [Ps.-] Thomas Aquinas, *In libros Aristotelis Meteorologicorum expositio*, ed. R.M. Spiazzi (Rome, 1952), p. 645:

Quoniam autem quatuor causae determinatae sunt elementorum: harum autem secundum coniugationes et elementa quatuor accidit esse: quarum

duae quidem factivae, calidum et frigidum, duae autem passivae siccum et humidum. Fides autem horum est ex inductione. Videntur enim in omnibus caliditas quidem et frigiditas terminantes et copulantes et permutantes, et homogenea et non homogenea, et humectantes et exsiccantes, et indurantes et mollificantes: sicca autem et humida terminata, et alias dictas passiones patientia, ipsaque secundum se et quaecumque communia ex ambobus corpora constant.

Translation associated with Averroes, *In quartum librum Meteorologicorum* (Venice, 1562-1574), fol. 467v:

Postquam divisum est quod principia elementorum, quae sunt secundum modum formae, sunt quatuor sicut est numerus elementorum, ex quibus componuntur: & duo sunt activa, & sunt calor, & frigus: & duo passiva, & sunt humidum, & siccum. Et signum huius est, quod calor, & frigus sunt ambo, quae componuntur res ad invicem & admiscent, quousque res nova generetur: & universaliter istae duae potentiae, & virtutes sunt, quae mutant creaturas convententes in genere unam in aliam. Sed siccitas, & humiditas sunt passiva in se ipsis istarum duarum qualitatum, & per illas duas patiuntur omnia composita et signum huius est. quod etiam Antiqui definiunt cum istis distinctionibus illas, & nominaverunt illas nominibus istorum: & dixerunt quod calor, & frigus erant virtutes....

Alexander of Aphrodisias, translated by William of Moerbeke. From: *Commentaire sur Les Météores d'Aristote*, ed. A.J. Smet (Leuven, 1968), p. 281:

Quoniam quattuor sunt causae elementorum determinatae... [282] videntur in omnibus caliditas et frigiditas terminantes et copulantes et permutantes...[283] congenea...

c. Renaissance

Mattia Palmieri, *Meteorologica*, ms. Milano, Biblioteca Ambrosiana, L 40 sup (xv), fol. 92r:

Cum vero quatuor iam elementorum causae quae secundum coniunctionem, atque elementa. Quatuor esse continget, diffinitae sint: quarum duae quidem activae, calidum nempe & frigidum: quemadmodum ex inductione ostenditur. Nam in cunctis quidem caliditas, atque frigiditas ea quae aut eiusdem generis sunt, aut partibus differant circumscribere coniungere et permutari videntur humectari quaque illis et exiccari: dura fieri ac mollia reddi apparent. Quae autem sicca humidaque determinata sunt:

tum et alia, quae eiusmodi pati dicuntur ipsa per se: tum quaecumque ex ambobus communia corpora constant.

Joachim Périon, *Aristotelis Stagiritae Meteorologicorum liber quartus* (Wittenberg, 1585), [A2]:

[The version amended by Nicolaus Grouchy is essentially identical. Cf. Aristotelis Stagiritae tripartitae philosophiae opera omnia absolutissima, ex optimis quibusque, maxime novis interpretibus collecta, aliquot libris aucta, recognita, argumetis valde bonis in singulos libros & capita, multis... (Basel, 1563)]

Quoniam quatuor causae elementorum expositae sunt, ex earumque copulationibus quatuor etiam elementa consecuta sunt, quae quidem earum faciendi, calor & frigus, reliquae duae patiendi vim habent: idque inductione doceri potest. Videntur enim in omnibus rebus calor & frigus tum determinare, tum copulare, tum mutare, tum humida reddere, tum exiccare, tum durare, tum mollire, tam ea, quae eiusdem generis sunt, quam ea quae diversi: siccitatem vero & humorem determinari, aliasque affectione, s [sic] quae expositae sunt accipere [A3] tum ipsas per se, tum corpora, quae ex utraque earum constant....

Pietro Alcionio, *Aristotelis Stagiritae Opera* (Lyon, 1578), vol. 1, p. 761:

Cum quatuor elementorum causae allatae iam sint, pro earum certe paribus accidit quatuor etiam enumerari elementa. illarum quidem duae agentes habentur, calor, & frigus: duae patibiles, siccitas, & humor. Horum autem omnium fidem ipsa inductio facere potest: nam calor & frigus in rebus naturae omnibus videntur figurare, suisque finibus describere, coagmentare: & quae tum eodem similique genere, tum dissimili sunt, mutare, humectare, arefacere, obdurare, & emollire, siccitas autem & humor tum illa separatim, tum quae communiter ex illis compacta sunt, videntur finibus describi, & alias a calore & frigore contrahere affectiones....

