

# KENELM DIGBY (AND MARGARET CAVENDISH) ON MOTION

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Motion—and, in particular, local motion or change in location—plays a central role in Kenelm Digby’s natural philosophy and in his arguments for the immateriality of the soul. Despite this, Digby’s account of what motion consists in has yet to receive much scholarly attention. In this paper, I advance a novel interpretation of Digby on motion. According to it, Digby holds that for a body to move is for it to divide from and unify with other bodies. This is a view of motion—as change in relations of parthood—that Alison Peterman attributes to Digby’s contemporary and acquaintance, Margaret Cavendish. Having shown that Digby’s presentation of the view predates Cavendish’s by more than a decade, I make a case that Digby’s work influenced Cavendish’s on this topic. In developing and defending my reading, I consider to what extent the Digbean account of motion and the arguments for it accord with the ideals of the mechanical philosophy emerging in the early modern period.

**Keywords:** Kenelm Digby; Margaret Cavendish; motion; parthood; place; mechanical philosophy

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## 1. Introduction

Kenelm Digby remains a neglected figure within philosophy.<sup>1</sup> His *Two Treatises*, published in 1644, shares with René Descartes' *Principles of Philosophy* 'the honour of being the first fully considered attempt at a mechanical system' (Henry 1982: 213) and is 'the first comprehensive philosophical work in the English language' (MacDonald 2013: 5). Despite this, and despite the considerable influence and distinguished reputation Digby enjoyed in his time,<sup>2</sup> he is now rarely a subject of serious discussion and for the most part receives only the occasional passing mention.

In this paper, I will present the first detailed exposition of Digby's account of motion, specifically, the motion of material or bodily things. In the seventeenth-century context, 'motion' is to be understood in a broad sense to mean change of any kind, with 'local motion' referring specifically to change in location. As I will explain, change in location is, for Digby, fundamental to bodily change more generally.

My aim is to show that, according to Digby, local motion consists in change in parthood relations; more specifically, in one body ceasing to be and subsequently becoming a part of other bodies. As a result, for Digby, all motion broadly construed is, or is a result of, change in parthood relations.

This is a view that Alison Peterman (2019b) attributes to one of Digby's contemporaries, Margaret Cavendish, another less-than-canonical English philosopher of the seventeenth century.<sup>3</sup> Peterman claims that the account of motion as (in her terms) mereological change is 'unique' and 'completely original' to Cavendish (2019b: 472, 498).<sup>4</sup> I will demonstrate that it was in fact Digby who first advanced the view in print in his *Two Treatises*, which predates Cavendish's earliest publications by almost a decade. So, in addition to furthering our understanding of Digby's philosophy, this paper will help to correct the historical record, so to speak. In turn, I will present a (tentative) case for thinking that Cavendish was influenced in her views on motion by Digby's writings. In this way, I will contribute to the contextualization of Cavendish's work.

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1. Digby's 'natural philosophy' has received some attention among historians of science. Important early studies include (Kargon 1966: 70–73; Dobbs 1971; 1973; 1974). The few dedicated discussions in the philosophical literature of Digby include (Henry 1982; 2010; Adriaenssen and de Boer 2019; Pécharman 2020), and the essays in (Adriaenssen and Georgescu 2022b).

2. On Digby's intellectual standing in the seventeenth century, see (Kargon 1966: 73; Clericuzio 2000: 81; MacDonald 2013: 31–34).

3. Cavendish, though, is arguably more familiar to contemporary scholars thanks to the pioneering work of scholars such as (Hutton 1997b; 1997a; 2003; James 1999; O'Neill 2001). For state-of-the-art book-length studies, see (Walters 2014; Cunning 2016; Boyle 2018).

4. Mereology as a formal theory is an early twentieth century development, but mereology as the study of part-whole relations more generally is as old as philosophy itself (Varzi 2016).

The paper will proceed as follows. First, I will outline Digby's account of the nature of bodies (§2) and explain how, together with some additional commitments, it leads to the account of motion as change in the whole of which a body is a part (§3). Then I will consider what might seem a decisive obstacle to my interpretation, namely, Digby's claim that parts are—in a sense to be explained—unreal (§4). Having addressed that objection, I will introduce Cavendish's account of motion (§5) and give reasons for thinking that its roots lie in Digby's work (§6). I turn next to a challenge to the claim that Digby and Cavendish agree on the nature of motion stemming from their disagreement as to whether all or any bodily motion is self-motion, a disagreement that reflects the differing degrees to which they embraced the ideals of the emerging mechanical philosophy (§7).<sup>5</sup> In closing, I will explore whether Digby's account of motions other than local motion—specifically, of 'rarefaction' and 'condensation'—are to be understood in terms of change in parthood relations and, again, what that says about his commitment to mechanistic explanation (§8).

## 2. Body as Divisibility

With Descartes and Thomas Hobbes (see, respectively, Martinich 1995: 307–8; Slowik 2021: §3), and in opposition to contemporaries such as Pierre Gassendi and Walter Charleton (see, respectively, LoLordo 2006; Kraye 2002), Digby maintains the avowedly Aristotelian view that there is no empty space or vacuum. As he says, 'no vacuity is possible in nature' (TT, 21). The universe, for Digby, is a plenum of matter or bodily substance.

With regard to the nature of body, Digby takes as his springboard the notion of quantity, which he considers its 'first and primary affection' (TT: 1). When a person thinks of a body, such as a rock or a chair, they thereby think of something that has 'bulke, or magnitude', and hence, of something of some quantity. Quantity, Digby continues, 'is nothing else, but the extension of a thing, which is expressed by a determinate number of lesser extensions of the same nature'.<sup>6</sup> What has quantity is, then, divisible. As he puts it, quantity 'is nothing else but divisibility' (TT: 9). So, according to Digby, to be a body is to be divisible into parts.

Following his mentor, Thomas White, Digby maintains that the universe is finite, including with respect to the number of bodies it contains. So, Digby concludes, there must be some lower limit on the parts into which a body can be divided or, in his words, 'some least cise of bodies' (TT: 117). This leads Digby

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5. For discussion of that ideal, as well as of the history and usefulness of 'the mechanical philosophy' as a category, see (Hattab 2011; Roux 2017; 2022).

