

# Renaissance Medicine and the Reinterpretation of Aristotle's *Meteorologica*

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## Introduction

The puzzling nature of the fourth book of Aristotle's *Meteorologica* provoked controversy throughout the twentieth century. Even a casual reading reveals that this book only tangentially discusses meteorology. While most commentators of the previous century have noted that *Mete.* IV does not justly hold its place as part of the *Meteorologica*, some interpretations have taken such discussions one step further, and argued against the authenticity of the fourth book, claiming that the supposed atomistic and corpuscular doctrines contained in it show that one of Aristotle's followers, either Strato or Theophrastus, was the true author. Currently accepted opinion has restored Aristotle as the true author, although its placement within the corpus remains a subject for discussion. These discussions are not entirely without precedent. Renaissance commentators frequently concerned themselves with questions of authenticity and order. While no one explicitly questioned the authorship of *Mete.* IV before the twentieth century, the sixteenth and seventeenth centuries witnessed diverse views regarding the book's placement within the corpus, its subject matter, and its general utility.<sup>1</sup> By the early sixteenth century, while there were some dissenters such as Francesco Vimercati, Jacob Schegk, and in the seventeenth century Jesuit Niccolo Cabeo,<sup>2</sup> accepted opinion separated the fourth book from the previous three, maintaining that *Mete.* I-III treats imperfect mixtures while *Mete.* IV's subject is perfect mixtures. Pietro Pomponazzi,

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<sup>1</sup>The idea of the multi-faceted nature of Renaissance Aristotelianism was put forth in: Charles B. Schmitt, *Aristotle and the Renaissance* (Cambridge, MA, 1983).

<sup>2</sup>Jacob Schegk, *In reliquos naturalium Aristotelis libros commentaria plane Philosophica* (Basel, 1550) 394. Cabeo vol. 1, 4; vol. 4, 1.

for example, writing in the 1520's, claimed that *Mete.* IV does not follow the subject matter of the previous three and its actual title should be *De mixtione*.<sup>3</sup> Agostino Nifo agreed with Pomponazzi and entitled the fourth book Περ\_ τ'ν μικτ'ν since the intent of the book is to treat «completed and perfect mixtures.»<sup>4</sup> As a result of this perceived discontinuity between *Mete.* IV and the three preceding books of the *Meteorologica*, commentaries often only treated either the first three or only the fourth book. Examples of commentaries, disputations, and editions which only treat the fourth book are numerous and include, among others, the works of Pietro Pomponazzi, Francisco Vallés, Jacopo Zabarella, and Giordano Bruno.<sup>5</sup> Similarly many works treated only the first three books, and by the end of the sixteenth century the discipline of meteorology was defined by the subjects contained in the first three books of Aristotle's *Mete.*<sup>6</sup> Commentators often understood *Mete.* IV to address the subject

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<sup>3</sup>Pietro Pomponazzi, *Dubitiationes in quartum Meteorologicorum Aristotelis librum* (Venice, 1563) 1v.

<sup>4</sup>«de mistis terminatis, ac perfectis» Agostino Nifo, *In libris Aristotelis Meteorologicis commentaria. Eiusdem generalia Commentaria in Libro de Mistis, qui a veteribus Quartus Meteororum Liber inscribitur. Et iunioribus Meteorologicon dicitur* (Venice, 1551) 122v. First edition published in 1531, cf. Lohr, *Latin Commentaries*, 285. The precise date of the composition of Pomponazzi's work is unknown, but is probably from the first half of the 1520's. Nifo's commentary was written in Salerno in 1523.

<sup>5</sup>Giordano Bruno, *In IV Meteorologicorum libro*, Tocco and Vitelli (eds.), *Opera latine*, III (Florence, 1891) 373-393; Jacopo Zabarella, *Commentarii in Meteora* (Frankfurt, 1602).

<sup>6</sup>See for example Jacobus Amsfordiensis, *Commentarii in libros Metheorum Aristotelis* (Cologne, 1503); Iodocus Willich, *Isagoge in Aristotelis, Alberti Magni, et Pontani meteora, per tres libros digesta* (Frankfurt, 1549); Michael Stanhuf, *Sylvula complectens praecipua Meteororum genera, quae apud Aristotelem & alios Philosophos passim reperiuntur* (Wittenberg, 1554); Henricus Decimator, *Epitome Meteororum, hoc est impressionum aerearum et mirabilium naturae operum...* (Leipzig, 1587); Fortunato Crellio, *De subiecto meteorologiae, hactenus incognito, disputatio* (Heidelberg, 1590); and Wolfgang Meurer, *Commentarii meteorologici* (Leipzig, 1592). Codification of the discipline of meteorology in the seventeenth century is evident in Francisco Resta, *Meteorologia de igneis, aereis, aqueisque corporibus* (Rome, 1644); and Jean Baptiste du Hamel, *De meteoris et fossilibus libri duo* (Paris, 1660); as well as Rene Descartes, *Les*

of «perfect mixtures» while *Mete.* I-III discussed «imperfect mixtures.» There was, however, great diversity in opinions over the relevance of perfect mixtures. Commentators variously saw *Mete.* IV as a treatise on the metaphysics of mixture, a discussion of the powers of the qualities, a handbook for *ars chemica*, or an introduction to physiology for doctors and students of medicine.

Alchemists were among the first to appropriate the doctrines of *Mete.* IV because of its descriptions of matter and homeomerous substances, in addition to the fact that Alfred of Sarashel appended a portion of Avicenna's diatribe against alchemy, the so-called *De mineralibus*, to the Latin translation of the *Meteorologica*. Geber's *Summa perfectionis* and other medieval alchemical works utilized terminology and concepts from *Mete.* IV, and that seventeenth-century alchemists such as Daniel Sennert and Joachim Jungius employed corpuscular interpretations of this book.<sup>7</sup> Accordingly there are discussions of alchemy in medieval treatments of this work,<sup>8</sup> and a seventeenth-century set of disputations is entirely devoted to metals and alchemy in general.<sup>9</sup> Commentators in the early and middle parts of the sixteenth century, however, were far more likely to connect this book to medicine, and in fact one commentator, Vallés wrote a commentary on *Mete.* IV specifically to allow medical doctors and students, intending to show how this book sets the foundation for medicine.

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*Météores* (Leiden, 1637).

<sup>7</sup>William R. Newman, *The «Summa perfectionis» of pseudo-Geber: a Critical Edition, Translation and Study* (Leiden, 1991) 1-56, 143-210; William R. Newman «Corpuscular alchemy and the tradition of Aristotle's *Meteorology*, with special reference to Daniel Sennert,» *International Studies in the Philosophy of Science* 15 (2001) 145-153.

<sup>8</sup>For a medieval discussion see: Themon Judaeus, *Quaestiones super quatuor libros Meteororum compliate per doctissimum philosophii professorem Thimonem* (Paris, 1518) 211v.

<sup>9</sup>Girolamo Trimarchi, *Disputatione in libros Aristotelis Meteororum* (Genoa, 1637) 333-404.

The links between Aristotelian natural philosophy and early modern medicine have been increasingly scrutinized. It is now accepted that anatomical works of Girolamo Fabrici d'Acquapendente straddle the gap between Aristotelianism and novel methods of dissection and observation.<sup>10</sup> Similarly, the anatomical reforms of William Harvey, a student of Fabrici, have been shown to be based on empirical methods as championed by Italian Aristotelians as well as his adherence to the Aristotelian doctrine that the heart is the source of blood.<sup>11</sup> Aristotelian natural philosophers and teachers of medicine shared more than doctrine. They also used similar methods of exposition and textual exegesis. Medieval and Renaissance professors of medicine used commentaries as a means of investigating and explaining medical doctrine thereby forming a coherent medical tradition that derived primarily from Avicenna's *Canon* and selected works of Galen and Hippocrates.<sup>12</sup> By the middle of the sixteenth century the traditional texts subject to commentary expanded to including nearly all of the Galenic and Hippocratic corpuses. Charles B. Schmitt has noted that while Aristotle

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<sup>10</sup>Andrew Cunningham, «Fabricius and the 'Aristotle project' in Anatomical Research at Padua,» in Andrew Wear et al. (eds.) *The Medical renaissance of the sixteenth century* (Cambridge, 1985) 195-222; Loris Premuda and Giorgio Zanchin, «Il pensiero scientifico di Girolamo Fabrici d'Acquapendente,» *Medicina nei secoli* 9 (1997) 109-120.

<sup>11</sup>Don Bates. «*Machina Ex Deo: William Harvey and the Meaning of Instrument.*» *Journal of the History of Ideas* 61 (2000) 577-593; Enrico Berti, «L'aristotelismo padovano e la nascita della medicina sperimentale,» *Medicina nei secoli* 9 (1997) 23-38; Roger French, *William Harvey's Natural Philosophy* (Cambridge, 1994); Franco Alessio, «Motivi harveyani,» in Luigi Olivieri (ed.) *Aristotelismo veneto e scienza moderna* (Padua, 1983) 405-413; Charles B. Schmitt, «William Harvey and Renaissance Aristotelianism,» in Rudolf Schmitz and Gundolf Keil (eds.) *Humanismus und Medizin* (Weinheim: Verlag, 1984) 117-138, reprinted in Charles Webster (ed.), *Reappraisals in Renaissance Thought* (London, 1989); J. Stannard, «Aristotelian Influences and References in Harvey's *De motu locali animalium*,» in R. Tursman (ed.), *Studies in the Philosophy and History of Science: Essays in Honor of Max Fisch* (Lawrence, Kansas, 1970) 122-131; J. S. Wilkie, «Harvey's Immediate Debt to Aristotle and to Galen,» *British Journal for the History of Science* 10 (1963) 103-124; Erna Lesky, «Harvey und Aristoteles,» *Sudhoffs Archiv* 41 (1957) 289-311, 349-78.

<sup>12</sup>Jole Agrimi and Chiara Crisciani, *Edocere Medicos: Medicina scolastica nei secoli XIII-XV* (Naples, 1988) 75-104.

was clearly influential among Renaissance doctors, Aristotelian commentaries, particularly those on the *Physics* show little concern with medical topics.<sup>13</sup> While Schmitt is correct in claiming that commentaries on the *Physics* did not typically treat medical topics, the Renaissance commentary tradition did treat one Aristotelian work as a source for medical theory, namely *Mete.* IV. Francisco Vallés' commentary on *Mete.* IV, first printed in 1558, is the foremost example of a Renaissance commentary that attempted to connect physics to medicine. This commentary, intended specifically for a medical audience, highlights the medical issues and foundations for medicine within *Mete.* IV and shows how these foundations could be applied in practice. Vallés' commentary began a tradition that interpreted *Mete.* IV, particularly the first three chapters as medical work that lasted until the first decades of the seventeenth century.

#### **Aristotle, *Mete.* IV, and Medicine**

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<sup>13</sup>Charles B. Schmitt, «Aristotle among the Physicians,» in Andrew Wear, et al. (eds.) *The Medical renaissance of the sixteenth century* (Cambridge, 1985) 1-15. Reprinted in Charles B. Schmitt, *Reappraisals of Renaissance Thought* (London, 1989).

