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Did Francis Bacon See Democritus As a Mechanical Philosopher?

Abstract

Robert Kargon interpreted the pneumatism of the later works of Francis Bacon as vitalism; however, for him, the atomism of the early Bacon was mechanistic. Similarly, Graham Rees argued that pneumatism and atoms are incompatible; so, without making any distinction between the early and later Bacon, he thought that Bacon was never an atomist. Both Kargon's and Rees' claims rest on the false idea that atomism necessitates a mechanistic view of the world. In this paper, contrary to the generally accepted identification of mechanical philosophy with atomism, it will be argued that Francis Bacon saw Democritus, an atomist, as a vitalist philosopher.

Keywords

Francis Bacon, Democritus, Vitalism, Mechanical Philosophy.

1. Reappraisal of Experimental and Rational Philosophies by Considering Their Attitudes towards Matter's Vitality

Mechanistic philosophy favours inert or non-self-determined matter, while vitalist philosophies hold to an active matter theory. In this discussion, I limit the definition of 'mechanical philosophy' to the motion of particles only by touching each other. This definition conceives matter as a passive entity and is a counter-argument of a belief in the ability of particles to move without collision, which refers to active matter.¹ In this sense, I should also point out that I see Pierre Gassendi, who is generally accepted as a mechanical philosopher, as a vitalist philosopher because of his proposition that atoms were endowed by God with an ability to move themselves.²

When examining Bacon's attitude towards the motion of seeds (or atoms), *On Principles and origins according to the fables of Cupid and Coelum* is one of his important texts in which he mentioned his ideas about atoms and Democritus. Bacon believed this fable showed the ancient doctrine regarding the principles of things, and this doctrine was mainly held by Democritus. For Bacon, Cupid represents primary matter and its qualities, and primary matter was conceived by ancients as owning principles of motion in itself, which refers to the activity of matter. As he states:

(...) matter itself, its power and nature, and in fine the principles of things, had been shadowed forth in *Cupid* himself (Bacon 1996: 199).³

For Bacon, the important point is that we should not look for Cupid's parents, and Cupid's parents are the causes of the qualities of matter, namely, the principles of motion and the form of matter. If you inquire into the parents of Cupid, you will find them beyond matter, such as the forms of Plato and Aristotle.⁴ Therefore, to avoid

¹ As also Antonio Clericuzio states, according to mechanical philosophy, "matter is inert and all interactions in nature are produced by the impact of particles" (Clericuzio 2000: 7). However, Banchetti–Robino states, "Vitalism has been generally regarded as the view that claims that 'vital forces' or 'vital spirits' are causally operative in nature" (Banchetti–Robino 2011: 174). By 'active matter' I mean a vitalistic or an animistic conception of matter. Active matter is a kind of matter that has the principles of motion in it. These principles are what give the particles that constitute matter the ability to move by themselves. This view is different from Aristotelian passive matter. Aristotle saw the prime mover, which is pure form, as the reason for all motion in matter. It is also different from mechanistic philosophy that favours inert or non-self-determined matter. On the contrary, Francis Bacon thought that God created matter as an active entity by endowing it with the principles of motion, so matter has an ability to move by itself without any later intervention of God.

² See also Carre (1958: 117, 119) and Fisher (2005: 259), who also argue that Gassendi's matter is not inert, but animist or proto-vitalist.

³ For Cupid as natural appetite, see Giglioni (2016b). Giglioni has argued more recently that Baconian atoms are indeed actual appetitive motions of matter. See Giglioni (2016a: 63–7), and (2016b: 165).

