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*Published in:*  
Oxford Studies in Early Modern Philosophy

*DOI:*  
[10.1093/oso/9780192897442.003.0001](https://doi.org/10.1093/oso/9780192897442.003.0001)

**IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.**

*Document Version*  
Publisher's PDF, also known as Version of record

*Publication date:*  
2021

[Link to publication in University of Groningen/UMCG research database](#)

*Citation for published version (APA):*  
Adriaenssen, H. T. (2021). Thomas White on Location and the Ontological Status of Accidents. *Oxford Studies in Early Modern Philosophy*, 10, 1-35. <https://doi.org/10.1093/oso/9780192897442.003.0001>

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# 1

## Thomas White on Location and the Ontological Status of Accidents

*Han Thomas Adriaenssen*

The work of Thomas White (1593–1676) was in many ways at the forefront of the new philosophy of the seventeenth century. Yet, at the same time, it remained firmly rooted in the Aristotelian tradition of the time.<sup>1</sup> This is clear in many areas of his thought. His cosmology wedded a defence of Copernicus to a variety of geocentrism, his physics combined a variety of atomism<sup>2</sup> with the claim that the basic building blocks of material objects are the four Aristotelian elements, and in his metaphysics, White sought a compromise between a mechanistic conception of bodies and a teleology that defines bodies in terms of their nature-given purposes.<sup>3</sup>

This systematic attempt in White to combine the best of Aristotelian tradition with some of the most promising ideas of the new philosophy of the seventeenth century earned him the criticism of Hobbes and the praise of Leibniz.<sup>4</sup> Today, however, White remains

<sup>1</sup> On White's biography and intellectual context, see Beverley Southgate, *Covetous of Truth: The Life and Works of Thomas White, 1593–1676 [Covetous of Truth]* (Dordrecht: Kluwer, 1993); Dorothea Krook, *John Sergeant and his Circle: A Study of Three Seventeenth-Century English Aristotelians* (Leiden: Brill, 1993), and Stefania Tutino, *Thomas White and the Blackloists: Between Politics and Theology during the English Civil War [Thomas White and the Blackloists]* (Aldershot: Ashgate, 2008).

<sup>2</sup> On White on atoms, see Antonio Clericuzio, *Elements, Principles and Corpuscles: A Study of Atomism and Chemistry in the Seventeenth Century* (Dordrecht: Kluwer, 2000), 81–6; John Henry, 'Atomism and Eschatology: Catholicism and Natural Philosophy in the Interregnum', *British Journal for the History of Science*, 15 (1982), 211–39.

<sup>3</sup> On the former, see Southgate, *Covetous of Truth*, ch. 11. For the latter, see Thomas White, *Peripateticall Institutions: In the way of that eminent person and excellent philosopher Sr. Kenelm Digby [Peripateticall Institutions]* (London, 1656), 201–3.

<sup>4</sup> For Hobbes, see Jean Jacquot and Harold Whitmore Jones (eds.), *Thomas Hobbes: Critique du De Mundo de Thomas White [Critique du De Mundo]* (Paris: Vrin, 1973), 204. For Leibniz,

little studied, and although recent years have seen something of a renewed interest in White and his work,<sup>5</sup> most of his attempts to navigate between traditions still remain to be explored in detail. The aim of this chapter is to do this for a central topic in his metaphysics: his ontology of accidents.

According to White, we conceive of the bodies we see around us in terms of the ten Aristotelian categories.<sup>6</sup> That is, we conceive of the bodies we see around us as substances and their accidents, where accidents for White are broadly construed as features of substances.<sup>7</sup> Now as White was well aware, the Aristotelian category scheme had traditionally raised a big question about the ontological status of accidents. Are accidents beings in their own right, so that an inventory of what there is would include substances as well as various kinds of accidents? Or can accidents in some way be reduced to substances and their material parts?

According to White, many scholastic Aristotelians took the first route, and treated accidents as beings in their own right. But like modern thinkers such as Descartes, White was critical of tradition here. According to White, scholastic tradition had produced an unwieldy ontology of accidental beings that flew in the face of both

see his letter to Jacob Thomasius of 20/30 April 1669 (A II. i. 30/L 97–8). As documented by Charles Schmitt, Aristotelian philosophers since the sixteenth century had made attempts to ‘accommodate new developments within the traditional Aristotelian framework’. Charles Schmitt, *Aristotle and the Renaissance* (Cambridge, MA: Harvard University Press, 1983), 103. See also Christia Mercer, ‘The Vitality of Early Modern Aristotelianism’, in Tom Sorell (ed.), *The Rise of Modern Philosophy* (Oxford: Oxford University Press, 1997), 33–67.

<sup>5</sup> For instance, Marco Sgarbi, ‘Thomas White: An Aristotelian Response to Scepticism’, *Archive of the History of Political and Social Thought*, 58 (2013), 83–96, and Patrick Connolly, ‘Thomas White on the Metaphysics of Transubstantiation’ [‘Metaphysics of Transubstantiation’], *Southern Journal of Philosophy*, 54 (2018), 516–40.

<sup>6</sup> After a review of the ten categories, he concludes that ‘there are just *ten Orders* or *Classes* of Predicates, or *Notions*’ in terms of which we conceive of the bodies we see around us. *Peripateticall Institutions*, 11.

<sup>7</sup> Like many Aristotelians before him, White speaks of accidents in a narrow and a broad sense. In the narrow sense, accidents are contingent features of a substance (such as the white color of Socrates) and are contrasted with properties, or features substances of a certain sort always have (such as the risibility of men). See, for instance, *Peripateticall Institutions*, 17. In the broad sense, accidents for White are either accidents in the narrow sense, or properties. See, for instance, *Peripateticall Institutions*, 248. In what follows, I will use the term in this broad sense, but nothing hinges on this choice. For instances of a similar use of the term in earlier Aristotelians, see Robert Pasnau, *Metaphysical Themes 1274–1671* [*Metaphysical Themes*] (Oxford: Oxford University Press, 2011), 658.

reason and common sense. To regiment this ontology, he proposed that at least some accidents could be reduced to substances and their material parts. But even though White aimed for a generally lean ontology of accidents, he did not believe that all accidents could be so reduced. On the contrary, he believed that some accidents were genuinely distinct from their bearers. And as we will see, the way in which he developed this idea puts him at odds with contemporaries such as Descartes on the nature of matter. At the same time, it reveals a common ground with some of the Aristotelian accounts of accidents he criticizes in other places.

The approach in this chapter will not be to go through all of the nine categories of accidents identified by Aristotle to show how White deals with them. Instead, the lion's share of this chapter will be dedicated to the one accident White himself pays most attention to: the accident of location. In *De Mundo*, White gives center stage to the accident of location, and offers a detailed criticism of a number of scholastic accounts of location. One reason for this focus on location seems to be that, according to White, the case of location illustrates like few others what is wrong with treating accidents as beings in their own right over and above the substances whose accidents they are.<sup>8</sup> But there is a second reason for this focus on location as well. As we will see, White believes that flawed accounts of location are a breeding ground for the dangerous hypothesis that God could have created, not one world, but many. Given a correct account of location, however, this plurality of worlds hypothesis can be ruled out.

I will proceed as follows. Section 1 will provide some background to White's *De Mundo* and provide a suggestion as to why White would worry about the plurality of worlds hypothesis. Section 2 looks at his

<sup>8</sup> The English Aristotelians Kenelm Digby and John Sergeant agreed with White here and used the case of location as a paradigm example of how scholastic ontology had gone astray in reifying the accidents of material substances. See Kenelm Digby, *Two Treatises: in the one of which, the nature of bodies, in the other, the nature of mans soule is looked into* [*Two Treatises*] (Paris, 1644), 3–7, and John Sergeant, *The Method of Science* [*Method to Science*] (London, 1696), 91–2. White and Digby mutually influenced each other, and it is often hard to tell precisely what the direction of the influence is. In this case, however, Digby is explicit that his own treatment of location is indebted to White.

criticism of some scholastic accounts of location. White does not mention his opponents by name here, but section 3 argues that the Spanish Jesuit, Francisco Suárez, may well have been among the main targets of his criticism. Section 4 clarifies White's own account of location by looking at a problem that was raised for it by Hobbes. Finally, section 5 puts White's account of location in the broader context of his ontology of accidents. As we will see by looking in some detail at his ontology of quantity, White thinks that some accidents are genuinely distinct from their bearers, and develops this view in a way that lays bare a fundamental disagreement with contemporaries such as Descartes.

## 1. Background

In 1642, White published his dialogues *De Mundo*. The work is organized in three main parts and reports the scientific and philosophical discussions of three friends, Andabata, Ereunius, and Asphalius, on their journey to the city of Reims. Andabata appears in the dialogues as a spokesman of Aristotelian tradition and as a defender of geocentrism. His principal opponent in the dialogues is Ereunius, a critic of Aristotelian tradition and a supporter of Copernican cosmology. Less outspoken than either of his two companions, Asphalius generally ends up favouring the more modern views of Ereunius.