The first three books of the *Meteorologica* treat what might be called proper meteorology. *Mete.* I- III explain atmospheric phenomena, or in slightly more Aristotelian terms: change in the sub-lunar region. The sub-lunar region is characterized by disorderliness (ἄτακτότερος) relative to the eternal circular motion of the heavenly region.<sup>14</sup> Aristotelian meteorology, not being a predictive science aims to show the causes of meteorological phenomena. While much of Aristotelian natural philosophy privileges final and formal causes, knowledge of meteorological phenomena primarily consists of understanding material causes, as well as efficient causes. The powers of the prime qualities, the hot, the cold, the wet, and the dry, act as the material cause, creating change in the sub-lunar region and participating in the transformation of the four elements: fire, air, water, and earth.<sup>15</sup> The efficient cause of sub-lunar change is the eternal motion of the celestial bodies which drives the transformation and cyclical motions of the four elements.<sup>16</sup> The motion of the celestial bodies gives rise to two exhalations that have continual cyclical motion between the surface of the earth and the uppermost limit of the terrestrial region. The prime qualities define the properties of these two exhalations, one being a vaporous exhalation that is wet and cold, the other a smoky exhalation characterized by its dryness and heat.<sup>17</sup>

*Mete.* IV does not directly address proper meteorology.<sup>18</sup> In this book, Aristotle

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<sup>14</sup>338a26-339a6.

<sup>15</sup>339a11ff.; 339a27-30. Cf. *De generatione et corruptione* 2.10 especially 336b35ff.

<sup>16</sup>339a30-32.

<sup>17</sup>On *Mete.* I-III see Otto Gilbert, *Die meteorologischen Theorien des griechischen Altertums* (Leipzig, 1907) 176-205; Friedrich Solmsen, *Aristotle's System of the Physical World*, (Ithaca, 1960) 393-439; and Cynthia A. Freeland, «Scientific Explanation and Empirical Data in Aristotle's *Meteorology*,» *Oxford Studies in Ancient Philosophy* (1990) 67-102.

<sup>18</sup>Discussions on the content of *Mete.* IV, as opposed to its authenticity, are found in the following literature: Carmela Baffioni, *Il libro IV dei 'Meteorologica' di Aristotele*,

defines the four elements by the prime qualities and identifies these as passive and active and as the causes of generation and corruption. The hot and the cold are active. The wet and the dry are passive.<sup>19</sup> The discussion then moves on to the active operations of the elements and their qualities. The prime qualities are responsible for concoction (πέψις), its incompletions, inconcoction (ὑπέψις); its opposite; or putrefaction (σύνψις) and concoction's species; ripening (πέπανσις), roasting (ὑπέρψις), and boiling (ὑψίσις). Concoction is a broad term and includes such diverse processes as cooking, fermentation of wine, maturation of fruit, and animal digestion.<sup>20</sup> In the following chapters, Aristotle discusses the passive qualities of solid objects. Eighteen different qualities, such as malleability, fissility, flexibility, combustibility and plasticity are explained by differing ratios of the elements and by the arrangement of pores which allow the qualities to penetrate to the interior of a given solid or determine the solid body's structure.<sup>21</sup> The final section of *Mete.* IV discusses the epistemological status of different kinds of bodies by giving a *scala substantiae*. The elements compose homeomerous bodies, substances made up of parts all of which are same, such as flesh, blood, bone, and milk. The homeomerous bodies in turn compose

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(Naples, 1981); H.J. Drossaart-Lulofs, «*To Aristotle: Meteorologica IV. 10.*» *Mnemosyne* 4 (1948) 294-296; Ingemar Düring, «Aristotle's Chemical Treatise: *Meteorologica, Book IV.*» *Göteborgs Hogskolas Arsskrift* L. 50 (1944) 1-112; David Furley, «The Mechanics of *Meteorologica IV: A Prolegomenon to Biology,*» in Paul Moraux and Jürgen Wiesner (eds.) *Zweifelhaftes im Corpus aristotelicum* (Berlin, 1983) 73-93. Reprinted in David Furley, *Cosmic Problems* (Cambridge, 1989) 132-148; Mary Louise Gill, «Material Necessity and *Meteorology IV 12*» in Wolfgang Kullmann and Sabine Föllinger (eds.) *Aristotelische Biologie: Intentionen, Methoden, Ergebnisse* (Stuttgart, 1997) 145-162; Heinz Happ, «Der chemische Traktat des Aristoteles *Meteorologie IV.*» in *Synusia, Festgabe für W. Schadewaldt* (Tübingen, 1965) 289-322. L. Pepe, «A proposito del IV Libro dei *Meteorologica* di Aristotele,» *Atti dell'Accademia di Scienze Morali e Politiche* 89 (1978) 503-523. Hans Strohm, *Aristoteles Meteorologie* (Berlin/Darmstadt, 1970).

<sup>19</sup>4.1, 378b10-379b9.

<sup>20</sup>4.2-4.7.

<sup>21</sup>4.8-4.11.

anhomeomerous bodies, namely organs such as the eye or the liver; and the anhomeomerous bodies in turn compose complete organisms. Levels of knowledge of substances correspond to the levels of composition. The epistemological status of an organism is greater because the formal and final causes are clearer than the lower substances that compose it. A human being is defined according to its species or formal cause; and its final causes, namely reproduction and rationality are equally clear. Similarly, the final cause of an organ such as the liver is more clear than the flesh that composes it; but, just as the final cause of the liver can only be known in relation to the complete organism that depends on the liver for the production of blood, the final cause of flesh that makes the liver is subordinate to the functioning of the liver. The final cause of an element such as fire is least clear, and in fact the elements and homeomerous substances are best understood by examining material rather than final causes.<sup>22</sup>

The Latin West's adoption of Aristotle's *libri naturales* in the twelfth and thirteenth centuries was due in part, at least partially, to the perceived practical uses of these books for medicine.<sup>23</sup> For some of Aristotle's books, such as the specifically biological treatises, the connection between natural philosophy and medicine is clear or even explicit. For example, a passage in the *Parva naturalia* states that inquiries into nature must consider the principles of health and disease, and recommends that doctors start from the principles of natural

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<sup>22</sup>4.12; Mary Louise Gill, «Material Necessity and *Meteorology* IV 12,» 145-161 gives a detailed philosophical discussion of this book.

<sup>23</sup>E.g. Aleksander Birkenmajer, «Le rôle joué par les médecins et les naturalistes dans la réception d'Aristote aux XIIe et XIIIe siècles.» *Études d'histoire des sciences et de la philosophie du moyen âge. Studia Copernicana* I (1970) 1-15; Danielle Jacquart, «Aristotelian Thought at Salerno,» in P. Dronke (ed.), *A History of 12th-century Western Philosophy*, (Cambridge, 1988).



philosophy.<sup>24</sup> The connection between natural philosophy and medicine is not explicitly stated in *Mete.* IV, although some twentieth-century scholarship has suggested that *Mete.* IV reveals Aristotle's debts to Hippocratic concepts.<sup>25</sup>

Even though *Mete.* IV does not directly address medicine *per se*, its themes were relevant to medical studies. The prime qualities and the elements composed out of them were integral to medical studies derived from Greek learning. The powers of the elements and the prime qualities form the subject of many introductory chapters of medical works that were popular in the West as early as the twelfth and thirteenth centuries, such as those found in Hunain ibn Ishaq's (Johannitius) *Isagoge*,<sup>26</sup> Marius' *De elementis*,<sup>27</sup> and Urso of Salerno's *De commixtionibus elementorum libellus* and *De effectibus qualitatum*.<sup>28</sup> The processes of

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<sup>24</sup>436a18ff.;480b21ff. On the reception of these lines in the Renaissance see: Charles B. Schmitt, «Aristotle among the Physicians,» in Wear, A. et al. (eds.) *The Medical renaissance of the sixteenth century* (Cambridge,1985) 1-15. Reprinted in C. B. Schmitt, *Reappraisals of Renaissance Thought* (London, 1989).

<sup>25</sup>E.g. William A. Heidel, «Antecedents of Greek Corpuscular Theories,» *Harvard Studies in Classical Philology* 22 (1911)111-172 especially 162-166; Heinz Happ, «Der chemische Traktat des Aristoteles,» in Hellmut Flashar and Konrad Gaiser (eds.) *Synusia* (Tübingen, 1965) 292-295; James Longrigg, «Elementary Physics in the Lyceum and Stoa,» *Isis* 66 (1975) 211-229; Gad Freudenthal, *Aristotle's Theory of Material Substance* (Oxford, 1995) 169-172.

<sup>26</sup>Mark D. Jordan. «Medicine as Science in the Early Commentaries on 'Johannitius',» *Traditio* 43 (1987) 121-145. Johannitius, *Isagoge ad Tegni Galeni* (Leipzig, 1497), partially translated in Edward Grant (ed.), *A Source Book in Medieval Science* (Cambridge, Massachusetts, 1974) 705-715.

<sup>27</sup>Marius, *De elementis*, Richard C. Dales (ed.) (Berkeley, 1976).

<sup>28</sup>Urso, *De commixtionibus elementorum libellus*, Wolfgang Stürner (ed.) (Stuttgart, 1976); Curt Matthaes, *Der salernitaner Arzt Urso aus der 2. Hälfte des 12. Jahrhunderts und seine beiden Schriften «De effectibus qualitatum» und «De effectibus medicarum,»* (Leipzig, 1918). Matthaes notes that the Salernitans were familiar with the *Meteorologica* and in particular the fourth book. The Salernitans use of the *Meteorologica* and other works of Aristotle is treated in: Pier Morpurgo, *Filosofia della natura nella Scuola salernitana de secolo XII* (Bologna, 1990) 145-155; 197-245; and Paul Oskar Kristeller, *Studi sulla Scuola medica salernitana* (Naples, 1986) 46-47.

*pepsis* and *sepsis*, usually translated into Latin as *digestio* or *concoctio* and *putrefactio* respectively, are important to medical theory as well. A species of concoction is animal digestion, and since Aristotle understands concoction in terms of perfection or completion, his discussion of the maturity or completion of concoction provided medical theorists a definition of healthy digestion. For example, in the early fourteenth century Pietro D'Abano cites *Mete. IV* and Alexander of Aphrodisias' commentary on *Mete. IV* in his discussions of digestion, where he argues that the cold can only cause indigestion.<sup>29</sup> Putrefaction refers to various forms of rot and decay, including those which take place in the body and cause disease. Probably most important was the connections between *Mete. IV* and Avicenna's *Canon*. *Mete. IV*'s description of homeomerous substances, including parts of the human body, such as flesh, bone, sinew, and blood, and their relation with organs and the entire organisms, sets up a framework for a physiological theory from which doctors can understand the hierarchy of the composition of the parts of the body as well as diagnose the temperaments of specific substances. Aristotle's consideration of homeomerous parts and the functions of organs in *Mete. IV* has resonances in his biological works, thereby causing many interpreters of *Mete. IV*, including several contemporary ones, to call *Mete. IV* a prolegomenon to Aristotelian biology.<sup>30</sup> *Mete. IV* treats issues related to biology and human life, and thus falls within the science of medicine as Avicenna partially defines it in his *Canon* as: «a science by which the dispositions of the human body are recognized,» although

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<sup>29</sup>*Conciliator* (Venice, 1520) diff. 62, 89r: «Metha. 4to. frigiditas enim indigestionem. unde Alexander ibidem. Non fit aliique digestio a frigiditate ponitur enim digestio a calidate facta esse.» See also 88v where he writes: «Canon quoque est quarto metharorum quia quaecumque fiunt a frigido a calido dissolvuntur.»

