

Kenelm Digby's Aristotelianism and Mechanism

ケネルム・ディグビーのアリストテレス主義と機械論

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〈要旨〉

Kenelm Digby (1603-65) has been recognized as an influential figure of the 17th century England. As a natural philosopher, he developed a mechanistic theory with his friend Hobbes, and had a substantial influence upon the young Leibniz. However, although his natural philosophy is interesting as a fruitful attempt to synthesize Aristotle's philosophy with a modern theory, it has not been attentively studied by recent scholars. In this paper, I will elaborate Digby's natural philosophy and how he reconciled Aristotelianism with mechanism.

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1 Introduction

Kenelm Digby (1603-65) has been recognized as an influential figure of the 17th century England.⁽¹⁾ In the context of the early modern philosophy, he is now primarily known as a close friend of Thomas Hobbes. He gave a copy of René Descartes' *Discours de la method* to Hobbes, and suggested a remarkable similarity between their mechanistic views (Malcolm, 2002, pp. 13-14 cf. Prin, 1996, p. 132). Digby and Hobbes also exchanged letters on other philosophical topics.⁽²⁾ Moreover, Gottfried Wilhelm Leibniz, the major philosopher of the younger generation, referred to Digby several times⁽³⁾ in letters to Jakob Thomasius.⁽⁴⁾ In a letter of April 1669, Leibniz suggested that Digby was a great and original philosopher:

“...I should venture to say that hardly any of the Cartesians have added to anything to the discoveries of their master. Certainly Clauberg, Raey, Spinoza, Clerselier, Heerbord, Tobias Andraee, and Henry Regius have published only paraphrases of their leader. However, I am calling Cartesians only those who follow the principles of Descartes; such great men as Bacon, Gassendi, Hobbes, Digby, and Cornelius van Hoghelande, who are commonly confused with the Cartesians, are definitely to be excluded from their number, since they were either equals or even superiors of Descartes in age and in ability.” (L.94)

He contrasted Spinoza, Regius and others with Hobbes and Digby, suggesting that Digby was greater than Spinoza. To be sure, this statement does not represent how Leibniz later evaluated Spinoza: *Tractatus Theologico-Politicus* and *Ethica* were not written at that time, and Leibniz probably knew him as the author of *The Principles of Cartesian Philosophy*. So there is no wonder if Leibniz did not consider Spinoza as an original thinker. Nonetheless, one may be amazed at how the young Leibniz took highly of Digby, since Leibniz suggested that Digby might be even superior to Descartes in some sense.

In spite of Digby's fame in 17th century, and that his works, *The Nature of Bodies* and *On the Immortality of Reasonable Souls*,⁽⁵⁾ certainly had impacts upon major figures of that period, his philosophy and metaphysics have been somewhat ignored for a long time. But I think his natural philosophy is interesting for contemporary scholars of the early modern philosophy since it is a fruitful attempt to synthesize Aristotle's philosophy with a modern theory. In this paper, I will elaborate Digby's metaphysics and how he reconciled Aristotelianism with mechanism.⁽⁶⁾

2 Digby's Aristotelianism

Among early modern philosophers, Digby was a stark champion of Aristotle's philosophy. Thus Maria Rosa Antognazza characterizes him as “an eclectic English

thinker who attempted to reconcile Aristotle with mechanistic physics” (Antognazza, 2009, p. 91). He wrote that Aristotle’s definitions were “generally received, as fully expressing the notions of mankind” (NB.4.2.34), since for him Aristotle was “the greatest master” of “finding out definitions and notions” (NB.3.8.29). He praised Aristotle more frequently than other notable figures of 17th century did. Not only that, Digby actually endorsed several important theses of Aristotle, as we will see in the following.

2-1 Four Elements

In *De Generatione et Corruptione*, Aristotle argued that there are four fundamental elements, namely earth, water, air and fire:

“Now since the elementary qualities are four in number and of these four six couples can be formed, but contraries are not of a nature which permits of their being coupled – for the same thing cannot be hot and cold, or again, moist and dry – it is clear that the pairs of elementary qualities will be four in number, hot and dry, hot and moist, and again, cold and moist, and cold and dry. And, according to theory, they have attached themselves to the apparently simple bodies, Fire, Air, Water and Earth...” (GC.2.3)

Here he had some influence from Empedokles, who had perhaps argued that earth, water, air and fire are fundamental elements for the first time in the ancient Greece (GC.1.2). But Aristotle also gave a critical note upon Empedokles, arguing that an element can change into another kind of element. For instance, fire can become air by getting wet, since he thought that two sets of sensible qualities, “hot-cold” and “dry-wet” characterize the four elements.