6. Compare: 'The nature of body includes divisibility along with extension' (Descartes [1664] 1985: ATVIII.13). On Descartes on extension, see (Normore 2008).

to the view that there are ‘Atomes’ or ‘Elements’ that are the minimal units in nature from which all other bodies are composed (TT: 38).<sup>7</sup> This might seem in tension with Digby’s claim that the ‘capacity of being divisible into infinite parts, is a property belonging to all extension’ (TT: 11). However, different senses of divisibility are in play here. As Digby explains, elemental bodies can be ‘Mathematically’ but not ‘Physically’ divided (TT: 24).<sup>8</sup>

According to Digby, an immediate consequence of the view that bodies are nothing but divisible things is that they act and are acted upon only via division:<sup>9</sup>

If we consider the nature of a body, that is, that a body is a body by quantity; and that the formall notion of quantity is nothing else but divisibility; and that the adaequate act of divisibility, is division: it is evident, there can be no other operation upon quantity, nor (by consequence) among bodies, but must eyther be such division, [...] or what must necessarily follow out of such division. (TT: 35–36)

Since, for Digby, the fundamental operation of bodies—motion in the broad sense—is to divide or be divided, it follows that a body’s change in location—motion in the narrow sense—must be understood in terms of division. Accordingly, he writes, ‘locall motion consisteth of division’ (TT: 34; see also 69).

### 3. Parthood and Local Motion

I will now explain how this idea, together with two additional commitments, leads Digby to a view of local motion as consisting in change in parthood. First, I will show that, for Digby, if a body ceases to be part of one whole and becomes part of another, it moves location. Then I will show that, for Digby, if a body moves location, it ceases to be part of one whole and becomes part of another.

It is nontrivial to say that a change in the whole to which a body belongs entails a change in its location. One might think, for example, that a foundation stone that is at one moment part of a building set for demolition and later part of another building constructed on the earlier foundations could remain in place throughout this transition. This sort of possibility is ruled out by Digby’s account of place or location. For Digby, there is no fixed space as a ‘subsistent quantity’ independent of the bodies it contains relative to which those bodies

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7. On Digby’s atomism and its relation to others of the period, see (Kargon 1966: 70–73; Clericuzio 2000: 81–86).

8. On different senses of divisibility, see (Holden 2004: 9–16).

9. Adriaenssen and Georgescu also stress this point (2022a: 19).

might be situated.<sup>10</sup> Instead, a body's place is just a matter of its relation to other bodies. In Digby's words, it is 'a respect to other extrinsecall bodies' (TT: 33).

In contemporary terms, Digby endorses a relational as opposed to absolute conception of space, and with it a corresponding conception of place, which he immediately proceeds to precisify. The place of a body, Digby says, is 'the inward superficies of a body that compasseth and immediately containeth' it (TT: 33–34). That is, a body's location is nothing more than the facing surfaces of the bodies that immediately surround it, what he later calls its 'cloathing' (TT: 34).<sup>11</sup>

When a body is divided from another, and assuming that there is no empty space, different bodies will surround it. Given Digby's definition of place, when different bodies surround an object, it thereby changes place. So, when a body is divided from another, ceasing to be a part of it, it thereby changes place.<sup>12</sup> As Digby puts it:

When one body dividing [from] an other, [it] getteth a new immediate cloathing; and consequently, new respects to the stable and immoovable bodies (or seeming such) that environ it; we do vary in our selves the notion we first had of that thing; conceiving it now accompanied with other circumstances and other respects then formerly it had. Which notion we expresse by saying, it hath changed its place; and is now no longer where it was att the first. And this change of place, we call *Locall motion*. (TT: 34)

To return to the example, it is Digby's view that if the founding stone is part of one building at one time and another building at another time, it must change location. More carefully, whether we say that the founding stone moves or remains stationary depends, for Digby, on what we hold fixed. Taking the surface of the founding stone as the point of reference, we can say that the other bodies (bricks, tiles, beams, etc.) that it (partially) encompassed move. Taking the surfaces of those other bodies as the point of reference, we can say that the founding stone moves. Which option we take, according to Digby, 'importeth not' (TT: 34). Either way, the underlying reality is the same, namely, that whenever one body divides from and unifies with another, there is local motion.

I turn now to the second claim belonging to Digby's view of local motion: If a body moves location, it ceases to be part of a larger whole and joins another.

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10. Gassendi defends such an account of space, which allows him to define motion straightforwardly as the transfer of a body from one region of space, so conceived, to another (see LoLordo 2006: chap. 7).

11. This notion of place is Aristotelian in origin (see Normore 2008; Zepeda 2014: §1).

12. Adriaenssen and Georgescu (2022a: 19) briefly sketch the same line of thought, though without reference to the idea of part-whole relationships. They do not discuss the converse line of thought.

Again, this is nontrivial. One might think, for example, that a boulder could roll downhill without at any stage of its descent uniting with and departing from some other body, say, the ground or air over or through which the boulder passes. Even granting the claim that local motion must ultimately be a consequence of division, one might think that the body changing location need not itself be the body divided. In the example, the boulder might be moving because some other chunk of rock split from the hilltop and bumped into it, setting the intact boulder in motion.

Digby's argument for the view that local motion entails change in parthood rests on the (perhaps surprising) idea that 'by touching, bodies do become one' (TT: 121). To make sense of this, I return to Digby's claim that to be a body is to be divisible. Whatever is divisible, he adds, 'must needs be one' (TT: 35). That is, only what is united can be divided. So, it is in the nature of a body to be a coherent whole. Digby takes this to show that, while there must be a cause or explanation for why a body is divided, there is and need be no cause or explanation for why a body is united; or, at least, none external to it. To ask why 'a body sticketh together', Digby objects, is 'prejudicial to the nature of quantity' (TT: 35). He later elaborates:

In partes of the same nature, which once were two, and afterwarde become one; there can be no other reason why they are one, then the very same for which those partes that were never seperated (but that may be seperated) are likewise one: and this, most evidently, is the nature of quantity. (TT: 118)

What Digby adds here is that having quantity explains not only the integrity of individual bodies but also why distinct bodies combine to form a larger whole. Again, the thought here is that what has quantity is divisible, and what is divisible is, by its nature, one.