<sup>30</sup>E.g. Gill op. cit.; David Furley, «The Mechanics of *Meteorologica IV*: A Prolegomenon to Biology,» in *Cosmic Problems* (Cambridge, 1989) 132-148.; Luigi Pepe «A proposito del IV libro dei *Meteorologica* di Aristotele,» *Atti dell' Accademia di Scienza Morale e Politica*, (1978) 503-523.

it does not specifically consider the preservation or restoration of health, which are the essential activities of medicine.<sup>31</sup> Furthermore, *Canon* 1.1 defines the elements and the combinations of the prime qualities that result in *complexiones* or *temperatura*.<sup>32</sup> Sixteenth-century commentators on the *Canon* routinely used it to discuss topics common to commentaries on *Mete.* IV, such as the nature of the elements and the composition of mixtures.<sup>33</sup> Not infrequently these commentaries referred to *Mete.* IV as an authority in discussion on the elements, complexions, and temperaments.<sup>34</sup>

### Renaissance Commentaries

An attitude supporting the subalternation of medicine to natural philosophy is typical of commentaries on *Mete.* IV, throughout the middle ages and early Renaissance.<sup>35</sup> The theory of subalternation holds that there is an hierarchy of subjects. Most typically the study of natural philosophy is held to be higher than the subalternate subject of medicine which depends on the principles of philosophy. Thus, a number of commentators maintained that

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<sup>31</sup>Avicenna, *Liber Canonis* (Venice, 1562) Fen 1, Book 1, p. 3: «Dico, quod medicina est scientia, qua humani corporis dispositiones noscuntur....»

<sup>32</sup>Avicenna, *Canon* (Venice, 1562) 3v-6v.

<sup>33</sup>Nancy Siraisi, *Avicenna in Renaissance Italy: The Canon and Medical Teaching in Italian Universities after 1500* (Princeton, 1987) 296-315.

<sup>34</sup>For example Oddo Oddi cites *Mete.* IV or Averroes' commentary on it nine times during his discussion on the elements and complexions. See: *In primam totam fen primi libri Canonis Avicennae dilucidissima et expectatissima Expositio* (Padova, 1612, first published 1575) 65, 70, 73, 77,84,104,120, 124. See also Giambatista Da Monte, *In primi libri Canonis Avicennae primam fen profundissima commentaria.* (Venice, 1558) 133-146..

<sup>35</sup>For an explanation of the varied views on subalternation and the relation among *scientia*, medical theory and practice see: Jole Agrimi and Chiara Crisciani, *Edocere medicos* (Naples, 1988) 21-47. On the widespread belief in the subalternation of medicine to natural philosophy see Charles B. Schmitt, «Aristotle among the Physicians,» in A. Wear, et al. (eds.) *The Medical renaissance of the sixteenth century* (Cambridge,1985) 1-15. Reprinted in Charles B. Schmitt, *Reappraisals of Renaissance Thought* (London, 1989); Jerome J. Bylebyl «The Meaning of *Physica*,» *Osiris* 6 (1990) 16-41.

*Mete.* IV may be useful to medicine, but that it is not the job of the exegete *qua* exegete but of the doctor to extract medical knowledge from this book. This attitude was reflected in the educational system in which Aristotelian natural philosophy, including the *Meteorologica*, was taught to bachelors often as preparation for more advanced medical degrees. Since a medical student heard lectures on medical works after already having been taught natural philosophy, he would be far more likely to apply natural philosophy to his medical learning than to consider medicine as a tool for evaluating natural philosophical texts.

It may not be surprising that Agostino Nifo, even though he was trained as a medical doctor, adhered to the doctrine of subalternation in his commentary on *Mete.* IV, and thus has little to say about medicine.<sup>36</sup> Nifo considers the utility of *Mete.* IV only with respect to natural philosophy in general.<sup>37</sup> By the beginning of the sixteenth century that there was a renewed need to reconcile divisions between philosophy and medicine because of the growing knowledge of Galenic and Hippocratic works that had entered the West for the first time in the fifteenth century. Pietro D'Abano's *Conciliator*, written around the turn of the fourteenth century remained a model for reconciling differences between medical and philosophical doctrines.<sup>38</sup> The explicit comparison of Aristotle's doctrines with medical

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<sup>36</sup>For an analysis of the influences on Nifo's interpretation and of ancient philosophy and the importance of his commentaries see: Edward P. Mahoney, «Plato and Aristotle in the Thought of Agostino Nifo (ca. 1470-1538),» in Giuseppe Roccaro (ed.), *Platonismo e aristotelismo nel Mezzogiorno d'Italia (secc. XIV-XVI)* (Palermo, 1989) 80-102; Andriaan Pattin, «Un grand commentateur d'Aristote: Agostino Nifo,» in Burkhard Mojsisch and Olaf Pluta (eds.), *Historia philosophiae Medii Aevi II* (Amsterdam, 1992) 787-803.

<sup>37</sup>Agostino Nifo, *In libris Meteorologicis* (Venice, 1551).

<sup>38</sup>Partial bibliographies of Renaissance manuscripts and editions of the *Conciliator* are found in Lynn Thorndike, *A History of Magic and Experimental Science II* (New York, 1923) 919-920; Leo Norpoth, «Zur Bio-, Bibliographahie und Wissenschaftslehre des Pietro d'Abano,» *Kykos* (1930) 301; Arnold C. Klebs, *Incunabula scientifica et medica* (Hildesheim, 1963) 250. Norpoth lists 19 editions printed between 1472 and 1595. Thorndike claims that it was printed eight times before 1500 but does not give complete citations. Klebs

theorists began to appear in discussions of the *Meteorologica* in the early sixteenth century.

Before Vallés' commentary was published, several commentators used *Mete.* IV to clarify medical theory. The most prominent were: Pietro Pomponazzi, Lodovico Boccadiferro, Jacob Schegk, and Francesco Vimercati. The attempt to link *Mete.* IV to medical theory in a commentary on *Mete.* IV is first found in Pietro Pomponazzi's work. In his *Dubitaciones in quartum Meteorologicorum* (ca. 1520), Pomponazzi<sup>39</sup> addresses the question why doctors (*medici*) disagree with Aristotle on the issue of digestion.<sup>40</sup> Pomponazzi claims that a common question often arises among doctors because they disagree with Aristotle's words that proclaim: «Whatever bodies undergo digestion, all in the end are thicker.»<sup>41</sup> Pomponazzi rejects Aristotle's dictum for empirical reasons. He cites as empirical evidence that the liquid substance seen in the stomach of dissected cadavers that is similar to

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lists six printings between 1472 and 1496. Both Pomponazzi and Boccadferro regularly use the *Conciliator* as a guide for discussions on the differences between medicine and natural philosophy. See: Pietro Pomponazzi, *Dubitaciones in quartum Meteorologicorum* (Venice, 1563) 20v, 23r, 29v-30r, 34v, 40r, 46v; Lodovico Boccadiferro, *Lectiones in Librum IV Meteororum* (Venice, 1563) 29-30, 93- 94, 124, 165, 180, 190, 203, 204.

<sup>39</sup>There is much scholarship over Pomponazzi's position on the immortality of the soul and his methodology, such as the following seminal works: Bruno Nardi, *Studi su Pietro Pomponazzi* (Florence, 1965); Antonino Poppi, *Saggi sul pensiero inedito di Pietro Pomponazzi*, (Padua, 1970); John Herman Randall, *The School of Padua* (Padua, 1961) respectively. For a study on Pomponazzi's meteorology and its relation to his psychology see: Franco Graiff, «I prodigi e l'astrologia nei commenti di Pietro Pomponazzi al *De Caelo*, alla *Meteora*, e al *De generatione*,» *Medioevo* (1976) 331-361. This work treats Pomponazzi's unprinted *Expositio super libros Metheorum* and not the *Dubitaciones*..

<sup>40</sup>Pietro Pomponazzi, *Dubitaciones in quartum Meteorologicorum Aristotelis librum* (Venice, 1563). The date of this work is uncertain. His unpublished *Expositio in IV libris Meteororum* dates from the first half of the 1520's and thus was one of Pomponazzi's final works before his death in 1525 see Charles Lohr, *Latin Aristotle Commentaries*, 347-362; Bruno Nardi, «Corsi inediti di P. Pomponazzi,» in *Studi su Pietro Pomponazzi* (Florence, 1965) 83-84.

<sup>41</sup>«Aliud dubium. Quoniam dixit Aristoteles in principio huius cap. quod ea, quae digeruntur, omnia in fine fiunt grossiora,» 28v. This is a paraphrase of 380a23-25. See also 380a4-6.

food but is far more thin and liquid (*longe subtilior & magis liquidus*) than undigested food. Since this partially digested food is thinner than it was before digestion, Pomponazzi concludes that *digestio* is a process that acts by thinning (*ergo digestio procedit subtiliando*).<sup>42</sup>

Pomponazzi did not claim to be the first to dispute Aristotle's theory of digestion. He claims that it is in fact common within medical theory to explain digestion through thinning rather than thickening. Pomponazzi notes that both Avicenna and Galen had held this view and as a result the topic of the nature of digestion has been discussed by many more recent medical doctors-- including the fifteenth-century Ugo Benzi.<sup>43</sup> Pomponazzi took philosophers to task for ignoring this issue and writes that while numerous doctors have addressed this issue and found the solution to the question, no philosophers have examined the question except John Buridan.<sup>44</sup> Discussions on digestion held by medical theorists were far from perfect according to Pomponazzi. Ugo complicated the issue by distinguishing between healthy (*iuvativo*) and harmful (*nocitivo*) forms of digestion. Ugo did not invent these terms as they appear in earlier medical literature including Pietro D'Abano's *Conciliator*.<sup>45</sup> Healthy digestion retains what has been digested because its subject nourishes the body, while harmful digestion is the process the body uses to drive toxic substances from the body. Harmful digestion is not harmful to the body but rather restores health by

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<sup>42</sup>Pomponazzi, *Dubitaciones in quartum Meteorologicorum*, 29r.

<sup>43</sup>On Pomponazzi's debt to and influence on medical studies see Giancarlo Zanier, *Ricerche sulla diffusione e fortuna del «De incantationibus» di Pomponazzi* (Florence, 1975) 7-12, 50-72; Nancy Siraisi, *The Clock and the Mirror* (Princeton, 1997) 10.

<sup>44</sup>*Dubitaciones in quartum Meteorologicorum*, 29r; Pomponazzi does not give a precise reference to Buridan. For a very brief discussion of this issue see: Buridan's *Expositio libri Meteororum*, Vat. lat. 2162 (XIV) f. 104r.

<sup>45</sup>*Conciliator* (Venice, 1520) 89r.

eliminating harmful substances. When the human body is unable to expel noxious humors it changes them through digestion into a product which the body can expel. Harmful digestion proceeds by means of either thickening what is too thin or by thinning what is too thick, thus turning what was «inobedient» to expulsion into a new «obedient» substance that the body can easily reject.<sup>46</sup> Pomponazzi, while appreciative of Ugo's detailed consideration of digestion as opposed to the philosophers who are silent on the subject, notes that Ugo's treatment of digestion is inaccurate. His inaccuracy is especially unfortunate since Ugo attributes his views to Aristotle despite the fact that Aristotle states that all forms of digestion are through thickening and makes no distinction between healthy and harmful digestion. Ugo's error in textual analysis of Aristotle, according to Pomponazzi, results from the methods of doctors, even unnamed contemporaries to Pomponazzi (*immo nostris temporibus*). Medical theorists do not examine Aristotle's texts themselves, but rather rely on works derivative of Aristotle's writings. He writes: «The texts of Aristotle are not read but only texts of the Questioners (*Quaestionarii*),» of Aristotle's text.<sup>47</sup> Since the primary meaning of *quaestionarius* is a torturer or executioner, Pomponazzi's pun suggests that the medieval form of disputation twists and destroys Aristotle's actual intent. Pomponazzi's method of analyzing Aristotle's text as found in his *Dubitationes* is very concerned with textual problems and resolving or exploiting contradictions within Aristotle's text itself as opposed to the methods of many fifteenth-century Aristotelians who used the texts as bases

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<sup>46</sup>Ugo addresses the question of whether all forms of digestion proceed by thickening in: *Expositio in primam et secundam fen primi Canonis Avicenne cum questionibus eiusdem* (Venice, 1498) 56r-56v.