⁴ Bacon says in his *Novum organum* the following regarding the difference between his own definition of form and Aristotle and Plato's definitions: "We should rather focus on matter, its schematisms and metaschematisms, and the pure act and the law of that act or motion. For forms are fictions of the human soul, except when you want to call those laws governing the act forms" (Bacon 2004: 89). Baconian forms are the laws of action in matter. For further

passing beyond matter, a philosopher must accept that Cupid has no parents, which means an acceptance of the principles of things as they are found in matter. As Bacon states:

For nothing has corrupted philosophy as much as this inquiry about Cupid's parents, i.e. philosophers have not accepted the principles of things as they are found in nature and embraced them as a positive doctrine and as if they were articles of experimental faith, but they have rather deduced them from the laws of discourse, the piddling conclusions of dialectic and mathematics, from common notions, and from suchlike excursions of the mind beyond the bounds of nature. Therefore a philosopher should always be telling himself that Cupid has no parents, in case his mind wanders off into the realms of emptiness (...) (Bacon 1996: 199–201).

Bacon believed Democritus was one of the pre-Socratics who attributed the principles of motion (or activity) to matter, or in other words, who did not inquire into the parents of Cupid:

(...) almost all the ancients, *Empedocles*, *Anaxagoras*, *Anaximenes*, *Heraclitus* and *Democritus*, though differing in other respects about primary matter, were as one in maintaining that matter was active, had some form and imparted its form, and had the principle of motion within itself (Bacon 1996: 209).

Democritus is important for Bacon because he found the principles of motion in matter, that is, atoms.⁵ So, Democritus dissected nature but did not abstract from it. Contrary to Democritus, however, what Aristotle did, for Bacon, was abstracting from nature. Bacon defines dissection of nature as looking for the qualities of matter in matter, and the abstracting of nature as looking for those qualities beyond matter. If a philosopher abstracts from matter, then his abstraction will end up creating an abstract (or potentially uninformed) matter. As Bacon states:

This abstract matter is the matter of disputations, not of the universe. But one who philosophizes rightly and in an orderly manner must dissect nature and not abstract from it (for those who will not dissect it are forced to abstract), and he must wholly maintain that primary matter is united with the primary form, and also with the first principle of motion, as we find it (Bacon 1996: 209).

explanations of Baconian forms, see Whitaker (1970) and Horton (1973: 243–4). Doina-Cristina Rusu argues that Baconian form is motion, see Rusu (2013: 192–7). Here, I should emphasise that while Aristotle looked for the principles of motion (forms) beyond matter, Plato looked for the form of matter (Platonic ideas) beyond matter. However, Bacon states that almost all the ancients (such as *Empedocles*, *Anaxagoras*, *Anaximenes*, *Heraclitus* and *Democritus*) thought that matter had some form and the principles of motion.

⁵ Bacon also says the following in his *Historia Vitae et Mortis*, which shows how he attaches importance to Democritus: “Democritus of Abdera lived for 109 years; he was a great philosopher and, if ever Greek was, a physicist in the true sense; he visited many countries but much more did he visit nature itself; an indefatigable experimenter, and (as Aristotle objected against him) rather a follower of similitudes than an upholder of the laws of disputation” (Bacon 2007: 203).

In his *Novum organum*, Bacon also says the following:

it happens that men do not stop abstracting from nature until they arrive at potential and uninformed matter (Bacon 2004: 107).⁶

It may be asked, therefore, whether we can find a correlation between the passive matter of Aristotle and, for example, the passive matter of mechanical philosophy. While Aristotle found the principles of motion (or forms – one the objects of a natural philosopher) beyond matter, we cannot say the same thing for mechanical philosophy, because the objects of a mechanical philosopher are in matter. However, this does not change the fact that mechanical philosophers saw matter as a passive entity and God as the cause of motion in this passive matter, while vitalist philosophers argued that atoms (or the smallest particles) were endowed by God with appetites and desires, which give them a chance to move intrinsically.⁷ This difference between vitalistic and mechanistic philosophers regarding matter means another difference arises between them when it comes to the methods they use for natural inquiries. The idea that ‘matter is inert and all interactions in nature are produced by the impact of particles’ (see fn. 1) is an acceptance that all qualities can be explained by shape, size, and motion, which are indeed quantitative properties (see Henry 2002: 69). The increasing role of mathematics in natural philosophy became a tool for mechanical philosophy to support its argument against vitalist philosophy. Paolo Rossi states that mechanical philosophy had the following assumptions:

(1) nature is not the manifestation of a living principle but is a system of matter in motion that follows laws; (2) the laws of nature are mathematically precise; (3) relatively few such laws suffice to explain the universe; and (4) the explanation of natural phenomena excludes all reference to *vital forces* or *final causes* (Rossi 2001: 125).