Digby also suggested that there are only four elements: “Thus we see that the number of Elements assigned by Aristotle is truly and exactly determined by him; and that there can be neither more nor lesse of them; and that their qualities are rightly allotted to them: which to settle more firmly in our minds, it will not be misse-spent time to summe up in short the effect of what we have hitherto said to bring us unto this conclusion.” (NB.4.7.37)

Thus Digby suggested that four elements are sufficient to explain natural phenomena, but we don’t need five of them. As Aristotle had done, Digby believed that all the features of elements are explained by the qualities of wet, dry, hot and cold, and there is not more than four combinations of the qualities since opposite qualities such

as wet and dry cannot be combined.

2-2 Continuous Movement

In *Physics*, Aristotle argued that both movement and time are continuous.

“[S]ince anything that moves moves from a ‘here’ to ‘there,’ and magnitude as such is continuous, movement is dependent on magnitude; for it is because magnitude is continuous that movement is so also, and because movement is continuous so is time; for (excluding differences of velocity) the time occupied is conceived as proportionate to the distance moved over.” (Physics.219a)

He argued that the distance from ‘here’ to ‘there’ is a finite and continuous magnitude that can be endlessly divided. He also denied that movement is composed of indivisible elements. Rather, we can divide the movement of a body from one place to another as many as we want, and in this sense “time and movement” are “unlimited” (Physics.208a). So it is impossible to pick out an indivisible unit of movement or time by divisions.

Digby also thought that every locomotion is continuous. In other words, a moving thing cannot leap to a different place, since “[n]o local motion can be performed without succession” (NB.9.1.78). Although Digby thought that there are natural and violent motions (NB.10.1.94), and in the case of the latter bodies drastically change their motions, all motions continuously change. He introduced two examples of violent motion:

“When a tennis-ball is stricken by a racket, or an arrow is shot from a bow, we plainly see the causes of their motion: namely the strings, which first yielding, and then returning with a greater celerity, do cause the missives to speed so fast towards their appointed homes.” (NB.12.1.124)

Thus a tennis ball suddenly changes the moving direction when it is hit, and an arrow is largely accelerated by the string of a bow with a short period of time. But even in these cases, the ball and arrow gradually accelerate. And Digby even held the Aristotelian thesis that a moving body is moving together with immediately surrounding bodies. So for instance, he argued that a flying arrow is carried by the surrounding air (NB.12.4.127).

2-3 Finitide

Aristotle held that every body is finite, and the number of bodies is finite. Thus he thought that the whole universe

is not infinitely large. He suggested that there is an infinite being, but it is indivisible, and it cannot be measured by magnitude or number:

“Now, it is impossible that there should exist an ‘unlimited’ seunct from objects of sense, and constituting a self-existing ‘infinity.’ For [...] if the ‘unlimited’ is neither magnitude nor number, but infinity itself is its very being and not an attribute, it must be indivisible...” (Physics.204a)

A so-called “prime mover” is such an infinite being. But it is not infinite in its magnitude. Thus Aristotle argued that if something “in excess of every definite magnitude,” then it would transcend the magnitude of the whole universe (Physics.207b).

Digby also thought that every body is finite in magnitude, agreeing with Thomas Whites’ view:

“But if [one infinite thing] will have the virtue be infinite in each half, he therein alloweth that there is no more virtue, in the whole body then in one half of it: which is against the nature of bodies. Now that a body cannot be infinite in greatnesse, is proved in the second knot of Master Whites first Dialogue of the world.” (NB.9.3.81)

Digby argued that if a natural body were infinite, then its half part would be infinite as well, since otherwise it would be merely twice as large as some finite body. In that case the whole would not be larger than the half part, which is absurd. He thought this is a good argument against the possibility of an infinite natural body. He also thought that nothing in nature has an infinite power to act:

“Since then, the power of all naturall Agents is limited; the mover (be it never to powerfull) must be confined to observe these propositions; and cannot passé over all these infinite designable degrees in an instant; but must allot some time (which hath a like infinity of designable parts) to balance this infinity of degrees of velocity: and so consequently, it requireth time, to attain unto any determinate degree.” (NB.9.6.85)

Digby thought that every natural body needs to move somewhere passing through intermediate places, and it cannot have an infinite degree of velocity to move instantly. Hereby he denied an instant motion to a distant place. Moreover, he thought that White successfully demonstrated that the universe is finite, and “there cannot be infinite number of bodies” (NB.14.2.145). In short, Digby constantly denied the existence of an actually infinite thing in the natural world, following Aristotle and White. And he

believed that we can demonstrate that there is no infinite natural thing on the basis of the incoherence of its concept.

