The Mind of the Minimal Bodies, According to Spinoza

Giuseppe Feola
Department of Letters, Arts and Social Sciences
University "G. D'Annunzio" Chieti-Pescara
Via dei Vestini, 66100, Chieti, Italy
Email: giuseppe.feola1@gmail.com

Abstract:

Starting from the well-known parallelism between bodies and minds in Spinoza's ontology, according to which to each body a mind should correspond, and given the supposition – in Spinoza's philosophy of physics – of very simple bodies (the "minimal bodies"), the paper faces the question of which kind of mind Spinoza could have thought these minimal body should have. It finally comes to the conclusion that the mind of the minimal bodies is the perception of the bounces and strokes of such a body against other bodies.

Keywords: Spinoza, mind(s), simple, minimal, body

1. The question

Did Baruch Spinoza, in the philosophy of physics exposed in his *Ethics*, hold atomistic positions? in the axioms 1 and 2 of the part 2 of the *Ethica more geometrico demonstrata*, he proposes the hypothesis that the bodily universe is composed by "absolutely simple bodies" or "most simple bodies" (*corpora simplicissima*) "those which are distinguished from one another solely by motion-and-rest, quickness and slowness".[1]

That Spinoza held atomistic positions is *not* an indisputable claim: the usage of the superlative form of the adjective, either meant in its "relative" meaning ("the most simple bodies among all") or in its "absolute" one ("bodies that are simple at a maximum degree") seems to convoy exactly this idea, that atoms are a reality. But the majority of the interpreters feels that the best way to deal with the doctrine of the "simplest bodies" is trying to reconcile the statement I just quoted with the anti-atomistic stance which is usually ascribed to Spinoza, on the basis of his rejection of atomism in *PPC* 2P 5 *Dem.*[2]

Now, it seems to me that the argument for the rejection of atoms given in *PPC* can just provide a rejection of the impossibility to infinitely divide an abstract extension; this argument turns into a rejection of atomism only if we assume that the physical properties of extension are exactly the same of its geometrical properties, i.e. if we assume that whichever operation we can carry out about its geometrical properties (e.g. an infinite division of its magnitudes) must be possible also about its physical properties: which is something the *PPC* clearly assume, but which is nowhere upheld in the *Ethics*.

In the first part of the paper, in a provisional way, I will take Spinoza's statements in the *Ethics* at their face value: taken in this way, these statements seem to imply an atomistic position. Later on, I will qualify this position, trying to provide an idea which could, perhaps, reconcile the atomistic and the anti-atomistic interpretations.

If we ascribe to Spinoza atomistic positions in physics, a question arises.

Due to the overall mind-body parallelism that Spinoza postulates in this same part 2, some modes of the mental attribute should correspond also to those modes of the Substance's bodily attribute that are the "simple bodies": otherwise said, to each simple body should correspond an idea, which would be the mind of that simple body.

What the mind of such a "simple body" should be? And what could it think?[3]

2. The animation of the atoms: misunderstanding Leucippus and Democritus

Democritus does not endow his atoms with any kind of soul or mind.[4] He has a materialistic theory about mental phenomena: the soul is a particular kind of body, which is composed of atoms that differ from the atoms that compose the visible body – atoms whose *material* and *bodily* properties would explain the properties that *seem* to radically distinguish the soul from the visible body: according to Democritus, the souls of the living bodies differ from their visible bodies not because they are not bodily, but because they have bodily properties that are different from those of the visible bodies; so that people came to believe that they are not bodily (DK68 A1, 84, 16-17 = P6, P10, P15 Laks-Most). Consequently, as Leucippus had already thought (DK67 A30), mental and intellectual acts are conceived as motions of these atoms and therefore as alterations (*heteroiôseis*, ἑτεροιώσεις) that intervene in the particular set of atoms that is the soul.[5]

But we also have testimonies that seem to misunderstand (and sometimes clearly misunderstand) Leucippus' and Democritus' ideas, and state or can be meant as if they stated that the atomists endowed each atom with a soul.