<sup>47</sup>*Dubitationes in quartum Meteorologicorum*, 29v: «non legebantur textus Aristotelis, sed solum Quaestionarii....»

for their own theories not found in Aristotle's work such as the latitude of forms.<sup>48</sup>

According to Pomponazzi, doctors have some advantages over philosophers: their seminal texts, such as Galen's and Avicenna's writings, lead them to consider the question of whether digestion really thickens, and practices such as dissection provide evidence, such as the fact that not all digestion proceeds by thickening, that Aristotle might in fact be wrong, but their use of Aristotle's texts themselves is deficient and can lead them astray. Pomponazzi's critique of Ugo's textual methods is unfair and perhaps typical of humanist attacks on medievals. Ugo was undoubtedly familiar with at least some of Aristotle's texts and was in fact the author of a paraphrase of the *Parva naturalia* that is relatively faithful to the text itself.<sup>49</sup>

Although Pomponazzi considers medical writings and uses them to critique Aristotle, his work neither revolutionized the role of medical theory in the interpretation of Aristotelian meteorology nor changed the intellectual position of medicine with respect to natural philosophy. Medicine remained subalternated to philosophy. Lodovico Boccadiferro (1482-1545), who probably was a student of Pomponazzi,<sup>50</sup> maintains a sharp division between medicine and natural philosophy in his commentary on *Mete. IV*, which was published

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<sup>48</sup>For Pomponazzi's rejection of the methods and opinions of his fifteenth-century predecessors and his adherence to certain aspects of scholasticism, see: Antonino Poppi, *Introduzione all'aristotelismo padovano* (Padua, 1970); Francesco Paolo Raimondi, «Il Pomponazzi e la tradizione calcolatoria in Italia,» *Bolletino di Storia della Filosofia* 11 (1993/95) 53-94; Curtis Wilson, «Pomponazzi's Criticism of Calculator,» *Isis* 44 (1953) 355-362. On Pomponazzi's method of writing disputations see: Brian Lawn, *The Rise and Decline of the Scholastic 'Quaestio Disputata'* (Leiden, 1993) 88-91.

<sup>49</sup>Dean Putnam Lockwood, *Ugo Benzi: Medieval Philosopher and Physician 1376-1439* (Chicago, 1951) 33-34; Ugo Benzi, *Scriptum de somno et vigilia*, Gianfranco Fioravanti and Antonella Idato (eds.), (Siena, 1991).

<sup>50</sup>For Boccadiferro's dates and writings see: Charles H. Lohr, *Latin Aristotle Commentaries*, 57; Charles H. Lohr, «The Aristotle commentaries of Ludovicus Buccaferrea,» *Nouvelles de la république des lettres*, 1984 (1) 107-118.



posthumously in 1563. According to Boccadiferro, the utility of *Mete. IV* is bipartite. Citing a Robert Grosseteste's distinction found in his commentary on Aristotle's *Posterior Analytics*,<sup>51</sup> Boccadiferro argues that *Mete. IV* possesses two different levels of utility which correspond to its essential and accidental qualities. According to Boccadiferro, *Mete. IV* possesses a twofold essential utility, one of which is equivalent to the utility of natural philosophy as a whole, that is to provide knowledge of causation, the other is to give the knowledge of perfect mixtures in general. The accidental utility, however, results from the fact that medical doctors often draw material from *Mete. IV*.<sup>52</sup> For Boccadiferro, the judgements of doctors remained secondary to those of philosophers. Nevertheless, medical doctors have considered certain subjects in more depth than philosophers have and therefore can present useful evidence for understanding Aristotle.<sup>53</sup> The evidence from medical writings, however, should be considered with care as their goal is not to reveal accurate

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<sup>51</sup>For Grosseteste the essential utility of the *Posterior Analytics* is the truth of syllogisms. The sciences of mathematics and mechanics are subalternated to logic because they lack its perfection. Pietro Rossi (ed.) *Commentarius in Posteriorum Analyticorum libros* (Florence, 1981) 1.1, 93-98.

<sup>52</sup>Lodovico Boccadiferro, *Lectiones in Librum IV Meteororum* (Venice, 1563) 8: «Tertia dubitatio principalis est de utilitate huius libri: dico quod utilitas huius libri est duplex, una essentialis, & alia accidentalis. essentialis utilitas etiam est duplex, & una dico quod est eadem cum utilitate, quae est totius philosophiae naturalis, quia est pars naturalis philosophiae, & utilitas partis est eadem cum utilitate totius. quae autem sit utilitas naturalis philosophiae, non repeto, quia alias dictum fuit. secunda essentialis & principalis huius libri est generalis cognitio mixtorum perfectorum simularium in universali; accidentalis etiam utilitas est multiplex & multorum. Quia est utilis philosopho, & est utilis medico, quia agitur de concoctione & inconcoctione, & coagulatione, & putrefactione: quorum scientia est etiam utilis [9] medico, quia multa hauriunt medici ex isto libro, & sic etiam est utilis medico valde.»

<sup>53</sup>Boccadiferro, *Lectiones in Librum IV Meteororum* (Venice, 1563) 47: «Quo vero ad difficultates difficiles, quas tractant medici, recurre ad medicos, quia philosophi pauca dicunt de ista putredine & de generatione: sed medici de his dicunt multa, & plures condiciones addunt descriptioni Aristotelis, & ideo ad eos vos remitto....»

interpretations of Aristotle, and thus only possess a limited utility for natural philosophy.<sup>54</sup>

The consideration of medical theory as a tool of interpreting *Mete.* IV was not confined to sixteenth-century Italy. Such consideration crossed both geographical and confessional boundaries. Jacob Schegk, a doctor and natural philosopher based in Tübingen, wrote a detailed commentary on all of Aristotle's natural philosophical writings. Schegk's mixes his knowledge of Greek medical writings with his interpretation of Aristotle. He makes frequent references to Galenic and Hippocratic works in his commentary on the *Meteorologica* in the *In reliquos Aristotelis libros commentaria plane Philosophica*, first published in 1550. Nevertheless, medicine remains subalternated to philosophy. Despite the fact that Hippocrates and Galen concerned themselves with philosophy, medicine does not contemplate truth but only the accidental qualities of matter which are useful in producing proper action.<sup>55</sup> For Schegk, the purpose of natural philosophy or *physiologia* as he calls it is to show the works of «the first and principle cause, namely God.»<sup>56</sup> While Schegk's

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<sup>54</sup>For example Tommaso del Garbo and Gentile da Foligno's treatment of putrefaction provides an unsatisfactory interpretation of Aristotle's theory of concoction. See: *Lectiones in Librum IV Meteororum* (Venice, 1563) 127: «...& haec dicunt Gentilis & Thomas de Garbo. Sed, domini, haec opinio implicatur sibi, & cum hoc, quod non exponit intentionem Aristotelis, contradicit etiam Aristoteli, & extorquet verba eius.....». Furthermore, Boccadiferro agrees with Pomponazzi that Ugo's treatment of concoction does not adequately interpret Aristotle's words. See p. 61: «Sed hoc, quod dicit Ugo, non satisfacit verbis Aristotelis...»

<sup>55</sup>*In octo Physicorum, sive de auditione physica libros Aristotelis, Commentaria.* (Basel, 1546) α3r: «Hippocrates & Galenus artis medicae principes, per omnem vitam philosophiae operam dederunt, & colendum praeceperunt etiam,» [α5r]: «quietiam medica ars & professio, in qua bene conicere summa artis esse perfectio iudicatur: hac enim solertia doctos et exercitatos ab indoctis & imperitis discernimus. nam in hac arte, ut ait Hippocrates, τ\_κριβ\_ς\_λιγάκις\_στ\_v\_δε\_v. denique παχὺλ'ς, ut Aristotelis verbo utar, contemplari & cognoscere verum, omnium est harum professionum atque artium, in quibus non ipsae per se considerantur res sed, rerum accidentia, quae ipsis propter materiam accidunt, quae industria cognitionis artium est propria, & prudentiae in rebus gerendis.» The reference to Hippocrates is from *VetMed* 9.15, and to Aristotle is from *EN* 1094b20.

<sup>56</sup>*In reliquos naturalium Aristotelis libros commentaria, plane Philosophica* (Basel,

commentary on the fourth book of the *Meteorologica* takes into consideration all sorts of medical issues and views of Galen and Hippocrates, he does not discuss the utility of *Mete.* IV. Schegk's reluctance to discuss the utility of *Mete.* IV may arise from his previous consideration of the utility of natural philosophy in general, but it is not surprising considering his treatment of earlier commentators. Schegk notes that he has been preceded by a large number of Greek, Arabic, and Latin commentators, but he does not use their views either to frame his discussion of the text or as examples of interpretations to be adopted or rejected.<sup>57</sup> Schegk has impressive familiarity with ancient writers and quotes and cites a large array of both Roman and Greek authors including philosophers, doctors, historians, and poets to elucidate his text, but never refers to another commentator and rarely refers to non-classical authors. His desire to break away from previous interpretations and to «explain, interpret, and render clear the more obscure meaning of these [Aristotle's] books,» led him away from the questions and typical discussions of earlier commentators. Thus, Schegk discusses none of the questions of the *accessus ad auctores*, and although he notes that *Mete.* IV is truly the fourth book of the *Meteorologica* he never cites another opinion or even suggests that some have doubted its traditional place and title.<sup>58</sup> Nonetheless, ancient authors were fair game and, he cites Galen repeatedly, and he notes where Galen and Aristotle's texts are in disagreement, thereby discussing topics germane to medical theory including the role of putrefaction in causing disease.<sup>59</sup>

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1550) α 4r: «...primam & principem causam, Deum scilicet...»

<sup>57</sup>*In octo Physicorum commentaria* (Basel, 1546) [α5r].

<sup>58</sup>*In reliquos naturalium Aristotelis libros commentaria, plane Philosophica*, 394: «legitime quartus ille liber ad tres superiores accessisse videtur.»

<sup>59</sup>*In reliquos naturalium Aristotelis libros commentaria, plane Philosophica*, 399. Schegk notes that Aristotle and Galen are often in disagreement see p. 395: «Contradicat Aristot. Galenus multis in locis, praesertim lib. 1. de Facultatibus naturalibus.»

