

# PLACE AS A METAPHYSICAL PROBLEM IN ALBERT THE GREAT AND THOMAS AQUINAS

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## Abstract

Thomas Aquinas' particular synthesis of Aristotelianism and Neoplatonism, and the intellectual tradition it inaugurated, has at least twice faced critical challenges from developments in physics. Besieged by the sixteenth and seventeenth century *novatores* and more or less ignored by the nineteenth- and twentieth-century practitioners of mathematical physics, Thomism was nevertheless forced, in both cases, to reckon with the relationship of metaphysics to physics and the related question of the nature of scientific theories. This essay begins with two opposed twentieth-century Thomist responses to these challenges, that of Pierre Duhem and that of the River Forest Thomist school. Then, after carefully examining the concept of place in Albertus Magnus' untranslated *De Natura Loci* and commentary on the *Liber de Causis*, putting this element of Albert's natural philosophy into conversation with Thomas Aquinas', and investigating Thomas' account of the ordering of the sciences, I argue that both approaches, opposites though they are, fail. Neither adequately accounts for a crucial and much-neglected feature of Albert's and Thomas' conception of the relationship between the sciences: the dependence of metaphysics upon various deliverances of natural philosophy.

## Introduction

Champions of that strange and strangely potent synthesis of Aristotelian and Neoplatonic philosophy called "Thomism" have, in the time since their namesake's death, at least twice found themselves in crises owing to developments in physics. In the sixteenth and seventeenth centuries, Aristotelian philosophy, as mediated by Albertus Magnus, Thomas Aquinas, and the Arabic philosophers upon whom they drew, was facing immense pressure from the "new philosophers," or *novatores*.<sup>1</sup> As is well known, figures like René Descartes, Pierre Gassendi, Thomas Hobbes, and Henry More both attacked Aristotelian natural philosophy and metaphysics and proposed rivals. Less commonly known, however, in part because of their numerical diminution in the modern era, is that advocates of Aristotelian and particularly Thomistic systems of

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<sup>1</sup> Daniel Garber, "Descartes among the Novatores," *Res Philosophica* 92, no. 1 (January, 2015): 1-19, 8. <https://doi.org/10.11612/resphil.2015.92.1.1>.

thought felt themselves to be in crisis in the late-nineteenth and early-twentieth centuries.

The physicist Stephen M. Barr has noted that, as Newtonian and post-Newtonian physics became increasingly mathematical, thinkers in the neo-Aristotelian Thomistic tradition developed an “almost disjointed universe of discourse,” separating physics from metaphysics and themselves from the culture and deliverances of then-contemporary physics.<sup>2</sup> Opinions about whether such a development was good varied, and they were connected to and in some cases anticipated the realist/anti-realist debates in the philosophy of science. Here, I wish to concern myself with two particular approaches to this separation, chosen not necessarily because they are representative, but because their contrast brilliantly illuminates the issues at stake: the approaches of Pierre Duhem and the River Forest School of Thomism.

### Pierre Duhem

The influential late-nineteenth and early-twentieth century physicist and historian of natural philosophy, Pierre Duhem, believed the separation between physics and metaphysics to be salutary. Indeed, his remarkable book *The Aim and Structure of Physical Theory* is an extended argument for precisely this separation. Duhem argues that roughly two accounts of “physical theory” have been given in the history of natural philosophy: the first is that physical theory constitutes an “*explanation* of a group of laws experimentally established,” and the second is that it aims to “*summarize and classify logically* a group of experimental laws without claiming to explain them.”<sup>3</sup> Duhem describes “*explanation*” as the attempt to “strip reality of the appearances covering it like a veil, in order to see the bare reality itself.”<sup>4</sup> In this understanding of physical theory, experimental physics is the observation of physical phenomena qua sensible appearances as manifested concretely to us. Experimental physics cannot disclose to us the realities underlying these appearances—but physical theory can and should. A physical theory focused on explanation will be forced to assume a disjuncture between sensible appearances and underlying realities, and this will drive it to seek knowledge of the nature underlying this reality.<sup>5</sup> Duhem deftly points out that this question has not arisen from the methods of experimental physics—and neither is it within the power of experimental physics to resolve. Thus, “if the aim of physical theory is to explain experimental laws,” physics will be subordinate to metaphysics.<sup>6</sup>

For a variety of reasons, including the hash metaphysics had made of explanatory physical theory in the wars between incompatible schools (Cartesians, Atomists, Newtonians, Aristotelians, and so on), Duhem, and Jacques Maritain following him,

<sup>2</sup> Stephen M. Barr, “The Mathematization of Physics and the Neo-Thomism of Duhem and Maritain,” *American Catholic Philosophical Quarterly* (December, 2017). <https://doi.org/10.5840/acpq20171227142>.

<sup>3</sup> Pierre Maurice Marie Duhem, *The Aim and Structure of Physical Theory* (Princeton, NJ: Princeton University Press, 1954), 7. Emphasis original.

<sup>4</sup> Duhem, *The Aim and Structure of Physical Theory*, 7–8.

<sup>5</sup> *Ibid.*, 10.

<sup>6</sup> Duhem points out that, in attempts to make physical theory explain other phenomena, “when the progress of experimental physics goes counter to a theory and compels it to be modified or transformed, the purely representative part enters nearly whole ... whereas the explanatory part falls out in order to give way to another explanation.” Duhem, *The Aim and Structure of Physical Theory*, 10, 32.

argued that physics and metaphysics could be separated.<sup>7</sup> Duhem proposed that physics might be regarded as an autonomous science, if only it had the right aim. Physics would have no need for or right to principles too lofty for it.<sup>8</sup> He gives the following definition for his preferred model of physical theory: rather than an explanation, physical theory is “a system of mathematical propositions, deduced from a small number of principles, which aim to represent as simply, as completely, and as exactly as possible a set of experimental laws.”<sup>9</sup> Unlike metaphysics, Duhem argued, physics is able merely to grasp observable appearances. Physics incorporates mathematics via measurement, and measurement deals only with a certain subset of visible appearances (namely, those which are measurable) rather than with essences, forms, and so on.<sup>10</sup> In holding this position, Duhem saw himself to be stating the classical Aristotelian and scholastic distinction in a contemporary idiom.<sup>11</sup> As Ibn Sīnā put it, for example, the subject matter of metaphysics is “things that are separable from matter in substance and definition,” or, put otherwise, “the existent (*al-mawjūd*) inasmuch as it is an existent”;<sup>12</sup> by contrast, the subject matter of physics is “the sensible body insofar as it is subject to change,” which is to say the body according to its necessary accidents, as it is subject to motion and rest, and as it is in place.<sup>13</sup>

Similarly, for Duhem, physics and metaphysics dealt with realities in different respects: the former according to appearances by means of creating classificatory models on the basis of mathematical abstraction, and the latter according to essences. This account is remarkably similar to that advanced briefly by the phenomenologist Jean-Luc Marion in the introduction to *Negative Certainties*, in which he says that science produces certainty only in the domain of that which can be modelled and measured.<sup>14</sup> In the idiom of contemporary analytic philosophy of science, by contrast, Duhem was something of an idiosyncratic anticipator of the semantic view of scientific theories and structural realism in scientific theory, which holds, in the words of Hans Halvorson, that “what is important in a scientific theory is the structure that it posits or describes.”<sup>15</sup> On this view, the structural realist differs from the traditional realist by believing only that the world has the *structure* posited by the theory, rather than the “entities” the theory posits. Duhem could therefore be classed comfortably as an anti-realist. Consequently, contemporary physics posed no problem for the metaphysical system of Aristotle as mediated by Thomas Aquinas and others.