In turn, Digby takes this to show that bodies have an inherent tendency to unite—to return to their natural state of oneness, as it were. This, Digby suggests, is what explains 'Attraction':

The nature of quantity is such, that whensoever there is nothing between two partes of it, they must needs touch and adhere and joyne to one another, (for how should they be kept asunder when there is nothing betweene them to part them?). (TT: 159)

This quote might seem to suggest that, for Digby, when two bodies make contact, they merely stick together while remaining distinct. But, in fact, he makes

the stronger claim that, when two bodies make contact, they unite to form one body. For ‘any two partes that are indistant from one an other’, Digby writes, ‘theire owne nature maketh them one’ (TT: 35). More straightforwardly: ‘Two bodies can not touch one an other, without becoming one’ (TT: 119). A disposition to unite is, for Digby, the corollary of the disposition to be divided.

From Digby’s account of place and his denial of empty space, it follows that, if a body changes place, it comes into contact with the surfaces of the different bodies that subsequently surround it. Given that bodies are disposed to unify on contact, it follows in turn that the relocated body unites with those that now surround it. So, for Digby, if a body changes place, it ceases to be part of one body and joins another. To return to the example, it is indeed Digby’s view that, when the boulder rolls downhill, it becomes part of the ground or air (or something else) over or through which it moves. In his words, ‘According as the body mooved [...] so, it did joyne it selfe to some new partes of the medium [...], and did in like manner forsake others’ (TT: 63; see also 33).<sup>13</sup>

It is a nice question to what extent the idea that bodies, in virtue of their divisibility, have a tendency to unite accords with the mechanical philosophy with which Digby is typically associated (see §1). I return to that issue below. For now, the point is that this idea of ‘attractive unity’ (TT: 118) leads to a view of local motion that is distinctive relative to others in currency at the time. According to Descartes, for example:<sup>14</sup>

*Motion is the transfer of one piece of matter, or one body, from the vicinity of the other bodies which are in immediate contact with it, and which are regarded as being at rest, to the vicinity of other bodies. ([1644] 1985: ATVIII.A.53)*

Corresponding to Digby’s notion of place, Descartes defines a body’s ‘external place’ as the ‘surface immediately surrounding’ it (ATVIII.A.48), as well as in terms of the body’s ‘position relative to other bodies’ (ATVIII.A.47).<sup>15</sup> Since motion, as Descartes defines it, entails change of external place in both senses, his view can be restated more straightforwardly: Motion is change of place.

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13. The claims that two bodies form one body on contact and that there is no empty space might seem to entail that there can only really be one body. However, Digby’s picture here is a dynamic one. Once a body is in motion, there is division, and hence physically distinct bodies, which will then unify with others, which given differences in density between the bodies, will lead to further division, and hence motion, and so on. I discuss Digby’s account of density in §8.

14. For Descartes’ views on motion, see (Garber 1992: chap. 6; Slowik 2015; Peterman 2019b: 476).

15. Descartes also has a notion of ‘internal place’ or ‘space’, which is ‘extension in length, breadth and depth’. Since bodies, for Descartes, simply consist in extension, he concludes that ‘there is no real difference between space and corporeal substance’ (ATVIII.A.45–46).

In a similar fashion, Hobbes defines motion as ‘the leaving of one place, and the acquiring of another continually’ (1656: 59; see also 52, 79).<sup>16</sup> He later introduces the notion of a ‘situation’, which he defines as ‘the relation of one place to another’ (1656: 145). Putting these two ideas together, the proposal is that motion involves change of situation. Since Hobbesian situations correspond to Cartesian places, their definitions might seem notional variants. One complication is that, for Hobbes, place—and by implication situation—is a ‘Phantasme’. What he means by this is controversial (see Slowik 2014), but, very roughly, the point is this: Place is an imaginary construct arrived at by abstraction from our experience of particular, extended bodies—it is the idea of a magnitude that is not, or need not be, the magnitude of any particular body, and hence that could be occupied or filled by different bodies.<sup>17</sup> If place is imaginary in this way, it seems to follow that, for Hobbes, motion too is imaginary, since he defines it in terms of place. I will not explore that issue here. What matters for present purposes is that neither Descartes nor Hobbes hold that, when a body moves, there is a change in the whole of which it is a part. That, I suggest, is because the Digbean idea that bodies have a disposition or tendency to unite is no part of their respective philosophies.

I have shown that, for Digby, a body moves location if and only if it ceases to be part of one whole and becomes part of another. This by itself is a significant result, but I take Digby to be making a stronger claim. Since the right-hand side of the biconditional refers to the operations of division and composition, which operations Digby takes to be fundamental, it is clear that he takes local motion not only to correlate with change in parthood, but to *consist* in it. This view is most explicit in the following passage, where the dense body is the one dividing and the rare body the one divided:<sup>18</sup>

The dense or dividing body must necessarily cutt and enter further and further into the rare or divided body; and so the sides of it be joynd successively to new and new partes of the rare body that giveth way unto it, and forsake others it parteth from. Now the rare body being in a determinate situation of the universe, (which we call being in a place, [...]) and the dense body coming to be within the rare body, whereas formerly it was not so: it followeth, that it looseth the place it had, and gaineth an other. This effect, is that which we call locall motion. (TT: 33; see also 36)

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16. On Hobbes on motion, see (Blits 1990; Peterman 2019b: 476–80; Adams 2021). Hobbes also introduces a notion of *endeavour*, which he defines as a kind of motion that takes place ‘*in an Instant or Point of Time*’ (1656: 151). Endeavour is akin to an exercise of power or exertion of force. I set it aside here.

17. Corresponding to Descartes’ motion of ‘internal place’, Hobbes also has a notion of ‘Real Space’, which is simply the ‘Extension of a Body’ (1656: 76).

18. I return to Digby on rarity and density in §8.



Since all change consists in dividing and uniting, and to divide and unite is to change location, Digby concludes:

All operations among bodies, are either locall motion, or such as follow out of locall motion. (TT: 35–36; see also 139)

As anticipated at the outset, then, local motion is, for Digby, fundamental to bodily change in general, that is, to motion in the broad sense.

#### 4. The Potentiality of Parts

I turn now to a complication, one which relates also to the idea of bodies as unities or wholes. According to Digby, parts are virtual, not real. More fully, Digby insists that to be divisible is to have a ‘vertue or power to be diverse things’ (TT: 13). But until that virtue or power is manifest and the relevant body is divided, the ‘diverse things’ or parts remain potential, rather than actual.<sup>19</sup> As Digby says:

It [a body] is but one whole that may indeed be cut into so many severall partes: but those partes are not really there, till by division they be parcelled out: and then, the whole (out of which they are made) ceaseth to be any longer. (TT: 10)

The line of thought here is as follows: Prior to division, the body is whole and its parts do not yet exist. Subsequent to division, the body no longer exists: only its parts do. So, there is no point at which both the whole body and its parts exist.