However, for both Bacon and the vitalist neo-Platonist chemical philosophers, the qualitative properties of matter, such as the desires or appetites of matter, are properties that cannot be represented mathematically and logically. For them, these qualities can only be discovered through experiment. Mechanical philosophers did not favour such qualitative properties of matter; instead, they held to motion by a collision of particles and assumed that qualities are reducible to quantitative properties that can be defined according to the laws of geometry.⁸ For one of the most important chemical philosophers, Paracelsus, nature can be understood in a similar way as chemical processes are understood (see Debus 2002: 87). Therefore, seeing matter as a passive

⁶ Bacon also says the following regarding abstraction and dissection: “The human intellect’s very nature carries it towards things abstract and to fancying that things fleeting are fixed. But to abstract from nature is not as effective as to dissect it, as did the school of Democritus which penetrated further into nature than the others” (Bacon 2004: 89).

⁷ ‘Vital forces’ or ‘vital spirits’ refer to the principles of motion (or change). Vitalism is a kind of matter which includes the principles of motion, and whether these principles are considered as spirits or anything else does not matter. See also fn. 1.

⁸ As Christopher Kaiser rightly says, particles which can move by touching each other (an account such as that we have found in Descartes) “meant that matter was entirely receptive to the mathematical laws imposed on it by God” (Kaiser 1997: 215–6).

entity caused both Aristotle and mechanical philosophers to favour a rational method more than an experimental one.⁹ I should also emphasise that mechanical philosophers did not deny the experimental method, but chemical philosophers denied using the logical and mathematical methods to make natural philosophical claims.¹⁰ The reason vitalist chemical philosophers favoured only the experimental method, instead of logical and mathematical methods (the geometrical abstractions of Copernicus, Galileo and Kepler, or the mathematization of nature),¹¹ was their views regarding the qualitative properties of matter. For vitalist natural philosophers, the appetites and desires of matter, which refer to the vital forces in matter, are the proper objects of natural philosophy, which can only be discovered through the experimental method.¹² The aim of the neo-Platonist chemical philosophers was to control nature to produce practice, and controlling nature by discovering the hidden powers of nature was possible through the experimental method. As you remember, for Bacon, contrary to Aristotle, who abstracted nature through his logic, Democritus was a dissector of nature, which means that Bacon saw Democritus as an experimental philosopher. The support of mechanical philosophy to the mathematical method and its conception of matter as passive can be compared to the support of Aristotle to the logical method and its conception of matter as passive.

2. Bacon's Conception of Democritus as a Vitalist

Now, let us read Bacon's words showing he agrees with Democritus:

Democritus made the admirable claim that atoms or seeds, and their virtue, were quite different from anything subject to the senses, but that they were remarkable for being things whose nature was entirely dark and secret. Therefore he proclaimed concerning them, that

⁹ Regarding how Bacon saw Aristotle's method as a rational method, see Çimen (2017: 33–6).

¹⁰ For the attitude of vitalist chemical philosophers towards mathematical and logical methods, see Debus (1968) and (1973).

¹¹ Edmund Husserl explains Galileo's mathematization of nature as follows: "*nature itself* is idealized under the guidance of the new mathematics; nature itself becomes – to express it in a modern way – a mathematical manifold" (Husserl 1970: 23). For mathematization of nature, see also Henry (2002: 14–30); Zvi (2008: 9–11); Smeenk (2016), and Goldenbaum (2016).