With this organization, White's dialogues were modelled upon Galileo's better-known *Dialogo*, which had appeared a decade earlier. Galileo's *Dialogue concerning the Two Chief World Systems* had pitted the Aristotelianism of Simplicius against the modern physics of Salviati. An informed layman whose sympathies gravitate towards the more modern views of Salviati, the role of Sagredo in the *Dialogue* roughly corresponds to that of Asphalius in White. But in spite of the parallels between the two works, White's overall project differs in tenor from that of Galileo. For in *De Mundo* as in his other works, White is not so much aiming to replace Aristotelian ideas with the new science of the seventeenth century, as to develop a compromise between the two. This becomes particularly evident in

his treatment of the heliocentric system that puts the sun at the center of the world.<sup>9</sup>

## 1.1 Heliocentrism

On the one hand, White agreed with Copernicus and Galileo that the earth is ‘mov’d about the sun’ (*Peripateticall Institutions*, 186), and that the sun is the ‘Fixer and as it were, Basis of all things rouling about it’ (*Peripateticall Institutions*, 188). But on the other hand, he remains committed on biblical grounds to the position that ‘our Earth is situated in the very middle of the Universe’ (*Peripateticall Institutions*, 364). This led Hobbes to comment that, ‘when as a philosopher he wishes to uphold the motion of the earth and as a Christian to leave the interpretation of Scripture to the Church, he is torn between two commitments.’<sup>10</sup>

White attempted to reconcile these two obligations by redefining the notion of a cosmic center as follows:

From the whole *Story* ’tis evident that our Earth is situated in the very middle of the Universe... Which I would not have so understood, as if the Centre of the Earth were the very middle point; but, that the Great Orbe (that is, all that Orbe, which the Earth makes with its circle about the Sun) has the notion of a Centre.

*(Peripateticall Institutions, 364–5)*

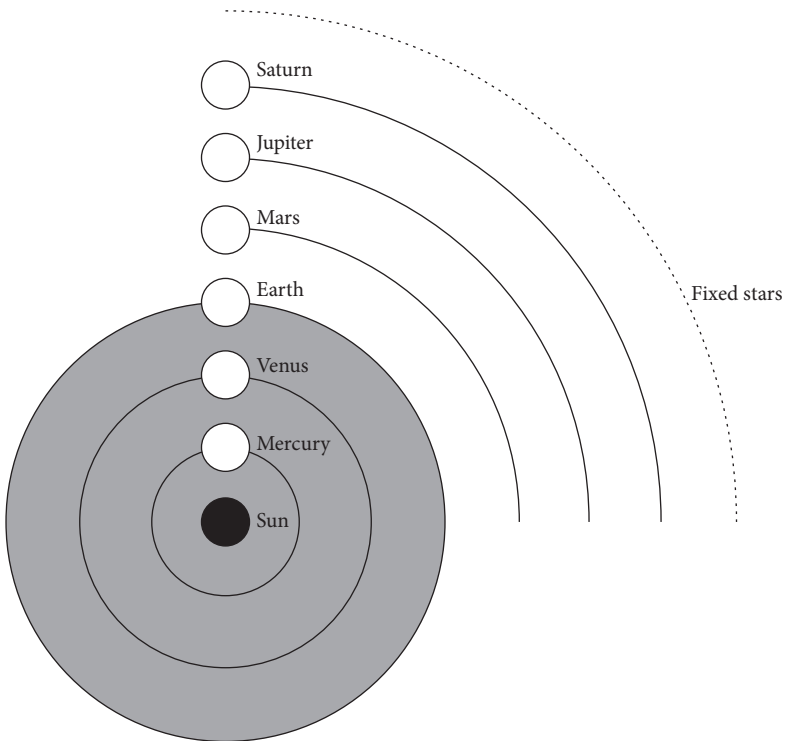
In other words, the earth rotates around the sun as per the Copernican obligations Hobbes detects in White. But the center of the universe is the whole area described by the rotation of the earth around the sun, which

<sup>9</sup> The world, for the authors discussed in this paper, is the whole system of planets and stars, of which the earth is but a part. It is in this broad sense that the word will be used in this chapter as well.

<sup>10</sup> ‘Dum enim motus telluris tueri vult, ut philosophus, et scripturae interpretationem relinquere ecclesiae, ut Christianus, ... inter utrumque tumultuatur.’ *Critique du De Mundo*, 204. Unless indicated otherwise, translations are my own.

places the earth in the center of the world, as per his other obligation, to Scripture and Church. As Beverley Southgate puts it, with his efforts to wed Copernican cosmology to Christian geocentrism, ‘White appears as an exemplary seventeenth-century Janus face.’<sup>11</sup>

Clearly, White’s compromise comes with problems of its own. If the center of the universe is described by the entire orbit of the earth, Venus and Mercury move into the center as well, and it is not clear that White intended this outcome. Moreover, it seems that, if the universe has a center at all, it would have to be some determinate point in space, rather than an area like the grey area in Fig. 1.1. Hobbes was deeply puzzled by



**Fig. 1.1** White’s cosmology showing the rotation of the earth

<sup>11</sup> Southgate, *Covetous of Truth*, 103.

White's balancing act between Aristotle and Copernicus, and concluded his review of *De Mundo* on this point with the remark that 'I do not know what his position is.'<sup>12</sup>

But here Hobbes arguably was a bit too harsh with his friend. For even though White attempts to accommodate the Christian doctrine that places the earth at the center of the universe, this attempt is clearly premised upon the Copernican conclusion that the earth rotates around the sun rather than the other way round. Indeed, as one commentator has pointed out, White stands out as the only Catholic writer of his time who was willing to go this far in endorsing a position that had but recently earned Galileo his condemnation from the Roman Inquisition.<sup>13</sup>

White's commitment to heliocentrism emerges clearly in his discussion of stellar parallax. If the earth moves, one would expect to observe an apparent motion of nearby stars against the background of more distant ones. However, no such parallax effect could be observed with the instruments available at the time, and according to geocentrists such as Tycho Brahe, this counted as empirical evidence against the idea that the earth orbits around the sun.<sup>14</sup>

Copernicus had foreseen this kind of objection, and in his *De revolutionibus* argued that, if no stellar parallax could be observed, this was not because the earth was the stationary center of the universe after all, but rather because of the immense remoteness of the stars, which causes parallax effects to 'disappear from our eyes'.<sup>15</sup> White agreed with Copernicus here and did not accept the absence of observed parallax as evidence against heliocentrism. In his *Peripateticall Institutions*, he explained that, according to some astronomers, the absence of observed parallax was evidence against 'any such thing as this Anuall motion

<sup>12</sup> 'Nescio quam sententiam dicat.' Hobbes, *Critique du De Mundo*, 204.

<sup>13</sup> Southgate, *Covetous of Truth*, 97.

<sup>14</sup> On Brahe's objections to the Copernican system, see Ann Blair, 'Tycho Brahe's Critique of Copernicus and the Copernican System' ['Tycho Brahe's Critique'], *Journal of the History of Ideas*, 51 (1990), 355–77.

<sup>15</sup> 'Quod autem nihil eorum apparet in fixis, immensam illorum arguit celsitudinem, quae facit etiam annui motus orbem sive eius imaginem ab oculis evanescere.' Nicolaus Copernicus, *De revolutionibus orbium coelestium* (Nurnberg, 1543), 1.10. The immense remoteness of the fixed stars required by the Copernican system was one of the features of the system Tycho Brahe found most implausible. See Blair, 'Tycho Brahe's Critique', 364.



of the Earth' postulated by Copernicus and his follower. But like Copernicus before him, White believed that it was the 'vast remoteness of the Fixed Stars' that rendered stellar parallax unobservable, not the stable position of the earth at the center of the universe.<sup>16</sup>

## 1.2 No Plurality of Worlds

In thinkers such as Copernicus and White, then, the endorsement of heliocentrism goes hand in hand with an immense increase of space. Some, like the English Copernican, Thomas Digges, had gone so far as to argue that the orb of fixed stars extends infinitely in space. But here White disagreed.<sup>17</sup> Given infinite space, the very notion of a cosmic center becomes vacuous. In a space that extends infinitely, it becomes arbitrary to single out any one point as its center, and indeed, this was just the conclusion that proponents of infinite space such as Giordano Bruno had drawn.<sup>18</sup> According to Bruno, God had made not just one but infinitely many worlds, each of which could lay an equal claim to being at the center of space.<sup>19</sup>

The idea that God could have made more than just one world was widely rejected by early modern thinkers, but at the same time, it was not unusual for this idea to be associated with the new cosmology of scientists such as Galileo.<sup>20</sup> In his *Sidereus Nuncius* of 1610, Galileo had shown that the surface of the moon was in fact not unlike the surface of the earth. According to some of his readers, this suggested that the earth might not be unique in space, and that, if the earth was not unique in space, then perhaps our world was not unique either. Such, at least, was one of the arguments presented in favour of the plurality thesis in the *Quaestiones in*

<sup>16</sup> See Thomas White, *De mundo dialogi tres [De Mundo]* (Paris, 1642), 177.

