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## EARLY ROBERT GROSSETESTE ON MATTER

by

NICOLA POLLONI\*

*Institut für Philosophie, Humboldt Universität zu Berlin, Unter den Linden 6,  
10099 Berlin, Germany*

This article investigates the origin of Robert Grosseteste's theory of matter. Covering Grosseteste's early production, from his *De artibus liberalibus* to *De luce* and the *Commentarius* on Aristotle's *Physics*, his gradual developing of a philosophical theory of matter and prime matter is examined by means of his progressive study of the works of the Aristotelian tradition. Surprisingly, Grosseteste's first notion of matter is bound to alchemy and astrology. It is a physical notion of matter as subject to astral influence and human manipulation. Only with his study of Aristotle's *Physics* does Grosseteste elaborate a more Aristotelian theory of matter, directly engaging himself with the manifold problems of assimilating Aristotle's theories into a Christian-based speculation. As a consequence, a much-refined version of his theory of matter is presented in the commentary on the *Physics* and *De luce*, where prime matter is envisioned as an extensionless point containing in itself the possibility of the existence of the entire universe. Notwithstanding the gradually more philosophical attitude marking Grosseteste's reflection, some tension between the alchemical and metaphysical epistemes of matter he engaged with can be appreciated throughout much of his early production.

**Keywords:** matter; Grosseteste; metaphysics; alchemy; natural philosophy

## INTRODUCTION

Living in the first half of the thirteenth century, Robert Grosseteste (d. 1253) is representative of the transition from early medieval Platonism to Scholastic Aristotelianism. Often considered a polymath, his scientific interests covered a wide set of disciplines and problems (from astronomy to the theories of vision and sound), which are often treated with a remarkably mathematical approach. Grosseteste's scientific reflections, however, were gradually accompanied by his interest in philosophy and, later, theology. The mingling of science and philosophy that marks relevant aspects of his early production was famously welcomed by Roger Bacon, who, later in the thirteenth century, would leave

\*nicola.polloni@hu-berlin.de

Paris and its Scholastic method to follow ‘the other way’, of which he considered Grosseteste to be the initiator.<sup>1</sup>

Grosseteste’s scientific and philosophical thought is marked by conspicuous tendencies toward the Aristotelian shift that was initiated one century earlier and which would be completed later in the thirteenth century. In particular, his early reflections are grounded on a pioneering blending of traditional Latin Platonism with new theories that were made available by translations from Greek and Arabic into Latin in the twelfth century.<sup>2</sup> Thus, an examination of Grosseteste’s early speculations is directly connected to the questions about the production, circulation and use of the translations made in southern Italy (from Greek) and, especially, in Iberia and Toledo (from Arabic). On the one hand, the gradual shift toward Aristotelianism implied an overall reassessment of philosophical theories of matter at the beginning of the thirteenth century and the de-materialization of the ‘primordial matter’ of the universe from a material chaos into an extensionless potency.<sup>3</sup> On the other hand, the Greek- and especially Arabic-into-Latin translation movements made available new interpretations of Aristotle’s theory of matter (notably those of Avicenna, Ibn Gabirol and, later, Averroes) and, crucially, implanted in Latin Europe new scientific disciplines that were focused on practices of material manipulation, such as alchemy.

This article surveys the development of Grosseteste’s theories of matter. Whereas a recent study by Cecilia Panti focused on Grosseteste’s theory of matter as presented in his later works, this article analyses the development of his early thought on the related notions of matter and prime matter.<sup>4</sup> The philosophical coordinates of Grosseteste’s first engagement with the problem of matter are rather different from his later thought, in consideration of both his aims and the sources used. Specifically, through my examination of the origin of his theory of matter, I want to address a central question: how did Robert Grosseteste interact with the diverse considerations of matter as an epistemic object provided by different disciplines and traditions in his attempt to construct a unitary theory of matter?

This question is very important in consideration of the gradual absorption of medieval sciences within the Aristotelian philosophical framework, which would become their shared paradigm later in the Middle Ages. In the case of matter, the epistemes adopted and

1 On Roger Bacon’s consideration of Oxford and Paris, see Jeremiah Hackett, ‘From *Sapientes antiqui* at Lincoln to the new *Sapientes moderni* at Paris, ca. 1260–1280: Roger Bacon’s two circles of scholars’, in *Robert Grosseteste and the pursuit of religious and scientific learning in the Middle Ages* (ed. J. Cunningham and M. Hocknull), pp. 119–142 (Springer, Berlin, 2016). Bacon’s narrative tends to characterize Grosseteste in opposition to the university masters, especially those working in Paris. For instance, see Roger Bacon, *Compendium of the study of philosophy* (ed. T. S. Maloney), pp. 74 and 81 (Oxford University Press, Oxford, 2018).

2 On how those new texts reshaped the Latin framework of both philosophy and science, see Charles Burnett, ‘Arabic into Latin: the reception of Arabic philosophy into western Europe’, in *The Cambridge companion to Arabic philosophy* (ed. P. Adamson and R. C. Taylor), pp. 370–404 (Cambridge University Press, Cambridge, 2005); and Charles Burnett, ‘Translations and transmission of Greek and Islamic science to Latin Christendom’, in *Cambridge history of science* (ed. D. C. Lindberg and M. H. Shanks), vol. 2, pp. 341–364 (Cambridge University Press, Cambridge, 2013).

3 In the twelfth century, the problem of how to interpret Plato’s theory of primordial chaos expounded in the *Timaeus* gave rise to some controversy, for instance between Hugh of St Victor and William of Conches and, later, Gundissalinus. On the former, see Dominique Poirel, ‘Physique et théologie: une querelle entre Guillaume de Conches et Hugues de Saint-Victor à propos du chaos originel’, in *Guillaume de Conches: philosophie et science au XII<sup>e</sup> siècle* (ed. B. Obrist and I. Caiazzo), pp. 289–327 (International Society for the Study of Medieval Latin Culture (SISMEL), Florence, 2011). It is worth pointing out how these controversies on the nature of primordial chaos and matter witness the gradual shift toward a more Aristotelian consideration of primordial matter as prime matter.

4 See Cecilia Panti, ‘Matter and infinity in Robert Grosseteste’s *De luce* and *Notes on the Physics*’, in *Materia: nouvelles perspectives de recherche dans la pensée et la culture médiévales (XII<sup>e</sup>–XVI<sup>e</sup> siècles)* (ed. T. Suarez-Nani and A. Paravicini Bagliani), pp. 27–55 (SISMEL, Florence, 2017).

construed by medieval sciences would not always fit easily within a framework envisioning matter both metaphysically (as the ontological partner of the form within the composite) and physically (as corporeal substrate, or secondary matter).

In this regard, Grosseteste's early production is an eminent case to be studied. First, it should be considered that, unlike most of his colleagues at the time, Grosseteste's first works were not directly connected to any teaching activity at the universities of either Paris or Oxford (he would teach the Franciscans in Oxford only later in his career). Second, Grosseteste's early interests were primarily directed toward the study of scientific disciplines. Only at a later point would he expand his interests to philosophy and theology. As a consequence, his case is noticeably different from Roger Bacon's and most of their contemporaries. Whereas natural philosophers usually moved toward the study of nature after having received a specific philosophical training, Grosseteste does the exact opposite and moves toward philosophy after having dedicated many years to the study of the natural sciences. Because of this reverted path from natural science to philosophy and, later, theology, one might expect Grosseteste's early notion of matter to be marked by a gradual 'metaphysicalization'. As will become clear, this is only partially true.