Giovanni de Camozzi, *In Meteora Aristotelis Commentarii* (Venice, 1551), fol. 76r:

Quoniam quatuor elementorum causae decretae sunt... [76v] Quia duae sunt causae efficientes calidum videlicet & frigidum. Duae autem materiales, siccum videlicet & humidum...

François Vatable in *Operum Aristotelis Stagiritae philosophorum omnium longe principis, nova editio, Graece & Latine*, ed. Isaac Casaubon (Lyon, 1590), vol. 2, p. 359:

Cum autem elementorum causas quatuor esse a nobis definitum sit, & iuxta coniugationes harum ipsas quoque elementa esse quatuor acciderit,

e quibus duae quidem, calor inquam & frigus, agere solent: duae vero ariditas, videlicet & humiditas, pati: (cuius rei fides ex inductione sumi potest.) nam in omnibus calor & frigus, tam quae unius, quam quae diversi sunt generis definire, copulare, transmutare, humectare, arefacere, indurare, & mollificare videntur: arida vero & humida, tum ipsa per se, tum communia corpora quaecunque constant ex utrisque, definiri, & caeteros quos diximus affectus pati. praeterea & hoc quoque rationibus ipsis quibus eorum naturas definimus, perspicuum existit..

Francesco Vimercati, *In quatuor libros Aristotelis Meteorologicorum commentarii et eorundem librorum e graeco in latinum per eundem conversio* (Paris, 1556), fol. 163r:

Quoniam autem elementorum causae quatuor sunt constitutae, ex quarum coniugationibus evenit, ut quatuor quoque existerent elementa, duae illarum efficiendi vim habent, calor & frigus, duae vero patiendi, siccitas & humor. id quod inductione probatur. Calor enim & frigus, tum ea, quae eiusdem, tum quae diversi generis sunt, determinare, coniungere, immutare, humectare, exiccare, durare, emollire, in omnibus videntur. Humida autem & sicca, tum ipsa per se, tum quae communiter ex utrisque concreta sunt corpora terminari, & aliis, quae dictae sunt, qualitatibus affici.

Francisco Vallés, *In quartum librum Meteorologicorum Aristotelis commentaria* (Torino, 1583), p. 4:

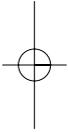
Quandoquidem quatuor elementorum causae expositae iam sunt, atque pro earum coniugiis quatuor etiam elementa esse contingit: illarum quidem duae agentes habentur calidum & frigidum: duae patibiles, siccum & humidum. Horum autem omnium fides ex inductione est. nam calor & frigus in omnibus videntur finire, coniungere, tum quae eodem genere, tum quae diverso sunt, mutare, humectare, exiccare, durare & mollire: sicca autem & humida, cum illa per se, tum quae ex illis ambobus compacta sunt corpora, finibus describi, & alia pathemata dicta pati. Rationibus etiam quibus naturas illorum definire consuevimus, fit manifestum.

Juan Ginés de Sepúlveda, *Opera Aristotelis latina facta* (Paris, 1532), fol. 29r:

Elementorum causa quatuor esse, supra est a nobis definitum. harum enim copulis quatuor existunt elementa, quarum duae sunt affectivae calidum, & frigidum: duae passivae siccum & humidum. quarum rerum



fides non solum inductione fit, cum calor & frigus in cunctis rebus finire, concernere, mutare tum cognata, tum quae diversi generis sunt: ad haec humectare desiccare, durare, atque mollire notentur: sicca vero & humida tum ipsa per se tum corpora communia, quae ex ambobus conflantur, finiri, & caeteras quae memoratae sunt affectiones pati, sed etiam rationibus, quibus ipsorum naturas definimus.



The Renaissance man, a painter, engineer, scientist, inventor and sculptor. Famous for the Mona Lisa, and the Last Supper. ; Used mathematics to organize his paintings.Â What are the causes and effects of the Protestant Reformation? Martin Luther, indulgences, Theses, led to calvinism, there were abuses in the church so they need to reform, protestant took over north. Who was Martin Luther and how did he impact the world? Renaissance Humanism, the Reformation, and the Scientific Revolution all levied challenges towards the preceding intellectual traditions of Medieval Europe, and the Enlightenment would further build upon that influence. Renaissance Humanism carried with it a focus on the individual and on civic engagement within the bounds of temporal life (in contrast to Medieval thought, focused as it was on theological concerns, and on the primacy it placed on one's life in the Church). Meanwhile, the Protestant Reformation and the Scientific Revolution both contained at their heart an attack on tradit...Â Reformers also called for the translation of the Bible into vernacular languages so that laypeople would be (The entire section contains 4 answers and 978 words.)