In Digby’s view, to think of parts as real, existing entities prior to division is an instance of a more general mistake:

In the things, all that belongeth unto them is comprised under one entire Entity: but in us, there are framed as many severall distinct formall conceptions, as that one thing sheweth itself unto us with different facets. Every one of which conceptions seemeth to have for its object a distinct thing. (TT: 2)

Since we can (for Digby, must) comprehend a body under specific aspects, and since we can consider those aspects independently of others, we mistakenly

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19. For a more thorough discussion, see (Holden 2004, chap. 2; Pasnau 2011: 621–23; Pécharman 2020; Georgescu 2022).

conclude that those aspects can exist independently.<sup>20</sup> To illustrate by means of one of Digby's examples: When a person considers a green apple, they can attend to the 'greenesse by it selfe', that is, to the colour independently of the body that has it. This might lead the person—indeed, it is their 'bent and inclination'—to 'give actuall Being' to the greenness, that is, to think of the colour as something that does not depend on the body for its existence (TT: 2–3).

In view of his commitment to the potentiality of parts, one might object that Digby cannot view local motion as consisting in change in parthood relations, as I have claimed. If parts are not real, they cannot stand in relations. Hence, there can be no relations to change.

The idea that parts are virtual does not raise a serious challenge to the interpretation of Digby that I present here. For one thing, Digby can allow that there are facts about the potential parts of a body that are grounded in facts about that body's disposition to divide. Those facts will also ground relational facts about potential parts. So, I could restate Digby's view as local motion consists in change in *potential* parthood relations.

One way to develop this suggestion is to distinguish different senses of parthood corresponding to the different senses of divisibility (see §2). If a body is mathematically divisible, as all bodies are in Digby's view, then it has what one might call *mathematical parts*, which can be distinguished in terms of their mathematically specifiable relations to one another, for example, their relative distances. So, another way to state Digby's view is to say that local motion consists in change in mathematical parts, which parts are also physical or actual following the change. This also reveals how local motion is quantifiable on Digby's view: in terms of changes in the mathematically specifiable relations among the relevant parts.

Be that as it may, the important point is that, for Digby, any instance of local motion consists in one body dividing from and then uniting with another body. Whether the body that moved previously qualified as a real part of another body, or subsequently qualifies as such, is a further matter.

## 5. Cavendish on Bodies and Motion

Despite considerable differences in the philosophies of Digby and Cavendish, some of which I will explore below, there are also significant points of overlap.

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20. Compare: 'The notions of matter, forme, act, power, existence, and the like, that are with truth considered by the understanding, and have there each of them a distinct entity, are never the lesse, no where by themselves in nature. They are termes which wee must use in the negotiations of our thoughts, if wee will discourse consequently, and conclude knowingly. But then againe wee must bee very wary of attributing to things in their owne natures, such entities as wee create in our understandings' (Digby ORM: 22–23).

Like Digby (and Descartes and Hobbes), Cavendish maintains that there is no vacuum, and that the universe is a plenum of material or bodily substance (PF: 8; GNP: 4).<sup>21</sup> Moreover, from early to late, Cavendish insists that matter or body is divisible:

Division is as infinite, as the Matter divided. (PF: 4)

There is no body that is not [...] dividable. (OEP: 133; see also GNP: 4)

In support of this view, Cavendish writes, 'Whatsoever has body, or is material, has quantity, and what has quantity is divideable' (OEP: 135). Here Cavendish, like Digby, proceeds from the idea that bodies must have quantity to the idea that they must be capable of division.<sup>22</sup>

Cavendish also makes the Digbean inference that since objects in nature or bodies are divisible, their principal mode of operation is via division, that is, by the separation and in turn the composition of their parts. In Cavendish's words, 'the chief actions of Nature are to divide, and to unite' (PL: 434; see also PPO: 5; OEP: 147).

Peterman (2019b) takes this to show that Cavendish explains motion—in the broad sense—in terms of division and unification, and hence that Cavendish 'reduces' all bodily change to change in relations of parthood:

[Cavendish] holds that for a body to move is just for it to separate from one whole and join with another whole. (2019b: 171)

The view Peterman attributes to Cavendish encompasses motion in the narrow sense, that is, change in location. With respect to this, and in support of her interpretation, Peterman cites passages such as:

When I say, an Animal or any thing else that has exterior local motion, goeth or moveth to such or such a place, I mean, to such or such a body; and when such a Creature doth not move out of its place, I mean, it doth not remove its body from such or such parts adjoining to it. (PL: 536)

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21. On Cavendish's denial of empty space, see (Cunning 2006: chap. 4). In her early work, Cavendish floats a version of atomism (see P&F: 5–6), which she goes on to reject (see PPO, 'A Condemning Treatise Concerning Atomes'). For discussion, see (Kargon 1966: 73–76; Clucas 1994; Detlefsen 2006; Boyle 2018: chap. 2).

22. For Cavendish, unlike for Digby, the quantitative is not to be identified with the mathematical. In other words, Cavendish does not restrict what has quantity to what can be characterized in the mathematical terms available to the likes of us. For discussion on this, see (Peterman 2019a).