The philological and historical concerns of Schegk are common to Francesco Vimercati's treatment of *Mete.* IV; and like Schegk, Vimercati relates *Mete.* IV to medicine in a detailed manner.<sup>60</sup> Vimercati primarily worked in France despite his Milanese origins. Vimercati's commentary was first published in 1556 and went through four editions in the sixteenth century.<sup>61</sup> Vimercati wrote eleven commentaries on the Aristotelian corpus that concentrated on natural philosophy and ethics, and there is no evidence that he had a medical degree.<sup>62</sup> Vimercati taught Greek and Latin at Paris from 1543-1561. His philological skills have impressed scholars and editors throughout the centuries.<sup>63</sup> His exegesis relies on ancient texts for both method and evidence. Vimercati asks the traditional questions (scope, order, utility and division) of the *accessus ad auctores*, conservatively using textual sources from antiquity to guide his understanding of Aristotle's words. He withholds judgement on the question of the place of *Mete.* IV, although he says that Alexander's opinion that *Mete.* IV is not part of the rest of the *Meteorologica* is «rather likely» (*probabilior*), but he concedes that in «in some way» (*aliquo modo*) it fits with the previous books. But he doubts those who, like Nifo and Pomponazzi, wish to separate *Mete.* IV from the first three books and call it «*de mistis*» because there is no ancient authority or codex on which they base themselves.<sup>64</sup> On

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<sup>60</sup>For Vimercati's biography and works see Neal W. Gilbert, «Francesco Vimercato of Milan : a Bio-Bibliography,» *Studies in the Renaissance* 12 (1965) 188-217. I have followed the *Bayerische Staatsbibliothek: Alphabetischer Katalog 1501-1840* (vol. 56, p.132) in using Vimercati as the vernacular form of Vicomercatus.

<sup>61</sup>Francesco Vimercati, *Commentarii in IV libros Meteorologicorum* (Paris, 1556); Lohr, 479-481. Ideler's edition of the *Meteorologica*, (Leipzig, 1834), preserves lengthy extracts from Vimercati's commentary.

<sup>62</sup>Gilbert, «Francesco Vimercato,» (1965) 189, 203-210.

<sup>63</sup>Scipione Chiaramonti, *In quartum Metheorum librum commentaria*, 127: «Vicomercatus graecae linguae vir perbelle peritus.»; Ingemar Düring, «Aristotle's Chemical Treatise: *Meteorologica*, Book IV,» 23.

<sup>64</sup>*Commentarii in IV libros Meteorologicorum*, vol. 1, p. 4; vol. 4, p. 3.

the issue of utility Vimercati writes that *Mete.* IV is by far the «most useful» (*longe utilissimus*) of Aristotelian texts. *Mete.* IV is useful for natural philosophy in general, providing knowledge of an «infinity of matters» (*infinita rerum*), including explanations of all sorts of natural alteration, generations, and perishings. Natural philosophy, however is not the only use of *Mete.* IV. Vimercati writes:

But it [*Mete.* IV] is also [useful] to many crafts necessary to human life, such as building, smithing, founding metals, but foremost to medicine. For he [Aristotle] strives to explain those things which pertain to driving out disease, why fatty and oily humors come to be and thin, raw things are concocted, rot evacuates, the rare and softer parts of the body close up and harden, those that are closed up and hard soften and rarify, and innumerable other kinds of such things, and in the following [treatise] he puts forth all the works [of medicine]. All of which a doctor does erroneously, unless he apprehends the cause of rawness, concoction, thickening, putrefaction, softening, hardening, and the action and affection of other kinds of things,... and knows [their] constitution and nature, which this book shows nearly complete understanding.<sup>65</sup>

Vimercati, however, was a philologist by trade and not an architect, a doctor, or a smith, so his arguments about utility rely primarily on textual interpretation, and for him this interpretation is for the most part historical. His primary task as a commentator is to explain the text and one of his methods is to find other passages in Greek writing that might provide insight into the meaning of Aristotle's words. He considers a wider range of Greek texts to interpret Aristotle than either Pomponazzi and Boccadiferro did because he considered the

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<sup>65</sup>*Commentarii in IV libros Meteorologicorum*, vol. 4, p. 3: «...praeclarus (ut diximus) admodum est et longe utilissimus, infinitamque rerum in se habet cognitionem, non ad omnium tantum rerum naturae ortus et interitus, mutationemque omnem agnoscendam utilem, verum etiam ad artes multas vitae humanae necessarias, ut aedificatoriam, fabriliam, fusoriam, sed cum primis ad medicinam. Ea enim ad morbum pellendum humores crassos et viscosos extenuare et incidere, crudos concoquere, putridos evacuare, partes item corporis rariores et molliores constipare et durare, constipatas et duras rarefacere et emollire, et alia eius generis innumera praestare enitur, in iisque adsequendis omnem operam ponit. Quae omnia medicus perperam efficit, nisi cruditatis, concoctionis, densitationis, putredinis, emollitionis, durationis, et aliarum eius generis affectionum actionumque rationem tenuerit, earum item rerum, quae concoqui, tenuari, densari, emolliri, durari, aliisque affici qualitalibus aptae sunt, naturam et constitutionem noverit, quam sane cognitionem omnem liber hic exhibet.»

historical context of their production and their relation to Aristotle's contemporaries and near contemporaries to be more important than his Italian predecessors did. According to Vimercati, Hippocratic texts are useful for understanding Aristotle because Hippocrates was the first to treat many of the issues in *Mete.* IV. As a good humanist, Vimercati is concerned with the historical relation between ancient authors. For example, Vimercati claims that Hippocrates invented the four elements; while Aristotle explained them through demonstration.<sup>66</sup> Vimercati argues that Hippocrates treated the issue of concoction before Aristotle and also notes that Galen «famously expounds» on this issue.<sup>67</sup> Furthermore, ancient medical writers, particularly the infamously prolix Galen, give examples that explain the brief and obscure Aristotle. Thus, Vimercati uses ancient medical writers to explain the difficulties inherent in the words of Aristotle, but he does not aim to improve medical theory.

#### **Vallés, Medicine and *Mete.* IV**

Vimercati, as well as Pomponazzi, Boccadiferro, and Schegk understood that medical writers provided evidence for interpretations of Aristotle. The commentaries of each of these scholars is devoted to explicating Aristotle's text. The application of Aristotle's work to medicine and other practical disciplines was not a prime feature of their work despite the fact that they understood medicine and natural philosophy to be intimately related. A major shift occurs in the work of Francisco Vallés (1524-1592). His commentary on *Mete.* IV is specifically addressed to those interested in medicine, and his explicit goal is to make this work of Aristotle accessible to doctors and medical students.

The paucity of twentieth-century scholarship on Vallés is not an indication of his

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<sup>66</sup> *Commentarii in IV libros Meteorologicorum*, 163v.

<sup>67</sup> *Commentarii in IV libros Meteorologicorum*, 174r.

status and influence during the sixteenth and seventeenth centuries.<sup>68</sup> He was the royal physician to King Philip II in addition to being a professor of medicine at the Complutensis University from 1554-1572. His first published work, *Controversiarium medicarum et philosophicarum libri decem*, originally published in 1556, went through ten editions, and was printed in Spain as well as Frankfurt, Basel, and Venice.<sup>69</sup> Indeed, Vallés' fame was such that Galileo argues against him in his *Questiones physicae*;<sup>70</sup> and Tycho Brahe, in a letter to Caspar Peucer describes Vallés as an extremely learned scholar.<sup>71</sup> Tycho's praise is not without merit. Vallés' works are numerous, and include four commentaries on Hippocratic works, six commentaries on Galen's works, and commentaries on Aristotle's *Physics*, and the fourth book of the *Meteorologica*, first published two years after the *Controversiae medicae* in 1558.<sup>72</sup> The medical faculty at university of Alcalá had adopted an humanistic medical curriculum which concentrated on expounding the works of Galen, Hippocrates, and

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<sup>68</sup>Vallés' biography and analyses of his works are found in: Anastasio Chinchilla, *Anales históricos de la medicina española* vol. 1 (Valencia, 1841) 220-233; Antonio Hernandez Morejon, *Historia bibliográfica de la medicina española* vol. 3 (Madrid, 1843) 57-83; Eusebio Ortega and Benjamín Marcos, *Francisco de Valles (El Divino)* (Madrid, 1914); Marcial Solana, *Historia de la filosofía española. Época del renacimiento*, vol. 2 (Madrid, 1941) 297-347. Francisco Calero, «Pervivencia de Galeno: Los conceptos básicos de la enfermedad en los *Controversiarum Medicarum et Philosophicarum libri decem* de Francisco Vallés,» *Asclepio* (1989) 141-156; Jose Maria López Piñero, «La fisiología en los *Controversiarum medicarum et philosophicarum libri decem*,» in *Estudios dedicados a Juan Peset Alexandre*, vol. 2 (Universidad de Valencia, 1982) 529-547; Ana Isabel Martín Ferreira, *El humanismo médico en la Universidad de Alcalá: siglo XVI* (Alcalá, 1995) 58-64.

<sup>69</sup>Nancy Siraisi calls the *Controversiae medicae* the most successful volume of medical questions of the sixteenth century. *The Clock and the Mirror* (Princeton, 1997) 55.

<sup>70</sup>William A. Wallace (tr.) *Galileo's Early Notebooks: The Physical Questions* (South Bend, 1977) 170.

<sup>71</sup>Tycho Brahe, *Tychonis Brahe Dani Opera omnia*. J. L. E. Dreyer (ed.) (Copenhagen, 1913-1929) vol. 7, 133f; and vol. 7, 190 for Peucer's response.

<sup>72</sup>*In IV librum Meteorologicorum commentaria* (Alcalá, 1558) had two subsequent editions: Torino 1588 and Padua 1591. My citations refer to the pagination according the 1591 printing.

Avicenna.<sup>73</sup> Nonetheless, Vallés' choice of texts for his commentaries was exceptional for his time and place. Vallés' commentaries on *Epidemiorum libri* and *De ratione victus in morbis acutis* had relatively few competitors from Spanish authors, as they were infrequently the subject of scholars' scrutiny in the sixteenth century compared to the more standard Hippocratic texts such as the *Aphorisms* or *Prognostics*. His commentary on *De alimento* had little if any competition at all.<sup>74</sup> The bulk of Vallés' medical theories, however, can be found in his most influential work the *Controversiae medicae*. The *Controversiae medicae* discusses topics which have common ground in both medicine and philosophy, and is similar in its conciliatory intent to Pietro D'Abano's *Conciliator* which, as mentioned earlier, also had wide circulation in the sixteenth century.<sup>75</sup> In the *Controversiae medicae*, Vallés hoped to solve disputes between medical theory and natural philosophy. These disputes arose from either the varieties of thought (*varietas ingeniorum*), contradictions within or between texts, or errors in translation and transmission.<sup>76</sup> The themes and arguments which appear in the *Controversiae medicae* reappear in both Vallés' Galenic and Aristotelian commentaries, in particular his commentary on *Mete.* IV.

Vallés was conditioned and influenced by Renaissance humanism. He rejected the

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<sup>73</sup>Ana Isabel Martín Ferreira, *El humanismo médico en la Universidad de Alcalá: siglo XVI* (Alcalá, 1995).

<sup>74</sup>Teresa Santander Rodríguez, *Hipócrates en España (siglo XVI)* (Madrid, 1971). Vallés' commentary on *De alimento* was one of very few commentaries on this work in Europe in the sixteenth century or in earlier centuries. Antonio Fracanzano's commentary was first printed in 1566 and Girolamo Cardano's in 1568 according to Blas Bruni Celli, *Bibliografía Hipocrática* (Caracas, 1984) 84. I found no earlier commentaries on the *De alimento* in G. Maloney and R. Savoie, *Cinq cents ans de bibliographie Hippocratique, 1473-1982* (Quebec, 1982).

<sup>75</sup>William A. Wallace, «Traditional natural philosophy,» in Charles B. Schmitt and *et al.* (eds.) *Cambridge History of Renaissance Philosophy* (Cambridge, 1988) 231-233.