¹² The relation between active matter theory and the experimental method is also well stated in the following words of John Henry: "As soon as Bacon turned to magic he could hardly fail to notice that its principal method was experimental" (Henry 2003: 53). Magic is the operation to produce practice from the discovered (hidden) properties of matter; for Bacon, these properties are forms. Henry also states the followings about the same issue: "Since magic was chiefly concerned with exploiting the sympathies and antipathies between corresponding things in the Great Chain of Being, and since the assumption was that these powers of agreement and disagreement were hidden or occult, the magician could only discover the powers of things empirically" (Henry 2003: 55). On appetites of matter in Baconian natural philosophy, see Giglioli (2010).

*they do not resemble fire or anything else
besides that which can send bodies
to our senses or be felt by our sense of touch;*

and again concerning their virtue,

*But in giving birth to things the first beginnings ought
to hold to a secret and dark nature,
lest something should rise up to fight against and oppose them.*

Thus atoms are not like fiery sparks, drops of water, bubbles of air, specks of dust, not tiny amounts of spirit or ether. Nor is their power and form something heavy or light, hot or cold, dense or rare, hard or soft, such as are found in larger bodies, since these virtues and others of the kind are products of composition and combination (Bacon 1996: 201–3).

However, Bacon thinks differently from Democritus regarding the motion of atoms. He states:

Nor, similarly, is the natural motion of the atom either that motion of falling bodies which is called natural, or the motion opposite to it (percussion), or the motion of expansion and contraction, or of impulse and connection, or the motion of expansion and contraction, or of impulse and connection, or of the rotation of the heavenly bodies, or any of the other motions of larger bodies simply. None the less in the atoms' body exist the elements of all bodies, and in the atom's motion and virtue exist the beginnings of all motions and virtues. But yet in this very matter, namely the atom's motion compared with that of larger bodies, the philosophy of parable [the fable of Cupid] seems to differ from the philosophy of *Democritus*. For we find that *Democritus* is not only quite at odds with the parable, but also at odds and virtually in contradiction with himself in the other things he says on the matter. For he ought to have attributed a heterogeneous motion to the atom no less than a heterogeneous body and a heterogeneous virtue. But he chose from among the motions of larger bodies the two motions of descent of the heavy and ascent of the light (which he explained by the striking or percussion of the heavier driving the lighter upwards), and attributed them to the atom as primitive motions. The parable, however, preserves the heterogeneity and exclusion throughout, in both substance and motion (Bacon 1996: 203).

As is seen, Bacon did not accept reducing the motion of atoms into descending and ascending, and he agreed with the ancient doctrine of the motion of atoms being heterogeneous.¹³ Bacon did not see the Democritean idea of descending motion of

¹³ In the *Novum organum* (1620), Bacon explains that he does not accept the Democritean doctrine of atoms: Now this business will not be brought down to the atom, which presupposes a vacuum and invariable matter (both false assumptions), but to real particles as we actually find them (Bacon 2004: 213). Bacon believed the doctrine of atoms to be false because the ideas of vacuum and invariable matter, which are required by the doctrine, are false assumptions. However, Bacon still thought that there are particles in matter; the real particles, which do not presuppose a vacuum, and invariable matter. For further reading regarding atoms and void in Bacon's natural philosophy, see Manzo (2001) and (2003). For discussions on void in ancient Greek and Democritus' philosophy, see Sedley (1982) and Berryman (2016).

heavier atoms as mechanical accounts of the motion. This becomes clearer in his following words:

Democritus considered the matter more deeply; and having first given the atom some dimension and shape, attributed to it a single desire or primary motion simply and absolutely, and a second by comparison. For he thought that all things move by their proper nature towards the centre of the world; but that that which has more matter, moving thither faster, strikes aside that which has less, and forces it to go the other way. (Bacon 1858b: 730, underlining added).