A man changes his place when he removes, yet it [‘change of place’] is not a proper Philosophical expression; for he removes onely from such parts, to such parts; so that it is a change or a division and composition of parts. (OEP, ‘An Argumental Discourse’; see also PL: 106)

A man goes a hundred miles, he leaves or quits those parts from whence he removed first; but as soon as he removes from such parts, he joins to other parts, were his motion no more than a hairsbreadth; so that all this journey is nothing else but a division and composition of parts. (OEP: 138)

We cannot perceive progressive local Motion otherwise, then by change of distance, that is, by composition and division of Parts, which is commonly, (though improperly) called change of Place. (OEP: 154)

These passages provide support for Peterman’s suggestion that Cavendish views local motion as consisting in one body dividing from and joining with another, hence ceasing to be part of one larger body and becoming part of another. Such a view entails that all bodies in motion are parts of larger wholes both prior to and after moving. And, indeed, that is Cavendish’s view (see O’Neill 2001: xv–xviii):

There is not any thing in Nature, that has an absolute subsistence of it self [...]; and though one part is not another part, yet one part belongs to another part, and all parts to one whole, [...] which whole is one corporeal Nature. (PL: 431; see also OEP: 142)

While it is in this way consonant with Cavendish’s broader philosophical commitments, Peterman’s reading is not uncontroversial. In a recent article, Marcy Lascano (2021: 180–82) challenges it.<sup>23</sup> Specifically, Lascano queries whether Cavendish explains *all* motion or bodily change in terms of change in parthood relations. According to Lascano, Cavendish does not understand the motions of dilation, contraction, retention, and transformation in such terms. Consider:

For dilation and composition, as also division and contraction, are different actions; the dilation of a body is an extension of its own parts, but composition is an addition of foreign parts; and contraction, although it makes the body less in magnitude, yet it loses nothing of its own parts. (OEP: 134)

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23. In contrast, David Cunning (2022: §3) accepts it.

Here Cavendish seems explicitly to contrast the actions of dilation and contraction with those of division and composition.

However, following Peterman (2019: 472), Lascano focuses on Cavendish's philosophy from the 1660s. It is consistent with Lascano's claim that Cavendish did not reduce motion in general to change in parthood relations in this mature work that she did so in her early work from the 1650s. In view of this, consider a remark from the first edition of *Philosophical and Physical Opinions* (1655):

All things in the world have an Operative power; which Operation is made by Sympathetical motions & Antipathetical motions.

These motions are in turn explained in terms of, respectively, 'making Faction' and 'making Fraction' (PPO: 6–7). From this it follows that all bodies operate (and, hence, move) by uniting and dividing.

The notion of sympathy, which has its roots in classical thought (see Brouwer 2015; Emilsson 2015), was in wide circulation in the seventeenth century (see Mercer 2015; Meyns 2018).<sup>24</sup> Sympathy in this context is typically understood as a relation that holds '*within* a single being/unit' (Schliesser 2015: 7). Indeed, one of the explanatory roles it plays is to individuate and unify bodies.<sup>25</sup> As Cavendish puts it, individual 'figures' or 'forms' are created and maintained by sympathetic relations among their parts (PPO: 36). So, in saying that all motion is sympathetic or antipathetic, Cavendish (in this early work) is saying that all motion involves one body forming or quitting a union with others.

Of course, this passage is not on its own decisive. Fortunately, I do not need to resolve the interpretive issue here. Lascano does not challenge Peterman's more specific suggestion that Cavendish—early and late—reduces *local* motion in particular, as opposed to dilation and the like, to change in parthood relations. For present purposes, it is that suggestion that matters.

While I think that Peterman is correct that Cavendish explains local motion in terms of division and unification, Peterman claims in addition, as noted at the outset, that that view is 'unique' and 'completely original' to Cavendish (2019b: 472, 498). This further claim, I suggest, is false. In §3, I demonstrated that the view of motion as change in parthood is to be found in the earlier work of Digby.

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24. Digby too appeals to sympathy but is more concerned to analyse it in mechanistic terms so as to explain away any appearance of action at a distance (see Lobis 2011; Mercer 2015: 111–13). I turn to the mechanical philosophy in §7.

25. For discussion of the various roles sympathy plays for Cavendish, see (Borcherding 2021).

## 6. Did Digby Influence Cavendish?

There are reasons to think that, in addition to anticipating Cavendish's account of (local) motion, Digby is the source of, or at least a significant influence on, that account. Note, first, that Cavendish and Digby knew one another personally; they were correspondents<sup>26</sup> and moved in the same social, political, and intellectual circles. Both belonged to the exiled court of Queen Henrietta Maria in Paris—Cavendish as a lady-in-waiting, Digby as chancellor. Cavendish was the first woman to receive an invite to the Royal Society, of which Digby was a founding member. Digby was also a member of the 'Newcastle Circle' of leading intellectuals, at some of whose meetings Cavendish was present, if not as an active participant.<sup>27</sup>

Another noteworthy consideration is that, as mentioned in §1, Digby's *Two Treatises* was written and published in English. As a result, Digby's writings were readily accessible to Cavendish, who by her own admission 'could never attain to the knowledge of any other Language but [her] native' (PL, 'Preface'), several years prior to the work of other would-be interlocutors of the time. For example, until the appearance of *Leviathan* in 1651, Hobbes published only in Latin; his *De Corpore* was not available in English until 1656 (Martinich 2015). Descartes' *Discourse on Method* and *Passions* were translated into English in 1649 and 1650, respectively (Hutton 2015: 65), though Cavendish reports that she had access only to the Latin texts and had to arrange in the early 1660s for sections of Descartes' works to be translated for her (PL, 'Preface'). So, Cavendish had a unique opportunity to read Digby's work at the earliest stages of her intellectual development.

Did Cavendish take advantage of that opportunity? As Laura Georgescu (2022: 241–42) has shown, Cavendish explicitly criticizes the Digbean claim that parts are merely potential in the second edition of *Philosophical and Physical Opinions*:<sup>28</sup>

I do not understand those that say, that a whole Figure may be Divided into many several Parts, but yet those Parts are not really there as in the whole Figure, untill by Division they are parcelled out, and then the whole Figure, out of which they were made, ceases to be any longer a Whole. (PPOII: 87)

The language here repeats Digby's almost verbatim, which strongly suggests that Cavendish was by that point familiar with and worked from the text of

26. For a letter of thanks from Digby to Cavendish, see (LP: 65).

27. For this biographical information, see (Lee 1888; Foster 2004; Whitaker 2011: 94–96, 301–4).

28. Georgescu also points to PPOII: 81–86, which corresponds closely to TT: 2–3.

Digby's *Two Treatises*. If Cavendish read Digby on parthood, she almost certainly read Digby on motion, just a few pages later.

The text Georgescu cites is from the 1660s. As noted in §5, the view of motion—broadly understood—as change in parthood relations is arguably present in Cavendish's earlier work from the 1650s. Whether or not Cavendish had first-hand acquaintance with Digby's writings at that stage, she is sure to have encountered them second-hand as early as the 1640s as a result of the circulation of those ideas within the overlapping social and scholarly circles that the two occupied, circles whose members included her husband William and her brother-in-law Charles, both of whom Cavendish cites as the sources of her knowledge of past and present philosophy (PPO, 'To the Reader').