<sup>17</sup> See Thomas Digges, *A Prognosticon everlastinge* (London, 1576), fol. 43.

<sup>18</sup> According to Bruno, every celestial body can be said to be the center of space from the perspective of that celestial body. But as no one perspective is privileged over the others, there is no absolute center. See Bruno, *De l'infinito universo et mundi*, in Giovanni Aquilecchia (ed.), *Giordano Bruno. Dialoghi italiani [Dialoghi italiani]* (Florence: Sansoni, 1985) i. 406.

<sup>19</sup> See *De l'infinito universo et mundi*, in *Dialoghi italiani* i. 372–82.

<sup>20</sup> On the early modern association of heliocentric cosmology with the plurality thesis, see Steven Dick, *Plurality of Worlds* (Cambridge: Cambridge University Press, 1982), ch. 4.

*Genesisim* of White's Parisian friend, Marin Mersenne.<sup>21</sup> In the chapter of that work on whether or not there can be more than one world, we find the following argument in favour of an affirmative answer:

Since a few years, many things have been observed that argue the existence of a number of other worlds, distinct from ours. These observations include the regions that have been seen in the moon with the help of telescopes, in particular those of Galileo, through which the vast magnitude of the moon is observed in such a way that not only Galileo Galilei in his *Sidereus Nuncius*, but also the august mathematician Kepler in his dissertation on that work, assert that large woods, fields, caves and similar things are seen on the moon, such that these caves can be inhabited by men of some sort.<sup>22</sup>

Mersenne rejected this argument, but the attention he dedicates to it evinces how the connection between the new cosmology of scientists such as Galileo and the plurality thesis was alive among some of White's closest intellectual friends.

White too rejected the plurality thesis, and it is not hard to see why. Given even a mere duplication of the world in Fig. 1.1, both our earth and our sun would move out of the cosmic center. A plurality of worlds beyond duplication would annul entirely all of his efforts to reconcile biblical orthodoxy with Copernican cosmology. But although White joined Mersenne in rejecting the plurality thesis, he did so on different grounds. Indeed, his strategy in the dialogues *De Mundo* was to argue that there is no room for

<sup>21</sup> On Mersenne's critique of Bruno, see Miguel Granada, 'Mersenne's Critique of Giordano Bruno's Relation between God and the Universe: A Reappraisal', *Perspectives on Science*, 20(2010), 26–49. On White's affiliation with the Parisian circle of intellectuals around Mersenne, see Tutino, *Thomas White and the Blackloists*, 15.

<sup>22</sup> 'Multa paucis adhinc annis observata sunt, quae quosdam alios mundos a nostro distinctos inferant, quales sunt ingentes provinciae, quae in luna visa sunt tuborum Batavicornum, sed praecipue conspicilliorum Galilei auxilio, quibus tam vasta lunae magnitudine cernitur, ut in eas sylvas ingentes, campos, cavernas, et similia videri, non tantum Galilaeus a Galilaeo in suo Nuntio sydereo, sed etiam Keplerus Caesareae maiestatis Mathematicus in dissertatione ad praedictum asseverat, adeo ut in istis cavernis homines quosdam habitare.' Marin Mersenne, *Quaestiones celeberrimae in Genesisim* (Paris, 1623), 1075–6. Kepler had agreed with Galileo that the dark spots on the moon must be seas, and that the surface of the moon was in general not unlike that of the earth: 'do maculas esse maria, do lucidas partes esse Terras'. Johannes Kepler, *Dissertatio cum Nuncio sidereo* (Frankfurt, 1611), 29.

more than one world, simply in virtue of what a location is. A plurality of worlds is possible only given a flawed, scholastic notion of location.

## 2. White on the Plurality of Worlds

According to Andabata in the first part of *De Mundo*, God could have made not one, but two worlds. Ereunius challenges him on this point. According to Ereunius, the scenario in which God has made two worlds comes in two basic versions. On scenario *A*, the two worlds are contiguous. On scenario *B*, they are separated by a distance:

[*Ereu.*] So assuming but two distinct worlds and nothing else . . . , would you say that they were contiguous, or separated from one another by some kind of interval?<sup>23</sup>

Ereunius shows little interest in scenario *A*. If the two worlds were contiguous, they would ‘merge into one’ so that we would end up with one single world after all.<sup>24</sup> *B* is the relevant scenario. Now to say of two worlds that they are separated by a distance, according to Ereunius, is to say that they occupy different locations. So Andabata needs to be able to account for this:

*Ereu.* So let us assume that they are separated by an interval, and that one of them is here and the other there, for that follows from their separation. What is it, according to you, that *here* and *there* signify with regard to these worlds?<sup>25</sup>

In answer to this, Andabata first proposes that the location of any object is the region of space that it occupies and that, accordingly, for one of the two worlds to be ‘here and the other there’ is for the two worlds to occupy two non-adjacent regions of space.

<sup>23</sup> [*Ereu.*] Si itaque duo tantummodo mundi forent . . . , praetera vero nihil, contiguosne putes, an aliquo a se invicem distracto intervallo? *De Mundo*, 26.

<sup>24</sup> ‘In unum contiguitate et vicinia certe mundum conspirare.’ *De Mundo*, 30.

<sup>25</sup> ‘*Ereu.* Sunt igitur distracti, et unus quidem hic, reliquis illic, hoc enim consequens est; quid censes *to* hic et illic iis significare?’ *De Mundo*, 26.

Now an answer along these lines immediately raises the question of what space is. One option here, it seems, would be to think of space as a kind of three-dimensional void into which objects can be received. On this view, which traces back to the Byzantine thinker John Philoponus and which appears to have enjoyed a fair amount of support in the sixteenth century, when a region of this void is filled up by some given object, this region is identified as the location of that object.<sup>26</sup>

Andabata, however, does not consider this option, presumably because he denies the possibility of a void. Moreover, it appears that, even if the notion of space as a void were on the table, scenario *B* could not be made to work given what White has to say about the void on other occasions. According to White, the distance between two objects *x* and *y* is a function of the quantity of the medium that separates them. But this means that the very idea of a distance between two objects located in a void becomes contradictory. For on the one hand, to say that there is a distance between *x* and *y* is to commit to the existence of some medium that separates them. But on the other, to say that *x* and *y* are located in a void, is to deny the existence of any such medium. As White puts it:

'tis plain, that, a Body being created, Distance too, is created: But, to imagine Distance abstracted from a Body is manifestly against this first principle of Reason, which denies that the same can be a *Thing* and *no Thing*. (*Peripateticall Institutions*, 34)

Applied to the case at hand, if we have two worlds that each occupy some given region of void space, White would argue that it makes no sense to say that they are distant from one another. To say that they are distant from one another implies the existence of a medium between them. But to say that they occupy regions of a void space denies the existence of any such medium.

A second way to spell out the notion of space in the claim that a location is a region of space would be in terms of the medieval theory of imaginary space. This theory comes in many versions, but its core idea

<sup>26</sup> On this account of location and space and its reception in the sixteenth century, see Edward Grant, *Much Ado about Nothing: Theories of Space and Vacuum from the Middle Ages to the Scientific Revolution* [*Much Ado about Nothing*] (Cambridge: Cambridge University Press, 1981), 191–213.

seems to have been that, even though the world is in fact a plenum, we can imagine a void space and use this imagined void as a reference frame in which we locate objects. Thus to say of a stone that it is in a given location is to say that it takes up some region of an imagined void space. And to say of the world as a whole that it is in some location is to imagine an immense void and to assign the world to some region of this imagined void.<sup>27</sup>

As Edward Grant and others have documented, from the thirteenth century onwards, thinkers who were willing to entertain a scenario in which God had created more than one world would often spell out this scenario in terms of some notion of imaginary space.<sup>28</sup> Thus they would say that, if God had decided to make more than one world, each world would take up its own region of imaginary space. In fact, this is just how Andabata proposes we construe the scenario in which God has made one world here and a second one there:

*Andab.* What else could *here* and *there* signify with regard to these worlds, if not that this world is in this region of imaginary space, and the other world in another?<sup>29</sup>

But Ereunius has little patience for this account:

[*Ereu.*] For the very word brings out the inanity of imaginary space, and signals that it is nothing at all.<sup>30</sup>

The underlying objection here seems to be that, if space is an imagined void, space will exist in the mind alone. The same will be true for regions

<sup>27</sup> The notion of imaginary space was initially used with regard to extra-cosmic space. But in late scholastic accounts, it became a tool to locate intra-cosmic items as well. See Cees Leijenhorst, *The Mechanization of Aristotle: The Late Aristotelian Setting of Hobbes' Natural Philosophy* [*The Mechanization of Aristotle*] (Leiden: Brill, 2002), 111–13.