As is seen, the motion of atoms which move towards to the center of the world was interpreted by Bacon as a desire of atoms, but not motion by force or strike.¹⁴ Bacon calls motion by force as mechanical, as he states:

But it is far more necessary (for a great deal turns on it) to persuade men that violent motion (which I call *Mechanical*, and which *Democritus*, who in setting out his primary motions ranks even beneath run-of-the-mill philosophers, called motion of *Percussion*) is nothing other than motion of liberty, i.e. from compression to relaxation (Bacon 2004: 387).

Here, Bacon talks about motion by strike, and when we consider Democritus, the strike of the heavier atoms causes the lighter atoms to move upward.¹⁵ As to sidelong motion, Bacon thought that Epicurus introduced the sidelong motion of the atom into the philosophy of Democritus to substitute fortune for fate (see Bacon 1874: 253). So, Bacon thought that Democritus attributed two motions to atoms; first, the descending motion of atoms (a desire of atoms, an intrinsic motion)¹⁶, and second, the ascending

¹⁴ Bacon also says the following about the motion by strike in his *Novum organum*: “For if air be under water it climbs fast towards the surface, by that motion of (as *Democritus* called it) *Percussion*, by which the water sinking down strikes and lifts the air upwards, and not by any conflict or striving on the air’s part” (Bacon 2004: 317).

¹⁵ Regarding the motions of Democritus’ atoms, Simplicius (470–560 AD) says the following in his interpretation of Aristotle’s *On the Heavens*: “For Democritus and his followers and, later, Epicurus say that since all atoms have the same nature they have weight, but because some are heavier, the lighter are pushed out by the heavier ones, which sink down, and they move upward; and they say that it is for this reason that some things seem to be light, others heavy. And if not all natural bodies are heavy, nevertheless it is agreed by everyone that at least some, such as earth and water, are” (Simplicius 2014: 43; 569,1 {5–10}). For a discussion on Aristotle’s claim regarding the motion of Democritus’ atoms, which is that the motion of atoms is not intrinsic to them but only a property of them acquired by collision, see Mourelatos (2005).

¹⁶ If Bacon accepts the descending motion of atoms towards the centre of the world as an intrinsic motion, which shows us his conception of matter as an active entity, can we assume that Bacon may have also thought that Aristotle’s natural motions of the elements earth and water downwards, and air and fire upwards as intrinsic motions, refer to the activity of matter? Bacon has no answer for this question, but I can give it a shot. Since Aristotle thought that all motions were caused by the first mover, which is a pure form without matter, we have to assume that natural motions of the mentioned elements have to stem from the first mover,

motion of lighter atoms, caused by collision with heavier ones. Here, I should emphasize that the idea that ‘all things move by their proper nature towards the center of the world’ is Bacon’s idea regarding the motion of Democritean atoms. In his *On the Heavens*, Aristotle, for example, claimed that Leucippus and Democritus only offered a constrained motion for atoms, not a natural motion (see Aristoteles 2013: 82; 300^b–10).¹⁷

The descending motion of atoms, which is seen by Bacon as their desire, must be the reason why Bacon – even though he did not like attributing to atoms only the motions of descent and ascent instead of heterogeneous motion – thought Democritus attributed the principles of motion (or activity) to matter. Also, this interpretation of Bacon is in accord with his argument that Democritus thought that ‘matter was active, had some form and imparted its form, and had the principle of motion within itself’; that is, Democritus did not look for the principles of matter beyond nature.

In his *Cogitationes de Natura Rerum* (Thoughts on the Nature of Things – 1604), which was written earlier than *Novum organum*, these words are useful to understand Bacon’s attitude towards the philosophy of Democritus:

THE doctrine of Democritus concerning atoms is either true or useful for demonstration. For it is not easy either to grasp in thought or to express in words the genuine subtlety of nature, such as it is found in things, without supposing an atom. Now the word atom is used in two senses, not very different from one another. For it is either taken for the last term or smallest portion of the division or fraction of bodies, or else for a body without vacuity (Bacon 1858a: 419).