It is interesting to read a sentence by Macrobius (DK68 A103 = Macr. *In Somnium Scipionis* 1.14, 19[6]) that says that, according to Democritus, soul is "spiritum insertum atomis hac facilitate motus ut corpus illi omne sit pervium" ("a spirit internal to the atoms, endowed whit such an easiness of motion that the whole body is accessible to it", trans. of my own). The easiest interpretation is that soul is a material spirit (composed of atoms), whose easiness to motion makes it possible to it to penetrate the whole of the living body, and is therefore "among the atoms" ("internus atomis") of this same living body. But the phrasing "internus atomis" is ambiguous and can be easily misunderstood in the sense that this spirit is "into the atoms", thus giving to ingenuous readers the impression that, according to Macrobius, Democritus stated that atoms, or at least some atoms, have a soul inside of them.

Sometimes the ascription of panpsychism to Democritus is explicit: Aetius says that, according to Democritus, corpses "have some share in heat and sensation"[7] (DK68 A117, 111, 28 = Aetius 4.4, 7 = D140 Laks-Most); Alexander of Aphrodisias is clear-cut, affirming that "corpses

perceive, as Democritus thought" (DK68 A117, 111, 29-30[8] = Alex, *Top.* 21, 21). Aetius even comes to the most general conclusion: "Democritus says that all things have a share in a certain kind of soul" (DK68 A117 = D140 Laks-Most). And Albertus Magnus puts Democritus among those who think that also the elements have a soul.[9] The fact that this kind of soul, in Albertus' opinion, probably had nothing to do with sense-perception or mind or even sensation, can be easily concealed by Alexander's testimony (*loc. cit.*), who explicitly describes this animation of inorganic stuff as a kind of sensation.

We can conclude that, even if Democritus never endowed atoms with a mind, a reader that, in the XVII century, when the ordered collections of fragments and testimonies did not exist, read randomly the scarce sources at his disposal, could have more than one element for the conclusion that Democritus held such a doctrine.

The same cannot be said about Epicurus: Epicurus' position, as described by Lucretius, is unmistakable on this point: atoms are just portions of matter in motion, and soul and mind are just properties of some sets of atoms.[10] Even if atoms are endowed with an inherent, irreducible tendency to swerve (*DRN* 2.216-220), and even if this tendency is (according to Lucretius) the factor that should disrupt all deterministic accounts of the mind, thus allowing some room for the existence of free will (*DRN* 2.251-260; cfr. Purinton 1999, 272-273), this inherent tendency to swerve is not described by Lucretius as a mental property in itself.

3. The transmission of the idea of the animation of the atoms from Democritus to Spinoza: Bruno and his readers in England

What matters for us are not the possible sources of Spinoza's atomism (atomism had many upholders at the beginning of modern age); what we are interested in, are the sources that could have been the trait-d'union for the transmission of the far more specific and peculiar idea that atoms have a soul and a mind.

A name we can easily think about is Bruno, whose pantheism and panpsychism, coupled with an atomistic vision of physical reality, could well bring to the idea that atoms can be ensouled. But the idea of the animation of the atoms in the early modern age had more than just one upholder (two names can be mentioned as instances of this position: Daniel Sennert[11] and Nicholas Hill[12]), and Spinoza could have been inspired from any one of them. As far as Bruno himself is concerned, he had proposed, in the *De minimo*, the coexistence of a corpuscular material reality and of a world-soul; according to him, every particle of matter is ensouled by the world-soul: otherwise said, he did not endow each atom with its own soul; rather, he stated that each material atom is "connected" to the world-soul[13].

The idea that Spinoza could have read one of the sources about Democritus that we saw before, getting some inspiration from them, and the idea that he could have been touched by the diffusion of Bruno's ideas, can be meant as alternative options as well as complementary ones.

4. The animation of atoms in Spinoza's library

As it is obvious, the presence of an author in another author's library is not a proof of the fact that the second author read the first one; the absence of a book from the same library is not a proof of the fact that the owner of the library could not have read the book by borrowing it from another library; most of all, this absence does not prove that the second author could not have heard about the ideas of the first author. But the presence or absence of a book in the library of the second author, with or without the proof that the book had been read, is anyway significant. Never Spinoza quotes Bruno.[14]

We have the catalogue of Spinoza's library:[15] in this catalogue there is no trace of Bruno. Is the absence of books by Bruno in Spinoza's library due to Schuller's move of removing some books from the stock, just after Spinoza's death?[16] We cannot say.