2-4 Denial of Vacuum

Aristotle argued that there is no vacuum in nature. More specifically, he argued that there is no space that completely lacks bodies. In other words, he believed that he could successfully demonstrate that “vacuum with the independent existence [...] does not really exist” (Physics.214b). One reason why he thought that there is no vacuum is that we otherwise would have to assume that there are an infinite number of entities:

“If it has an existence of its own, ‘where’ does it exist? For we cannot ignore Zeno’s dilemma: If everything that exists, exists in some ‘place,’ then if the place itself exists it too must have a place to exist in, and so on *ad infinitum*. Further: If each body exactly occupies the place it is in, then reciprocally each place is exactly occupied by the body in it. But in that case what account are we to give of ‘growing’ things? It would seem that their places must also grow, to keep company with them, since they can never be less than the places they occupy, nor the places they occupy be greater than they are. So, after all, we are forced by these perplexities not only to ask what a ‘place’ is, but also to reopen the question that appeared to be closed, and ask whether there is such a thing as ‘place’ at all.” (Physics.209a)

So Aristotle thought that if a vacuum exists, then its place (a vacant place for the vacuum!) also exists, which further needs its vacant space. This assumption postulates an infinite number of entities, whereas for Aristotle, the number of entities cannot be infinite.

Digby endorsed Aristotle’s view on vacuum:

“...[W]e shall understand in what sense it meant that *Nature abhorreth from Vacuity*, and what means she useth to avoid it. For, to put it as an enemy that nature fighteth against; or to discourse of effects that would follow from it, in case it were admitted, is a great mistake, and a loft labour; seeing it is nothing; and therefore, can do nothing: but is merely a forme of expression to declare in short nothing else but that it is a contradiction, or implication in terms, and an impossibility in nature, for vacuity to have, or to be supposed to have a *Being*.” (NB.18.2.197)

Digby argued that nature does not literally “hate” a vacuum, in a way that it acts to eliminate a vacuum at any

case. Rather, he argued that the concept of vacuum is not coherent, and it cannot express any actual entity. Here his argument against vacuum is pretty similar to that against an infinitely large body, since in either case he argued that some concept is incoherent, and it cannot designate any actual entity.

3 Digby's Mechanism

Although Digby strongly supported several of Aristotle's claims, he did not hold a scholastic philosophy of the medieval age. He was rather considered as a reformer of the traditional philosophies, and he substantially denied some of Aristotle's claims. For instance, he would not agree with the view of the following passage:

“[T]o begin with, we may safely assert... that all the elemental substances have a natural tendency to move towards their own special places, or to rest in them when there – such movement being ‘upward’ or ‘downward,’ such rest ‘above’ or ‘below.’” (Physics.211a)

Thus Aristotle thought that bodies have natural inclinations to move towards somewhere. On the contrary, Digby took a mechanic view that bodies move only in accordance with interactions with other bodies:

“Now in our present intended survey of a Bodie, the first thing which occurreth to our sense in the perusal of it, is its Quantities, bulk, or magnitude: and this seemeth by all mankind to be conceived so inseparable from a body, as when a man would distinguish a corporeal substance from a spiritual one (which is accounted indivisible) be naturally pitcheth upon an apprehension of its having bulk, and being solid, tangible and apt to make impression upon our outward senses...” (NB.1.1.1)

Here Digby argued for a view similar to Descartes⁽⁷⁾ namely that every body has its magnitude,⁽⁸⁾ and this feature distinguishes it from a mind or spiritual substance. And Digby attempted to explain many qualities of bodies by his mechanistic theory. As other early modern philosophers like Descartes and Hobbes, Digby contrasted his mechanistic theory with the scholastic philosophy, and denied the existence of scholastic substantial forms (NB.16.7.179). For Digby, movements and qualities of bodies should be explained by a mechanistic theory as much as possible.

3-1 Weight and Density

Digby argued that weight is among the six basic quantities, together with magnitude, place, motion, time

and number (NB.2.8.18). And he suggested that two bodies of the same size can be different in their weights (NB.3.2.19). In this case, the heavier body is denser than the lighter. Like Descartes, Digby thought that dense bodies are mainly made of large particles, whereas rare bodies are made of tiny particles.

“First, it seemeth unto us that dense bodies have their parts more close and compacted than others have that are more rare and subtil. Secondly, they are more heavy than rare ones. Again, the rare are more easily divided than the dense bodies.” (NB.3.3.20)

Since Digby denied the existence of vacuum, he thought that no body has an empty place inside. But he thought that a heavy body is mainly composed of large particles that do not move smoothly as smaller ones.