In this article, I examine Grosseteste's philosophical and scientific production from *De artibus liberalibus*, likely his earliest work, to his *De luce* and *Commentarius* on the *Physics*; my aim is to assess the progressive role played by philosophical sources in Grosseteste's theory of matter. I also want to show that the elaboration of that theory (or theories) corresponds to a clarification of how matter can be a reliable explanatory device for both natural philosophy and metaphysics. Contrary to what some might expect, however, Grosseteste's theory does not entail an exclusion, but rather an inclusion in the Aristotelian framework of different epistemes of matter, starting with its alchemical notion.

#### THE BEGINNING OF GROSSETESTE'S SCIENTIFIC ACTIVITY

Robert Grosseteste wrote his treatise *De artibus liberalibus* at the beginning of the thirteenth century.<sup>5</sup> The work describes the structure and usefulness of the seven traditional liberal arts, with specific insights provided by freshly translated texts. Accordingly, Grosseteste's treatise is quite original, although it is still marked by the twelfth-century account of the disciplinary division of the sciences. Considering the aims of *De artibus liberalibus*, it is not surprising to see that Grosseteste refers to the Latin term *materia* only three times, and with some caveat. In fact, a fundamental semantic distinction is required before the examination of Grosseteste's early theory of matter. In Latin, the term *materia* can have different meanings, which can be divided into two classes:

1. *materia* as the definite matter of something, considered as its physical or metaphysical basic fundament (univocal and technical sense of matter);
2. *materia* as a thing in general, considered as a reference to an unspecified thing—a substance, a tree or anything else—taken generically (equivocal and generic sense of matter).

<sup>5</sup> See Giles E. M. Gasper, 'On the liberal arts and its historical context', in *Knowing and speaking: Robert Grosseteste's De artibus liberalibus 'On the liberal arts' and De generatione sonorum 'On the Generation of Sounds'* (ed. G. E. M. Gasper, C. Panti, T. C. B. McLeish and H. Smithson), pp. 9–35 (Oxford University Press, Oxford, 2019).

It is evident that only the context in which the term is used can establish whether *materia* falls into the first or the second class of meanings. Moreover, the first class, of technical and univocal uses of *materia*, only points to its meaning of fundament, without implying any adherence of its user to one rather than another tradition, discipline or theory. Only a source-based systematic analysis of the text is able to clarify what the coordinates of that specific reference to matter are.

According to this semantic distinction, it may be noted that *De artibus liberalibus*'s first reference to *materia* follows its equivocal, rather than univocal, meaning. Grosseteste uses the term in his discussion of how a sound is produced by a *sonativum*, referring through it to anything which is able to produce a sound.<sup>6</sup> In turn, the last two references to matter are marked by the technical meaning of 'basic fundament', although with some peculiarity. Indeed, Grosseteste mentions matter in relation to his discussion of the usefulness of a novel scientific discipline that entered the Latin tradition a few decades earlier: alchemy. He claims that:

The other [minerals] do not differ from gold except according to the impurity of matter or inequality of complexion. Therefore, to transform these is to remove impurity and to add to the purified [minerals] a substance similar to the sun in power and operation, which withdraws them from inequality. This substance should not be prepared at any hour whatever, but when the sun is in its exaltation, freed from the aspect of malefic [planetary bodies], since it will then be in full power and draw out in the matter of this substance a power similar to itself, which it can only bring from potency into act at specific hours.<sup>7</sup>

In this passage, Grosseteste discusses the astrological hours at which the alchemical operation must be pursued in order to be effective. Following the alchemical tradition claiming that all metals would be gold if it were not for astral and earthly influences, he claims that the variables differentiating these metals from their golden root are the inequality of their complexion and the *immunditia materiae*, the filth or impurity of matter. It is upon this material impurity that the alchemist must operate in order to cleanse it and obtain the principle of metals, that is, gold. A few lines afterwards, Grosseteste refers to the propitious astral hour at which this operation must be pursued in order to best use the sun's radiation on matter. Evidently, in both cases *materia* is not considered in its generic meaning, but as the physical fundament on which the metal is grounded.

The semantic field of these two references needs to be referred back to the sources used by Grosseteste in order to clarify its doctrinal scope. As has been pointed out elsewhere, the alchemical discussion in *De artibus liberalibus* is based on two main sources, Morienus and Artepheus.<sup>8</sup> From the latter's *Clavis sapientiae*, Grosseteste appears to have derived his 'set of variables' for the alchemical transmutation of metals, an example of an early

6 See Robert Grosseteste, *De artibus liberalibus* (ed. S. Sønnesyn), in Gasper *et al.*, *op. cit.* (note 5), pp. 74–92, at p. 80, ll. 63–64: 'Hanc autem extensionem et contractionem ingredientem profunditatem materie—et precipue illud quod est areum subtile in corpore—sonationem esse intelligo'.

7 *Ibid.*, p. 92, ll. 171–179: 'Reliqua vero ab auro non differunt nisi secundum immunditiam materie aut complexionis inequalitatem. Quapropter transmutare ista est immunditias abstergere et mundificatis substantiam apponere assimilata soli in virtute et operatione, que ipsa reducit ab inequalitate. Hec substantia non qualibetcumque hora preparatur, sed cum fuerit sol in exaltatione, liber ab aspectu malorum, quia tunc est in fortitudine et extrahit in materia huius substantie virtutem sibi assimilata quam non potest nisi in certis horis de potentia ad actum perducere.' English translation from *ibid.*, p. 93.

8 See Giles E. M. Gasper, Nicola Polloni, Sigbjørn Sønnesyn, Ann Lawrence-Mathers and Nader El-Bizri, 'The use of the stars: alchemy, plants, and medicine', in Gasper *et al.*, *op. cit.* (note 5), pp. 167–195.

interest in this text by medieval philosophers.<sup>9</sup> However, it is from the *Liber de compositione alchemiae* of Morienus that Grosseteste takes his reference to the impurity of matter. The text had been translated by Robert of Chester in the twelfth century and was surely available to Grosseteste, as a lexicographical analysis of the terms used suggests.<sup>10</sup>

The *Liber de compositione alchemiae* often refers to the *immunditia* as a main characteristic of the substances used or produced during the process of transmutation. It is often linked to blackness (*nigredo*), stench (*fetor*), death (*immunditia mortui*) and waste (*feces vitri, licet eius immunditia*).<sup>11</sup> It is a strongly denoted term that implies a feature proper to physical matter, stressing the operational process of transmutation that is pursued by the alchemical practitioner. Evidently, references to stench and death are to be connected to the odour produced by the process (supposedly, a bad smell), whereas those to blackness and waste are to be referred to the colour acquired by the substance at that phase of the operation.<sup>12</sup>

Grosseteste, however, does not seem to refer just to the transmuting operation, but to imply that the impurity of matter is a basic and natural characteristic of all metals except gold. Being so, his use of the term *materia* cannot be considered in its generic meaning, because it expresses a basic feature of metallic matter as such. Accordingly, the impure matter of the metals corresponds to a technical meaning specific to alchemy: the first occurrence of this term in Grosseteste.