For Bacon, Democritus’ doctrine of atoms is useful for demonstration. As you remember, Bacon’s conception of Democritus was that he was one of the pre-Socratics who thought matter had the principles of motion in it; that is, he did not look for these principles beyond matter. So, by accepting atoms as the principles of motion, Democritus did not fall into the error defined by Bacon as looking for the principles of

and this shows us that motions of those elements are not their self-directed, intrinsic motions. As also mentioned above, Bacon emphasised that Aristotle found the source of motion beyond matter (that is forms), which means that Aristotle’s matter is passive or potential.

¹⁷ Wilhelm Capelle informs us that, according to Aetius, Democritus offered only two properties to atoms: their size and forms. But, for the first time, Epicurus added ‘weight’ as another property to atoms. See Capelle (Sokrates’ten Önce Felsefe, vol. 2, 1995: 155). For more on Aetius’ claim, see also O’Brien (1977: 67). See Cherniss (1935: 96–100, and 209–13) and McDiarmid (1960) who also argue that Democritus did not ascribe weight to the atoms. However, O’Brien refutes Aetius’ claim by talking about Simplicius who “writes of the theory of weight belonging to Democritus” (O’Brien 1977: 67). For explanations of Simplicius, see also fn. 15 in this paper. For further explanations regarding weight and atoms, see O’Brien (1977), (1981); Furley (1989: 91–102). Alan Chalmers argues that the problems regarding the question of whether or not Democritus attributed weight to atoms are twofold. According to Chalmers, “Democritean atoms can be said both to possess and not to possess weight or heaviness, depending on which meaning of those terms is intended” (Chalmers 1997: 279). However, these discussions regarding whether Democritus attributed weight to atoms is beyond the aim of this paper. The aim of this paper is to show Bacon’s conception of Democritus, and Bacon thought that Democritus attributed weight to atoms.

motion beyond matter. It is clear that the reason why Bacon approved of Democritus' doctrine of atoms was that Democritus saw matter as the object of his natural philosophy by accepting atoms as the principles of motion in matter. So, the main reason Bacon supported the philosophy of Democritus was that he searched for the principles of motion in matter, which refers to an agreement with the ancients' theory of matter as told in the fable of Cupid. Even though Bacon was against some Democritean ideas regarding atoms, he still approved of Democritus because Democritus agreed with ancient wisdom and his theory of atoms was the closest philosophy to that wisdom.

3. Are Atomism and Pneumatism Compatible?

Bacon himself, even though he denied some claims of Democritus' doctrine, was an atomist, but he was also a vitalist. Mechanism separates itself from vitalism by considering atoms or the smallest particles as inert, namely, as being destitute of the intrinsic ability to move. In this sense, Bacon was a vitalist and an atomist, and he interpreted the philosophy of Democritus as a vitalist and atomist philosophy. We should not fall into the error that Robert Kargon and Graham Rees fall into, which is an argument that atomism necessitates a mechanistic view.

In his *'Atomism in England from Harriot to Newton'*, Kargon argued that while Bacon was an atomist and a mechanical philosopher in his earlier works, he later gave up the doctrine of atomism and adopted pneumatic¹⁸ matter theory. However, Kargon accepted that Bacon's atom is endowed with form, appetite, and motion (see Kargon 1966: 46). Kargon thought that after Bacon adopted the pneumatic matter theory, he gave up atomism and positioned pneumatism against atomism. For Kargon, pneumatism refers to the vitalist character of Bacon's matter theory,¹⁹ while atomism refers to the mechanist character of it.

I agree with Kargon's argument that Bacon's atoms (or seeds) are endowed with appetite and motion. However, I believe it is problematic that Kargon attributed the vitalist character of Bacon's matter theory to Bacon's pneumatism, not to his atoms. Indeed, because Bacon's atoms are endowed with appetite and motion, we should call Bacon's atomism 'vitalist'.