3-2 Mechanical Explanations of Four Elements

We have seen that Digby held that there are four elements, following Aristotle. But he explained the features of four elements by his mechanistic theory.⁽⁹⁾ Digby introduced mechanical explanations for properties of dry/wet and hot/cold. As for dryness, he states as the following:

“[W]e term those things *dry*, which have a consistence within themselves; and which to enjoy a determinate figure, do not require the stop or hinderance of another body to limit and circle them in: which will be the nature of those that have a greater proportion of density in respect of their gravity.” (NB.4.3.34)

So Digby argued that a dry body has parts that tightly cohere each other, and as a result the shape of the whole is not easily changed, and that a wet body does not have sufficient cohering parts, and the whole shape is not settled:

“For although a body be dense, (which of its own nature, singly considered, would preserve the continuity of its parts, as making the body hardly divisible; whereby it would be dry) yet if the gravity that worketh upon it, be in proportion greater then the densitie; it will sever the parts of it, and make them run to the center, and so become fluide and moist...” (NB.4.2.34)

As for a hot body, Digby thought that it has many tiny particles⁽¹⁰⁾ that move fast, and these affect other bodies more actively than cold bodies:

“In summe, by this action of an extreme rare body upon a compounded one, all the parts of one kind that were in the compounded one, will be gathered into one place; and those of divers kinds into divers places: which is the notion

whereby Aristotle hath expressed the nature of heat; and is an effect, which daily experience in burning and boyling, teacheth us to proceed from heat.” (NB.4.4.35)

On the contrary, Digby thought that a cold body has parts that are likely to resist the motion of tiny and rare particles. Therefore, it resists the action of a hot body more effectively than other bodies:

“On the other side, if a dense thing be applied to a compound, it will (because it is weighty) presse it together: and if that application be continued on all sides, so that no part of the body that is pressed be free from the siege of the dense body that presseth it, it will form it into a narrower room, and keep in the parts of it, not permitting any of them to slip out. So that what things soever it findeth within its power to master, be they light or heavy, or of what contrary natures soever, it compresseth them as much as it can, and draweth them into a lesse compasse, and holdeth them strongly together, making them stick fast to one another. Which effect, Aristotle took for the proper notion of cold; & therefore gave for definition of the nature of it, *that it gathereth things of divers natures...*” (NB.4.4.36)

Digby explains four elements as the following. For him, earth is mostly made of dense and large particles. Thus it cannot utilize tiny, rare and fast particles to act upon other bodies. But it is the most active when it is used to divide something (NB.4.6.44). He thought that fire is full of active particles that are “like so many extreme sharp needles” (NB.4.7.45). They move fast, and have pointed shapes. Thus they affect other bodies more easily. Water can the most effectively resist to the action of fire, and often extinguishes it. Water has relatively large particles that press smaller particles. As a result, they weaken the movements of smaller particles in fire. But these water particles are not as large as largest particles in earth. They can be easily moved, and hard to make up a solid large body. Lastly, air is hot and wet. It mostly consists of rare, tiny particles. But they are influenced by gravity more than fire particles, and they easily come together to form a bit larger particles that resist the action of hot bodies.

3-3 Light

Digby argued that light is a cluster of fire element particles. But compared to a visible flame, this cluster is much thinner. Thus Digby thought that a light beam is much more tenuous than fire, and it does not heat up objects

that much. Digby also argued that although light is a cluster of particles, it is not moved by the wind (NB.8.7.76). The reason is that the particles are so tiny and not easily affected by stream of larger particles.

Digby thought that although a light beam moves extremely fast, the speed is finite. Thus he argued that light does not “enlighten any room in an instant” (NB.8.3.69).

3-4 Gravity

Some natural philosophers believed that some bodies have powers to go toward the earth. But since Digby was a mechanist, he denied that bodies have intrinsic inclinations to move downwards (NB.11.11.121). Digby thought that the beam of sunlight affects the surface of the earth, cutting tiny parts from it, and make them raise (NB.10.2.95). As a result, a stream that is rising vertical to the surface of the earth is brought about. After rising up for a while, the stream will be descending down to the earth is brought about. And this descending stream has denser particles than the upcoming one, since particles gradually become larger by ascending and descending.

Thus Digby thought that descending stream is more “powerful” (NB.10.4.97), and anything in the air needs to go downward pushed by the descending stream.