<sup>28</sup> See Grant, *Much Ado about Nothing*, ch. 6. In 1277, Bishop Tempier of Paris famously condemned the thesis that God could not have made more than one world. This compelled Paris scholastics in the late thirteenth century, not only to concede the possibility of a plurality of worlds, but also to think through the cosmological implications of this possibility. See Grant, *Much Ado about Nothing*, 108–10.

<sup>29</sup> '*Andab.* Quid enim nisi hunc in hac spatii imaginarii parte situ messe, alterum in alia?' *De Mundo*, 26.

<sup>30</sup> '[*Ereu.*] Spatium enim imaginarium ipsa voce prodit inanity suam et sese nihil esse coarguit.' *De Mundo*, 26.

of space. Hence if locations are regions of space, the location of an object will exist in the mind alone.<sup>31</sup> But that is wrong. The location of an object is something real in the world, not a mere idea of the mind that locates it in a space that has an imagined being only.

But if the locations of the worlds in scenario *B* are neither regions of a real nor of an imagined void, the question of how one of these worlds can be here and the other there remains open. Andabata at this point turns to an alternative account of location that gives up the basic idea that the location of an object is some kind of region of space it occupies. Instead, he proposes that the location of an object is one of its inner states. Such a locating state he calls an ‘ubication’, and to say of two objects that they have different locations, on this account, is to say that they have different locating states or ubications:

[*Andab.*] I say, then, that the two worlds are in distinct locations in virtue of their different ubications. An ubication (in case you should think it necessary to ask), is a kind of being that is inseparable from its subject, and the effect and essence of which is to constitute a body here or there in accordance with the kind of ubication it has received.<sup>32</sup>

It is an advantage of this view that, because to locate an object no longer is to assign it to some given region of space, the difficulties that come with the articulation of a theory of space can, in a discussion of location, be put to one side. At the same time, however, the notion of a locating state is not at all an obvious one, and Andabata so far has provided no reason to believe that there are states of this kind.

In the dialogue we learn little more about locating states than what can be found in the passage above. What Andabata does tell us, however, is that his account of locating states traces back to some ‘eminent’ masters

<sup>31</sup> In the *Peripateticall Institutions*, White seems to question the very notion of a ‘region’ or ‘part’ of imaginary space when he writes that ‘what they call Imaginary space is nothing at all, nor has it any distinguishable parts’. *Peripateticall Institutions*, 33.

<sup>32</sup> [*Andab.*] Aio igitur mundos dissitos esse per diversas ubicaciones; est autem ubicatio (ne forte interrogare tibi necesse sit) ens quoddam a subiecto inseparabile, cuius virtus et tota ratio sit constituere corpus hic vel illic secundum speciem ubicacionis quam sortitur.’ *De Mundo*, 27.

of philosophy (*De Mundo*, 26). As I will argue in the next section, one of these eminent masters may well have been the Spanish Jesuit, Francisco Suárez. Taking a brief look at his account of location will help us to better appreciate the view Andabata is proposing here as well as the criticism Ereunius will go on to level against it.

### 3. Suárez on Location

In his *Metaphysical Disputation* 51, Suárez offers what may well be the most detailed account of location by a scholastic author extant today.<sup>33</sup> In it he argues that the location of a substance is one of its ways of being, or modes. But before arriving at this position, he begins with a brief review of some competing accounts of location.

The first is the Aristotelian container theory of location. On this account, the location of an object is the ‘innermost motionless boundary’ of the body that contains it.<sup>34</sup> Suárez rejects this view on the ground that it cannot account for the location of objects that lack a containing body, such as angels or the outermost sphere of the world. On the second account he discusses, an object is in a determinate location because of the region of space it fills. This view does not reduce locations to containing bodies, and so does not leave objects with no bodies to contain them without a location. But Suárez rejects the space theory too: ‘This view immediately raises the question of what this space is. And the authors who hold this view have hallucinated the strangest things in answer to this question.’<sup>35</sup>

<sup>33</sup> Suárez on location has not been studied in much detail. But see Pasnau, *Metaphysical Themes*, 369–73. Also Olivier Ribordy, ‘Francisco Suárez and Francesco Patrizi: Metaphysical Investigations on Place and Space’, in Frederik Bakker, Delphine Bellis, and Carla Rita Palmerino (eds.), *Space, Imagination and the Cosmos from Antiquity to the Early Modern Period* (New York: Springer, 2019), 133–56.

<sup>34</sup> *Physics* IV.4, 212a20. I use the translation by R. P. Hardie and R. K. Gaye in Jonathan Barnes (ed.), *The Complete Works of Aristotle* (Princeton: Princeton University Press, 1995). For detailed discussion of Aristotle on location, see Benjamin Morris, *On Location: Aristotle’s Concept of Place* (Oxford: Oxford University Press, 2002), ch. 5.

<sup>35</sup> ‘Statim occurit inquirendum in hac sententia quid sit hoc spatium, in quo mire hallucinati sunt auctores eius.’ *DM* 51.1.10; *OO* xxvi. 975.

According to an account of space Suárez traces back to Simplicius, space is a kind of body. More precisely, it is a body penetrated by the bodies it contains. But Suárez objects to this account that, in order to contain bodies space must be extended in three dimensions, and that in order for space to be extended in three dimension it must have quantity. But quantity is the accident in virtue of which bodies resist penetration by other bodies: ‘There would have to be three real dimensions in such a body. Hence it would have quantity as well, which would make it impenetrable by other bodies.’<sup>36</sup>

Suárez next considers a view he refers to his fellow Jesuit, Francisco of Toledo. On this view, space is ‘some kind of void, the being of which consists in the lack of a body, in such a way that it is apt to be filled up by something else.’<sup>37</sup> Now according to Toledo, such a void exists in the imagination only. Indeed his view seems to be that space is a vast extension that we imagine to be empty, and ready to be filled up by objects. The location of an object, on this view, is a region of imaginary space, or a region that we imagine to be empty but apt to be filled up by an object of the same size as this region.<sup>38</sup>

Suárez rejects this view on the ground that the location of an object is something real: ‘when a body is said to be here or there, these words signify some real feature of that body’.<sup>39</sup> But imaginary space is ‘nothing at all’.<sup>40</sup> Hence locations are not regions of imaginary space. Having ruled out these options, Suárez puts forth his own position that location is an inner mode of located objects.

<sup>36</sup> ‘Praeterea in tali corpore necessario essent tres dimensiones reales, ergo et quantitas esset, esset ergo impenetrabile cum aliis corporibus.’ *DM* 51.1.10; *OO* xxvi. 975. On quantity as the accident responsible for the impenetrability of bodies, see Tad Schmaltz, *The Metaphysics of the Material World: Suárez, Descartes, Spinoza* (Oxford: Oxford University Press, 2020), 66–80.

<sup>37</sup> ‘Hoc spatium non esse quid reale, sed secundum se, vacuum quoddam, cuius esse est carentia corporis, ut repleri possit.’ Francisco de Toledo, *In Libros Physicorum* 4.5.3, in *Opera omnia philosophica [Opera Omnia]* (Hildesheim: Georg Olms, 1985) iv. 116.

<sup>38</sup> See Toledo, *In Libros Physicorum* 4.5.8, in *Opera Omnia* iv. 122. On Toledo on location, see Leijenhorst, *The Mechanization of Aristotle*, 113–14 for more detail.

<sup>39</sup> ‘Cum corpus dicitur esse hic vel illic, hic vocibus significatur aliquid reale conveniens tali corpori.’ *DM* 51.1.14; *OO* xxvi. 976.

<sup>40</sup> ‘Sufficienter videtur posse convinci illud spatium... revera esse nihil.’ *DM* 51.1.12; *OO* xxvi. 975.



### 3.1 Suárez on Location as a Mode

According to Suárez, the location of a substance is not something extrinsic to the substance, such as a region of space or the boundary of an object that contains it, but something intrinsic to it. That this is so can be seen from an analysis of local motion, or change of location. For a substance to be in motion is for it to be in some kind of inner state. Now this state has a beginning and an end point. But these points are just limits of the state itself. Hence they are not beings over and above the state of motion the substance is in. But the beginning and end points of motion are locations. Hence locations are inner states of substances:

The local motion of a body, according to all, subjectively inheres in the mobile object itself. This is clear to the senses. Now local motion, like any other kind of motion, is but a path to an intrinsic end point. Hence the intrinsic end point of such a motion, too, is in the mobile object itself. For the path and its end point cannot be entirely distinct, and so cannot be in distinct subjects. But the end point of local motion just is a location.<sup>41</sup>

The inner states that locate substances are but ways of being or modes of these substances. Hence they are inseparable from them, in the sense that no local mode can exist without a substance whose mode it is. Indeed a local mode ‘cannot be conceived without a subject’.<sup>42</sup>

But even if local modes never exist apart from the substances they locate, Suárez notes that a substance can change location without changing with regard to the matter and form that constitute it. Hence the location of a substance does not supervene on the matter and form that constitute the substance, and is somehow distinct from these. He also notes that a substance can change location without changing with regard

<sup>41</sup> ‘Motus localis corporis ex sententia omnium est subiective in ipso mobile, quod fere ad sensum etiam patet; motus autem localis, sicut et omnis alius, non est nisi via ad suum intrinsecum terminum; ergo etiam intrinsecus terminus talis motus est in ipsomet mobile, et consequenter terminus talis motus est in ipsomet mobile, quia via et terminus non possunt esse res omnino distinctae, et consequenter neque in subiectis distinctis; sed terminus motus localis est ipsum ubi.’ *DM* 51.1.25; *OO* xxvi. 979.