Finally, it is worth recalling just how distinctive the theory of local motion as consisting in one body's dividing from and unifying with others is relative to the views in circulation among their peers (see §3). It would be surprising, to say the least, if two thinkers in such close proximity arrived at that view in complete independence of one another.

The textual and circumstantial evidence presented is not decisive, I grant, but it gives some reason to think that Digby—directly or indirectly—shaped the development of Cavendish's views on motion. If that proves false, the main claim of this paper still holds, namely that the view of motion that Peterman attributes to Cavendish was first advanced by Digby.

## 7. Self-Motion

I now turn to an objection to that claim. It takes off from the suggestion that Digby embraced the emerging mechanical philosophy (see Kraye 2002: 288–90), while Cavendish opposed central aspects of it.<sup>29</sup> That is not to deny that Cavendish, who insists that all things in nature consist of matter in motion (PL: 225; OEP: 155), qualifies as a mechanical philosopher to some degree or in some respects. The mechanical philosophy was a broad church, and different thinkers of the seventeenth century approximated more or less to its ideals.<sup>30</sup> Rather, the point is that Cavendish explicitly rejects and Digby officially accepts a commitment typically thought to be central to the mechanistic outlook, namely that all bodily change is to be explained in terms of the local motions of material bodies that result only from collision or contact with other material bodies in motion.

According to Digby, as discussed in §2, all bodily change is due to division, and hence to local motion. But, he adds, a body will not manifest its disposition

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29. On Cavendish's relationship with mechanical philosophy, see (James 1999: 222–25; O'Neill 2001: xxix–xxxv; Broad 2002: 46–50; Boyle 2018: 44–47).

30. For a recent collection of papers on this theme, see (Garber and Roux 2012).

to divide, and hence will not move, unless it 'be moved by some extrinsecall Agent' (TT: 70). So, Digby concludes, 'The motion of every body followeth the percussion of extrinsecall Agents' (TT: 76; see also 353).<sup>31</sup> That is to say, bodies are not self-moving; they move only when other bodies make contact with them so as to set them in motion. A corollary of this is that there is no action at a distance. In Digby's words, 'No body can worke upon an other remote from it' (TT: 138).

Later, Digby presents as his principal 'Maxime':

*That Nothing whatsoever we know to be a Body, can be exempted from the declared lawes, and orderly motions, of Bodies: unto which, lett us adde two other positions [...]: the first that it is constantly found in nature, that none of the bodies we know, do move themselves; but their motion must be founded in some thing without them: the second, that no body moveth an other, unlesse it selfe be also moved.* (TT: 353; see also 306, 342)

One might wonder how to reconcile these remarks with Digby's claim that one body's unifying with another is the result of its own nature, as divisible, not that of some external cause (see §3). Presumably, the idea here is that unification is always a corollary of division, and division always has some external cause. So, the body itself never initiates its own motion, even if, in a sense, it concludes it. While Digby's view that bodies have an inherent tendency to unite is in this way consistent with his denial of self-motion, it does reveal a limit to his commitment to the mechanical ideal, at least insofar as that ideal involves 'denying intrinsic forces to matter' (Hattab 2011: 73).<sup>32</sup>

In contrast to Digby, Cavendish denies that all change results from the collision of bodies. For Cavendish, there is such a thing as action at a distance:

They are out, that say, there can be no communication at a distance. (PL: 182)

Sympathy and Antipathy work at a distance [...] by the agreeable or disagreeable corporal motions. (PL: 402)

Even if these quotes do not represent her official or considered view,<sup>33</sup> it is uncontroversial that Cavendish denies that one body moves another by transferring its

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31. Like Descartes (Slowik 2021: §4), Digby thinks that the motion of bodies ultimately traces back to God (TT: 144).

32. For discussion of other respects in which Digby might seem to depart from that ideal, see (Adriaenssen and de Boer 2019; Jalobeanu 2022).

33. For competing perspectives on this issue, see (Cunning 2016: 58–59; Whiting Forthcoming: §6.1).



motion to it upon contact. That would require the motion to be capable of existing independently of the relevant bodies, such that it might detach from the one and reattach to the other. It is, Cavendish claims, inconceivable that that happens:

It cannot be a motion that sets them at work without [material or bodily] substance, for motion cannot be without substance. (PPO, 'A Condemning Treatise of Atomes')

There can be no abstraction made of motion from body, neither really, nor in the manner of our conception, for how can I conceive that which is not, nor cannot be in nature, that is, to conceive motion without body? (PL: 97)

More generally, Cavendish—early and late—insists that accidents have no independent existence:<sup>34</sup>

All accidents live in substance. (PPO: 31)

If an Accident be something [...] Then certainly it must be body' (OEP, 'An Argumental Discourse').

Whatever the force of Cavendish's objection to the transference model, Digby's account of mechanical change is not open to it. Like Cavendish, he insists that it is 'a contradiction in nature to have the accidents really severed from one another, and to have them actually subsist without their substance' (TT: 3).<sup>35</sup> With respect to motion in particular, he maintains the same. Again, for Digby, motion just consists in a (potential) part being divided from a body and uniting with others resulting in a new body. So, Digby agrees with Cavendish that motions are not real entities that could subsist apart from the bodies in motion. To think otherwise, returning to an earlier theme (§4), is to confuse our ability to think about motion independently of body with the independence of motion from body.

What is more, Cavendish agrees with Digby that motion can transfer so long as material parts also transfer:<sup>36</sup>

My opinion is, that if motion doth go out of one body into another, then substance goes too; for motion, and substance or body [...] are all one

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34. For more on Cavendish on accidents, see (Adams 2016). Compare (Descartes 1984: AT VII.253, CSM 11.176).

35. For more on Digby on accidents, see (Adriaenssen 2022).

36. On this point, see (James 1999; O'Neill 2001; Cunning 2016: 160–66).

thing, and then all bodies that receive motion from other bodies, must needs increase in their substance and quantity, and those bodies which impart or transfer motion, must decrease as much as they increase. (PL, 98)

In view of this, one might wonder how deep Cavendish's opposition to those aspects of the mechanical philosophy Digby defends really goes.