As for Rees, he did not accept that Bacon had accepted the doctrine of atoms in any of his works, and for him, Bacon cannot be seen as a mechanical philosopher. Rees explains his reasoning as follows:

Bacon's rejection of the classical atom is all too plain. He explained that minute portions of spirit were not the same as the atomists' ultimate particles and since spirit and tangible matter were convertible, it must follow that tangible

¹⁸ 'Pneumatic' is a word derived from ancient Greek word *pneumatikós*, which means relating to wind or air, from *pneûma*, which means wind, air, breath or spirit. So, pneumatic means 'of relating to air', and 'spiritual'. See Dictionary.com (2017).

¹⁹ On Bacon's theory of matter, see Rees (1975), (1980), (1996); Gaukroger (2001: 166–221); Weeks (2007); Rusu (2012), (2013: 51–7), and Giglioli (2013), (2016a), (2016b), (2016c).

matter did not consist of the atomists' indivisible particles either (Rees 1980: 563).

Rees based this argument on the following words of Bacon, which I have also quoted above: 'atoms are not like fiery sparks, drops of water, bubbles of air, specks of dust, nor tiny amounts of spirit or ether'. For Rees, the atoms of Bacon are different from the particles of spirit or pneumatic matter. As a result, Rees argues that Bacon never became an atomist and therefore a mechanical philosopher, and that, for Bacon, atomism was only a useful tool to explain the subtlety of nature (or the subtlety of matter)²⁰ (see Rees 1980: 562).

Silvia Manzo, however, rightly argues that Rees' argument is problematic because it rests on the idea that pneumatic matter and atoms are incompatible. As mentioned above, Rees interprets Bacon's words as an incompatibility between atoms and spirits, but we cannot interpret these words as such. Manzo explains her argument as follows:

In order to argue for the imperceptibility of atoms, Bacon deals with a relation of external similitude (*similes*), not with a relation of ontological identity. And even if he had meant a relation of identity, Rees' conclusion would still not follow, because from "A is not identical to B," it does not necessarily follow that A is incompatible with B, nor that B is not composed of A (Manzo 2001: 224).

For Manzo, the alchemical and mechanical approaches are interwoven in Bacon's works, especially in his later works. She accepts Bacon's explanations regarding the processes of separation and alteration as mechanical explanations, while she accepts the appetites of Cupid as an animistic approach. I agree with Manzo that separation and alteration can be seen as mechanical explanations in Baconian natural philosophy, however I still label Bacon as a non-mechanical philosopher because of his belief in the activity in matter or particles' intrinsic ability to move. Bacon's mechanical explanations regarding alteration and separation are not an obstacle in labelling him as a non-mechanist philosopher. Also, I do not believe Manzo labels Bacon as a mechanical philosopher, she only rightly argues that Bacon's explanations regarding the processes of separation and alteration are mechanical explanations, which are alternative explanations for Aristotle's forms and qualities.²¹ Remember, I limit my definition of mechanistic philosophy to the motion of particles only by touching each other.

To sum up, Kargon's aforementioned argument is problematic because, even though he argued that Bacon attributed the appetite and motion to atoms, he only interpreted Bacon's pneumatism as vitalistic. For Kargon, however, pneumatism can only be seen in Bacon's later works, and it is different from Bacon's atomism which can be seen in the earlier works, and this shows us that for Kargon, Bacon's atomism and pneumatism are not compatible. Rees' argument is also problematic because it also rests

²⁰ For the term 'subtlety of nature' in Bacon's natural philosophy see Mori (2016: 15–9) and Çimen (2017: 43–7).

²¹ For those who also argue that Bacon was not a mechanical philosopher, see Weeks, (2008), Klein (2008) and Giglioni (2012).

on the incompatibility between pneumatic matter and atoms. As a result, we can say that both Kargon and Rees seemed to think that a mechanistic view necessitates atomism.²²

Conclusion

In this paper, I have argued that Francis Bacon saw Democritus as a vitalist. For Bacon, Democritus was important because he agreed mostly with the ancient view regarding the properties of matter, according to which ‘matter was active, had some form and imparted its form, and had the principle of motion within itself’. Active matter refers to matter’s inner ability to move by itself. This kind of matter is contrary to the mechanistic view of matter which is inert, passive, and non-self-determined.