<sup>42</sup> ‘Intelligi non potest talis modus sine aliquo subiecto quod alicubi sit.’ *DM* 51.1.13; *OO* xxvi. 976.

to accidental forms such as its color and shape. Hence the location of a substance does not supervene on such accidental forms either, and is somehow distinct from these as well: 'It is easily proven that this mode is distinct in reality from a subject and its quantity and other accidents, because a subject can gain and lose this mode without any change in the subject, its quantity, or any one of its other accidents.'<sup>43</sup>

In order to better understand the idea of location as a mode, it will be helpful to note how it relates to the idea of imaginary space. For in spite of his criticism of space theories of location, Suárez does admit that we can imagine a void space and grants that we can use this imagined void space as a reference frame to locate objects: 'In order to explain local presence and the duration of things, we imagine two infinite spaces: one that is, as it were, permanent, and infinitely extended in all directions, and the other, as it were, successive.'<sup>44</sup>

To locate an object in the first kind of space is to say where it is. To locate it in the second kind of space is to say when it is.<sup>45</sup> But even though there is nothing wrong with this way of speaking, we must not say that the location of  $x$  just is a region of an imagined space. Instead, we must say that the location of  $x$  is the presence it has to some given region of the space we imagine: 'Thus location, in things created by God is a mode that is distinct in reality from the creature, because it is some kind of limited presence to a determinate portion of the first kind of space.'<sup>46</sup>

The language here is perhaps not entirely clear, but the idea seems to be that objects have features that modify them as fillers of certain regions of imagined space. If this is correct, we may capture Suárez's proposal here as follows. Suppose we imagine a void space that extends in three dimensions and use this as a reference frame in which we locate objects  $x$  and  $y$  as follows:

<sup>43</sup> 'Facile probatur hunc modum esse distinctum ex natura rei a subiecto, quantitate et caeteris accidentibus eius, quia hic modus acquiri et perdi, nulla alia mutatione facta in subiecto, neque in quantitate aut caeteris accidentibus eius.' *DM* 51.1.16; *OO* xxvi. 976.

<sup>44</sup> 'Ad explicandum praesentias locales et durationes rerum, duo spatia infinita a nobis concipiuntur: unum quasi permanens et undique infinite extensum sine termino; aliud quasi successivum.' *DM* 50.2.18; *OO* xxvi. 921.

<sup>45</sup> On Suárez on time, see Emmaline Bexley, 'Quasi-Absolute Time in Francisco Suárez's *Metaphysical Disputations*', *Intellectual History Review*, 22 (2012), 5–22.

<sup>46</sup> 'ubi ergo in rebus creatis Deo est modus ex natura rei distinctus a creatura, quia est definita quaedam praesentia ad determinatam partem prioris spatii'. *DM* 50.2.18; *OO* xxvi. 921.

$x$  has coordinate (1, 2, 3)<sup>47</sup>

$y$  has coordinate (2, 2, 3).

According to Suárez, each of these objects has a certain mode that makes these claims true:

$x$  has a mode that makes it true that it has coordinate (1, 2, 3)

$y$  has a mode that makes it true that it has coordinate (2, 2, 3).

Now, according to Suárez, we must resist the temptation to say that the *coordinates* here are the locations of  $x$  and  $y$ . Coordinates are abstractions of the mind, locations are not. What we must say instead is that the locations of  $x$  and  $y$  are the intrinsic *modes* that make it true of these objects that they can be assigned to these coordinates.

With this account of location, Suárez thinks he can account for a number of things that are otherwise hard to account for. First among them is the location of angels. Angels are not contained by bodies and lack a location on the Aristotelian account of location. But if the location of  $x$  just is an inner mode of  $x$ , there is no reason why an angel could not have a location. In fact, according to Suárez, angels are in a location in virtue of just the same kind of modes that locate bodies.<sup>48</sup>

Secondly, if locations are inner modes of located objects, it becomes possible to think of objects in a void as separated by distances. If the distance between two objects is a function of the quantity of the medium between them then, as we have seen, the idea of a distance between two objects in a void will fail to make sense. But this, according to Suárez, is a problematic outcome for an account of distance relations to have. To see why, imagine a small room, and consider what would happen if God were to remove all of the medium from this room but left its walls in their respective locations. Surely in this scenario the distance between the walls would remain the same as before, in spite of the fact that they would no longer be separated by a medium: 'If God were to destroy the

<sup>47</sup> Suárez did not of course use the modern language of coordinates. Yet it seems helpful as a tool to appreciate what he is after.

<sup>48</sup> Suárez offers a detailed discussion of angelic location in *De Angelis* 4.1–2; *OO* ii. 421–33.

air in this small room and left the medium empty (as he easily could), then the same real distance that exists now would remain.<sup>49</sup> According to Suárez, the fact that the distance would remain the same is easily explained if objects have modes of location. To see this, assume that  $x$  and  $y$  are two walls of the room in question and that they have local modes that make it true to say that they have the coordinates given above. From this it follows that the distance between  $x$  and  $y$  is one unit and that this distance remains one unit for just as long as  $x$  and  $y$  retain the intrinsic local modes they have now. More to the point, it would remain one unit even if God decided to empty the medium between them.

By the same token, Suárez goes on to explain, if objects have local modes that ground the distance relations between them, it becomes possible to envision a scenario where God has created two distant worlds in a void: ‘And God could do the same with bodies that are outside of this world by creating another world distant from this one, in whatever way or at whatever distance he wished to . . . . For who will restrict the power of God and dare to say that he could only create a world contiguous with this one?’<sup>50</sup> Indeed, assuming that  $x$  and  $y$  are worlds, the distance between them would be one unit, even if there were no real medium to keep them apart. Thus it is possible for God to create two distant worlds in an otherwise void space.

This makes it plausible that Suárez was one of the eminent masters Andabata had in mind. First, both treat location as an inner mode of a substance. Second, both hold that location is inseparable from, yet resists reduction to, the substance whose location it is. Third, in both Suárez and Andabata, the claim that location is a real mode of substances comes as an alternative to the identification of location with a region of

<sup>49</sup> ‘Si Deus aerem hujus cubicula in nihilum redigeret, et medium vacuum relinqueret, ut facile posset, tunc enim eadem realis distantia inter parietes maneret.’ *De Angelis* 4.8.6; *OO* ii. 455–6. For earlier versions of this thought experiment, also Grant, *Much Ado about Nothing*, 121–7.

<sup>50</sup> ‘Deinde in corporibus extra mundum idem posset facere Deus, creando alium mundo ab isto distante, quantum vel quomodo vellet. Quod etiam non negatur. . . . Quis enim ita potentiam Dei limitabit, ut audeat dicere non posse creare alium mundum, nisi huic contiguum?’ *De Angelis* 4.8.6; *OO* ii. 456.

imaginary space, which both take to deny the reality of location. Finally, both Suárez and Andabata appeal to the mode of location to account for the possibility of a plurality of mutually distant worlds.

### 3.2 White versus Suárez on Location

White raises two main objections to the local modes account of location. The first is that, just as it is explanatorily vacuous to say that opium is sleep-inducing because it has a dormitive power, it is explanatorily vacuous to say that a substance is located in a location in virtue of its mode of location, or *ubi*:

*Ereu.* Now you are simply playing with words. For suppose you did now know of houses, churches, yards, ships and the like, that you would ask for an explanation of what these things are, and that you were told that a house is a thing whose essence it is to be a house, and that similarly a church or ship is a thing whose nature it is to be a church or a ship. Would it be possible to consider your teacher to be anything but an imposter or a mocker? Do you not know that the first rule of the dialecticians is that, in building a definition, the thing that is to be defined should not feature in the definition?<sup>51</sup>

The second objection is that the ubication theory flies in the face of our ‘common notion’ of location. According to White, science and philosophy ought to build upon the ‘common notions’ of ordinary men, not on the technical concepts of the learned few:<sup>52</sup>

<sup>51</sup> ‘*Ereu.* Nunc puris putis illudis voculis. Pensa enim teca si domus, Cathedrae, plateae, navis, alicuiusve alterius quod ignorares, Entis explicationem peteres: refers autem domus esse rem, cuius natura est esse domum, et cathedram similiter vel navis rem esse, quarum hec natura foret navim et cathedram essendo esse: poteras aliter quam vel leuteum existimare doctorem vel irrisorem? Nescis hoc primum Dialecticorum in condendis definitionibus esse praeceptum ne definitum in definitione maneat inclusum?’ *De Mundo*, 27.