If we now turn to ancient atomism, we can see that in Spinoza's library there is a book by Aristotle, classified as "Aristoteles, 1548 vol. 2" (Offenberg 1973, 318); this book was traditionally identified with the 1548 Latin translation of the *Politics* by Juan Ginés de Sepúlveda;[17] since Aristotle never speaks about atomism in the *Politics*, and since Sepúlveda translated also the *De anima*, but this translation was not published in 1548, we should have concluded that Spinoza had no text by Aristotle in which Aristotle discussed atomism. But Aristotle's book in Spinoza's library has now been identified with Aristotle's *Opera Omnia* published at Basel by Johannes Oporinus[18], and it is now clear that Spinoza had the whole *corpus* of Aristotle in Latin translation at hand.

Regarding Macrobius and Aetius, who, as far as we know, are the only sources that could have suggested the possibility that Democritus had held the theory of the animation of the atoms, there is no trace of them in Spinoza's library. And, after all, if Spinoza read Aristotle's account of Democritus' physic, he could clearly realize that Democritus and Leucippus denied animation to atoms.

In the end, we must admit that we cannot be sure that Spinoza had any *direct* knowledge of authors that had held the animation of the atoms. The only thing we can postulate, are the (remote) possibility that members of Hill's entourage had diffused the ideas of Bruno in the Netherland, and the possibility that Spinoza had had some works by Bruno at hand during his life, that were removed from his library by his friends just after his death.

But it is surely open the possibility that Spinoza had got some ideas about the possibility of conjoining the theory of universal animation with atomistic physical theory from what he could read in Aristotle about Plato's *Timeus*. Moreover, it is very interesting to find in the catalogue of Spinoza's library the entry "Salustius" (Pozzi 2015, 200); we cannot know if this "Salustius" was the Roman historian of the I century BC or the Neoplatonic philosopher of the IV century AD, the author of the treatise *De diis et mundo*: if this would be the case, we can surely notice that the Neoplatonic Salustius speaks about the animation of matter at chapter 7.6 of his treatise (Salustio, 2000).

Let us now go directly to Spinoza's doctrine about the simplest bodies.

5. Some ontological issues about the simplest bodies

Prop. 1.12 of the *Ethics* states that no attribute of the Substance can imply that the

Substance is divisible;[19] this statement is repeated in 1.13.[20] The scholium to prop. 15 states that the infinite Substance that is God is truly conceived as undivided and indivisible by the intellect, and that also its attribute "extension" is undivided and indivisible, but our imagination can divide extension in parts to facilitate our cognitive grasp of it (Spinoza 1925, II, 38, 5-12). Can we assume, therefore, that the simplest bodies are (just as whichever other way of dividing the Substance) just a fiction that imagination builds to facilitate our grasp of the attribute "extension"?

Not necessarily.

Spinoza does not believe in the existence of void. So, the whole extension is for him an infinite whole without gaps:[21] and this is what Spinoza means when he affirms that the extension of the Substance is indivisible. But this fact does not deny that in such a continuum could be in principle anyway possible to find parts, that would be defined by their distinctive patterns of motion,[22] and parts of parts, till we come to the minimal parts (also these, in their turn, defined by their patterns of motion), that are the simplest bodies.[23]

And here we come to the main question: which kind of simplicity we are dealing here with? If extension is continuous, what prevents these "simplest bodies" from being divisible? If we accept that the criterion for the identity and unity of a body is the fact that its motion should be described as a unitary motion, the best interpretation is probably the one which sees the simplest bodies as bodies whose motion is simple: minimal bodies should be conceived as bodies whose distinctive feature is the absolute simplicity of their motion, without any other hypothesis about their other features