<sup>76</sup>*Controversiae medicae*, 2; Jose Maria López Piñero, «La fisiología en los *Controversiarum medicarum et philosophicarum libri decem*,» 532.



medieval translation of Aristotle, and was willing to discuss the Greek text, although far less often than some of his more philologically minded colleagues, such as Vimercati and Schegk. Vallés' exegetical goals included erasing the interpretative errors of medieval scholars, both Arabic and Latin, and uncovering the true doctrines of Aristotle, Galen, and Hippocrates free of the opinions of the commentators of earlier eras. Thus, Vallés provided his own humanist Latin translation of the *Mete.* IV.<sup>77</sup> It is rare to find Renaissance translations of the *Mete.* in commentaries.<sup>78</sup> Most commentators preferred to use the medieval text, and referred to passages by a standard numbering system, and university lecturers employed the medieval text to their primarily Greekless audience. Furthermore, that Vallés privileged *prisca sapientia*, believing that older sources offered purer doctrines, is evident in his preference for the clinical methods found in the Hippocratic writings over Galen's, because Hippocrates predates Galen, while simultaneously not rejecting Galen.<sup>79</sup> This preference, however, did not prevent Vallés from showing that doctrines found in the texts of Aristotle, Galen, and the Hippocratics possessed a limited unity, or at least their contradictions could be solved. Vallés did not slavishly adhere to Galenic, Hippocratic, or Aristotelian texts. He adopted the

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<sup>77</sup>In the earlier editions of his commentary the translator of the text is not identified. In the preface to the 1591 edition, however, the Paulo Meietto, the printer of the work, praises Vallés' on his translation and his ability as a translator [*iiv*]: «tum Vallesius ipse, eruditus alioqui atque excellenti ingenio praeditus interpres, ita nonnumquam structurae negligens, ut perspicuitatis curam, quae prima interpretis laus esse debet, nullam propemodum habuisse videatur. id passim & in explanatione cernere licet, & in Aristotelis verborum translatione [sic] potissimum: ubi cum particularum usum, quarum in continuanda orationis serie apud divinum philosophum mira vis est, vel praetereat, vel invertat, orationem ipsam non raro occaecavit.»

<sup>78</sup>Vimercati's also commentary contains his own translation.

<sup>79</sup>López Piñero identifies Vallés as a main adherent to the «Galenico-Hipocratista» movement of the sixteenth and seventeenth centuries, «La fisiología en los *Controversiarum medicarum et philosophicarum libri decem*,» 530-536. Martín Ferreira identifies Fernando Mena who was Vallés' colleague and fellow student at Alcalá as an exponent of «un galenismo hipocratista,» *El humanismo médico en la Universidad de Alcalá: siglo XVI*, 56-

unorthodox position that matter in the celestial spheres is composed of a mixture of the four terrestrial elements,<sup>80</sup> explicitly criticized Aristotle's theory of olive oil,<sup>81</sup> and took into account Vesalian anatomy.<sup>82</sup> Furthermore, Vallés recognized that the medical issues that were prevalent during his life differed from those during Galen's. Thus, Vallés' *Methodus medendi* is a concise handbook for medical practitioners that treats contemporary issues rather than a commentary or digest of Galen's book of the same title.<sup>83</sup>

Vallés' commentary on *Mete. IV* is distinct from those of his predecessors and contemporaries because its specific intent is to explain Aristotle's natural philosophy and its relation to medical topics for doctors and medical students. To the best of my knowledge no previous Renaissance commentator on *Mete. IV*, or for that matter on any other book of Aristotle, possessed that specific intent. Vallés thought that medical doctors must examine Aristotle's writings themselves to understand how natural philosophy is the basis for medicine. Vallés was not the first to write a commentary on a book of Aristotle's, or Pseudo-Aristotle's, natural philosophy for a medical audience. Pietro D'Abano wrote an exposition on the *Problemata* possibly with a medical audience in mind;<sup>84</sup> but such treatments of Aristotle were rare. Vallés' commentary on *Mete. IV* is, in spirit, a response to Pomponazzi's criticism of medical doctors for not reading Aristotle's texts but only derivative works, as it

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<sup>80</sup>*De sacra philosophia*, cap. 51, cf. Tycho Brahe, *Tychonis Brahe Dani Opera omnia*, vol. 7, 134.

<sup>81</sup>*In IV librum Meteorologicorum commentaria*, 47rff.

<sup>82</sup>*Controversiae medicae*, 29v.

<sup>83</sup>*Methodus medendi* (Madrid, 1588) 4-6.

<sup>84</sup>Nancy G. Siraisi, «The *Expositio Problematum Aristotelis* of Peter of Abano,» *Isis* 61 (1970) 321-339.

makes clear that medicine needs a sophisticated exegesis of natural philosophical texts.<sup>85</sup>

Vallés thought that the content of *Mete.* IV was useful to medicine and his consideration of utility affected the methods with which he evaluated Aristotle's text. For Vallés, *Mete.* IV, of all of Aristotle's works on natural philosophy, was particularly relevant to medicine. Vallés' commentary was not part of a larger project to give an interpretation to a large body of Aristotelian texts. He does not even comment on the first three books of the *Meteorologica*, presumably because they are less relevant to medical theory.<sup>86</sup>

In Vallés' *Controversiae medicae*, he maintains that medicine is based on natural philosophy and cites Aristotle's maxim that «the end of philosophy is the beginning of medicine.»<sup>87</sup> Vallés claims that «philosophy guides the path of medicine,» a phrase which he repeats in his commentary on *Mete.* IV.<sup>88</sup> Vallés' belief that philosophy guides medicine, however, appears problematic in consideration of his evaluation of Greek authorities. At times he sides with Galen over Aristotle when their texts are at odds with each other. In fact, while Vallés may have believed that natural philosophy is a guide to medicine, he also

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<sup>85</sup>There is no evidence that Vallés was familiar with Pomponazzi's work, but it is more than likely that he was familiar with the others who wrote commentaries only on the fourth book of the *Meteorologica*. He does, however, cite Nifo's commentary (p. 32r, 46r).

<sup>86</sup> Vallés' commentary on the *Physics* does not treat medical issues at all. According to Vallés, the subject of the *Physics* is speculative and does not shed light about actions. Francisco Vallés, *Controversiarum naturalium ad tyrones pars prima, continens eas quae spectant ad octo libros Arist. De physica doctrina* (Alcalá, 1563) 4: «Quare, si omnis intellectus aut activus, aut factivus, aut speculativus est, physica speculativa quedam profecto est. Haec Aristo. quod quidem apertum est, quia physica ad nullam actionem aut opus refertur per se...» I have not been able to examine Vallés' other commentary on the *Physics*, published in 1562, entitled *VIII librorum Aristotelis De physica doctrina versio recens et commentaria*. According to Solana (vol. 2, 304) the 1563 version is a resume of the earlier version and as a result they do not differ substantially.

<sup>87</sup>*Parva naturalia*, 436a21-436b1; 480b26-30.

<sup>88</sup>*Controversiae medicae*, 1v; *In IV librum Meteorologicorum commentaria*, 2v.

maintained that medicine was a more important field of learning than philosophy. According to Vallés, theology surpasses all other fields of human knowledge, being followed by jurisprudence and then medicine. Medicine holds an inferior position because it is only concerned with the health of the body, while theology and law are concerned with greater goods: namely, how one should act with respect to God and with respect to society.<sup>89</sup>

While throughout the entire commentary on *Mete. IV* Vallés addresses medical topics, at the beginning and the end of his commentary he explicitly addresses his motives and explains why *Mete. IV* is a foundation for medical knowledge. In the proemium, Vallés explains that *Mete. IV* was a foundation for Galen, and thus a foundation for all medical knowledge. He writes:

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<sup>89</sup>Vallés, *De sacra philosophia*, 604-606; Solana, *Historia de la filosofía española. Época del renacimiento*, vol. 2, 305-306.

I see that the school of doctors lacks any earlier commentary for this book [*Mete.* IV] and this book no less lacks a medical commentator. It is not that it [*Mete.* IV] does not have famous commentaries of many learned men, but that the best of them, although they were most distinguished philosophers, were less skilled in medicine. Assuredly, there are some who have appeared to be very diligent in medicine, but were less versed in the writings of good authors, especially Galen's, of whose [writings] I wish that the commentary on this work touches upon as much as possible.<sup>90</sup>

Galen extracts many Aristotelian concepts from *Mete.* IV, Vallés argues, such as mixtures according to the elements, putrefaction, concoction, passive qualities such as fineness, and density, the substance of body parts, the causes of death, the concoction of excrements, and the effects of medicines.<sup>91</sup> The frequent references to Galen's works throughout the commentary give insight into Vallés' interpretation of Galen in addition to showing how the views of Aristotle and Galen can be reconciled. Vallés writes that his commentary allows us to «compare, those matters, which are written in many places in Galen's books, by transferring them into a commentary on this book of Aristotle.»<sup>92</sup>

Vallés' interpretation of Aristotle most likely stems at least in part from Galen's assessment of Aristotle.<sup>93</sup> Galen adopted many aspects of Aristotelian philosophy as he

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<sup>90</sup>Vallés, *In IV librum Meteorologicorum commentaria*, 1r-1v: «Video Medicorum scholam indigere summopere libelli huius enarratione aliqua, & libellum hunc indigere non minus medico enarratore. Non quidem quod habeat multorum, atque ad eo doctissimorum virorum praeclara commentaria, sed quod illorum optimi, fuerint quidem philosophi praestantissimi, sed medicinae minus periti. Alii vero nonnulli, qui medicinae videbantur studiosi, minus sunt versati in bonorum autorum scriptis, praecipue Galeni. cuius ego vellem quam maxime commentaria in hoc opus nobis contigisse.»

<sup>91</sup>Vallés, *In IV librum Meteorologicorum commentaria*, 1v-3r.

<sup>92</sup>Vallés, *In IV librum Meteorologicorum commentaria*, 1v, «Sed quando haec non habemus, videmur nos posse nobis ipsis illa quadam ratione comparare, ea nempe, quae in multis Galeni libris scripta sunt, in huius libelli Arist. commentationem transferentes.»

<sup>93</sup>In his commentaries on Hippocrates, Vallés relied on Galen's interpretations wherever possible, and saw himself as filling in the gaps of the Galenic corpus by commenting on Hippocratic works on which Galen did not write commentaries. For example, see: *In libros Hippocratis de morbis popularibus, commentaria...* (Madrid, 1577); *In aphorismos, & libellum de Alimento Hippocratis, Commentaria* (Compluti, 1561) 255.

integrated it with Platonic and Hippocratic concepts. Certainly, Galen's vitriolic style led him to attack positions found Aristotle's texts; nevertheless his attitude towards Aristotle was for the most part positive. Galen adopted Aristotelian-style teleology and emphasized the role of formal causes in his denunciations of proponents of mechanistic explanations such as Erasistratus and Acsepiades of Bythinia. Aristotelian logic played a significant role in Galen's epistemology. Galen's wide-ranging intellectual interests prompted him to write a treatise *On sophistries resulting from language* that stems from Aristotle's *Sophistical refutations*.<sup>94</sup> Aristotle's strongly influenced Galenic matter theory, and in this topic the importance of *Mete.* IV on Galen's thought can be most clearly seen. Galen discusses the elements, the prime qualities, and the homeomerous parts in several treatises. His two works that deal with temperaments, *De temperamentis* and *De simplicium medicamentorum temperamentis ac facultatibus*, rely heavily on Aristotle's treatment of the powers of the prime qualities and the elements. *Temperamentum* is a translation of κρ\_σις, which means mixture, thus the congruence between *Mete.* IV and Galen's treatment of κρ\_σις may have been partly responsible for Nifo's and Pomponazzi's opinion that *Mete.* IV should be called *De mixtis* or *De mixtione*. Agreeing with Alexander of Aphrodisias, Galen argues that the hot, the cold, the wet, and the dry are the specific qualities of the elements.<sup>95</sup>

Galen argues that the prime qualities form the different powers of homeomerous substances, either those in the human body or in medicines.<sup>96</sup> Galen revises Aristotle's

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<sup>94</sup>XIV Kühn 582-598. See H. B. Gottschalk, «Aristotelian Philosophy in the Roman World,» in Wolfgang Haase (ed.) *Aufstieg und Niedergang der römischen Welt* 36.2 (Berlin, 1987) 1164-1171.