There is, however, a real dispute here. It concerns whether all change or motion happens due to the transfer (via, for Digby, the actualization) of parts in motion from one body to another. Digby thinks that it does. When one body collides with another and thereby moves it, the moving body, or some part of it, unites with the moved body, or some part of it, bringing its accidents with it. Cavendish disagrees. According to Cavendish, it is not generally true that when one body moves another, the 'bulk' of the first diminishes while that of the second increases via the loss and acquisition of parts, respectively (OEP: 218 PL: 82). Instead, Cavendish maintains, 'All the parts of Nature, whensoever they move, move by their own motions' (OEP: 27). Or, as she puts it in her earlier work, 'substance is moving innately' (PPO, 'Condemning Treatise'). For Cavendish, then, bodies have the capacity for self-motion.

So, Digby says that no body sets itself in motion, while Cavendish says that all bodies set themselves in motion. Does this straightforwardly refute my claim that Digby and Cavendish share the same view of motion?

It does not. Digby and Cavendish disagree as to why bodies move, not as to what their movements consist in. In other words, they give the same *constitutive* explanation of what motion is in terms of change in parthood, but they give different *causal* explanations of why motion or parthood change occurs in terms of, respectively, external and internal impulses.

Another way to make this point, which does not rely on a contrast between constitution and causation, is simply to distinguish different questions. First, what is motion? Digby and Cavendish give the same answer to this: Change in parthood relations. Second, what initiates motion; that is, what initiates change in parthood relations? They give different answers to this: According to Digby, what makes a body move is always some other agent. According to Cavendish, what makes a body move is always that body.

Yet another way to put this is in terms of levels of explanation. At one level, Digby and Cavendish agree that motion involves change in the whole to which a body belongs. At another level, they disagree as to the agent of that change.

Even if Cavendish and Digby disagree as to the nature of motion, which I have not here conceded, it remains the case that they both accept the biconditional: A body moves if and only if it divides from and unites with another body. That is itself a notable point of agreement, one that sets them apart from their contemporaries.

## 8. Rarefaction and Condensation

In the passage Lascano cites from the later work (§5), Cavendish gives examples of bodily changes—motions in the broad sense—that do not involve the division and unification of parts, namely, dilation and contraction. For Cavendish at this stage, dilation occurs when a body increases in extension without gaining material parts, and by implication contraction occurs when a body decreases in extension without losing material parts. This might seem to distance Cavendish both from Digby and from the ideals of the mechanical philosophy more generally.

However, in ways I will now explore, Digby's treatment of the actions of 'rarefaction' and 'condensation'—increasing and decreasing the density of bodies, respectively—might in a similar fashion seem non-mechanical. In turn, reflection on that treatment might seem to cast doubt on the interpretive claim that Digby views all motion as consisting in one part dividing from and uniting with another.

Digby starts by noting that two bodies might be identical in 'magnitude', a species of quantity, and yet differ in 'weight' (TT: 16). This is a puzzle for Digby since such bodies differ but not in respect of their quantity, the principal attribute which is supposed to 'ground' all others (TT, 'Preface'). To solve this puzzle, Digby first distinguishes the property or attribute of being divisible from the 'substance or thing which is divisible' (TT: 22). Expressing the same idea in different terms, he writes, 'A body is [...] a thing which hath partes; and quantity is that, by which it hath partes' (TT: 23–24). With this distinction in hand, Digby then explains differences in density in terms of differences in the 'proportion of quantity to its substance' (TT: 23).<sup>37</sup> That is, for one substance to be more or less dense than another is for its divisibility to be less or more than the other, respectively. A body's degree of divisibility, for Digby, is in turn a matter of how readily it divides. A rare body, he says, is one that has 'easie divisibility into lesser partes' (TT: 23). By the same token, and to bring this down to earth, a loaf of bread is dense when it is difficult to slice. On this account, to return to the initial puzzle, two bodies that are identical in magnitude might nonetheless differ in the proportion of substance to that magnitude.<sup>38</sup>

With this account of rarity and density in hand, I turn now to the actions of rarefying and condensing. For Digby, how rare or dense a 'mixed' or molecular body is might be changed by the loss or acquisition of parts. For example, if one body were to transmit dense parts to another, it would thereby condense that body; and, if it were to divide dense parts from another, it would thereby rarefy that body. However, the rarity and density of Digbean elements could not be changed in this way. Such a change would require a change in the proportion of

37. For the scholastic roots of this kind of view, see (Pasnau 2011: chap. 15).

38. For further discussion of Digby's account of density, see (Pécharman 2020; Adriaenssen and Georgescu 2022a: 15–17).

divisibility to substance, and that would be a change affecting a body's capacity to divide without triggering that capacity.

If Digby were to allow for this sort of change, would that be another point of departure from the ideals of the mechanical philosophy, and specifically from the attempt to understand all change in terms of the collision of material bodies in locomotion? Perhaps not. One body colliding with another might have the result that one of those bodies is weakened or strengthened, as it were, in that its capacity to divide is increased or decreased, respectively. In this way, the rarefaction and condensation of elemental particles would still be a consequence of the impact of bodies moving through space.

Be that as it may, if Digby were to allow for this sort of change, it would be in tension with the interpretation I have advanced here. Change in density at the elemental level would not consist in division, and hence would not consist in change in the whole to which a body belongs.

In response, I could restrict the view that I attribute to Digby to *local* motion, allowing that he gives a different treatment of motions of other sorts, as I did for the later Cavendish. On this interpretation, it would remain the case that Digby is an early advocate of a distinctive and intriguing account of what it is for a body to change location. Moreover, this restriction would only serve to strengthen the parallel I have uncovered between Digby's and Cavendish's views.

Nevertheless, I am inclined to a less concessive response. Digby does not allow for change in density at the elemental level. While the elements differ in their divisibility, they do not change with respect to it, at least not physically. That, I suggest, is why Digby explicitly labels rarefaction and condensation 'the passions of mixed bodies' (TT: 144), as opposed to those of elements. In the case of rarefaction, for example, the operation 'proceedeth originally from fire, and dependeth of heat' (TT: 145). It is not necessary to go into all the details of Digby's account of this process here. What matters is that heating involves 'a continuall streame of partes issuing' from the heat source which then 'entereth' the object heated (TT: 41). So understood, indivisible elements cannot be heated, and hence they cannot be rarefied.