The context of Grosseteste's discussion allows further speculation on this point. The final part of *De artibus liberalibus* examines how the celestial bodies influence the sublunary world. These astral influences have a direct effect on metallic matter, as Grosseteste points out. However, they also influence the causation of a wider set of sublunary phenomena concerning living beings—from plants to human health. Thus, if we suppose that the influence of the celestial bodies pervades the sublunary world as a whole, it seems possible to extend the relationship between celestial bodies and metallic matter to a wider notion of matter—the corporeal sublunary matter subject to astral influence. Evidently, this notion of matter would coincide neither with the equivocal meaning of the term *materia* nor with Aristotelian prime matter and is incidentally close to the notion of matter of later philosophers and practitioners, such as Peter of Abano.<sup>13</sup>

Accordingly, a plausible definition of Grosseteste's first notion of matter is that of a corporeal matter which is subject to natural astral influence and, at least in the case of metallic matter, to alchemical manipulation. It is a rather peculiar notion of matter which is very distant from the Aristotelian technical meaning of this term as 'metaphysical ingredient' of the hylomorphic composite characterized by potency and

<sup>9</sup> See Nicola Polloni, 'A matter of philosophers and spheres: medieval glosses on Arsephius's *Key of Wisdom*', *Ambix* 67, 135–153 (2020).

<sup>10</sup> See Richard Lemay, 'L'authenticité de la Préface de Robert de Chester à sa traduction du Morienus', *Chrysopoëia* 4, 3–32 (1991). See also Marion Dapsens, 'De la *Risālat Maryānus* au *De compositione alchemiae*: quelques réflexions sur la tradition d'un traité d'alchimie', *Stud. graeco-arabica* 6, 121–140 (2016).

<sup>11</sup> For instance, see Morienus Latinus, *Liber de compositione alchemiae* (ed. L. Stavenhagen), in *A Testament of Alchemy* (Brandeis University Press, Hanover, 1974), p. 21: 'Sed laton, i.e. terra, potest substantialiter auferre ab azoc, i.e. argentum vivum, suam albedinem, quia inest eo mirabilis fortitudo que facit omnes colores apparere cum colores fuerunt abluti et que auferat suam nigredinem atque immunditiam et fit album, tunc non propter latonem, qui faciat eum rubeum'.

<sup>12</sup> See Jean-Marc Mandosio, 'La création verbale dans l'alchimie latine du Moyen Âge', *Archivum Latinitatis Medii Aevi* 63, 137–147 (2005), especially at p. 144, where Mandosio discusses the term *spiritus foetens* in relation to prime matter.

<sup>13</sup> On Peter of Abano's notion of matter and its relation to astrology, see Aurélien Robert, 'Pietro d'Abano et le matérialisme', in Suarez-Nani and Paravicini Bagliani, *op. cit.* (note 4), pp. 217–250.



formlessness.<sup>14</sup> Indeed, *De artibus liberalibus* shows no references to any of the main philosophical sources of theories of matter, from Calcidius to Aristotle and Avicenna.

Grosseteste's first engagement with matter would not be further pursued in the treatises immediately following *De artibus liberalibus*. His *De generatione sonorum* refers only once to *materia*, in relation to the material vowel sounds.<sup>15</sup> In turn, the treatises *De sex differentiis* and *De sphaera* never mention this term. *De sphaera*, a treatise focused on astronomy and very close to Sacrobosco's homonymous work, mentions *forma* only once. This occurrence, however, is not related to form as the ontological partner of matter in the hylomorphic composite, but refers to its generic meaning of shape.<sup>16</sup> Other synonyms for matter, such as *substratum* or *subiectum*, are not attested either.

Matter would resurface only with *De cometis*, written following Grosseteste's study of Aristotle's *Meteora*. Grosseteste refers to matter in relation to the formation of comets. At first sight, it seems that matter stands here for the matter of the elements, as attested by its qualifications through adjectivizations, for example, *materia terrestris* (earthy matter), *materia sublimata* (sublimated matter) and *materia deorsum veniente* (matter proceeding from above).<sup>17</sup> However, a closer look shows that Grosseteste is not referring to the technical meaning of matter that we would expect (in this case, as substrate of the elements), but is again using the equivocal meaning standing for an 'unspecified thing' which enters the process of a comet's formation and in relation to Aristotle's distinction between superlunary and sublunary worlds.

Accordingly, it should be noted that the works authored by Grosseteste before 1225 have no reference to matter as philosophical principle outside of its alchemical meaning. He already knew at least some of Aristotle's texts, but he did not seem to have had any interest in the philosophical notion of matter presented by Aristotle. Accordingly, Grosseteste's first notion of matter envisions a rather corporeal matter: something concrete although rooted in substance and subject to astral influence and human manipulation.

#### GROSSETESTE'S ENCOUNTER WITH ARISTOTLE'S *PHYSICS*

Grosseteste's approach changed abruptly after his encounter with Aristotle's *Physics*, as shown by the *Commentarius in VIII libros Physicorum Aristotelis* which reveals his interest in Aristotle's notion of matter and that of prime matter inherited from the Aristotelian tradition. There are 135 references to matter in the commentary (table 1), the vast majority derived directly from Aristotle's text and generally presenting little originality by Grosseteste. Matter is a natural principle, one in number, directly connected yet not

14 I am following the distinction between a consideration of matter and form as 'metaphysical ingredients' and 'integral parts' proposed by Robert Pasnau. See Robert Pasnau, *Metaphysical themes 1274–1671* (Oxford University Press, Oxford, 2011). In the context of *De artibus liberalibus*, it is clear that, following that distinction, Grosseteste considers matter as an integral part of the considered thing—a noticeably 'physical' element of the thing. However, there is a fundamental caveat here, since he never refers to hylomorphism in his treatise, as I have made clear.

15 See Robert Grosseteste, *De generatione sonorum* (ed. S. Sønnesyn), in Gasper *et al.*, *op. cit.* (note 5), p. 252, ll. 93–94.

16 See Robert Grosseteste, *De sphaera*, in *Moti, virtù e motori celesti nella cosmologia di Roberto Grossatesta* (ed. Cecilia Pantì), p. 291, l. 38 (SISMEL, Florence, 2001).

17 For instance, see Robert Grosseteste, *De cometis*, in Pantì, *op. cit.* (note 16), p. 325, ll. 83–86.

Table 1. References to matter in Grosseteste's *Commentarius in VIII libros Physicorum Aristotelis*

Term	No. of references
<i>materia</i>	119
<i>materia prima</i>	6
<i>materia proxima</i>	1
<i>causa materialis</i>	2
<i>materialia</i> (things made of matter)	4
<i>materialis</i> (material, adjective)	3
Total no. of references	135

coincident with either potency or privation.<sup>18</sup> It is the substrate of change and movement, which desires the form as the form desires it, naturally incorruptible and kept in existence by God's goodness.<sup>19</sup>

While most of these connotations of matter and prime matter are derived from Aristotle himself or the early medieval Latin tradition, especially Calcidius, there are at least three main points that signal Grosseteste's own reflection on the problem of matter.<sup>20</sup> Cecilia Panti has recently pointed out a series of passages in Grosseteste's commentary that explicitly refer to prime matter as the subject of an infinite replication by means of form.<sup>21</sup> For instance, he claims:

However, the Pythagoreans perhaps understood the same infinite replication of matter through a reference to the infinite number which they posited as principle of the sensible things. Indeed, the replicability of matter to infinity is number and principle, [it is] the same replication of the sensible things. Yet the things that have sensible extension and bulk are made out of simple matter only by the infinite replication of matter over itself. And this replicability of matter is a passive potency.<sup>22</sup>

Infinite replication, here, means something different than the infinite multiplication of light described in *De luce*. There, Grosseteste claims that matter has been extended at the beginning of time by a point of light which indefinitely multiplied itself and matter with it, *de facto* extending prime matter into a three-dimensionality it cannot have *per se*.<sup>23</sup> The presence of these references in the commentary on *Physics* makes it clear that some of Grosseteste's interests in central aspects characterizing his physics of light are not exclusive to *De luce*, but are shared by other works authored in those years, probably as a consequence of his reading of Aristotle's *Physics*. At the same time, this set of passages also reveals that Grosseteste was well aware of the delicate ontological problems

18 See Robert Grosseteste, *Commentarius in VIII libros Physicorum Aristotelis* (ed. R. C. Dales), p. 28 (University of Colorado Press, Boulder, 1963).