3-5 Magnetic Force

Digby explained magnetic force from a mechanistic point of view, denying that magnets have intrinsic inclinations to attract other bodies. He thought that the earth has some constant stream moving from one pole to the other (NB.20.5.223-224; NB.20.7.227). This explains why loadstones constantly show the same direction, and thus they can be used for compasses. Since magnetic force can also be explained by mechanism, Digby thought that we should not ascribe a special kind of power to a magnet. He thought that an iron is easily captured by a certain type of stream of rare and tiny particles. As a result, the stream constantly comes around it, and moves some type of bodies. Thus he declared that “[t]he operations of the loadstone are wrought by bodies and not by qualities” (NB.21.1.230).

Digby suggested that as something comes to have a heat when it is close to a fire, an iron comes to have a magnetic force that attracts other irons:

“...I have considered how fire hath in a manner the same effect in iron, as the virtue of the loadstone hath by means of the cap: for I find that fire coming through iron

red glowing hot, will burn more strongly, then if it should come immediately through the aire; as also we see that in pitcoal the fire is stronger then a charcoal. And nevertheless, the fire will heat further if it come immediately from the source of it, then if it come through a red iron that burneth more violently where it toucheth; and likewise charcoal will heat further then pitcoal, that near hand burneth more fiercely. In the same manner, the loadstone will draw further without a

cap then with one; but with a cap it sticketh faster then withone one. Whence I see that it is not purely the virtue of the loadstone; but the virtue of it being in iron, which causeth this effect.” (NB.22.7.245)

Digby suggested that both heat and magnetic force are explained through the fast motions of tiny and rare particles. But unlike fire, a magnet does not heat up other bodies, since the streams from it involve only small portions of surrounding bodies.

Notes

- (1) He was known as an apologist of the Roman Catholic Church, as well as an alchemist. He was an extremely energetic and versatile person that even worked as an “amateur pirate” in his youth (Malcolm, 1996, p. 14; Malcolm, 2002, p. 1).
- (2) Yves Charles Zarka points out that Digby and Hobbes discussed how the first philosophy “that was intended to explicate the most basic concepts and principles of knowledge” can be logically constructed (Zarka, 1996, p. 62).
- (3) Leibniz first mentioned to Digby in a negative context, suggesting that some modern philosophers, such as Bacon, Gassendi, Hobbes, Descartes and Digby seriously damaged “the mantle of philosophy” (L.93). He thought that these philosophers were a bit too innovative in the sense that they denied even positive aspects of previous philosophers. But Leibniz also showed an agreement with Digby’s view on the immortality of the soul (L.97-98). Leibniz seems to have read the book attentively, given that he owned a copy and wrote some comment on it (Mercer, 2001, p. 83). Moreover, Daniel Garber shows that Leibniz even tried to explain four elements in terms of density and rarity in *De arte combinatoria* of 1666, following Digby (Garber, 1995, p. 337; 2009, p. 6).
- (4) Christia Mercer points out that the idea to reconcile Aristotle’s philosophy with the modern mechanism was pervasive “in Germany in the mid-seventeenth century,” and Jakob Thomasius, as well as Erhard Weigel and Athanasius Kircher, were such eclectic philosophers (Mercer 2001, p. 47n).
- (5) The two works are titled as *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*.
- (6) Leibniz agreed with Digby’s view that “in explaining corporeal phenomena, we must not unnecessarily report to God or to any other incorporeal thing, form, or quality,” and that “so far as can be done, everything should be derived from the nature of body and its primary qualities – magnitude, figure, and motion” (L.110; Mercer, 2001, p. 71; Antognazza, 2009, p. 102).
- (7) Considering the similarity between Descartes’ and Digby’s theories, Henry More seems to suppose that Digby’s theory is even derivable from that of *Principia philosophiae* (Henry, 2016).
- (8) As Thomas Lennon points out, Digby took “quantity, bulke or magnitude” as the “first and primary affections” of body (NB.1.1.1; Lennon, 1993, p. 53).
- (9) Mercer argues that Digby explained four elements in terms of “rarity and density,” and “the principle of force and velocity” (Mercer, 2001, pp. 106-107).

- (10) Digby frequently used the term “atom.” But for him, atoms are just small particles that almost keep their shapes for a long time (NB.5.8.48). Since he did not think that there are absolutely solid atoms that move around the empty space, he gave critical notes upon Pierre Gassendi’s view.

Abbreviations of Primary Texts and Translations

- GC: Aristotle. *De Generatione et Corruptione*. Translated by E.S. Forster. Cambridge: Harvard University Press.
- L: *G.W. Leibniz Philosophical Papers and Letters*. Translated and edited by L.E. Loemker. Dordrecht: Kluwer.
- NB: K. Digby. *The Nature of Bodies*. Cited by Chapter, Section and Page.
- Physics: Aristotle. *Physics*. Translated by P.H. Wicksteed and F.M. Cornford. Cambridge: Harvard University Press.

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