To summarize, Digby's view is that 'mixed' bodies are composed of elements 'joyned together' to 'make one' body (TT: 118). Those bodies might be 'homogeneall' — containing only the same elements as parts — or 'heterogeneall' — containing different elements as parts.<sup>39</sup> While the molecular bodies can change in their density — through the loss or acquisition of their parts — the elements cannot. In this sense, on Digby's view, the density of elements is inherent or fixed.

One might object to this reading on the grounds that Digby explicitly talks of 'water' being 'rarified into smoake or ayre' (TT: 16). Water, along with fire, air, and earth, is one the four traditional Aristotelian elements that he recognises.

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39. Parts here is to be understood in the mathematical sense (§2).

Note, however, that Digby insists:

It is not my intention to affirme, that those which wee ordinarily call [*'water', etc.*], and do fall dayly within our use, are such as I have here expressed them. (TT: 31).

As he explains in this remark, Digby does not assume that the thing to which he applies the label *'water'* on the basis that it plays a certain theoretical role is the same thing that in everyday contexts we refer to using the same label. Arguably, in the passage in which Digby talks of rarefying water, he is using the term *'water'* in its everyday or pre-theoretical sense. For one thing, that passage precedes Digby's derivation of the elements. For another, he also refers there to *'smoake'* and, in the surrounding text, to *'gold'*, *'lead'*, and *'quicksilver'*, none of which are Digbean (Aristotelian) elements.

Terminological issues aside, what Digby claims can be rarefied is a volume of water; specifically, a *'basen'* of the stuff. That volume is divisible—physically, not just mathematically. So, what is being rarefied in the case Digby has in mind is not an element but a pure or *'homogeneall'* composition of elements. His claim is consistent, then, with a reading on which, for Digby, rarefaction occurs only at the molecular level.

So, Digby does not in fact allow that an elemental body can be weakened or strengthened—made more or less divisible—as a result of collision with another body. Why not? Recall that how divisible a body is, on Digby's view, is a matter of the proportion of quantity to its substance. So, for a colliding body to make another more divisible, it would have to increase that proportion; that is, it would have to give it more quantity. This in turn might seem to require that the colliding body transfer some of its quantity to the other without also transferring some of its substance at the elemental level. Insofar as such transference would require quantity to be capable of existing independently of substance, it would seem to involve a reification of accidents of the sort Digby opposes (see §7).<sup>40</sup>

## 9. Conclusion

The stated aim of Digby's *Two Treatises* is to show that bodily *'operations may be effected by an exact disposition, and ordering (though intricate) of quantitative and corporeall partes'*, whereas those of the rational mind or soul *'cannot proceed from those principles'* and so *'cannot have a body for [their] source'* (TT,

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40. On the issue of whether quantity exists independently of substance, see (Adriaenssen 2022).

'Preface'; see also TT: 342). From this it follows, according to Digby, that the soul is an 'immaterial and spiritual' substance (TT: 144).<sup>41</sup> This stands in contrast to Cavendish's resolute materialism. According to Cavendish, 'There is but one onely substance in Nature, which is Matter' (OEP: II: 71).

Digby claims that the operations of bodies—those a soul cannot perform—always involve or result from local motion (§3). So, to understand and evaluate his overarching project, it is crucial to understand Digby's views on local motion. In this paper, I have argued that, for Digby, a body's changing location consists in its ceasing to be and becoming a part of other bodies. This unorthodox view of motion is also to be found in the writings of Cavendish a decade later. Given their personal and scholarly connections, I have suggested that Digby likely influenced Cavendish on this issue. Whatever its connection to Cavendish's version of the view, Digby's results from two ideas, both fundamental to his philosophy, ideas that he treats as two sides of the same coin, namely, that the essence of body is to be divisible, and that the essence of body is to be one.<sup>42</sup>

## Abbreviations

- GNP *Ground of Natural Philosophy Divided into Thirteen Parts: with an Appendix Containing Five parts: Written by the Duchess of Newcastle*. London: Printed by A. Maxwell, 1668.
- LP *A Collection of Letters and Poems Microform, Written by Several Persons of Honour and Learning, upon Divers Important Subjects, to the late Duke and Dutchess of Newcastle*, ed. Cavendish, William, Duke of Newcastle. London: Printed by Langly Curtis, 1678.
- OEP *Observations upon Experimental Philosophy to which is Added The Description of a New Blazing World: Written by the Thrice Noble, Illustrious, and Excellent Princesse, the Duchess of Newcastle*. London: Printed by A. Maxwell, 1666.
- ORM *Observations upon Religio medici occasionally written by Sir Kenelme Digby, Knight*. London: Printed by R.C. for Lawrence Chapman and Daniel Frere, 1643.
- PF *Philosophicall Fancies. Written by the Right Honourable, the Lady Newcastle*. London: Printed by Tho: Roycroft, for J. Martin, and J. Allestrye, at the Bell in St. Pauls Church-yard, 1653.

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41. For discussion of Digby's argumentative strategy, see (Garber 1998: 769–71; Kraye 2002, 290; MacDonald 2013: 27–28).

42. For very helpful feedback on previous versions of this material, some of which were very different to the finished product, my thanks to several anonymous referees and to my colleagues at the University of Southampton.

- PL *Philosophical Letters, or, Modest Reflections upon Some Opinions in Natural Philosophy Maintained by Several Famous and Learned Authors of this Age, Expressed by Way of Letters: by the Thrice Noble, Illustrious, and Excellent Princess the Lady Marchioness of Newcastle.* London, 1664.
- P&F *Poems, and Fancies Written by the Right Honourable, the Lady Margaret Newcastle.* London: Printed by T.R. for J. Martin, and J. Allestrye, 1653.
- PPO *The Philosophical and Physical Opinions Written by Her Excellency the Lady Marchionesse of Newcastle.* London: Printed for J. Martin and J. Allestrye. 1655.
- PPOII *Philosophical and Physical Opinions Written by The Thrice Noble, Illustrious, and Excellent Princess, the Lady Marchioness of Newcastle.* London: Printed by William Wilson, 1663. Available at: <https://cavendish-ppo.ku.edu/texts/philosophical-and-physical-opinions/>
- TT *Two Treatises in the One of which the Nature of Bodies, in the Other, the Nature of Mans Soule is Looked into in Way of Discovery of the Immortality of Reasonable Soules,* Sir Kenelm Digby. Paris: Printed by Gilles Blaziot, 1644.

## Competing Interests

The author has no competing interests to declare.

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