19 *Ibid.*, pp. 28–30.

20 Calcidius is mentioned seven times by Grosseteste in his commentary on Aristotle's *Physics*, which display the relevance that the *Timaeus* still had in Grosseteste's reflection at the time. On this point, see also Polloni, *op. cit.* (note 9).

21 See Panti, *op. cit.* (note 4), pp. 45–49.

22 Grosseteste, *op. cit.* (note 18), p. 54: 'Forte autem Pictagorici intellexerunt per numerum infinitum quem posuerunt principium sensibilibium ipsam replicationem materie infinitam. Replicabilitas igitur materie in infinitum numerus est et principium rerum sensibilibium ipsam replicationem. De simplici autem materia non fierent res habentes extensionem et magnitudinem sensibilem nisi per materie infinitam super se replicationem; et ista replicabilitas materie potencia passiva est.'

23 See Robert Grosseteste, *De luce* (ed. C. Panti), in *Robert Grosseteste and his intellectual milieu* (ed. J. Flood, J. R. Ginther and J. W. Goering), pp. 193–238 (Pontifical Institute of Mediaeval Studies (PIMS), Toronto, 2013), at p. 226, ll. 1–12.



surrounding the philosophical notion of prime matter, starting with its lack of extension. His solution to this problem would be given elsewhere by the theory of the form of corporeity and the cosmology of light. In this instance, it should also be acknowledged that Grosseteste has an utterly metaphysical notion of prime matter in his commentary on *Physics*.

A second point is that Grosseteste shows a critical attitude towards some of Aristotle's positions. In other words, he seems to have been aware of the tensions between Aristotelian works and Christian theology that characterized a crucial aspect of thirteenth-century philosophical reflection, in which matter plays a central role. For instance, while discussing the ingenerated nature of matter in *Physics* I, Grosseteste stresses that:

Accordingly, matter is corruptible not *per se* but by means of its link to privation. However, matter in itself is incorruptible and unborn, because everything that is born and corrupted has matter. According to this, if matter were corrupted, it would yet endure after its corruption, and likewise matter would be corrupted before being corrupted. Nonetheless, if Aristotle thought that matter is not generated, that is to say, eternal—like some people, philosophising, devoutly sustain he did—he would be mistaken. Indeed, at the beginning of time, matter is made from nothing and it is itself corruptible, that is to say, it has the possibility to return from its existence into nothingness. In turn, it is preserved perpetually by the goodness of the creator, and every natural thing that does not have in itself a necessity of corruption is of this sort.<sup>24</sup>

Grosseteste clarifies that matter is not generated, yet not eternal, as Aristotle appeared to have claimed. Matter is created at the beginning of time and is *per se* corruptible, although kept in existence perpetually by God's goodness. This passage shows that Grosseteste was ready to criticize Aristotle and was also well aware of the debate about the eternity of matter and its semi-divine position which would follow such a claim. He knew that similar positions were taken by Calcidius, whose commentary on Plato's *Timaeus* still circulated widely at the beginning of the thirteenth century. And, plausibly, Grosseteste was also aware of David of Dinant, who had been condemned in Paris around two decades earlier.<sup>25</sup> His condemnation was centred on his theory of matter, although the main feature leading to Dinant's condemnation was not matter's eternity, but its identification with God. Finally, Grosseteste appears to have read at least some of the works authored by Gundissalinus, whose *De processione mundi* explicitly states that matter is eternal in God's mind.<sup>26</sup> Accordingly, the framework in which Grosseteste was writing his commentary on *Physics* was marked by profound tensions concerning what we might call the 'theological' status of matter in relation to God and creation. His short discussion of this point shows his awareness of the possible implications in which a literal reading of Aristotle and radical philosophical developments of his stances might result.

<sup>24</sup> Grosseteste, *op. cit.* (note 18), p. 30: 'Materia igitur non per se sed secundum quod privatio est corrumpitur. In se autem incorruptibilis et ingenita est, quia omne quod gignitur et corrumpitur habet materiam, unde si corrumperetur materia, post corruptionem remaneret materia. Et ita esset materia corrupta antequam corrumperetur. Si autem Aristoteles intelligat materiam ingeneratam, hoc est eternam, sicut inponunt ei pie philosophantes, falsum dicit. Ex nichilo enim in principio temporis facta est et ex seipsa corruptibilis, hoc est de se potens redire in nichil. Bonitate tamen creatoris conservatur perpetuo. Sic omne naturale quod non habet in se necessitatem corruptionis.'

<sup>25</sup> See Andreas Speer, 'Von Platon zu Aristoteles: zur Prinzipienlehre bei David von Dinant', *Freiburger Zeitschr. Phil. Theol.* 47, 307–341 (2000).

<sup>26</sup> However, it should be noted that the role usually played by Gundissalinus's works—as 'rooting sources' rather than 'authoritative sources'—makes it almost impossible to ascertain his influence on Grosseteste.

In consideration of Grosseteste's theory of matter in his commentary on *Physics*, a third point worth stressing is his permanent interest in the notion of matter as object of human manipulation which he had already used in *De artibus liberalibus*. Commenting on *Physics* II, Grosseteste discusses the endurance of matter throughout a very specific case of natural change, that of the generation of metals. In this context, he claims that:

For everyone was acknowledging that nature is 'that from which everything is given birth'. However, this 'from which' is said ambiguously. In a way, indeed, matter is 'that from which everything is given birth' while, in another way, form is 'that from which everything is given birth.' Accordingly, matter is said to be the subject nature which persists in that which is transmuted and from which that which is transmuted is given birth, like the viscous water from which quicksilver is given birth. And through the mediation of quicksilver, the other metals are said so in virtue of the nature of metals.<sup>27</sup>

Following Aristotle, matter can be said to be nature under certain conditions, as matter is the substrate of endurance of physical change. The example offered by Grosseteste is the generation of metals, namely, the generation of quicksilver from viscous water and that of the other metals from quicksilver. This reference is to be connected, first, to *De artibus liberalibus*, where Grosseteste claimed that 'the power of Mercury mixing viscous water with sulphurous smoke produces quicksilver'.<sup>28</sup> It must therefore be considered as a reference to the sulphur–mercury theory which was implanted in the Latin tradition by the translation of the *Liber de secretis naturae* by pseudo-Apollonius of Tyana, attested also in Artepheus's *Clavis sapientiae*. This doctrine was spread in the Latin Middle Ages by the texts of the Jabirian alchemical tradition and, for different reasons, by Avicenna's *De congelatione et conglutinatione lapidum*.<sup>29</sup> Whereas Grosseteste does not make explicit the source of his example, its coincidence with the same theory discussed in *De artibus liberalibus* makes abundantly clear that he is referring to the alchemical tradition.