<sup>52</sup> On this view of the role of common notions in White and Digby, see Andreas Blank, ‘Composite Substance, Common Notions, and Kenelm Digby’s Theory of Animal Generation’, *Science in Context*, 20 (2007), 1–20.

*Ereu.* Thus it is now clear to you that in treating of location, we also spoke of the ten highest categories in general. For the account we have of them is given by nature and is common to all, and must not be taken from learned works, but from the understanding of ordinary men.<sup>53</sup>

Now the common notion of a location, according to White, is in fact the container notion of location as spelled out by Aristotle:

[*Ereu.*] I call upon all men and the daily words they use to express where something is. Do not all think of the location of an object as a thing that surrounds it, or as Aristotle puts it, as a kind of immobile container?<sup>54</sup>

As White is aware, this notion of location does not work very well for the world as a whole. If the location of a body is the boundary of the body that contains it, there will be no location for the world as a whole. This outcome was first noted by Aristotle. According to Aristotle, however, the world could still be said to be in a location *per accidens*, insofar as for each of its parts there is a body that contains it: 'Other things are in place accidentally, as the soul and the world. The latter is, in a way, in place, for all its parts are.'<sup>55</sup> But such a *per accidens* location, according to White, is a location in a strained sense only:

'Tis as certain that, either the world is not in a Place, or, if it be (as some endeavour to explicate), 'tis by its parts; that is, because every part is in a Place, it may, in a kind of forc'd sense, be said to be in a Place.

(*Peripateticall Institutions*, 37)

<sup>53</sup> '*Ereu.* Excidit proinde tibi quod dum de loco ageremus, de summis decem generibus universim pronuntiavimus; nempe eorum notiones a natura esse, et omnium gentium communes: neque ex doctis laboribus, sed ex simplici generis humani sensu trahendas esse.' *De Mundo*, 42-3.

<sup>54</sup> '[*Ereu.*] Ad hos omnes appello et quotidianas eorum voces, quibus ubi situm sit quippiam exponunt, si non omnes ambiens quippiam et ut Aristoteles vocat, vas quoddam immobile pro loco reddant.' *De Mundo*, 28.

<sup>55</sup> Even a body situated on the outermost boundary of the heavens would be surrounded by other bodies on at least some of its sides. See *Physics* IV.4, 212b7-15.

This concludes the argument in White against scenario *B*. As we have seen, the scenario of two worlds in distant locations cannot be made to work if location is construed as a region of space, because there is no viable notion of space to support this account of location. To construe location as an inner mode of located objects neutralizes the difficulties that surround the ontology of space but fails to do justice to our common notion of location. The container theory of location avoids these problems but does not allow that even our own world has a location in a natural sense of the term. As an account of Scenario *B*, therefore, it is a nonstarter.<sup>56</sup>

I will offer no detailed evaluation of this argument against the plurality of worlds here. What I will do instead is take a closer look at the ontology of location on which it turns. As we will see in section 4, Hobbes charged White with inconsistency, and argued that his account of location in the end amounted to just the kind of imaginary space theory of location he had wished to reject. I will argue that, even though White does see an important role for the human mind in fixing the locations of material substances, the charge of inconsistency in Hobbes rests on a misunderstanding of just what this role amounts to. In section 5 I will put White's account of location in the broader context of his attempt to develop a lean ontology of accidents and argue that he admits at least one kind of accident that behaves rather like the local modes we have seen him reject above.

#### 4. A Problem from Hobbes

White proposes a return to Aristotle: the location of an object is the inner surface limit of the body that contains it. Now, as White knows well enough, this notion of location comes with a traditional problem about

<sup>56</sup> If there is no account of location on which the world as a whole can be said to be in a location, the answer to the question 'where is the world?' appears to be: 'nowhere'. But if the world is nowhere, it follows that not everything that exists, exists somewhere. White never endorses this conclusion in so many words. Digby, however, is explicit that it would be 'an absurd illation' to say '*it is, therefore it is somewhere*'. See *Two Treatises*, 424. On the history of the idea that existence implies existence in some location or other in medieval and early modern philosophy, see Pasnau, *Metaphysical Themes*, 328–33.

immobility. To see what the problem is, it will be helpful to look at a concrete scenario involving the following items:

*S* An inert stone surrounded by flowing water.

*C1* The water that surrounds *S* at *t1*.

*C2* The water that surrounds *S* at *t2*.

Given the flow of the water, *C1* is not identical to *C2*. Hence if the container theory of location is correct, *S* will have changed location between *t1* and *t2*. But given that *S* was supposed to be inert, that seems wrong. As White realized, this problem is easily generalized. For at least on the level of their atomic parts, all bodies are in permanent flux. Hence, absent enduring containers, no object will be in one location for more than one moment.

White's answer to this problem was to say that it is 'from the mind' that the surface of a containing body can gain an immobility 'that it does not have of itself'.<sup>57</sup> Those who demand that location be mind-independently immobile wrongly assume a one-to-one correspondence between things as we conceive of them and the world as it really is:

[*Ereu.*] Thus many are in error who, making for themselves a ladder from the mind to the nature of things, demand that what they find in thought be found in the things as well. Thus some people, as soon as they hear talk of location as an immobile surface, start to look for some surface that from its nature is endowed with immobility.<sup>58</sup>

According to Hobbes, White at this point has made a U-turn. For if location is an immobile surface, and if immobile surfaces are found 'in thought' but not in nature, then locations are the work of the mind. But if that is correct, we seem to be back at just the kind of imaginary locations

<sup>57</sup> '[*Ereu.*] Huic superficiei ab intellectu notionem immobilitas contingere ab extrinseco quam ex sese non habet.' *De Mundo*, 33.

<sup>58</sup> '[*Ereu.*] Unde est ut plurimum aberrant ii, qui ab intellectu ad rerum naturam gradum sibi facientes, eadem quae in intellectu inveniunt, in rebus postea requirunt: hinc est quod aliqui locum superficiem immobilem audientes, statim in rebus investigant superficiem aliquam quae ex sua natura immobilitatem sit sortita.' *De Mundo*, 33.



White had rejected in his attack on the plurality of worlds: ‘And so the matter after all comes down to this: location is imaginary space. This contradicts what he had assumed in the previous problem to prove the unicity of the world.’<sup>59</sup> But this is unfair. To see just what the work of the mind consists in for White, consider again the case of the inert stone.

According to White, a surrounding body that is in flux can remain constant with regard to some given point of reference. Thus the water that surrounds the inert stone at various moments never consists of the same drops but can remain constant in the sense that, at every moment of time, the water that surrounds the stone stands in the same distance relation to some given point of reference. Thus the fact that the portions of water that surround the stone in the river at various moments of time bear the same relation to cosmic reference points such as the poles of the earth can be used to neutralize the fact that they are not materially the same portions of water:

’Tis plain, therefore, that *Place* is the *Body* which *next encloses* the thing within it; as ’tis *conceiv’d* to be in a certain site to the rest of the world, or its fixt parts. (*Peripateticall Institutions*, 36)<sup>60</sup>

At this point, it could be objected that, at least on the level of its atomic parts, everything is in permanent flux, so that there are no truly ‘fixt parts’ of the world:

You’l object, there’s nothing *constant* in the world, able to make a *Place*, besides *Imaginary Space*. ’Tis answer’d, *Place* . . . signifies a *thing* as ’tis in our *mind*, or under *Notions*; wherefore, you must not require something really immoveable, but which may *appear* such.

(*Peripateticall Institutions*, 37)

<sup>59</sup> ‘Et sic rursus devenitur ad hoc: ut locus sit spatium imaginarium. Contra id quod ad probationem unitatis mundi superiori nodo assumpserat.’ *Critique du De Mundo*, 127.

<sup>60</sup> On cosmic bodies as reference points, see also *De Mundo*, 34–5. On similar accounts in medieval treatments of location, Cecilia Trifogli, *Oxford Physics in the Thirteenth Century* (Leiden: Brill, 2000), 175–86.

The suggestion here is that, when we relate a surface to some given point of reference, what matters is not that the latter be immobile in and of itself, but rather that we can regard it as immobile, or that it appears to us as such. At any rate, this is how White was read by his friend and follower, John Sergeant. According to Sergeant, the location of an object is ‘the surface of the containing Body’ insofar as it stands ‘in a Determinate distance from some Parts of the House, the Town, the Country, or the World, which to our apprehension are fixt’ (*Method to Science*, 91–2).