As convenient as such a separation would no doubt be, particularly for those who find this broadly Aristotelian and Neoplatonic synthesis compelling in whole or in part,

<sup>7</sup> On Maritain, see R. James Long and James A. Weisheipl, *Philosophy and the God of Abraham: Essays in Memory of James A. Weisheipl, OP* (Toronto: Pontifical Institute of Mediaeval Studies, 1991), 5.

<sup>8</sup> Duhem, *The Aim and Structure of Physical Theory*, 19.

<sup>9</sup> Ibid.

<sup>10</sup> Ibid., 288; Barr, “The Mathematization of Physics and the Neo-Thomism of Duhem and Maritain,” 5–6.

<sup>11</sup> As will be seen, Duhem attributes the breakdown of the barrier between physical method and metaphysics to Descartes. Duhem, *The Aim and Structure of Physical Theory*, 39, 43–44.

<sup>12</sup> Avicenna, *The Metaphysics of The Healing*, trans. Michael E. Marmura, first edition (Provo, UT: Brigham Young University, 2005), I.1.6; I.2.12.

<sup>13</sup> Avicenna, *The Physics of The Healing: A Parallel English-Arabic Text in Two Volumes*, trans. Jon McGinnis, first edition (Provo, UT: Brigham Young University, 2010), I.i.1; Avicenna, *The Metaphysics of the Healing*, I.ii.2.

<sup>14</sup> Jean-Luc Marion, *Negative Certainties*, trans. Stephen E. Lewis (Chicago, IL: University of Chicago Press, 2015), 2. One wonders whether Marion had Duhem in mind when penning that paragraph.

<sup>15</sup> Hans Halvorson, “What scientific theories could not be,” *Philosophy of Science* 79, no. 2 (2012): 183–206, 185.

I will argue that, in at least one key respect, the metaphysics of the system, as articulated by Albertus Magnus and Thomas Aquinas, cannot be separated easily from the physics. More concretely, the claims of Albert and Thomas about the means by which matter is informed belong to their physics, particularly to their conceptions of place, motion, and the causality of the celestial sphere. But we are getting ahead of ourselves. Before proceeding to Albert and Thomas, we must make a brief detour to a school of Thomism founded in the suburbs of the greatest city in America: Chicago.

### The River Forest School of Thomism

The River Forest School of Thomism fostered numerous distinctives in its approach to the interpretation of Thomas Aquinas, most of them centering in some way on St. Thomas' natural theology.<sup>16</sup> Most of these distinctives have fallen out of fashion (or indeed, were never in fashion) although some of them deserve sustained attention from contemporary theologians and Thomistic philosophers.<sup>17</sup> For example, unlike Gilson and Maritain, in their understanding of Thomas' philosophy, the River Forest Thomists privileged Thomas' philosophical works, that is to say, his commentaries on Aristotle, rather than his *Summae* or commentary on the *Sentences*.

But the methodological commitments of present concern are two: first, the claim that "a correct interpretation of Aquinas' philosophy depends on a careful observance of his theory of the order of the sciences" and, second, the claim that the attempt "to distinguish the natural sciences as empirical from philosophy as 'rational' cannot be admitted in authentic Thomism."<sup>18</sup> Benedict Ashley, OP, attributes the former error to Scotus directly, since he held to a different understanding of the ordering of the sciences, and the latter to Scotus indirectly, as mediated by a diverse cast of characters, including Leibniz, Descartes, Wolff, and the "Augustinian-Platonic tradition."<sup>19</sup> These men championed the notion that philosophy deals with "necessary and certain truths" while natural science deals with "contingent and probable truths known only empirically."

This historical account opposes Duhem at almost every juncture: it downplays Aristotle's contention at the outset of his *Physics* that natural philosophy deals with what occurs "always or most of the time" and identifies the separation of physics from metaphysics with the early modern period—precisely the time Duhem argued physical theories began to depend upon metaphysical commitments. Similarly, per Ashley, Maritain argued that contemporary natural science differs from Thomistic natural philosophy because Thomas understood natural philosophy to be "intelligible essential knowledge of *ens mobile*," whereas modern science is "empirical accidental knowledge

<sup>16</sup> An in-depth treatment of this school is beyond the purview of this essay. Therefore, we will only be looking at River Forest Thomism's claims in broad outline, as given by one of its adherents, Benedict M. Ashley, O.P.

<sup>17</sup> The claim that, e.g., Thomas is "a convinced Aristotelian who vigorously opposes every tendency to Platonize epistemology" is far more difficult to sustain given what is now known about the integration of Platonism into what Thomas and the other Latin scholastics considered to be genuine Aristotelian works. Benedict M. Ashley, OP, "The River Forest School and the Philosophy of Nature Today," in *Philosophy and the God of Abraham*, 1.

<sup>18</sup> Benedict M. Ashley, OP, "The River Forest School and the Philosophy of Nature Today," 3, 5.

<sup>19</sup> *Ibid.*, 5.

of physical reality.”<sup>20</sup> The River Forest Thomists contended, by contrast, that contemporary natural philosophy is not “formally distinct from that of modern natural science.”<sup>21</sup> Indeed, they claimed that the apparent differences between natural science after Galileo and for Thomas do not derive from any “formal difference in the kind of knowledge which modern science achieves,” but are rather the result of confusions in modern science itself.

Galileo’s insight was that mathematics could be applied beyond astronomy to all dimensions of natural science, but he erred in thinking that physics could be explained without appeal to formal causality and by reducing “efficient causality to its measurable effects on locomotion.”<sup>22</sup> His second mistake—and here, while Ashley says he opposes Galileo, one cannot help but suspect he was actually opposing Duhem and Maritain—was holding that “natural science can proceed mathematically as a deductive science from a small number of axioms.”<sup>23</sup> Ashley argues that this preconception of the sciences was flawed on a number of grounds: final causality was never truly eradicated from the natural sciences, and the claim that scientific knowledge in the modern sense is only probabilistic is self-contradictory, generating an infinite regress of merely probable statements.<sup>24</sup> As a result of this transformation of scientific practice and theory, the scope of science has been narrowed and therefore distorted.<sup>25</sup>

The solution to these problems is, unsurprisingly, “the natural science of Aristotle and Aquinas.” While admittedly “obsolete in its details,” it can provide the “foundational analysis which can resolve the ... intellectual incoherence” of contemporary science which generated “disastrous cultural and ethical results.”<sup>26</sup> Only Thomistic natural philosophy can provide the foundations that contemporary science so desperately needs.

Crucially, the River Forest Thomists contend that, for Thomas, there “would be no grounds for a metaphysics, unless natural science had first established the existence of non-material *efficient* causes ... of the material world.”<sup>27</sup> The River Forest Thomists recognize that, for Thomas and pace Duhem, there is a relationship of dependence between metaphysics and natural science: natural science establishes the need for metaphysics.

Below, I will contend that both of the above accounts fail: Duhem is wrong to suggest that a methodological separation between natural philosophy and metaphysics is true to Thomas, but the River Forest Thomists in turn misunderstand the nature and implications of that relationship of dependence. Natural philosophy, for Albertus Magnus and Thomas Aquinas, does not simply prove the existence of immaterial causes which demand a science adequate to them, but rather metaphysics receives various discoveries of natural science as axioms in its own task. Albert and Thomas grant this in theory, but they also demonstrate how this works in practice. We will begin with examining this relationship of dependence in practice before turning to the relationship of dependence

<sup>20</sup> Ibid.

<sup>21</sup> Ibid., 6.