<sup>95</sup>*De simplicium medicamentorum facultatibus*, Kühn XI, 547; Alexander 179, 13-16.

<sup>96</sup>*De simplicium medicamentorum facultatibus*, 583. Galen addressed these questions in a treatise dedicated to the topic of homeomerous bodies. It was not available in the Latin West and is not extant in its Greek form. It was, as is, available in Arabic and has been

theory which holds that there are four possible combinations, what Galen calls temperaments or mixtures (κρ\_σις) of the prime qualities. There are, according to Galen, a total of nine temperaments, the four traditional Aristotelian pairs as well as those that are well-balanced or partially well-balanced. Thus there is a mixture that is well-balanced between hot and cold but is dry, as well as one that is wet. Additionally, there exists a mixture that is well-balanced between wet and dry that is hot, and one that is cold. Finally, there is the completely well-balanced mixture that is neither hot, cold, wet, or dry. This well-balanced mixture or temperament represents health and is the state to which the doctor should restore his patient.<sup>97</sup> Galen makes a further departure from Aristotle by distinguishing two ways of interpreting the prime qualities. The prime qualities are considered in absolute terms (πλ'ς) in relation to the elements or substances. The temperament of man is paradigmatic of a well-balanced substance, while the elements are the best representatives of absolute qualities. Other bodies, however, are well-balanced not in absolute terms but in relation to their genus. Knowledge of a temperament in relation to genus stems from the substance's purpose and how well it functions. Thus, different species have different temperaments, both which can be considered well-balanced in relative terms, and various organs and other parts of the body can have different ratios of the prime qualities while still being well-balanced.<sup>98</sup> Galen while maintaining the importance of final causes argues that the material causes are essential for explaining the healthy functioning of organs and organisms. While knowledge of the temperament of a substance is based on purpose, the ability of an organism or organ to

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translated into German. Gotthard Strohmaier (ed. and trans.) *Über die Verschiedenheit der homoioomerren Körperteile* (Berlin, 1970). Galen's treatise *De elementis ex Hippocratis sententia* also addresses many of these issues.

<sup>97</sup>*De temperamentis*, 1.8; 2.1.

<sup>98</sup>*De temperamentis* 2.1, 2.3.

function properly is determined by the mixture of qualities within the organism or organ itself. Thus, the prime qualities define and determine the substances composed from them, and by knowing the properties of temperaments it is possible to understand the functioning of higher substances formed out of the elements and homeomerous parts.

Vallés' belief that Aristotle is a necessary propaedeutic to medical studies likely stems from Galen's writings. Galen frequently praises the philosophy of Aristotle and in particular doctrines that are similar to those contained in *Mete.* IV, such as the existence of the four prime qualities. He lauds Aristotle because he revived Hippocratic teaching. In *On the natural faculties*, Galen writes:

In fact, of all those known to us who have been both physicians and philosophers Hippocrates was the first who took in hand to demonstrate that there are, in all, four mutually interacting qualities, and that to the operation of these is due the generation and corruption of all things that come into and pass out of being. Nay, more; Hippocrates was also the first to recognize that all these qualities undergo an intimate mingling with one another; and at least the beginnings of the proofs which Aristotle later set his hand are to be found first in the writings of Hippocrates.<sup>99</sup>

Two books later Galen explains that Aristotle followed Hippocrates in making the hot and the cold more active than the wet and the dry, and in fact cites the *Meteorologica*.<sup>100</sup> In *On the elements according to Hippocrates*, Galen claims that «Aristotle appears to have cast his arguments in the same form as Hippocrates,» thereby distinguishing Aristotle's and Hippocrates's theories from their contemporaries' theories, which are lacking in completeness and coherence, and the muddled interpretations of earlier medical theorists.<sup>101</sup> Vallés' interpretation of Aristotle's relation to Hippocrates depends on Galen's own exegesis which had as its goals the harmonization of Aristotle and Hippocrates and understood

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<sup>99</sup>*De naturalibus facultatibus*, I.II.5. Trans. A. J. Brock, Loeb Edition (Cambridge, MA, 1963).

<sup>100</sup>*De naturalibus facultatibus*, I.III.8.



Aristotle as developing Hippocratic concepts.

Vallés' Galenic understanding of Aristotle opens the way for a reevaluation of the relation between Aristotle and Hippocrates and natural philosophy and medicine. Vallés' interpretation of the history of philosophy shows that Aristotle and thus natural philosophy is in debt to medicine, specifically the ideas of the Hippocratic writers. Nevertheless, he still maintains that medicine must utilize natural philosophy and particularly Aristotle's teachings in *Mete.* IV. How medicine utilizes natural philosophy can be seen in Vallés' interpretation of the *scala substantiae* found in *Mete.* 4.12. Vallés transforms the general discussion of homeomerous and anhomeomerous bodies into a discussion of human physiology. The mixture of elements become temperaments (*temperamenta*) and affections (*passiones*); the homeomerous bodies become simples (*partes simplices*), and anhomeomerous bodies become organs (*instrumenta*). Adopting Aristotle's hierarchy of substances Vallés claims that:

If you have knowledge of what temperament the simple parts are, then you cannot be ignorant of what temperament an organ is, because the temperament of a composite derives from the temperament of simples, and is known by the combination of simples. Nor is it possible in some other way to investigate the temperament of an entire human.<sup>102</sup>

Vallés reverses the epistemological hierarchy found in *Mete.* 4.12 and, while agreeing that there is greater knowledge of composites and complete organisms, maintains that full knowledge of organs and organisms will include an account of their material causes or their temperaments. An account of the material causes and temperaments of organs and organism is dependent on knowledge of the material causes of homeomerous bodies and the elements

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<sup>101</sup>*De elementis*, 5,1; 5,14.

<sup>102</sup>*In IV librum Meteorologicorum commentaria*, 79v-80r: «sciens ergo cuius temperamenti sit pars simplex omnis, non possis ignorare cuius temperamenti sit instrumentum. Nam temperamentum compositi, provenit a temperamentis simplicium, cognosciturque collatione simplicium: neque totius hominis temperamentum aliter potest investigari.»

which define them.

Since a significant part of Renaissance medicine was the diagnosis of temperamental imbalances, proper understanding of disease depended on knowledge of the temperament of the patient. Knowledge of temperaments was particularly important to Vallés since, adhering to Hippocratic techniques, he believed that dietetics was the most effective part of practical medicine.<sup>103</sup> Vallés contends that this knowledge is dependent on understanding the temperaments of the elements, simples, and organs which compose the patient, thereby making clear how natural philosophy guides medicine. He writes: «No one, therefore, from what was just [explained], does not understand that Aristotle created in this little book [*Mete. IV*] the necessary basis for medicine, and from this [book] doctors take the starting point for their investigations.»<sup>104</sup> That *Mete. IV*, with its treatment of the qualities and the homeomerous parts and their relation to organs and complete organisms, guides the way for medicine is further supported in Vallés' *Controversiae medicae*, where adopting the hierarchy of substances found in *Mete. IV.12*, he writes:

Philosophy guides the path of medicine: especially in that part which concerns itself with knowledge of the temperaments and the composition of the human body. Indeed, the human body is composed, in accordance with a certain arranger and its own constitution, out of the organs: the head, I say, the thorax, stomach, legs, arms, and the rest. But before this, the single organs come out of the homeomerous parts, like flesh, nerve, arteries, and veins: which go back to the same elements, these in turn, which according to Galen and Hippocrates are said to be secondary elements, I say, are composed out of some elements, the humors.<sup>105</sup>

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<sup>103</sup>*Methodus medendi*, 8: «Sanitatis tutela, quae optima medicinae pars solius est dieticae.»

<sup>104</sup>*In IV librum Meteorologicorum commentaria*, 80v: «Nemo ergo iam hinc non intelligit, Aristotelem hoc libello necessariae medicinae fundamenta fecisse, atque hinc medicos suae contemplationis principium capere.»

<sup>105</sup>*Controversiae medicae*, 3v: «Sternit enim philosophia medicinae viam: potissimum qua parte temperamenti, & compositionis humani corporis notitiae sese accommodat. Componitur vero humanum corpus, compositiori quadam ac propria constitutione, ex membris organicis: capite (inquam) thorace, ventre, cruribus, brachiis & reliquis. Sed ante

Vallés takes the material of *Mete.* IV.12, twists it just slightly by evoking the humoral theory of Galen and Hippocrates, and transforms Aristotle into the starting point for medicine.

In his commentary on *Mete.* IV, Vallés retains his goal of the *Controversiae medicae* of trying to reconcile medical theory and natural philosophy. Vallés notes that Galen says in *De temperamentis* and *De simplicium medicamentorum* that water is the wettest element, while according to Vallés, Aristotle makes air the wettest element. Vallés reconciles this apparent discrepancy by saying that Aristotle is correct *secundum philosophiam* or in absolute terms because air is most wet according to substance. According to medicine and presumably in a relative sense Galen is correct and thus the diverging opinions of Aristotle and Galen derive from the fact that one was writing with respect to philosophical truth and the other with respect to medical truth.<sup>106</sup> Vallés, therefore, takes Galen's distinctions between the absolute and relative balance of mixtures and applies them to differing fields: absolute temperaments are the domain of philosophy while medicine is more concerned with relative temperaments. This leads Vallés to consider the value of empirical investigations into nature. Galen claims that sensation, primarily touch, is the only means for determining levels of heat and coldness in the body.<sup>107</sup> Furthermore, knowledge of the temperaments of drugs, since their heat and coldness exist in them potentially before being applied, can only

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hanc, singula illorum ex homiomeris, ut carne, nervo, arteria, & vena: haec rursus elementis quibusdam, quae ab Hippocrate & Galeno dicuntur secunda, humoribus, inquam, componuntur.»

<sup>106</sup>*In quartum librum Meteorologicorum*, 3r: «scripsimus illic modum quendam satis idoneum quo cum Aristotele componi possit Galenus; quem modo brevi dicam: esse scilicet aquam humidissimam inter omnes substantias ut medicamentum; hocque dictum esse a Galeno, utpote medico. aerem humidissimum in seipso, & ut elementum: dictumque hoc esse a philosopho.»