Now, on this view, the mind has a substantial role in fixing the locations of objects. Not only does it have to select a reference point, but it also has to consider this reference point as fixed and immobile. Even so, the account of location White offers remains far removed from the imaginary space account of location. It is true that both are relational accounts of location. On both accounts, the location of an object is not some inner state like a local mode, but an external item the object relates to in a certain way. But the two accounts disagree on the nature of that item. According to the proponents of imaginary space, it is a region of an imagined void. According to White, it is a surface that the mind relates to a reference point it conceives of as fixed. And this difference lays bare an even more fundamental one. The very starting point of imaginary space accounts of location is that it makes sense to think of objects in a void as having a location. According to White, however, it does not:

[*Ereu.*] What can be clearer, than that an object that is put in a void, has no location?<sup>61</sup>

Again, imaginary space accounts identify the location of an object as a region carved out by the mind in an imagined void. But, for White, locations are more firmly grounded in reality. On the side of the mind, they require an abstraction from the motion of its reference points. But on the side of the world, locations are grounded in concrete bodies that serve as containers for others.

<sup>61</sup> [*Ereu.*] Quid clarius esse potest quam positam in nihilo rem locum nullum habere? *De Mundo*, 28.

Given such bodies and given minds to abstract away from motion, then, there is no need to add locations as separate items to an inventory of what there is. In the next section, we will see that White aims for a lean ontology of other accidents as well. But even if, as we will see, sensory accidents, like color, can be reduced to substances and their parts, some accidents remain truly distinct from their bearers.

## 5. No Accidents without Substances

On at least one occasion, White sounds as if he wished to eliminate all accidents from his ontology. Thus on at least one occasion, he denies that accidents can be called beings or things.<sup>62</sup> And if all accidents are eliminated from the realm of beings or things, it appears we are left with an ontology that includes substances and substances only.

But this would be a misreading of White. For immediately after his denial that accidents are beings or things, he tells us that to be a being or a thing in his usage just is to be a substance.<sup>63</sup> Hence the denial that accidents are beings or things simply amounts to a denial that accidents are, or behave like, substances. And so construed, the claim that no accident is a being may not be such a strong claim to make after all.

Even so, White is not tilting at a straw man when he warns against treating accidents as substances. To see this, we need to take a brief look at a theological problem that provided the fuel for medieval and early modern debates about the ontology of material substance like few others: the problem of the Eucharist. The problem is this. After the consecration of the host, the piece of bread becomes a new kind of substance: it becomes the body of Christ. Yet we still perceive bread accidents, such as the color and taste of bread. And this raises the question of what now serves as the bearer of these accidents. Not the bread, because that has been replaced by the body of Christ. But not the body of Christ either. For being a human body, the body of Christ is not the

<sup>62</sup> 'The word *Thing* or *Being*' is used for accidents in a loose sense, because 'since a *Thing* is that which has a being, the first Predicament alone challenges to it self the title of a *Thing*'. *Peripateticall Institutions*, 19.

<sup>63</sup> 'Thing signifies An individual substance'. *Peripateticall Institutions*, 19.

kind of substance that looks and tastes like bread. The bready accidents we continue to perceive after the consecration of the host, then, seem to be somehow suspended in the air without a proper substance to bear them.

Scholastic philosophy saw a plethora of different responses to this problem.<sup>64</sup> One response that White may have been familiar with was defended by Suárez. According to Suárez, accidents like color inhere directly, not in a substance, but in the quantity of that substance. His idea was that a substance is spread out over a certain surface because of the quantity that inheres in it, and that the color of that substance is spread out over the very same surface, because it inheres in the same quantity that first spread out the substance.

Also, by making quantity the direct bearer of other accidents such as color, Suárez believed he could account for the status of the bready accidents we perceive after the consecration of the host. What happens after the consecration, he argued, is that the accident of quantity gets detached from its substance but continues to serve as the subject for the other accidents we continue to perceive. Thus after the consecration, the accident of quantity comes to behave rather like a substance, in two senses: first, in the sense that it lacks an underlying substance that bears it, and second, in the sense that it serves as the bearer for sensible accidents such as color.

And Suárez even went a step further. For he argued that, if God can preserve a quantity without a bearer, he must be able to do the same thing for a quality like color. If God so willed, that is, he could decide to preserve a color without either a substance or a quantity to bear it: 'If a quantity can be preserved by God, then why not a quality as well? For it is no more essential for a quality to actually inhere in a quantity than it is for a quantity to actually inhere in matter.'<sup>65</sup>

With this view, Suárez was drawing on the ontology of the influential Spanish theologian Domingo de Soto. According to Soto,

<sup>64</sup> For an overview and discussion, see Marilyn Adams, *Some Later Medieval Theories of the Eucharist* (Oxford: Oxford University Press, 2010).

<sup>65</sup> 'Si quantitas conservatur a Deo, cur non potest qualitas? Neque enim magis est de essentia qualitatis actu inhaerere quantitate, quam sit de essentia quantitatis actu inhaerere materiae.' *De Sacramentis* 57.3.8; OO xxi. 287.

accidents like color inhere in quantity, and God can detach quantity from an underlying substance in such a way that quantity comes to serve as a surrogate substance for these accidents. But, Soto argued, once God has detached quantity from its substance, he will also be able to detach the other accidents from the quantity that bears them. And when he does so, these accidents gain the mode of being of substances.<sup>66</sup>

This assimilation of accidents to substances was ridiculed by modern thinkers such as Descartes and Boyle. According to Descartes, if the scholastics conceive of accidents ‘by employing the notion of a substance’, the very distinction between substances and accidents on which they base their Aristotelian ontology of the material world collapses (AT vii. 253/CSM ii. 176). And according to Boyle, if accidents can indeed behave like substances, they are ‘accidents in name’ only, and the distinction between substances and accidents again becomes a verbal one at best.<sup>67</sup> White, too, rejected the notion that accidents could behave like substances, and made it clear that no amount of theology could convince him of the reality of accidents detached from substances:

You’l say, if these things are true, it implyes a contradiction that any Accident should exist out of its own Subject; the contrary whereof is a matter of *Faith*. ’Tis answer’d, ther’s neither Authority nor Demonstration, in *Theologie*, which convinces that an *Accident* may be preserv’d *out of a Subject*; as, ’tis plain, to those that look more attentively to it. (*Peripateticall Institutions*, 196)

It is not hard to see why White rejects the notion of accidents detached from substances. Locations cannot be preserved without substances because locations just are substances serving as containers. Relations cannot be preserved without substances because, as we have seen,

<sup>66</sup> Domingo de Soto, *Commentarii in quartum Sententiarum* (Salamanca, 1569) 11.1.1.

<sup>67</sup> See Robert Boyle, *On the origine of formes and qualities* [*Origine of Formes*] (Oxford, 1666), 13. When early modern philosophers deny the reality of accidents, the emphasis often is on the case of sensory qualities. It is less common to find explicit denials of the reality of accidents in the other accidental categories, such as action or position. But for a clear claim that these kinds of accidents must no more be treated as real beings over and above substances than sensory qualities, see *Origine of Formes*, 10.

relations can have no being but in related substances. A similar case can be made for accidents in the category of quality.

According to White, the material substances we see around us are built up out of minute portions of the four elements, or atoms. The specific way in which these atoms combine in a material substance determines which qualities it has. Thus a high number of component water atoms is what makes a material substance fluid, and a high number of component earth atoms is what makes a material substance dry (*Peripateticall Institutions*, 57). Again, the color of a material substance according to White consists in the way in which it reflects light, and the way in which it reflects light is determined by the number and composition of its atomic parts: 'Since Colors strike the Eye, their nature must consist in a virtue to reflect Light; that is, in a density and constipation of parts, and in having a many-corner'd figure' (*Peripateticall Institutions*, 102). But surely, the atomic composition of a substance is not something that can be preserved apart from that substance. So if qualities are a function of the atomic composition of a substance, then qualities for White are not the kind of items that could be preserved apart from substances, no matter what the theologians may teach.<sup>68</sup>

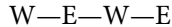
## 5.1 Quantity Distinct from Substance

Even though accidents never come without substances to bear them, and even though some accidents appear to reduce to substances, White believes that at least some accidents are distinct from their bearers. In particular, he holds that accidents in the category of quantity are distinct from their substances. In this section, I will explain why he holds this view, and argue that it reveals a common ground between the substance-accident ontologies of White and scholastic Aristotelians such as Suárez.

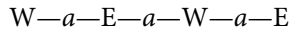
To see why and in what sense White believes quantity to be distinct from its bearer, it will be helpful to take a brief look at his account of the natural process of rarefaction. As White explains, an atomist would analyse this process as a change on the level of the atomic composition

<sup>68</sup> See also Connolly, 'Metaphysics of Transubstantiation', 526–7.

of a substance. To see how such an analysis might go, consider a substance that is built up out of two water atoms and two earth atoms with no gaps between them:



According to a classical atomist, when this substance rarefies, its atoms will come apart, and the pores that open up will remain void. White rejects this analysis on the ground that there are no empty spaces in nature and goes on to consider a modified account of rarefaction the atomist might offer (*De Mundo*, 31). On this account, the substance's constituent atoms still come apart, but the pores that open up do not remain void, but fill up with a rarer material, say *a*:



This account of course raises the question of what makes *a* rare. And given that void spaces have been ruled out, all the atomist can say at this point is that the inter-atomic pores of *a* are filled with an even rarer material *b* and so on until we arrive at an inter-atomic filler *c* that is rare in the highest degree.