<sup>22</sup> Ibid., 8.

<sup>23</sup> Ibid., 9.

<sup>24</sup> Ibid.

<sup>25</sup> Ibid., 12.

<sup>26</sup> Ibid., 10.

<sup>27</sup> Ibid., 13–14.

in theory. In so doing, it will become clear that Thomists must develop a new way of synthesizing natural and first philosophy if they are to preserve the plausibility of Thomism's metaphysical claims.

To show this, I will look in-depth at the understanding of place, motion, and the celestial sphere in Albert's *De Natura Loci* and commentary on *Liber de Causis*; then I will demonstrate that Albert should not be seen as idiosyncratic, but that, to the contrary, his system is adopted by Thomas Aquinas in the points of present concern. In accomplishing this, I hope to show in just what respect the metaphysics of the system depend upon pre-modern claims about physics and cosmology, raising concerns that the metaphysics and physics are, at least in this respect, not nearly so easily separated as figures like Duhem claimed. Put more provocatively: in discrediting Albert's and Thomas' physics, modern and contemporary physics present real conceptual challenges for their metaphysics. What will remain for us following this is to briefly propose a couple of possible solutions to this problem. Ultimately, however, such a reparative task will have to be undertaken by Thomists themselves.

### *Albertus Magnus on the Elements, Place, and Causality*

#### **The Elements**

To understand how the forming of matter is related to place and causality, it is necessary first to explicate, in very brief outline, Albert's conception of the elements. In this, Albert is a fairly standard exponent of the Aristotelian picture as modified by Neoplatonism and as delivered to him by the Arabic philosophers. Albert holds that there are two kinds of elements.<sup>28</sup> The first four elements are fire, air, water, and earth; these are organized in concentric spheres, with earth at the center, followed by water, then air, and finally fire. Materially, these elements are "ingredients of composites and are the prime matter of bodies" [*materialiter sunt ingredientia compositum et sunt primae corporum materiae*].<sup>29</sup> Above these four elements is the lunar sphere, and then above the lunar sphere is the sphere of fixed stars, the celestial sphere, also organized hierarchically in concentric circles. The fifth element is different in kind from the other four: it is the first efficient cause of bodies, but it does not enter into composition "according to substance and being" [*non ingrediens in compositionem per substantiam et esse*]; rather, it infuses its powers into all things, simple and composite.<sup>30</sup>

The four material elements possess different characteristics (various combinations of humidity, coldness, dryness, and heat), and they are the fundamental materials out of which everything in the sublunary sphere is composed.<sup>31</sup> When each is considered in its totality, each element is incorruptible, but portions of each element are continually being generated from others and are always becoming (i.e. generating) others. In other words, while the elements are, for reasons that will become apparent in a moment, naturally in their respective places, with earth at the center, fire at the outer extremity and

<sup>28</sup> Albertus Magnus, *Liber de Causis*, I.1. All citations from both Albertus' commentary on the *Liber de Causis* and his *De Natura Loci* come from *Opera omnia: ad fidem codicum manuscriptorum edenda apparatu critico notis prolegomenis indicibus instruenda*, Volume 5, Part 2 (Cologne: Monasterii Westfalorum in Aedibus Aschendorff, 1951). For certain passages of the *Liber de Causis*, I also consulted Albertus, *On the Causes of the Properties of the Elements (Liber de Causis Proprietatum Elementorum)*, *Mediaeval Philosophical Texts in Translation*; No. 46. (Milwaukee, WI: Marquette University Press, 2010).

<sup>29</sup> Unless otherwise noted, translations from Latin and Arabic are my own.

<sup>30</sup> Albertus Magnus, *Commentary on Liber de Causis*, I.1.

<sup>31</sup> *Ibid.*, II.2.

air and water in between, nevertheless, they mix with one another, and in this mixing one element is transformed into another and vice versa, in a cycle. This last claim of Albert's raises a peculiar problem: if portions of the elements ceaselessly mix with one another and transform into one another, and are therefore taking on the characteristics of one another in their transformations, how do these elements preserve their distinct character and integrity? In virtue of what do these elements remain distinct, such that they can be distinguished by us and such that they are organized in concentric spheres as Albert has contended?

It is here that Albert's account becomes particularly interesting, because, in both *De Natura Loci* and his commentary on the *Liber de Causis*, Albert states that elements, in themselves and co-mixed, have properties natural to them from place.<sup>32</sup> In both their pure and mixed states, elements receive their characteristic properties from place. In order to make sense of this initially strange claim, we must delve into the nature of place as Albert understands it; in the course of this, we will come to see how the fifth element that Albert has posited relates both to place and to the other four elements.

### Definition of Place

At the outset of *De Natura Loci* and before he defines place, Albert argues for the importance of studying place. It is in this discussion that some of the crucial dimensions of Albert's account of place come to the fore, although the full significance of these initial claims is unpacked subsequently. We begin with two nearly befuddling claims. First, the nature of places is produced "from the disposition of place to the heavens."<sup>33</sup> Second, expounding upon this claim, Albert states he has proved in his commentary on Aristotle's *Physics* that "place is an active principle of generation in the manner of a father."<sup>34</sup> He gives a brief argument for this, which is as follows: everything which is located (i.e. in place) relates to its place as matter relates to form; higher things relate to lower things as forms relate to matter; therefore, the principle of the formation of lower things "is infused into them from the higher things as from active principles." In other words, the higher things place the lower things, and in placing them constitute their active principle of generation. Albert also gives a second argument for seeing place as the principle of generation of the things that are in place: the first premise is that every change in something contained is by what contains it; place is that which contains any given thing; therefore, place is that by which things are changed, whether generated or corrupted. Thus, place itself actively generates that which is placed as a father generates a child. In sum, then, for Albert, understanding place is indispensable to a proper understanding of the relationship between form and matter, generation and decomposition.

But what is place? In the second chapter of book one of *De Natura Loci*, Albert states that place can be understood in two ways. First, place is commonly referred to as "every body externally surrounding another body" [*omne corpus ambiens extrinsecus alterum corpus*] by reason of a surface containing and in contact with that body. Second, in another mode,

<sup>32</sup> Ibid., I.5; Albertus Magnus, *De Natura Loci*, I.iv.

<sup>33</sup> Albertus Magnus, *De Natura Loci*, I.i.

<sup>34</sup> Ibid.

place is spoken of as the concavity of the surface toward which the movement of some body is.<sup>35</sup> This may be a disambiguation of the definition of place given by Ibn Sīnā in his *Physics*, although it is also plausible that Albert constitutes on this point a development of his tradition, stating that these are genuinely equivocal definitions, an interpretation made more plausible given how Albert sees the two definitions related in what follows.<sup>36</sup>

According to his first definition of place, Albert asserts that many bodies which are able neither to be generated nor corrupted are in place, for every body except the first body (i.e. the highest celestial sphere) has around it another body which circumscribes it.<sup>37</sup> According to his second definition of place, however, it would appear that the incorruptible bodies are not in place. Albert argues that such bodies are in contact with one another, but they do not touch, “except according to the mathematical mode” [*nisi per modum mathematicum*]. Because these bodies do not touch, they are not changed, nor do they change one another. Unstated and implicit in this argument is the claim that touch is that which brings about reciprocal change. But because these bodies do not touch and therefore do not change, and because their matter has substantial form by nature, there is never any deficiency in them which must be replenished by place; therefore, “no place is owed to them properly and according to nature” [*non proprie et secundum naturam debetur locus*].<sup>38</sup>

Whereas in the second chapter of book one, Albert introduced a twofold distinction in what place is and discussed which kinds of things are properly in place, in the third chapter of book one, he introduces a twofold distinction in how the diverse places of things are caused and determined. Place is in one sense caused by distance from the “orb” [*ex distantia sui ab orba*], which is true place, according to nature,<sup>39</sup> and in the other sense, it is caused by the position of place relative to the paths of the planets.<sup>40</sup> Albert states that this first and, for our purposes, more important sense follows from distinguishing between three kinds of bodies with respect to location: there is one body which locates (i.e. places) other bodies but is not located, one which is located but does not locate other bodies, and then there are bodies which locate

<sup>35</sup> Ibid., I.ii.