<sup>107</sup>*De temperamentis*, 2.3.

be known through induction from testing the drug in a variety of conditions.<sup>108</sup> Thus, Vallés argues that it is impossible to show the unavoidable nature of death except through induction (*inductione*), and that Aristotle's claim that every generated body can be corrupted can only be known through experience (*experimento*).<sup>109</sup>

While Aristotle may be the starting point for philosophy, Galen's application of Aristotle is a starting point for medicine. A Galenic reading of *Mete.* IV can lead to a greater understanding not only of the fundamental theories of medicine but also actual medical practice. For example, Vallés takes the Aristotelian dictum that water does not thicken when it is boiled to conclude that doctors do not need to concoct harmful humors that are primarily watery before purging them.<sup>110</sup> Aristotle's claim that sepsis only takes place in the lower intestines and not the stomach itself, prompts Vallés to defend his view by citing recent and ancient medical sources and taking evidence from dissections of animals.<sup>111</sup> Perhaps, the most useful application of *Mete.* IV for doctors is its keys to diagnosis and understanding the innate powers of medicines. Its descriptions of the composition of homeomerous substances from the prime qualities form a theoretical framework for understanding the structures and complexions of parts of the body. The powers of internal heat explain the innate abilities of drugs to cause concoction. Aristotle's words have a limited utility for identifying temperaments and the powers of medicines. Aristotle's fault, according to Vallés, is that his opinions are not supported by sufficient experience. The definition of concoction as the product of heat defies experience that shows that numerous plants of cold temperaments

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<sup>108</sup>*De temperamentis*, 3.5.

<sup>109</sup>*In quartum Meteorologicorum*, 8r.

<sup>110</sup>*In quartum Meteorologicorum*, 25r.

<sup>111</sup>*In quartum Meteorologicorum*, 30r-32r.

become ripe and reach perfection.<sup>112</sup> So Aristotle's philosophy starts the path for medicine it by no means supplies all of the answers. Vallés writes:

Therefore in this realm Aristotle did not open up the path (although he certainly started down it) by which the temperaments of simples and homeomers are known. Nor is it possible to discover in this way substances or for other accidental qualities. But the art of medicine is needed. For, it, accepting certain principles from this part of philosophy, and combining these with experiment, teaches the temperaments of everything, including the parts in living bodies.<sup>113</sup>

While natural philosophy provides principles, medicine surpasses its knowledge in certain areas because its techniques are broader, thus while natural philosophy remains necessary to medicine, medicine is by no means inferior to it.

## **Epilogue**

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<sup>112</sup>*In quartum Meteorologicorum, 77v.*

<sup>113</sup>*In quartum Meteorologicorum, 77v:* «Non ergo Arist. hoc loco viam aperuit (quanquam profecto incoepit) qua cuiusque rei simplicis, & homogeneae temperies cognoscatur. Neque certe ex modo substantiae, aut aliis accidentibus inveniri potest. sed medica arte est opus.. Ea enim quaedam principia ab hac philosophiae parte accipiens, atque ea cum experimento coniungens, rerum omnium, & partium in animantibus, temperamenta docet.»

Vallés' interpretation of *Mete.* IV remained influential well into the seventeenth century. After the middle of the sixteenth century it became increasingly common to treat *Mete.* IV as a medical text, or at least refer to the medical doctors who discussed its content. Numerous commentaries on *Mete.* IV cite Vallés and discuss *Mete.* IV's relation to medicine. The Wittenberg doctor Valentinius Espicius describes the doctrines of *Mete.* IV as physiological and especially important to medicine in the introduction to a 1585 edition of Joachim Perion's translation.<sup>114</sup> Konrad Gesner describes *Mete.* IV as helpful to philological research, natural philosophy in general, and especially to medical topics.<sup>115</sup> In 1595, Duncan Liddel, a Scottish medical doctor who taught at the University of Helmstadt, was a *praeses* over a doctoral disputation on *Mete.* IV which is clearly directed towards medical topics, strongly suggesting that the text was used in medical training.<sup>116</sup> Niccolo Cabeo states that the subject of *Mete.* IV is very close to medicine.<sup>117</sup> Francisco Veiarano in the prolegomenon

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<sup>114</sup>*Aristotelis Stagiritae Meteorologicorum Liber quartus cum diversa lectionis notatione, & Ioachimi Perionii interpretatione. Editus studio Valentini Espichii D.* (Wittenberg, 1585). This edition is one of four 16<sup>th</sup> century Latin translations that print *Mete.* IV separately from *Mete.* I-III of the nearly 100 Latin translations listed in F. E. Cranz and Charles B. Schmitt, *A Bibliography of Aristotle Editions 1501-1600* 2<sup>nd</sup> edition (Baden-Baden, 1984). For Espichius see Peter Petersen, *Geschichte der aristotelischen Philosophie im protestantischen Deutschland* (Leipzig, 1921) 118.

<sup>115</sup>Konrad Gesner, *Physicarum Meditationum, Annotationum & Scholarium Lib. V.* (Tiguri, 1586) 139v: «in quibus [*Mete.* IV] docetur, quoniam in rebus naturalibus, secundum quatuor primas qualitates contingant mutationes: hoc est quid in eis caliditas & frigiditas efficiant: & quibus affectionibus, humiditatis & siccitatis ratione, subiiciantur: non Physicis tantum ad rerum istarum naturalium cognitionem necessariae, sed etiam Grammaticis ad variorum vocabularum explicationes, & Dialecticis ad definitiones omnium corporum similium, variarumque in rebus naturalibus mutationum & insuper Medicis, cum alias tum quod concoctionum crudis tantumque genera hic explicantur.»

<sup>116</sup>*Quartum Meteororum Disputatio II De concoctione*, Proposita in illustri Iulia a Duncanio Liddelio Scot mathematico professore quam publice defendere conabitur Adamus Luchtenius Huxariensis. (Helmstadt, 1595).

<sup>117</sup>*In quatuor libros Meteorologicorum Aristotelis*, 4: «Sit materia proxima summe medicinae.»

to the fourth book of his *Quaestiones* adheres to Vallés' claim that this book is similar to the works of Galen and Hippocrates, and later cites Vallés and his view on the place of *Mete. IV* in the same prolegomenon.<sup>118</sup> A number of commentaries singled out the medical topics of *Mete. IV*, namely the definitions of putrefaction and concoction. For example, Jacopo Zabarella's commentary on *Mete. IV* only cover the first three chapters of the book, those which concentrate on concoction and putrefaction. Zabarella recognizes that the themes of *Mete. IV* are crucial to medical theory and thereby claims that the entire discipline of medicine depends on the knowledge of the elements and their mixtures. Following a line of argument that is similar to Vallés' analysis of *Mete. IV.12*, Zabarella states that Aristotle's treatment of the elements and their mixtures explains the formation of the body's temperaments.<sup>119</sup> Zabarella was not alone in concentrating on the issues of putrefaction and concoction in his reading of *Mete. IV*. Daniel Sennert in his *Epitome Naturalis Scientiae* treats the subject matter of the first three chapters of *Mete. IV* with overt references to medicine in a chapter entitled «De Temperamento & Coctione,» which is separate from the his treatment of the subjects of proper meteorology.<sup>120</sup> Vallés' example had particular influence in his home of Alcalá where a professor of medicine named Christobal Nuñez wrote a commentary on the Aristotelian theories of concoction and putrefaction as found in

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<sup>118</sup>*Super Quatuor Libros Meteororum Aristotelis Philosophorum Principis, Quaestiones* (Lyon, 1643) 353-354: «ideo assumpsi laborem istum ut illud quod scirit debet a Medico pertractetur cum maximam affinitatem habeat cum aliquibus libris Galeni, Hippocratis & Avicennae....»

<sup>119</sup>*Commentarii in libros de Generatione et corruptione* (Frankfurt, 1602) 750: «agit Aristot. de elementis, de primis eorum qualitibus quae alteratrices vocantur, ac de ipsorum commistione, unde varia aliorum corporum temperamenta exoriuntur, ex quorum omnium notitia tota videtur medica disciplina pendere.» This work was published posthumously.

<sup>120</sup>*Epitome Naturalis Scientiae* (Oxford, 1664). The first edition of the *Epitome* dates from 1600.

the first three chapters of *Mete.* IV that was published in 1613, and cites Vallés as his only known predecessor who wrote on *Mete.* IV.<sup>121</sup> Vallés' views did not meet universal acceptance. Scipione Chiaramonti claimed that while *medici theoretici* occupy themselves with *Mete.* IV and put forth opinions, these opinions sometimes should be revised and other times upheld.<sup>122</sup> For Chiaramonti, Vallés' opinion are those which need to be revised, as Chiaramonti feels the need to add an annotation to his commentary which argues against Vallés' reading of natural digestion as it appears in the second chapter of *Mete.* IV. Chiaramonti take Vallés to task for confusing the motion of natural generation by making it opposite to violent motion rather than chance. Chiaramonti's claim that *Mete.* IV is popular among medical theorists must at least partially derive from knowledge of his commentary since Vallés is among Galen, Avicenna and Ugo Benzi as doctors cited in Chiaramonti's commentary.<sup>123</sup> Vallés was not singularly responsible for the transformation of *Mete.* IV into a medical text; nor was this transformation universal. There remained some commentators who found his interpretation repugnant. Nonetheless, Vallés' commentary on *Mete.* IV presents a reinterpretation of Aristotelian natural philosophy as a means of

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<sup>121</sup>Christobal Nuñez, *Opus... in quo commentantur tria priora capita Arist. ex Meteoro. libro quarto* (Madrid, 1613) preface [1]: «Invium iure dixi, cum nemo ante me viam hanc (quod sciri possit) pedibus calcarit, praeter unum Vallesium, qui adeo obiter difficultates attingit, ut fere omnes, quae in nostra Complutensi Academia, nostro tractatur aevo, missa faciat.» For Nuñez' dates and list of works see: Charles Lohr, *Latin Aristotle Commentaries*, 290; Antonio Hernandez Morejon, *Historia bibliográfica de la medicina española* vol. 4 (Madrid, 1843) 291-292.

<sup>122</sup>*In quartum Metheorum librum commentaria* (Cesena, 1656) 1: «Quocirca Medici Theorici vocati, qui desertam a Philosophis de sanitate, & morbis contemplationem occupaverunt frequenter huius libri sententias, & dogmata memorant in illisque; partim recensendis, partim censendis multum temporis, & operae ponunt.» This work was first published in early 1640's. See Lohr, *Latin Aristotle Commentaries*, 93.

<sup>123</sup>*In quartum Metheorum librum commentaria*, 184: «Quaestio 1/9, Disputatio adversus Vallesium de naturalis generationis significatione 4. Meteor. cap. 2.»



understanding Greek medicine which persisted in medicine and natural philosophy.

**Abstract:** In this paper I describe the context and goals of Francisco Vallés' *In IV librum Meteorologicorum commentaria* (1558). Vallés' work stands as a landmark as the first *expositio* in which an commentator interprets a work of Aristotle's natural philosophy as specifically useful for medical doctors and medical theory. Vallés' commentary is representative of new understandings of Galen-Hippocratic medicine that emerged as a result of expanding textual knowledge. Similarly, new approaches to the utility of Aristotelian natural philosophy emerged from a revival of the Greek commentators and increased scrutiny of the questions of the *accessus ad auctores*. These approaches are evident in a number of fifteenth-century commentaries on *Mete.* IV; in particular the works of Pietro Pomponazzi, Lodovico Boccadiferro, Jacob Schegk, and Francesco Vimercati. After putting Vallés' conviction that *Mete.* IV is relevant to medical knowledge in relation to other Renaissance commentaries, I then show how Vallés' interpretation of *Mete.* IV as a medical text depends on his understanding of Aristotle's theory of homeomerous substances and their relation to composite substances.