Accordingly, the example of the generation of metals from quicksilver shows that Grosseteste's interest in alchemy was still alive. Evidently, he felt no tension between the alchemical theory and natural philosophy—he uses the example of metals in his commentary of an eminently philosophical work, Aristotle's *Physics*. Moreover, his example also shows that a notion of matter as subject to manipulation and astral influence nevertheless accompanied a different notion of matter as philosophical substrate of endurance.

#### THE CONSTRUCTION OF A PHILOSOPHICAL THEORY OF MATTER

Grosseteste's encounter with Aristotle's *Physics* is a turning point. His interaction and study of Aristotle's natural philosophy finally allows him to lay the bases of his own philosophical

27 Grosseteste, *op. cit.* (note 18), p. 31: 'Omnes enim intelligebant naturam esse unde res nascuntur sed istud unde dicitur ambigue. Materia enim uno modo est unde nascuntur et forma est alio modo unde nascuntur. Materia itaque subiecta que semper manet in transmutatis et unde nascuntur transmutata natura dicitur, ut aqua viscosa unde nascitur argentum vivum. Et sic metalla alia mediante argento vivo natura metallorum dicuntur.'

28 See Grosseteste, *op. cit.* (note 6), p. 92, ll. 170–171: 'Mercurii cum aqua viscosa fumum commiscens sulphureum vivum efficit argentum'. English translation, *ibid.*, p. 93.

29 See Pinella Travaglia, 'I *Meteorologica* nella tradizione ermetica araba: il *Kitāb sirr al-ḥalīqā*', in *Aristoteles chemicus: Il IV libro dei Meteorologica nella tradizione antica e medievale* (ed. C. Viano), pp. 99–112 (Academia Verlag, Sankt Augustin, 2002); Paul Kraus, *Jābir ibn Ḥayyān: contributions à l'histoire des idées scientifiques dans l'Islam, ii: Jābir et la science grecque* (Mémoires présentés à l'Institut d'Égypte, 45, Cairo, 1943); and Elisa Rubino, 'Il *De mineralibus* di Avicenna tradotto da Alfredo di Shreshill', *Bull. Phil. Médiévale* 58, 23–87 (2016).

reflection, in which matter plays a pivotal role in both physics and metaphysics. Additional works written in the same period by Grosseteste confirm his new attitude toward the problem of matter.

Almost contemporary with his commentary on Aristotle's *Physics*, Grosseteste's *De motu supercelestium* is a very peculiar text, comprised mostly of quotations proceeding from Averroes's *Long commentary on Metaphysics*, book 12. As Cecilia Panti has pointed out, the treatise is so close to Averroes's text that it may be considered as a first attempt by Grosseteste to understand Averroes's position on the movement of the heavens.<sup>30</sup> Accordingly, the positions therein expounded are more a result of Grosseteste's study of Averroes than the expression of his own positions. While discussing Averroes's theory of the immateriality of the heavens, for instance, Grosseteste does not criticize it directly, although his further works will describe a material universe—both above and below the moon.

Grosseteste's *De potentia et actu* is noticeably more engaged with the philosophical stakes of the theory of matter. The treatise studies the correlation between act and potency, as the title itself indicates, with much attention paid to the difference between active and passive potency and the role that the actualizing cause plays in the passage from potency to actuality. In this context and in coherence with the tradition, Grosseteste establishes a correspondence between matter and potency which, however, is not a complete identity. This allows him to justify the presence of some degree of potency also in simple substances. Every created being has a dual modal composition of active and passive potency (i.e. the power of perfecting and the potency of being perfected). However, while corporeal beings have these two potencies that are metaphysically separated (active potency corresponding to the form, passive potency to matter), in simple substances the active and passive potencies are coincident.<sup>31</sup>

Grosseteste also discusses the cosmological problem concerning the causation of prime matter. This problem can be discussed regarding what Thomas of York mistakenly ascribes to Gundissalinus.<sup>32</sup> How can prime matter be both caused and in potency? On the one hand, prime matter is the potential enduring substrate required by the natural world and its constant change. On the other, every causation is the actualization of a potency. Accordingly, if prime matter is caused, it must be actualized by the process of causation. If this is so, however, one has to suppose that there is also a potency of the potency of prime matter, in a *regressio ad infinitum* whose only solution would be to admit that

30 See Panti, *op. cit.* (note 16), pp. 169–186.

31 See Robert Grosseteste, *De potentia et actu* (ed. L. Baur), in Ludwig Baur, *Die philosophischen Werke Grossetestes*, p. 128, ll. 30–35 (Aschendorff, Münster, 1912). Grosseteste's distinction between active and passive potency is intriguing, as he appears to be one of the first to use it in the thirteenth century. While further studies on this point are required in order to ascertain what sources were used by him to substantiate this distinction, it is evident that a possible, even probable, source is Gundissalinus's *De processionem mundi*, where Gundissalinus claims that both matter and form are potencies, although one is passive and the other active. See Nicola Polloni, *The twelfth-century renewal of Latin metaphysics: Gundissalinus's ontology of matter and form* (PIMS, Toronto, 2020), pp. 192–204. See also Panti, *op. cit.* (note 4), pp. 48–50.

32 See Thomas of York, *Sapientiale* (ed. C. A. Grassi), in *The doctrine of creation in the Sapientiale of Thomas of York*, vol. 2, pp. 234–235 (University of Toronto, Toronto, 1952). Thomas of York's interpretation strains Gundissalinus's position, as the latter discussed but did not adhere to the argument quoted by the *Sapientiale*. For Gundissalinus, prime matter is eternal, yet created. Following and blending Ibn Gabirol's and Avicenna's cosmologies, Gundissalinus claims that prime matter is eternal in God's mind, together with the first form, and they are joined by God's will at the beginning of time, creating the universe.

prime matter is eternal. Probably aware of this problem, in *De potentia et actu* Grosseteste points out that:

It is clear from this that perhaps there is something which is in potency, yet that thing cannot be any existing thing and cannot come to be from any existing thing. And [maybe] there was something in potency, yet that thing could have never been anything at all and it could not have come to be from anything. For instance, the world was in potency before existing and before the matter of the world was created. Yet the world was not an existing thing and could not come to be from anything that existed. Before being created, indeed, prime matter and all those things that are completely immaterial were in potency. Yet matter could never have been anything at all and matter could not have come to be from anything.<sup>33</sup>

In this complex passage, Grosseteste distinguishes between three kinds of potencies. Potency can be considered as the aspect of potentiality of some existing thing ( $p_1$ ) and as the capacity proper to that thing of being actualized by something else ( $p_2$ ). Applied to the world and prime matter, however, this distinction has some fundamental limitations. Before being created, prime matter could not be the potency of something that becomes prime matter ( $p_1$ ), because there was nothing that could play such a role. At the same time, the potency to become prime matter could not be of the kind ( $p_2$ ) either. The first act of creation corresponds to the creation of prime matter itself and, as a consequence, there was nothing else that could actualize the potency of prime matter. Accordingly, there must be a third sense of potency as possibility ( $p_3$ ), namely the possibility to exist (in potency) proper to prime matter before being created. Like the possibility of building a house in the mind of an architect, the potency of prime matter before creation was a possibility in God's mind and will, which was concretized at the beginning of time with the creation of prime matter itself, in its potential state. Thus, it is only through God's creation that the potency of prime matter—as possibility—could become the potency of the world as expressed by both ( $p_1$ ) and ( $p_2$ ). The creation of matter, therefore, corresponds to the establishment of the substrate of potency, which, in turn, did not require any preceding potency.