<sup>36</sup> Ibn Sīnā's definition of place is as follows: “Place is itself nothing but the surface that is the extremity of the containing body. So it is what is proved to contain and be coextensive with the things subject to local motion, and which the locally moved thing fully occupies, and from which and to which the thing subject to local motion departs and arrives during motion, and in which it is impossible that two bodies exist simultaneously.” Here, I follow the English translation in Ibn Sīnā, *Physics of The Healing*, II.ix.1. Al-Kindī roughly follows Aristotle's definition of place, stating it is “a surface which is outside the body that is contained by place.” *On the Five Essences*, 22.31, in Peter Adamson, *The Philosophical Works of Al-Kindī*, Studies in Islamic Philosophy (Oxford: Oxford University Press, 2012), 320.

<sup>37</sup> Albertus Magnus, *De Natura Loci*, I.ii.

<sup>38</sup> Ibid. The language Albert consistently uses, of certain natural phenomena being “owed” place, surely warrants an in-depth treatment of its own, although I cannot undertake this presently.

<sup>39</sup> Place in this sense is vividly illustrated in the work of Albert's elder contemporary, the English bishop and philosopher Robert Grosseteste, who, like Albert, built on the work of the Arabic philosopher al-Kindī, among others. As described in Mary Quinlan-McGrath's *Influences*, Grosseteste proposed in his *De Luce* that the ordering of the elements arose from the creation of the universe in the following way: God placed an original “point of light into a dimensionless point of matter” and caused light to actualize matter's potencies, creating the outermost spherical firmament—the sphere of fixed stars. This light then “shone back inward toward the center,” condensing the matter below it in a series of concentric spheres, ordered from least dense at the outside to most dense at the center; each region's matter was actualized into a sphere—the planets Jupiter, Mars, the sun, Venus, Mercury, and finally moon; beneath and contained within the sphere of the moon were the elemental spheres, hierarchically ordered, again, from least to most dense: fire, air, water, earth. Cf. Mary Quinlan-McGrath, *Influences: Art, Optics, and Astrology in the Italian Renaissance* (Chicago, IL: University of Chicago Press, 2016), 26.

<sup>40</sup> Albertus Magnus, *De Natura Loci*, I.iii.

and are located. The first body is the outermost celestial sphere, which alone possesses the causal power [*virtus causative*] of all generation and corruption, the second body is the earth, and the other bodies, including the elements, belong to this last sort. Albert states that the parts of this division are manifest to sense [*Et partes huius divisionis manifestae sunt ad sensum*].<sup>41</sup> This last comment is a reminder that Albert locates this twofold distinction pertaining to place, and the hierarchical ordering of the celestial and sub-lunar spheres, firmly within the realm of natural philosophy.

### The Places of the Elements

Having established what place is, to what place properly belongs, and how the places of things are determined, Albert can now discuss how the elements are placed, and here he will depend upon the various definitions given above to provide accounts of the place of each element. As was said above, the place of the earth in the cosmic hierarchy is the center of the world, and this can be seen in two ways. First, the earth naturally moves to this place owing to its status as the heaviest element and earth's position as "down *simpliciter*" [*simpliciter deorsum*], since what is heavy *simpliciter* must move down, i.e. away from the celestial sphere. And second, earth is densest and coldest among the elements, and therefore it must be placed opposite fire, which is least dense and hottest among the elements, and the place opposite fire is the center of the world.<sup>42</sup> It is nevertheless also true to say the place of the earth is the "concavity of the last surface of the water," and therefore both definitions of place obtain for the earth: it is placed in the sense that it is surrounded by the surface of the water and in the sense that water's concave surface is that toward which the movement of the body of the element earth is. Fire is opposite earth, being placed in the concavity of the surface of the orbit of the moon. The intermediate elements are between earth and fire, with air being placed in the concavity of fire, and water being placed in the concavity of air.<sup>43</sup>

Even when speaking of the places of the elements according to their concavities, less and more precision is possible. The less precise way of speaking is what Albert has already given, in describing the places of the elements as the concavities of the surfaces of the external bodies. The entire region of each element, however, is not equally the place of that element, but rather there is differentiation within these regions, certain parts being more principally the place of the relevant element than others [*non est hoc spatium totum aequaliter locus ignis, sed quasi principaliter et per posterius*].<sup>44</sup> For example, while the place of fire is the concavity of the surface of the orbit of the moon, because it is in the nature of the fire to rise up, the truest fire is that which rises to the highest region of the place of fire, where it makes contact with the concavity of the lunar sphere [*cum enim ignis sit ascendere sursum, verissime et principalissime attingit illa pars materiae formam ignis, quae usque ad altissimum loci elevator*]. To give another example, the truest air is located in the middle of its place, on the grounds that fire makes air hot and dry, whereas by nature air is hot and wet and so cannot be most "airy" in immediate proximity to fire. In this way, if Albert has not united his two definitions of place, he has at least articulated how they interact with one another in placing the elements. In sum, Albert states that he agrees with Ibn

<sup>41</sup> Ibid., I.iii.

<sup>42</sup> Ibid., I.iii.

<sup>43</sup> Ibid., I.iii.

<sup>44</sup> Ibid., I.iii.

Sīnā and certain other Aristotelians that natural place has the power to induce form in the matter of simple bodies, and he defines place as the surface of the containing body with its distance from the sphere. It is this distance from the sphere that causes heat, cold, humidity, and dryness.<sup>45</sup> Summing up the matter, as Albert puts it, Avicenna, Averroes, and Maimonides are correct in saying that place, under a determinate distance from the heavens, causes the forms of the elements.<sup>46</sup>

After arguing for his definition of place and articulating in just what respect the celestial bodies can and cannot be said to be in place, Albert turns his attention to the relationship between place, natural motion, and the generation and corruption of sublunary bodies. Albert states that composite things naturally move to their proper places, and that they are corrupted apart from their places.<sup>47</sup> In fact, place and that which is placed are connatural, and, as a result, if they are contrary to one another, that which is contained is destroyed by that which contains it. Because of this, it is not the case that any surface whatsoever can be the natural place of a thing, but only that surface which limits the locating body in its distance from the concavity which generates the located thing.<sup>48</sup> In the concavity in which the thing generated is generated, it flourishes, but outside of it, its place will be the concavity of a surface which has qualities that are contrary to it, and such a place will corrupt it.

It is for this reason that composite things have natural movement toward their proper places. To illustrate his point, Albert gives the example of people who leave their homes and home countries for “contrary climates” [*contraria climate*]. Because there is no con-naturality in the new climate, they become weakened [*infirmitur*] and overthrown or destitute [*destituuntur*].<sup>49</sup> When such people return to their proper place, however, they recover their health. This principle also illuminates what Albert meant above in suggesting that the celestial bodies are not owed any place: because there is never any deficiency which needs to be remedied, and because such remedy is caused by the generative power of natural place, they do not need to be in place.