But according to White, this analysis leaves the rarity of *c* unaccounted for. Given that, by stipulation, *c* is itself the rarest material, its rarity cannot be the result of the entrance of an even rarer material between its atomic parts. So if the atomist wishes to say that *c* is rare at all, she must grant that the rarity of a material cannot be accounted for simply in terms of its inter-atomic filler material. As Ereunius puts the argument:

[*Ereu.*] Even if some material could become rarer as the result of the entrance of a rarer material, the same cannot be said of the material that has entered it. Or if it is said of one such material, then, if the question is repeated over and over again, we certainly will arrive at some material that, because it is rarer than all others, has not received its rarity from mixture with an adventitious material.<sup>69</sup>

<sup>69</sup> [*Ereu.*] Quantumvis enim aliquod corpus subingressu rarioris, ipsum rareferi contingat, tamen hoc ipsum de corpore subingresso affirmari non potest: vel si de uno affirmetur, certe si

According to White, the rarity of a body is the result, not of the kind of material that fills its inter-atomic pores, but of the precise proportion that holds between its matter and its quantity (*Peripateticall Institutions*, 204).<sup>70</sup> Rarefaction is a process in which this proportion changes.

To see how this works, and how this proposal differs from its rival, consider again a substance with the following composition of water and earth atoms:

W—E—W—E

Also, assume that this substance takes up a certain area, say an area with size four, so that the ratio between number of atomic parts and the size units of its area is one to one. Now when this substance rarefies, it comes to take up a larger area, say an area with size eight. But according to White, this is not because its atoms are forced apart by the intrusion of some kind of alien matter. When the substance rarefies, its atoms remain chained to one another just as they were. What does change is that each of these atoms undergoes some kind of inflation, as a result of which each of them comes to take up an area that is twice as large. At the end of this process, then, the substance has retained the same atomic composition it had before, but the ratio between its atomic parts and the size units of its area has doubled. The ratio was one to one but has become one to two.<sup>71</sup>

According to White, then, a change in the quantity of a material substance, or an increase or decrease of the area that it takes up, need not come with a change on the level of its atomic parts.<sup>72</sup> And this teaches us a number of important lessons about quantity. The first is that, if not every change of quantity comes with a change of atomic composition, the quantity of a material substance does not supervene on its atomic

semper et ulterius repetatur quaestio, ad aliquod deveniendum erit, quod cum rarius sit non a mixtione adventitii corporis raritatem acceperit.' *De Mundo*, 31.

<sup>70</sup> See also *Peripateticall Institutions*, 192 and *De Mundo*, 31.

<sup>71</sup> See also *Peripateticall Institutions*, 192 and *De Mundo*, 31.

<sup>72</sup> Digby held the same view. According to Digby, it is not the case that, on the level of its atomic parts, a rare body looks more like a net or cobweb than a dense body does (*Two Treatises*, 21). See also Han Thomas Adriaenssen and Sander de Boer, 'Between Atoms and Forms: Natural Philosophy and Metaphysics in Kenelm Digby', *Journal of the History of Philosophy*, 57 (2019), 57–80, at 59–60.



composition. Indeed, this is what I take to be White's main point when he says that substance and quantity are distinct.<sup>73</sup>

Part of what this means is that accidents in the category of quantity differ in an important way from accidents like color. As we have seen, the color of material substance according to White is a function of its atomic composition. As long as a material substance retains its atomic composition, it retains its color or power to reflect light in a certain way. Conversely, if a material substance changes color, or comes to reflect light in a new way, it changes on the level of its atomic composition. Hence the color of a material substance supervenes on its atomic composition in a way that its quantity does not.

The second lesson we learn about quantity is that accidents in the category of quantity for White behave rather like local modes do for Suárez. For, given a substance  $x$  and quantity  $Q$ , White holds that

- W1  $Q$  is an intrinsic feature of  $x$ ,
- W2  $Q$  does not supervene on the atomic composition of  $x$ , and
- W3  $Q$  never exists without some substance.

And given a substance  $x$  and a location  $L$ , Suárez holds that

- S1  $L$  is an intrinsic feature of  $x$ ,
- S2  $L$  does not supervene on the matter or form of  $x$ , and
- S3  $L$  never exists without some substance.

To be sure, this leaves plenty of room for disagreement between the two thinkers. Suárez denies W3 in order to be able to account for the Eucharist. White denies S1 because he believes that location is an accident substances have in relation to the bodies that contain them only. And he denies S2 because he believes that there is a plausible way to reduce locations to substances. Yet the common ground between the two is that both thinkers believe that there are some accidents that always inhere in, but at the same time remain distinct from, the substances that

<sup>73</sup> In his *Euclides Physicus, sive De principiis naturae* (London, 1657), 102, White explains that rarefaction is a process resulting in a 'majorem proportionem Quantitatis ad substantiam'.

bear them. They may not agree on just which accidents behave in this way, but both believe that bodies have states that do not supervene on the constitutive parts of their substances.

Just how much White owes to the scholastic tradition he criticizes on other occasions can be made clear in another way as well. For the account of rarity and density that comes with his realism about quantity has its roots deep in the tradition of Aristotelian natural philosophy. Among scholastic natural philosophers, there was a broad agreement that rarefaction could not be accounted for in an atomistic way as the intrusion of rarer materials between the minute parts of a substance. According to Toledo, for instance, such a process could be called rarefaction in an improper sense only. Properly, rarefaction was an increase in quantity of an otherwise constant portion of matter:

That is rare which contains little matter under a large quantity. By contrast, that is dense which contains a lot of matter under a small quantity. From this it is clear that, when flax turns into fire, the matter of the flax, which was under a small quantity, comes to be under a large quantity of fire, and becomes rare.<sup>74</sup>

But if White agrees with Toledo and others that one and the same portion of matter can vary in quantity, this agreement puts him at odds with the matter theory of a modern philosopher like Descartes. According to Descartes, a given portion of matter has a fixed extension.<sup>75</sup> On this view, a body can grow by gaining new matter, but it cannot simply thin out over space as it retains a constant mass: 'It is a complete contradiction to suppose that something could be augmented by a new quantity or new extension without new extended substance—that is, a new body—being added to it at the same time'

<sup>74</sup> 'Rarum autem dicitur id, quod parum materiae sub multa continet quantitate: e contra, densum, quod sub parva quantitate multum continet materiae. Hoc autem apparet, cum ex stuppa fit ignis, illa enim materia stuppae, quae sub parva erit quantitate, postea sub magna ignis quantitate est, ac raritatem accipit.' *In Libros Physicorum* 4.9.11, in *Opera Omnia* iv. 132. For discussion, see Dennis Des Chene, *Physiologia: Natural Philosophy in Late Aristotelian and Cartesian Thought* (Ithaca: Cornell University Press, 1996), 107–9.

<sup>75</sup> On this 'Conservation of Quantity Principle' in early modern philosophy, see Pasnau, *Metaphysical Themes*, 71–6.

(AT viiia. 44/CSM i. 226). Matter, for Descartes, does not exhibit the kind of elasticity that White takes to underlie the natural processes of rarefaction and condensation. If White believes that a body can gain or lose spatial spread without the gain or loss of inter-atomic parts, this goes to show that matter for him is a rather different kind of stuff than it is for Descartes.

## 6. Conclusion

The philosophy of Thomas White can be characterized as a systematic attempt to combine Aristotelian thought with the best of the new science of the early modern period. This is perhaps nowhere clearer than in his cosmology, where he holds that the Copernican system can go hand in hand with the Aristotelian system that places the earth in the center of the world. In this chapter, I have argued that White's version of the Aristotelian substance-accident ontology occupies a similar place between tradition and innovation. Like modern thinkers such as Descartes, he criticizes scholastic tradition for treating accidents as entities in their own right over and above their bearers. His own position is that accidents such as location and relation reduce to substances and that colors at least supervene on the atomic composition of bodies. At the same time, however, he does not think that all accidents can be accounted for in this way. According to White, at least some accidents resist reduction to, and are truly distinct from, their bearers. As we have seen, with this claim White parts way with modern thinkers such as Descartes on the nature of matter. At the same time, it reveals a common ground with the scholastic tradition we have seen him criticize in other places.

In his ontology as in his cosmology, then, White looked for a compromise between old and new ideas. In the eyes of his friend and critic Thomas Hobbes, this attempt to seek a middle ground marked a failure in White to make up his mind. Leibniz, by contrast, welcomed the reconciliatory spirit it evinces. But if White's search for a middle ground was the topic of controversy in the seventeenth century, it does not

yet occupy a prominent place in early modern scholarship today. His treatment of the Aristotelian ontology of accidents has revealed some of his skills as a metaphysician, but most of his contributions to the science and philosophy of his day are still waiting to be fruitfully explored in detail.

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