Notwithstanding these crucial points discussed by Grosseteste, it seems that the most enveloping problems he tried to resolve were those related to prime matter's lack of extension. Being potential, prime matter is deprived of extensionality and corporeity. In other words, the position of prime matter as an utterly unqualified entity implies that it cannot be considered as corporeal, lacking all 'physicality'. Accordingly, the extension of prime matter was a central metaphysical problem which, in turn, corresponded to both establishment and foundation of Aristotle's physical world, mainly characterized by its materiality and movement.

In the thirteenth century, two controversial doctrines were directly related to the problem of prime matter's acquisition of three-dimensionality: formal pluralism (claiming that in the hylomorphic composite there is more than one non-incident form) and universal hylomorphism (claiming that the hylomorphic structure is common to all created beings,

<sup>33</sup> Grosseteste, *op. cit.* (note 31), p. 127, ll. 22–30: 'Ex hoc manifestum est, quod forte res est in potentia, et tamen nihil quod est, nec ex aliquo quod est potest esse res illa: et aliquid fuit in potentia, et tamen nihil unquam nec ex aliquo potuit esse res illa, verbi gratia antequam esset mundus vel materia mundi creata, fuit mundus in potentia, et tamen nihil potuit esse mundus, nec ex aliquo quod fuit, potuit esse mundus. Materia vero prima et omnis res immaterialis penitus, antequam crearetur, fuit in potentia; et tamen nihil unquam potuit esse materia, nec ex aliquo potuit esse materia.'

both corporeal and spiritual).<sup>34</sup> Following the translation of many philosophical and scientific works from Greek and Arabic into Latin, the first decades of the thirteenth century were marked by a much freer speculative approach to problems of matter than later medieval discussions of the same topic. Often dismissed in the later Middle Ages, a large number of doctrinal stances originated from this variety of approaches.<sup>35</sup>

Pluralist theories reckoned that substance cannot be reduced to the composition of prime matter and one substantial form, as its plurality of qualifications implies a plurality of non-incident (and therefore substantial) forms. In the thirteenth century, some upholders of pluralist theories acknowledged the existence of only two non-incident forms. Other thinkers proposed elaborate systems by which the ontological structure of any individual being reflects the branches of Porphyry's tree, up to the form of substantiality. In turn, others supposed that the first form to extend prime matter was not to be considered a substantial form at all, but rather an accident necessarily accompanying prime matter. Other central problems were the role played by prime matter in the process of individuation (not so central, evidently, for the upholders of a pluralist formal approach) and the *vexata quaestio* of the extensionality of prime matter.

Grosseteste appears to adhere clearly to the 'simple view' of prime matter, following Robert Pasnau's analysis of the problem of prime matter's extensionality.<sup>36</sup> In other words, prime matter is considered as a simple and potential entity; it has no extension *per se*, as it is an utterly unqualified substrate, apt only to receive forms. This position, however, does not resolve, but creates the problem of extensionality: how can prime matter be extended? In the thirteenth century, at least three solutions were available, corresponding to the positions of three Islamicate authors: Avicenna, Ibn Gabirol and Averroes.

Avicenna presents his solution to this thorny problem in the first book of his *Physics*.<sup>37</sup> Prime matter is extensionless and extended into three-dimensionality by the corporeal form or form of corporeity (*forma corporalis*). For Avicenna, corporeity corresponds to (potential) three-dimensionality (namely, the possibility of positing three dimensions). As matter is a feature of corporeal beings only and it does not have *per se* any extension, it is necessary to posit a form extending prime matter into corporeity. As Andreas Lammer has

34 In the Middle Ages, both formal pluralism and universal hylomorphism were divided into a myriad of different interpretations. In relation to the former, I am here referring exclusively to *ontological* formal pluralism as distinguished from *psychological* formal pluralism (which is focused on the number of souls within a living body). In the thirteenth century, ontological formal pluralism was often—but not always—quite generous in the number of forms it envisioned within a considered thing. In the later Middle Ages, it would become more parsimonious, often following Duns Scotus's version of this metaphysical theory. On thirteenth-century psychological formal pluralism, see D. A. Callus, 'Two early Oxford masters on the problem of plurality of forms: Adam of Buckfield – Richard Rufus of Cornwall', *Rev. néoscholast. phil.* 42, 411–444 (1939). On Scotus's parsimonious formal pluralism, see R. Cross, 'The plurality of forms', in R. Cross, *The physics of Duns Scotus: the scientific context of a theological vision*, pp. 47–76 (Clarendon Press, Oxford, 1998).

35 For an overall perspective on the metaphysical debate on prime matter in the later Middle Ages, see Pasnau, *op. cit.* (note 14), pp. 17–95. See also Marienza Benedetto, 'Alle origini della controversia medievale sulla pluralità delle forme sostanziali: il *Fons vitae* di Avicenna', in *Appropriation, interpretation and criticism: philosophical and theological exchanges between the Arabic, Hebrew and Latin intellectual traditions* (ed. A. Fidora and N. Polloni), pp. 137–184 (Federation of Institutes for Medieval Studies (FIDEM), Barcelona and Rome, 2016); and Stephen H. S. Chung, 'Hylémorphisme universel', in *Mots médiévaux offerts à Ruedi Imbach* (ed. I. Atucha, D. Calma, C. König-Pralong and I. Zavattero), pp. 331–342 (FIDEM, Porto, 2011).

36 See Pasnau, *op. cit.* (note 14), pp. 53–56. Another order of problems is the relation between Grosseteste's theory of prime matter and his latent references to atomism, which, apparently, he inherited from the twelfth-century discussion of that theme.

37 See Avicenna, *Liber primus naturalium: De causis et principiis naturalium* (ed. S. van Riet) (Peeters, Louvain-la-Neuve and Leiden, 1992), pp. 18–34. On the influence of Avicenna's theory of prime matter on the Franciscan tradition, see Antonio Pérez-Estévez, *La materia de Avicenna a la escuela franciscana* (Ediluz, Maracaibo, 1998).

pointed out recently, Avicenna's doctrine of the form of corporeity may be interpreted in two different ways. On the one hand, it can be interpreted as the attribution of a form to prime matter before the acquisition of its substantial form, distinguishing two ontological levels corresponding to 'body as such' and a particular corporeal body. On the other hand, the form of corporeity may express a function performed by the substantial form itself that, upon being joined to matter, extends it and provides it with its own qualification.<sup>38</sup> It is clear that, if the dynamic is interpreted in the first way, there will be some evident pluralist implications, as there will be two non-incidentals forms.<sup>39</sup>

This would be close to a second solution to the problem of matter's extensionality, given by Ibn Gabirol. His *Fons vitae*, indeed, was the main Latin source of both universal hylomorphism and the formal pluralism. For Ibn Gabirol, matter is a characteristic feature of created being as such, both corporeal and spiritual. Prime matter, therefore, is extensionless (it is proper also of the hypostatical spiritual beings, which are also unextended), and acquires dimension only at a lower level of reality. This lower level corresponds to the acquisition of the form of corporeity (*forma corporalis*), which joins the universal spiritual matter (the lowest level of hypostatical Nature) and extends it into three-dimensionality. The result of this union is matter bearing quantity, which is the substrate of the corporeal forms that join it, giving origin to the corporeal bodies of the heavens and the earth. Each one of these corporeal beings, therefore, is characterised by a complex ontological structure made of different degrees of matters and forms—an ontological richness provided by the theory of a plurality of non-incidentals forms.<sup>40</sup>

Finally, a third solution was offered by Averroes in *De substantia orbis*: the doctrine of undetermined dimensions, which had a widespread acceptance in the Latin medieval tradition.<sup>41</sup> Averroes also acknowledges that prime matter is *per se* extensionless and that it must be extended in order to be joined to corporeal forms. As a further substantial form is not permitted (so as not to admit formal pluralism), he claims that prime matter is always joined to an incidental form (as quantity cannot be a substantial feature), which provides matter with a non-determined extension. This undetermined dimension, in turn, is determined by the reception of the substantial form at a different ontological stage. In other words, the incidental form stretches matter into a sort of extended stuff which is shaped into corporeal beings by the reception of substantial forms.<sup>42</sup> The three models are summarized in table 2.