Following his claim that natural place has the power to cause the forms of the elements and move them to determinate distances below “the orb,” Albert states that this causal power, infused into things from the heavens, is “divine and most good” [*divina est et optima*], because if it were not, nothing would move to place. This is the case because movement to place does not occur unless the thing toward which motion occurs is “in the order of a divine and most good thing” [*nisi illud sit in ratione divinis alicuius et optimi*], and that which causes the movement to the divine and best is itself divine and best.<sup>50</sup> This further reinforces the claims about natural motion made above: things move to their natural places because these places are good for them, i.e., because in those places they are regenerated.

### Restrictions on Action and Summary

Before summarizing the model with which Albert is working, it is important to discuss one more principle, namely, Albert’s rejection of action at a distance. In one of his arguments for the goodness of place, Albert argues as follows: place is good because the

<sup>45</sup> Ibid., I.iv.

<sup>46</sup> Ibid., I.iv.

<sup>47</sup> Ibid., I.ii.

<sup>48</sup> Ibid., I.ii.

<sup>49</sup> Ibid., I.ii.

<sup>50</sup> Ibid., I.iv.

first mover is good. The first mover gives its nobility [*motor primus nobilitatem suam largiatur*] to everything which is formed to being, but it does not do this to something distant without first doing it to something closer to it.<sup>51</sup> Furthermore, the container is closer than the thing contained, and, recalling the definition of place above, the container places the thing contained; therefore, place is the means by which the first mover bestows being and form upon all other things.<sup>52</sup> In this dense argument, two crucial claims, for our purposes, are made: first, place is the means by which things are formed and, second, the forming of things does not occur at a distance, but only by the causal power of the first mover penetrating through each container and through what each container contains until it reaches the center of the world (or the particular object in question).<sup>53</sup>

Without both of these premises working in coordination, Albert's account of the forming of matter is unsustainable. If there is action at a distance, place need not be the means by which the celestial sphere forms matter; likewise, if matter is formed apart from place, there must be action at a distance. This will be a point to which we return subsequently, since the kind of action Albert envisions—of the first mover “beaming” its power through each successive elemental layer—is untenable according to the lights of contemporary physics.

First, however, we will summarize our findings to this point and then demonstrate that Thomas Aquinas adopts this basic vision of Albert's, not entirely, but in the particulars which are relevant for the issue at hand. As was demonstrated above, Albert gives two definitions of place. In the first, place is commonly referred to as every body externally surrounding another body, and in the second, place is spoken of as the concavity of the surface toward which the movement of some body is. We have furthermore seen that, for Albert, natural place causes the forms of the elements and moves them to determinate distances below the celestial orb. In addition, things have natural motions and natural places; their natural motions move them to their natural places, which are the sites of their regeneration, the places at which the salutary generative power of the higher bodies makes contact with them. Finally, we have seen that Albert rejects the possibility of action at a distance.

### *Thomas Aquinas on Place and the Generation of Forms*

#### **Thomas on Place**

As Oliva Blanchette has remarked, to skip over or minimize Thomas' physics and cosmology is to forfeit important dimensions of Thomas' metaphysics, like aspects of polymorphism or “the series of essentially subordinate causes in the universe.”<sup>54</sup> I will propose in what follows that these ideas are not merely connected with Thomas' natural philosophy and cosmology, but that his natural philosophy and cosmology provide certain of the mechanisms by which he envisions the realities studied by metaphysics as functioning. Concretely, Thomas' account of the informing of matter, like Albert's, depends upon principles in his physics. Any responsible Thomism

<sup>51</sup> Ibid., I.i.

<sup>52</sup> Ibid., I.i.

<sup>53</sup> For more on this, see the discussion of rays and the movement of qualities in Mary Quinlan-McGrath's *Influences*, 50–63.

<sup>54</sup> Oliva Blanchette, *The Perfection of the Universe According to Aquinas: A Teleological Cosmology*, first edition (University Park, PA: Pennsylvania State University Press, 1992), 9–10.

which seeks to preserve Thomas' hylomorphism must attend to and, if necessary, replace the mechanism by which Thomas believes this hylomorphism is achieved. We will begin by looking at Thomas' treatment of place, move from it to his account of form and activity, before finally showing how these, when combined, generate a need within Thomas' system for the activity of higher powers, mediated through place, to reduce matter to act.

Working from Aristotle's claim that "place is the boundary of the container," Thomas argues that whatever is contained by a body is in place "*simpliciter et per se*," and that that which lacks a containing body is not in place at all.<sup>55</sup> According to Thomas, the only thing which could appear to be not in place at all is the outermost sphere of the universe. Even that, however, is in place owing to its parts, per Thomas. Thomas believes the outermost celestial sphere moves rotationally, and although the whole body can only be considered to change place "as distinguished by reason," yet the parts change place according to reality, not reason alone [*non solum ratione*].<sup>56</sup> In holding that the outermost celestial sphere is in place *per accidens* on the grounds that its parts are potentially in place [*inquantum partes ultimae sphaerae sunt in loco in potentia, tota ultima sphaera est in loco per accidens ratione partium*], Thomas departs from Ibn Rushd and Roger Bacon, who both held that the outermost sphere is in place *per accidens* owing to the center around which it rotates, which is the earth.<sup>57</sup> Thomas also departs both from Albert and Ibn Sīnā who contended the outermost sphere is not in place at all.<sup>58</sup>

Like Albert, Thomas adopts Aristotle's claim that body is naturally moved to its proper place, and he holds that the containing body is akin to the contained body in nature [*Sic igitur proximitas naturae, quae est inter corpus continens et contentum ...*].<sup>59</sup> He argues that the "rank" [*gradus*] of natural place corresponds to rank in natures (e.g. fire is closest to heavenly body); thus, similarity or proximity of natures between the place and thing placed (or containing and contained [*continens et continentum*]) accounts for natural motion to natural place [*... est causa quare corpus naturaliter movetur ad suum locum*]. Additionally, Thomas states that Aristotle deals with bodies according to their substantial forms [*secundum formas substantiales*], which forms they possess from the influence of the heavenly body—the first place [*primus locus*] which gives to all other bodies the power of placing.<sup>60</sup> Thus far, Thomas is similar to Albert; he gives as his definition of place one of Albert's two definitions, and although he differs from Albert concerning whether the outermost celestial sphere is in place, he nevertheless agrees that there are natural places and that these places give things the forms they have via the influence of the heavenly bodies.

### Thomas on the Forms

It now remains to turn to Thomas' definition of form and his account of action, both of which depend upon his accounts of place, the nature of the motion of the heavenly bodies, and the causal efficacy they mediate to all lower created things. Thomas defines

<sup>55</sup> Saint Thomas Aquinas, *Commentary on Physics*, Latin and English edition, The Aquinas Institute (Green Bay, WI: Emmaus Academic, 2022), IV.vii.473–4.

<sup>56</sup> Thomas, *Physics*, IV.vii.478, 482.

<sup>57</sup> Thomas, *Physics*, IV.vii.479. Pierre Maurice Marie Duhem, *Medieval Cosmology: Theories of Infinity, Place, Time, Void, and the Plurality of Worlds* (Chicago, IL: University of Chicago Press, 1985), 145–46.

<sup>58</sup> Thomas, *Physics*, IV.vii.477.

<sup>59</sup> *Ibid.*, IV.viii.492.

<sup>60</sup> *Ibid.*, IV.viii.316.