Bacon saw the Democritean idea of the descending motion of atoms as an intrinsic motion, namely, a desire of them, different from the ascending motion of lighter ones caused by the striking of the heavier atoms. Bacon calls this kind of striking motion violent motion or mechanical motion. So, because Bacon thought all interactions in matter are the results of the descending motion of atoms, which was seen by Bacon as a desire of atoms to move towards the centre of the world, we can say that Democritus was seen by Bacon as a vitalist. This desire of atoms or their intrinsic motion shows us that Democritus, for Bacon, conceived matter as an active entity.

When we interpret Bacon, we should not fall into the error that atomism and pneumatism (or vitalistic matter theory) are not compatible, and that atomism necessitates mechanism, as Rees and Kargon believed. Bacon was both an atomist and a vitalist because he attributed the ability to move by itself to atoms (or seeds). And, Bacon interpreted the Democritean idea of the descending motion of atoms as the intrinsic motion of them. For Bacon, the descending motion of atoms is the result of their heaviness. Bacon seems to think that Democritus attributed weight or heaviness to atoms, but he does not tell us anything about from which source or sources he got this idea. As I have mentioned above, whether Democritus attributed weight or an intrinsic motion to atoms is not something this paper aimed to answer (see also fn. 17 in this paper regarding this discussion). This paper has tried to show Bacon’s conception of Democritus regarding the motions of atoms and the reasons of these motions, not what Democritus really thought about these motions.

For Bacon, Cupid (or the primary matter and its qualities) has no parents; that is, there are no causes for the qualities of matter, and the qualities of matter include the principles of motion and the form of matter. Matter was endowed by God with the principles of motion during creation, and because matter has these principles of motion in itself, it has the ability to move by itself, different from the mechanistic view of matter which is inert, passive, and non-self-determined. Bacon argues that Democritus was one of the above mentioned pre-Socratics who thought ‘matter was active, had some form and imparted its form, and had the principle of motion within itself’. Due to their heaviness, Bacon saw the Democritean idea of the descending motion of atoms as

²² How the identification of atomism with mechanistic view can be misleading, see Berryman (2013).

an intrinsic motion. This intrinsic motion is different from the ascending motion (violent or mechanical motion) of lighter atoms, caused by collision with the heavier ones. Intrinsic motion of the atoms refers to the principles of motion in matter, and this is the reason why I argue that Bacon sees Democritus as a vitalist (or animist) philosopher.

Francis Bacon, Demokritos'u Mekanikçi Bir Filozof Olarak Mı Gördü?

Öz

Robert Kargon, geç dönem Francis Bacon'ın pnömatizmini dirimselcilik olarak yorumladı; bununla birlikte ona göre erken dönem Bacon'ın atomizmi ise mekanik idi. Benzer olarak Graham Rees, pnömatizm ve atomların bağdaşmaz olduklarını, dolayısıyla da erken ve geç dönem Bacon arasında herhangi bir ayrım yapmadan Bacon'ın hiçbir zaman bir atomcu olmadığını ileri sürdü. Hem Kargon'un hem de Rees'in savları atomculuğun mekanist bir dünya görüşünü gerektirdiği şeklindeki yanlış düşünceye dayanmaktadır. Bu yazıda, mekanik felsefe ile atomculuğun genellikle özdeşleştiriliyor olmasına karşın Francis Bacon'ın bir atomcu olan Demokritos'u dirimselci bir filozof olarak gördüğü ileri sürülecek.

Anahtar Kelimeler

Francis Bacon, Demokritos, Dirimselcilik, Mekanik Felsefe.

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