Connected to the problem of extensionality and formal pluralism was the question of the ontological scope of matter. Is prime matter a feature shared by corporeal beings only or is it common to every created being? The latter was the answer proposed by Ibn Gabirol and Gundissalinus, the initiator of universal hylomorphism in the Latin medieval tradition. Thirteenth-century thinkers, mostly but not exclusively from the Franciscan tradition, would accept universal hylomorphism, grounding it upon Augustine's authority. Accordingly, prime matter is the substrate of created existence, utilized by God as a sort

38 See Andreas Lammer, *The elements of Avicenna's physics* (De Gruyter, Berlin, 2018), pp. 154–201.

39 This is the way the theory is interpreted, for instance, by Gundissalinus. See Polloni, *op. cit.* (note 31), pp. 244–253.

40 See *ibid.*, pp. 144–165.

41 See Silvia Donati, 'The doctrine of *dimensiones indeterminatae* in the commentary tradition of the *Physics* in the XIIIth and in the early XIVth century', in *The dynamics of Aristotelian natural philosophy* (ed. C. H. Leijnhorst, C. H. Lüthy and J. M. M. H. Thijssen), pp. 188–223 (Brill, Leiden/Boston/Cologne, 2002).

42 See also Pasnau, *op. cit.* (note 14), pp. 60–66.



Table 2. Models for the extension of prime matter

Author	Extension of prime matter	Qualification of the body
Avicenna (realist reading)	1 substantial form (form of corporeity)	1 substantial form (+ <i>n</i> accidents)
Ibn Gabirol	1 substantial form (form of corporeity)	<i>n</i> substantial forms (+ <i>n</i> accidents)
Averroes	1 incidental form (indeterminate dimensions)	1 substantial form (+ <i>n</i> accidents)

of subject of instantiation for each and every form he created. This implied a complete de-corporealization of matter and it gave origin to a harsh debate later in the thirteenth century.<sup>43</sup>

Grosseteste's position in relation to the problem of the ontological scope of prime matter is complex. He tends to elude any direct discussion of whether spiritual substances, like souls and angels, are hylomorphic composite or formal substances. On some occasions, he explicitly distinguishes between the levels of natural philosophy and theology, the latter discussing creation rather than generation. On this point, while discussing absolute generation in his commentary on the *Physics*, Grosseteste briefly refers to the case of the souls and matter just to observe that their creation *ex nihilo* is not a natural phenomenon. Therefore, their origin is not treated by natural philosophy:

Whatever participates of being, indeed, was previously participating of being and did not come to be from absolute non-being. I mean the natural things that are here considered by the philosopher [Aristotle in the *Physics*], and certainly I am not currently considering at all the creation from nothing of matter and the souls. Likewise, it is impossible for whatever participates of absolute non-being to come to be.<sup>44</sup>

Other passages appear to be open toward an admission of universal hylomorphism, although many tensions accompany Grosseteste's accounts of cosmology and even his metaphysical descriptions. For instance, *De motu corporali et luce* describes a universe in which everything originates and is moved by means of the interactions of light with matter, yet the ontological nature of spiritual entities such as souls, angels and spirits is unaccounted for, leaving out the question of what these spiritual entities are made of—namely, either light, reflected light or matter and light.<sup>45</sup>

Perhaps less problematic—yet no less controversial—is Grosseteste's position on prime matter's extension and the number of non-incidental forms within the composite. His works make abundantly clear that, at least in his early production, he envisioned more than one substantial form in the hylomorphic composite.<sup>46</sup> One of the best examples of this attitude is provided by *De motu corporali et luce*. At the beginning of this treatise,

43 On the criticism against this position by Albert the Great and Thomas Aquinas, see James A. Weisheipl, 'Albertus Magnus and universal hylomorphism: Avicenna. A note on thirteenth-century Augustinianism', in *Albert the Great: Commemorative essays* (ed. F. J. Kovach and R. W. Shahan), pp. 239–260 (PIMS, Toronto, 1980).

44 Grosseteste, *op. cit.* (note 18), pp. 26–27: 'Quicquid enim participat esse, prius participavit esse, nec venit de puro non-esse ad esse, De rebus dico naturalibus de quibus est hic intencio philosophi. De creacione namque materie et animarum ex nichilo, nichil ad intencionem presentem. Similiter quicquid participat pure non-esse, impossibile est quod fit.'

45 See Nicola Polloni, 'Robert Grosseteste on the origin of corporeal motion', forthcoming.

46 Grosseteste explicitly recalls a plurality of forms in his commentary on the *Physics*. See Grosseteste, *op. cit.* (note 18), p. 15. I am very grateful to Neil Lewis for having signalled this important passage to me. At the same time, scholars have reduced the scope

Grosseteste provides a short description of the basic ontological structure proper to each corporeal being, claiming that,

However, no common feature can be found in every corporeal being apart from prime matter, the first form, and the magnitude that necessarily follows from them, and other things that simply follow from magnitude, like position and shape.<sup>47</sup>

Considered in their commonality, every corporeal being is a composite of prime matter and the first form. From this hylomorphic union follows magnitude, that is to say, the extension of matter into three-dimensionality. Other features proper to corporeal things in general, like their position and shape, evidently follow the three-dimensional extension of matter, as the text points out. From the text, it is evident that the first form—which later in *De motu corporali* and in *De luce* would be called ‘the first form of corporeity’ (*forma prima corporalis*) and corresponds to light—performs the fundamental ontological role of extending prime matter into the three-dimensional, that is, into corporeity.

Grosseteste does not say much in his description of the ontological structure of corporeal beings, only that the first form extends prime matter. However, in relation to the three positions mentioned above—originating from Averroes, Avicenna and Ibn Gabirol, respectively—some considerations allow us to exclude Averroes’s solution as a source of inspiration. First, Averroes’s influence seems to be excluded for historical reasons, as there are no traces of Grosseteste’s access to *De substantia orbis*, although he might have had access to the same doctrine by different means. Second, as we have seen, Grosseteste explicitly refers to the *first form* joining matter. This allusion to *forma prima* should not be interpreted as referring to an accident. Indeed, Grosseteste is clearly referring to the first term of a series of forms, tracing the qualifications of the variety of natural bodies up to the most common features shared by all of them. These features cannot be incidental, as they correspond to the qualification necessarily shared by all bodies in their basic ontological description. Accordingly, if the first form mentioned by him were an accident, the outcome would be that the roots of Porphyry’s tree were incidental—which is utterly inadmissible. Therefore, Grosseteste clearly adheres to a pluralist theory of substantial forms, which could be either the result of a realist interpretation of Avicenna (*forma corporalis* as a proper form rather than as a function expressed by the substantial form) or the outcome of Grosseteste’s adherence to the perspective of Ibn Gabirol—or perhaps, Gundissalinus, who facilitated the circulation of Ibn Gabirol’s theories widely in the thirteenth century.