“form” as “nothing other than the act of the matter” [*nihil aliud est quam actus materiae*].<sup>61</sup> For Thomas, following Aristotle, certain Arabic philosophers, and Albert, forms are not separated from the matter of given things, but forms differ from matter by reason or “account” [*differt ab ea ratione*].<sup>62</sup> Self-consciously departing from the Platonic view that forms which exist apart from matter are the causes of formed matter, Thomas follows Aristotle in the *Metaphysics*, asserting that formed matter is generated from forms which exist in matter. This does not entail that Thomas abandons a single, universal cause of generation, which is what he takes the Platonic position to be asserting, but rather that Thomas locates this causal power “within the material universe, in a heavenly body, the sun.”<sup>63</sup>

Why does Thomas not think that species are capable of reproducing themselves apart from the higher causal agency of the celestial sphere? Why does he think, as he states repeatedly and explicitly in *Summa Theologiae*, Prima Pars, Q.115, A. 3, that the heavenly bodies are necessary for the forming of matter? Thomas gives the following argument. Recall that Thomas defines form as the act of matter: matter is passive potency, and its own substance is potency for substantial being [*sed materia secundum suam substantiam est potential ad esse substantiale*].<sup>64</sup> It follows that, even though Thomas holds matter to be a *per se* cause of a thing’s coming to be, matter cannot inform matter.<sup>65</sup> Thus, matter must be informed by some other agency. Nevertheless, matter should, Thomas tells us, be considered a cause of generation “after the manner of a mother”: *in recipiendo*.<sup>66</sup>

Still, one might think that, even if matter considered as passive potency cannot act, the elements considered as elements yet may, since they possess active qualities. Thomas recognizes this possibility, but he argues that the active qualities of the elements are not sufficiently diverse to create the diversity of sublunary bodies. In his discussion of the causal powers of matter in his *Summa Theologiae*, he argues that matter cannot be an agent cause because, apart from the active qualities of the elements (hot and cold), there are no active principles in the bodies in the sublunary sphere [*in istis inferioribus corporibus*]. While Thomas states that if the substantial forms of inferior bodies were only diversified according to the active qualities of the elements, there would be no need to suppose a higher principle of action, he thinks it is clear that the lower bodies are

<sup>61</sup> Saint Thomas Aquinas, *Summa Theologiae: Complete Set*, Latin and English edition, The Aquinas Institute, (Green Bay, WI: Emmaus Academic, 2012), Prima Pars Q.105, A. 1, Respondeo.

<sup>62</sup> Thomas, *Physics*, II.ii.151.

<sup>63</sup> B. T. Carl, “Thomas Aquinas on the Proportionate Causes of Living Species,” *Scientia et Fides* 8, no. 2 (2020): 234–35. <https://doi.org/10.12775/SetF.2020.020>.

<sup>64</sup> Note that “act” is twofold (operation, which is the primary sense, and form, which is a secondary sense) and potency possesses a corresponding twofold sense (active, which corresponds to the act which is operation, and passive, which corresponds to form, i.e. that which is its act). Thomas Aquinas, *De potentia*, q. 1, a. 1, Respondeo: “Ad huius quaestionis evidentiam sciendum, quod potentia dicitur ab actu: actus autem est duplex: scilicet primus, qui est forma; et secundus, qui est operatio .... Unde et similiter duplex est potentia: una activa cui respondet actus, qui est operatio; et huic primo nomen potentiae videtur fuisse attributum: alia est potentia passiva, cui respondet actus primus, qui est forma. Sicut autem nihil patitur nisi ratione potentiae passivae, ita nihil agit nisi ratione actus primi, qui est forma.” Thomas, *Opera omnia*, VIII-IX: Questiones Disputatae (Romae: Ex Typographia Polyglotta S.C. de Propaganda Fide, 1882).

<sup>65</sup> Matter—“being in potency”—is the *per se* cause of a given thing’s coming-to-be owing to the fact that it “enters the substance of the thing made,” whereas a cause of a thing’s coming to be *per accidens* does not enter into the essence of the thing after it has come to be. Thomas Aquinas, *Physics*, I.xiv.127. For more on the distinction between being the cause of a thing’s coming to be and being the cause of its *esse*, see the discussion of Doolan below.

<sup>66</sup> Thomas Aquinas, *Physics*, I.xv.135.

diversified according to a greater number of accidents which cannot be instantiated by the limited set of active qualities of the elements. For this reason, Thomas posits a superlunary active principle, which, by its presence or absence, causes generation and corruption of bodies. This active principle, or rather these active principles, are the heavenly bodies.<sup>67</sup>

Thomas does not, however, deny the inferior bodies causal agency in the generation of new beings. Rather, the things which generate in the sublunary sphere do so as agents of the heavenly bodies, and especially the sun. In this connection, Thomas cites Aristotle's *Physics*, book II, in which Aristotle says "man generates man, and the sun (generates man)" [*homo generat hominem, et sol*].<sup>68</sup> In keeping with this claim that the sun is an active principle of generation, Thomas holds that corporeal things are preserved by higher causes. Again, self-consciously following Aristotle, he contends "the diurnal movement" preserves the things that have been generated, and that the movement of the zodiac causes diversity in generation and corruption [*secundus autem motus, qui est per Zodiacum, est causa diversitatis quae est secundum generationem et corruptionem*].<sup>69</sup>

Not only does Thomas contend that the higher bodies are causes of generation, corruption, and preservation, he even argues that they cause the movement of bodies in the sublunary sphere, arguing as follows: "Every multitude proceeds from unity"; what is immovable has one mode of being; what is moved has many modes of being; thus, "all movement proceeds from the immovable"; the more immovable something is, the more it causes movement; heavenly bodies, having only locomotion, are the least movable of all bodies; therefore, all movement of lower bodies is caused by the heavenly bodies.<sup>70</sup>

Given that Thomas thinks the heavenly bodies are causes of generation and corruption, it remains to ascertain what sorts of causes the heavenly bodies are. Gregory T. Doolan helpfully delineates in just what sense Thomas thinks the heavenly bodies are causes.<sup>71</sup> He points out that Thomas distinguishes between the cause of a thing's coming-to-be and the cause of its being/*esse*. If an agent is not the cause of a given form as such, it will not be the cause of the *esse* of the thing having that form; it will merely be the cause of that thing's coming-to-be. Thus, a builder causes the house's coming-to-be but the *esse* is caused by the form.<sup>72</sup> The heavenly bodies, Thomas claims, can cause form as such and are thus universal agents. They are therefore capable of causing *esse* and the coming-to-be of any given thing.

### *Albert and Thomas Believed in Four Elements—So What?*

One gets the sense that some Thomists seem, perhaps, a little embarrassed by Thomas' view of the causality of the heavens, or at least interested in consigning it to irrelevance. When discussing Thomas' view of the causality of the heavens, for example, Doolan

<sup>67</sup> Thomas Aquinas, *Summa Theologiae*, Prima Pars Q. 115, A.3., Ad. 2.

<sup>68</sup> Ibid.

<sup>69</sup> Thomas Aquinas, *Summa Theologiae*, Prima Pars Q. 104, A.2. Respondeo.

<sup>70</sup> Thomas Aquinas, *Summa Theologiae*, Prima Pars Q. 115, A. 3, Respondeo.

<sup>71</sup> Gregory Doolan, *Aquinas on the Divine Ideas as Exemplar Causes*, Reprint edition (Washington, DC: The Catholic University of America Press, 2014), 174.