This point is very problematic, since Grosseteste refers to this form, both at the end of *De motu corporali* and in *De luce*, as *forma prima corporalis*, following both Avicenna’s and Ibn Gabirol’s vocabulary. Assuming that Grosseteste was following Avicenna’s model, we could suppose that the first form is followed by one and only one substantial form. In turn, if he was following Ibn Gabirol’s (or Gundissalinus’s) model, the first form would be accompanied by a plurality of additional substantial forms. Unfortunately, neither *De luce*

of Grosseteste’s psychological pluralism. See James McEvoy, *The philosophy of Robert Grosseteste* (Clarendon Press, Oxford, 1982), pp. 262–265.

<sup>47</sup> Robert Grosseteste, *De motu corporali et luce*, ed. L. Baur, in Baur, *op. cit.* (note 31), pp. 90–92, at, p. 90, ll. 8–11: ‘Sed nihil est commune repertum in omni corpore, nisi materia prima et forma prima, et magnitudo, quae necessario consequitur haec duo, et [si] qua consequuntur magnitudine simpliciter, ut situs et figura.’ I have expunged the ‘si’ from the sentence, as I suspect it to be a corruption of the text.

nor the other works by Grosseteste say enough to clearly establish whether his ontological model was the former or the latter, even though he appears to have used both Avicenna and Ibn Gabirol on different occasions, in *De motu corporali et luce*, *De luce* and elsewhere.

### CONCLUSION

Grosseteste's solution to the problem of prime matter's lack of dimension was famously presented in his *De luce*, describing how the power of self-multiplication proper to light extended prime matter into the corporeity of the universe:

The first corporeal form, which they name corporeity, I consider to be light. For by its nature light spreads itself in every direction in such a way that as large as possible a sphere of light is instantaneously generated from a point of light (provided nothing opaque stands in the way); while corporeity is that to which the extension of matter in three dimensions is necessarily subsequent, despite the fact that both corporeity and matter are in themselves simple substances lacking any dimension. But a form that is in itself simple and lacking dimension could only introduce omnidirectional dimension into matter that is equally simple and without dimension by multiplying itself and instantaneously spreading itself in every direction and by extending matter in spreading itself, since form cannot leave matter because it is inseparable [from matter], and matter cannot be emptied of form.<sup>48</sup>

Prime matter and light—the form of corporeity—are joined together at the beginning of time, in a moment which logically, but not temporarily, follows the creation of prime matter. In that first instant, light and prime matter are together in that original point which has no extensionality, either geometrically or physically. From that point without dimension, the physical universe was established through the self-multiplying power of light which, instantaneously, extended prime matter into the three dimensions and into a sphere corresponding to the universe itself. This is Grosseteste's formulation of the most original cosmology of light in the Middle Ages.

The results of Grosseteste's gradual engagement with the problem of matter and prime matter can be represented by a mental picture of that first and original point of prime matter before being extended by light. That point expresses the potentiality of the world to be and to become, because prime matter is the unqualified and unextended subject of the forms and the substrate of endurance that persists throughout change. This utterly metaphysical notion of matter is far removed from Grosseteste's first discussion of a matter that is the touchable and experienceable subject of astral influence and human manipulation. Gradually, this image of matter was accompanied by a more radical notion of prime matter grounded upon philosophy, yet also valid in science and alchemy, as the thinking of later medieval practitioners of alchemy would suggest.

48 Grosseteste, *op. cit.* (note 23), p. 226, ll. 1–12: 'Formam primam corporalem quam corporeitatem nominant lucem esse arbitror. Lux enim per se in omnem partem seipsam diffundit ita ut ex puncto lucis sphaera lucis quamvis magna subito generetur, nisi obsistat umbrosus. Corporeitas vero est quam de necessitate consequitur extensio materie secundum tres dimensiones, cum tamen utraque, corporeitas scilicet et materia, sit substantia in se ipsa simplex carens omni dimensione. Formam vero, in se ipsam simplicem et dimensione carentem, in materiam similiter simplicem et dimensione carentem dimensionem in omnem partem inducere fuit impossibile, nisi seipsam multiplicando et in omnem partem subito se diffundendo et in sui diffusione materiam extendendo, cum non possit ipsa forma materiam relinquere quia non est separabilis, nec potest ipsa materia a forma evacuari.' English translation by Neil Lewis, in Flood *et al.*, *op. cit.* (note 23), pp. 239–247, at p. 239.

These two different epistemes of matter, alchemical and philosophical, are somewhat harmonized by Grosseteste's inclusion of 'alchemical matter' into the realm of physical secondary matters. The emergence of the notion of prime matter as the basic root of corporeal existence does not exclude a plurality of epistemes from Grosseteste's consideration of nature. This point is made clear by Grosseteste's comments on *Physics* II and the reference he makes to the mercury–sulphur theory of the generation of metals.

Should we conclude that, for Grosseteste, alchemy was to be considered a part of natural philosophy? That was the position claimed by pseudo al-Farabi's *De ortu scientiarum* and, crucially, by Gundissalinus's influential *De divisione philosophiae*.<sup>49</sup> Moreover, it should also be noted that, *mutatis mutandis*, Roger Bacon's stance on the matter follows this position closely. While fundamental, an answer to this question surely escapes the aims of the present article. But it may be appreciated that alchemy also plays a role in *De luce*. In an evocative passage discussing how, by means of its luminosity, 'the first body is every following body', Grosseteste claims that the earthy element is

Cybele and mother of all the gods, for although all higher luminosities are brought together [in earth], they have not come forth in it through their operations, but it is possible that the luminosity of any celestial sphere you please be drawn out from earth into act and operation, and so from earth, as if from a kind of mother, any god will be procreated.<sup>50</sup>

As Cecilia Panti has pointed out, this passage appears to be based on Morienus's *Liber de compositione alchemiae*—the same book influencing Grosseteste's first treatise, *De artibus liberalibus*.<sup>51</sup> Together with additional references in later works, this passage shows that Grosseteste's theoretical—yet possibly also practical—interest in alchemy continued while he was embracing Aristotelian philosophy and an ecclesiastic career. With it, two different epistemes of matter and materiality continued to persist in his reflection on the natural world, balanced at least in part by the philosophical distinction between prime and secondary matter.

49 See Pedro Mantas-España, 'Interpreting the new sciences: beyond the completion of the traditional liberal arts curriculum', in Fidora and Polloni, *op. cit.* (note 35), pp. 51–91.

50 See Grosseteste, *op. cit.* (note 23), p. 234, ll. 158–163: 'Cibeles et mater deorum omnium quia, cum in ipsa superiora lumina omnia sint collecta, non sunt in ea tamen per operationes suas exorta, sed possibile est educi ex ea in actum et operationem lumen cuius celestis sphere volueris; et ita ex ea quasi ex matre quadam quivis deus procreabitur'. English translation, *ibid.*, pp. 244–245.

51 See Grosseteste, *La luce* (ed. C. Panti) (Pisa University Press, Pisa, 2011), pp. 155–156.