<sup>72</sup> One might object to identifying the builder as the agent-cause most properly speaking, averring that it is the form of the house *in* the builder which builds the house (by means of the builder). But that is to wander too far afield for our purposes.

mentions more than once that Thomas is merely “following the physics of his time.”<sup>73</sup> My purpose in going into such depth to describe the broad outlines of the cosmologies of both Albert and Thomas is not to embarrass, nor is it to insinuate that their metaphysical commitments must be similarly outdated. Rather, I simply mean to call attention to the implications of the fact that various discoveries over the past several hundred years have made much of the content of their physics impossible to accept. Put simply, a contemporary philosopher or scientist can no longer adopt an account of physical reality that posits four elements, hierarchically and physically ordered in concentric circles, with a celestial sphere beyond them whose causal power generates, corrupts, and moves everything beneath it.

Faced with this recognition, there are a number of possible responses. First, one could, as Duhem and Maritain following him, attempt to re-describe physics as an enterprise, separating it from metaphysics such that discoveries in the former have nothing at all to say about the latter. If, in other words, physics is based upon and proceeds from mathematical abstractions from reality and therefore cannot say anything about essences, one can preserve Albert’s and Thomas’ metaphysics while ignoring the claims they make in their physics (although, as will become clear below, one would nevertheless have to understand their physics to properly understand their metaphysics). Alternatively, one could, like Barr, attempt to preserve the picture of the relationship between physics and metaphysics which Thomas arguably has, a picture in which the discoveries of physics and those of metaphysics create an integrated “worldview” and therefore are connected with one another in various ways.

The proposal of Duhem and Maritain, that physics and metaphysics can be neatly separated, is compelling, not least because it recognizes that, unlike in physics, in metaphysics no new “facts” have been discovered (or, at least, if they have, there is no consensus about them).<sup>74</sup> The problem with Duhem’s proposal lies in the fact that—concerning both the general relationship between physics and metaphysics and particular loci in medieval physical and metaphysical systems—Albert and Thomas assume various instances of the dependence of metaphysics upon conclusions drawn from physics. At the general level, this can be seen as follows. For Thomas, as for the medieval Aristotelian tradition in the Arabic and Latin worlds broadly, metaphysics is prior in the order of being to physics—but physics is prior in the order of knowledge to metaphysics. In coming to learn about reality, on this picture, we move from mathematics to physics to metaphysics. This order exists for at least two commonly acknowledged reasons: first, it was thought, the principles of natural philosophy and mathematics are clearer and thus more easily known than those of first philosophy, and second, because learning the principles of natural philosophy trains the mind so that it is better able to apprehend the principles of first philosophy. Although the principles of the lower sciences are provided by the higher, nevertheless those principles come to be known by us before the principles of the higher.

But there is a third reason for this ordering of the sciences, one that is often neglected. The order exists not only because physics and mathematics are more easily known than metaphysics, and not only because they train the mind for metaphysics,

<sup>73</sup> Doolan, *Aquinas on the Divine Ideas as Exemplar Causes*, 175; 182.

<sup>74</sup> Pace Richard Rorty in “The Historiography of Philosophy: Four Genres,” 49, in *Philosophy in History: Essays in the Historiography of Philosophy*, ed. Richard Rorty, Jerome B. Schneewind, and Quentin Skinner (Cambridge: Cambridge University Press, 1984).

but because the metaphysics *receives discoveries* of the lower sciences *as axioms* and therefore depends upon them. Following Ibn Sīnā, whom he references, Thomas states this explicitly in his commentary on Boethius' *De Trinitate*.<sup>75</sup> Truths concerning motion, generation, and corruption, he says, are explained by physics, and many of these conclusions will in turn be needed for the science of metaphysics.<sup>76</sup> Likewise, to deal with separate substances, metaphysics must know the number and order of the heavenly spheres, but this is not possible without astronomy, which presupposes all of mathematics [*Indiget enim haec scientia ad cognitionem substantiarum separatarum cognoscere numerum et ordinem orbium caelestium, quod non est possibile sine astrologia*]. In these cases, metaphysics must receive the deliverances of "lower" sciences to undertake its own task.<sup>77</sup>

It is worth pointing out that Thomas' treatment of the nature and scope of metaphysics' dependence upon physics is largely borrowed from Ibn Sīnā's *The Metaphysics of the Healing*, I.3 In that section, Ibn Sīnā outlines the order of learning of the sciences and, in giving the order of learning, asserts that the dependence of metaphysics upon physics consists in the former receiving many deliverances of the latter as axioms; he queries whether the dependence of metaphysics upon the deliverances of physics and mathematics creates vicious epistemic circularity, and concludes in the negative. The reason he gives for the dependence of metaphysics on physics is as follows: "Concerning the natural [science], this is because many of the matters postulated in this [i.e., in metaphysics] are made apparent in natural science."<sup>78</sup> Thus, physics makes apparent many things that metaphysics receives as postulates in the undertaking of its own work. Thomas follows this same procedure, in the same order, giving the same reasons.<sup>79</sup>

Returning to Thomas: given constraints of space, I will not elaborate an argument, but presently I mean only to suggest that, for Thomas, the reasons, concepts, and structures of thought provided in his metaphysics are plausible because he had first internalized and *depended upon* deliverances of physics, the determinations of which are used in metaphysics. As Thomas Litt put the matter at the outset of his magisterial work on the celestial bodies in Thomas' work, a twentieth-century philosopher who wishes to adopt matter and form in a manner faithful to Thomas must also reason about Thomas' universe, which is to say, his natural philosophy.<sup>80</sup> If, as in the case of hylomorphism discussed above, the causal mechanisms of a "metaphysical" reality are supplied by appeal to the deliverances of natural philosophy, we must ask ourselves the degree to which we are able to find those dimensions of Thomas' metaphysics compelling, given that he claims they depend upon concepts and principles taken from his physics. If those conclusions in Thomas' physics which supply

<sup>75</sup> Thomas' treatment of this is largely borrowed from Ibn Sīnā's *The Metaphysics of The Healing*, I.3, discussed at greater length below.

<sup>76</sup> Thomas Aquinas, *Commentary on Boethius' De Trinitate*, V.i.a.9.

<sup>77</sup> Importantly, Thomas discusses whether his claim that physics is posterior to metaphysics but that metaphysics depends upon the lower sciences creates a vicious epistemic circle, and he concludes that it does not, on the grounds that metaphysics proves the principles it takes from the lower sciences independently in the course of its investigations; but it must nevertheless begin with these principles *as taken* from the lower sciences.

<sup>78</sup> AT: أما الطبيعية، فلأن كثيرا من الأمور المسلمة في هذا مما تبين في علم الطبيعي. Avicenna, *The Metaphysics of The Healing*, I.3.

<sup>79</sup> Ibn Sīnā's discussion is, however, more extensive than Thomas', and he is more explicit about the precise relationship of mutual dependence obtaining between metaphysics and physics.

<sup>80</sup> Thomas Litt, *Les corps célestes dans l'univers de saint Thomas d'Aquin* (Louvain: Publications Universitaires, 1963), 7.

reasons and explanations for certain substantial metaphysical commitments cannot be endorsed, are we licensed to adopt those metaphysical commitments? If so, under what conditions and for what reasons?

Let us now see this general conception applied in the case that here concerns us, the relationship between body and soul, form and matter. As I have demonstrated above, Albert and Thomas explain the mechanics of the informing of matter, generation, and corruption in terms of the influence of the celestial sphere as mediated through the elements and ultimately through place. This entails that the body-soul hylomorphism which Thomists are keen to preserve depends upon, in the self-understanding of Albert and Thomas, natural philosophy, which explains how the union of form and matter comes to be, how new individuals are propagated, and how their bodies are preserved over the course of their lives. Again, Thomas states that these subjects include matters pertaining to generation, corruption, motion, and other such things [*in quibus sunt multa determinata, quibus ista scientia utitur, ut generatio, corruptio, motus et alia huiusmodi*].<sup>81</sup> To separate physics from metaphysics *a la* Duhem is to leave Thomists eager to preserve hylomorphism without an account of the means by which form and matter are united, new individuals are generated, and species are propagated.

I suggest, then, that Thomists wishing to preserve the hylomorphism of the Albertine and Thomistic synthesis of Neoplatonic and Aristotelian thought will need to address these specific aspects of their account and seek to provide alternate explanations for the means by which hylomorphism comes about. Redefinitions of the nature, task, and epistemic standing of physics of the kind attempted by Duhem will be forced to abandon or relativize key dimensions of Thomistic metaphysics which depend upon Thomas' physics. Once the need for this more targeted work of reinterpretation is recognized, several potential solutions present themselves.<sup>82</sup> While it is beyond the scope of this essay to propose a definite solution, it is worth looking briefly at various possible ways forward and the objections that might be raised against them from a Thomistic perspective.

First, one might simply reject Albert's dismissal of action at a distance, and perhaps combine this rejection with the assertion that God operates immediately in the generation and corruption of creatures.<sup>83</sup> Second, one might reject Thomas' argument that generation needs a higher causal principle than those found in the inferior bodies, given that it depends upon his view of the active qualities of the four elements. Each of these has drawbacks. Concerning the first possibility, that of

<sup>81</sup> Thomas Aquinas, *Commentary on Boethius' De Trinitate*, V.i.a.9.

<sup>82</sup> There are, to be sure, Thomists working on precisely this task of particular reinterpretation in various other domains, although they tend to a) not be as interested in the problem of coordinating Thomas' physics and metaphysics in the relevant domains, and b) take for granted that the best way of doing this is to attempt to justify *something like* a given principle in Thomas' physics on the basis of some deliverance of or lacunae in contemporary physics. For two examples, see Christopher A. Decaen, "Aristotle's Aether and Contemporary Science," *The Thomist: A Speculative Quarterly Review* 68, no. 3 (2004): 375-429, and Thomas McLaughlin, "Energy and Form," *The Thomist: A Speculative Quarterly Review* 86, no. 1 (2022): 1-51.

<sup>83</sup> Of course, Albert is far from alone in finding action at a distance untenable, whether in the past or today, and the issue is still debated by contemporary physicists and philosophers of physics. An analysis of the plausibility of action at a distance is beyond the scope of this essay. For discussions of these issues, see David Glick, "The Ontology of Quantum Field Theory: Structural Realism Vindicated?," *Studies in History and Philosophy of Science Part A* 59 (October 1, 2016): 78-86, <https://doi.org/10.1016/j.shpsa.2016.06.007>, and Hans Halverson, "To Be a Realist about Quantum Theory," in *Quantum Worlds: Perspectives on the Ontology of Quantum Mechanics* (Cambridge: Cambridge University Press, 2019), 133-63.

accepting action at a distance and positing an immediate operation of God in generation and corruption, it should be noted that this would disturb the order of secondary causes as articulated by Albert and Thomas.<sup>84</sup> It is crucial for both men that God act in the created order by means of the created order, both because this preserves contingency and the potencies which belong to the various substances by virtue of their natures and because, as Thomas puts it, it is better for a thing to be both good in itself and a cause of goodness to others than it is for it only to be good in itself [*Maiores autem perfectio est quod aliquid in se sit bonum, et etiam sit aliis causa bonitatis, quam si esset solummodo in se bonum*].<sup>85</sup> Thus, a creation with secondary causality of the sort he envisions is superior to one which lacks it. Thomas makes a version of this argument in *Summa Contra Gentiles* III.69 which, stated in brief, is as follows: “To detract from a creature’s perfection is to detract from the perfection of the divine power. But if no creature exercises an action for the production of an effect, much is detracted from the perfection of the creature ... Therefore, this opinion detracts from the divine power.”<sup>86</sup> In short, rejecting the necessity of action at a distance and/or positing the immediate activity of God in generating forms would have the potential to undermine the order of secondary causes, and at least some of the goods that order is intended to preserve; in so doing, it also detracts from God’s power.

The second possibility, that of disputing Thomas’ claim that created things lack within themselves the power of their own propagation, would also appear to have the potential to undermine the causal relationship between God and the world held dear by Albert and Thomas and their intellectual descendants. Indeed, as Thomas puts it, “The power of the lower agent depends on the power of the higher agent insofar as the higher agent gives the lower agent the power whereby it acts, or preserves that power, or applies it to action.”<sup>87</sup> To posit that created things propagate themselves apart from any higher causal power would thus undermine the entire hierarchical order of causation as Thomas understands it. It would, at least potentially, remove the need for any universal cause of generation or preservation. Creatures, which Thomas considers particular and proximate causes, would become the sole efficient causes of generation and preservation. This view runs the risk, from a Thomistic perspective, of rendering the agency of God in creaturely causal power unnecessary.

### Conclusion

My purpose in this essay has been to illuminate the conceptual interdependence of the physics and metaphysics of both Albertus Magnus and Thomas Aquinas in the *loci* of place, causality, form, matter, and generation and corruption. To this end, I explicated Albert’s understanding of place as a generative principle, putting it in the broader context of his four-element cosmology, and I argued this conception of place bears on what contemporary followers of Albert and Thomas would classify as “metaphysics.” In turning attention to Thomas Aquinas, we then saw that these features of Albert’s thought are far from idiosyncratic. Differences of detail aside, Thomas follows Albert

<sup>84</sup> Thomas considers the possibility that “God works alone in all things” in SCG III.69, and he summarily rejects the view, although not all of his arguments are so plausible as to warrant present consideration.

<sup>85</sup> Thomas Aquinas, *Summa Theologiae*, Prima Pars, Q. 103 A. 6 Respondeo.

<sup>86</sup> Thomas Aquinas, *Summa Contra Gentiles* III.69.

<sup>87</sup> Thomas Aquinas, *Summa Contra Gentiles* III.70.

at the relevant junctures. In that dense but brief idiom for which he is justly famous, Thomas affirms that physics and metaphysics *qua* sciences share the kind of interdependence I demonstrated in the particular case of matter's informing. Finally, after demonstrating that these elements of Thomistic hylomorphism depend upon Thomistic physics, I proposed a couple of possible solutions and raised dangers for the Thomistic system if those solutions were followed.

Just as the schoolmen of the early modern period were forced to respond to the *novatores* and ultimately abandon Thomistic physics, so the Thomists of the early twentieth-century recognized that new discoveries in physics and claims about the power of physics could pose problems for Thomistic metaphysics. Duhem and Maritain attempted to separate physics from metaphysics as a result; more recently, the River Forest Thomists and Barr have sought to bring them back together. Ultimately, Duhem and Maritain were right to recognize, at least implicitly, that contemporary physics possesses the potential to threaten crucial dimensions of Thomistic metaphysics, but their solution is ultimately untenable for reasons internal to the Thomistic system. Thomists must find another way forward.<sup>88</sup>

#### DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

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<sup>88</sup> Thanks are owed to many. First, I am indebted to Professor Hendrik Lorenz for introducing me to the text of Albert's *De Natura Locis*, as well as to my fellow students in the philosophy seminar he taught on the same. Without their insights, this essay would not have come to be. I would like also to thank the members of the Bay Area St. Thomas Aquinas Society for inviting me to present on this topic and for their constructive and critical feedback. Finally, thanks are due to Professor Eric Gregory, Dr. Enoch Kuo, Darren Yau, and Johnny Walker for their comments on this essay.