We thus come to a conclusion very close to that of Adler: simple bodies are simple "not in the sense of "indivisible bodies" but rather as "unanalysable bodies" – that is, bodies that are conceptually simple" (Adler 1996, 255);[24] *prima facie*, this interpretation seems perfect, since it reconciles the apparent atomism of this part of the *Ethica* with the general ascription of a belief in continuity of body to Spinoza. Later on, Adler specifies the claim, saying that the condition for being a simple body, in Spinoza's thought, is that "there is no physical object that can be described in fewer terms" (Adler 1996, 262). Adler denies that Spinoza's simplest bodies should be conceived as atoms, since atoms are indivisible, while Spinoza's simplest bodies (in Adler interpretation) are divisible, but they are not divisible into bodies whose patterns of motion are simpler than the pattern of motion of the body we have divided: rather, the new patterns of motion will be identical to the original one.[25] On this point, I cannot agree with Adler, since the whole idea seems utterly contradictory: I cannot conceive how, if we split one single simplest body, the two bodies we obtain (which should differ in their motion, if they have to be two) can have a motion which is identical to the original one: two motions that are both identical to a third one must also be identical to each other.

Finally, I cannot see how axiom 2 of part 2,[26] with its tentative reduction of the interactions among bodies to "strokes" and "bounces", very close to ancient descriptions of the strokes among atoms (e.g. in Lucretius' poem), could be reconciled with a theory of matter as continuous. If

Spinoza held that body is continuous, why he describes it in terms that, in the minds of the readers of his time, clearly raised, if conjoined to the mention of "simplest body", Lucretian soundings?

The idea I maintain is that simplest bodies are, according to Spinoza, the bodies whose motion is simplest; but I think it should be added that this definition necessarily entails that such bodies must also be indivisible.

All in all, it seems that, at least in this point of the *Ethica*, Spinoza really held that extension is composed by unanalysable and indivisible bodies. The point on which Spinoza greatly departs from classical Atomism is the fact that these bodies are not defined in terms of size or shape, but in terms of patterns of motion.[27]

Notice that this solution could well bring with itself a powerful source of doubt: could the minimal bodies be conceived as bodies without any extension, in the same way as the geometrical point can compose a line or a surface or a volume without having themselves any extension? (We are, after all, here, in the age of the discovery of the infinitesimal in mathematics.) This solution would resolve a lot of exegetical enigmas:[28] but it seems (at least to me) really too audacious to be upheld here.

What I maintain is just that Spinoza conceived the minimal bodies as bodies whose motions are indivisible and unanalysable, without any other adjunctive hypothesis about their eventual other features, save the consequences of this definition (*Eth.* 2.13, scholium, Spinoza (1925), II, 124, 21).

6. The dependence of the simple bodies on God

As is well known, according to Spinoza, all particular items are modes of the divine attributes (*Eth.* pars 1, def. 5 and prop. 15-16 and 28 with demonstration and scholium): the simple bodies must be conceived as modes of the attribute "extension" and their minds as modes of the attribute "thought". Notwithstanding our hesitation to credit Spinoza with the idea that simple body have minds, it seems to me that Spinoza's overall mind-body parallelism, if taken seriously, inescapably brings to this conclusion. We could avoid this conclusion only if we had evidence that Spinoza did not took the mind-body parallelism as a universally valid fundamental point of his own philosophy.

What Spinoza says about the general dependence of the particulars on God will automatically hold also for simple bodies, and it is worth remembering it here.[29]

Particulars have essences that do not imply existence: the only thing whose essence implies existence, and which exists only in virtue of its own nature, is divine Substance (*Eth.* 1.24). Particulars exist until their existence is implied by the Substance (*ibid.*). Moreover, God is the cause of the essences of the particulars as far as the particulars are modes of the divine Substance (*Eth.* 1.25). The Substance's Self-causation coincides with the Substance's causation of the particulars (1.25, scholium). The conclusion is set in the corollary to prop. 1.25: particulars are affections of God's attributes, and modes of these same attributes.

Each one of God's attributes expresses itself in an infinite and uninterrupted chain of causes that necessarily links the particulars, i.e. the single modes, to each other (props. 1.28-29 and 33).

7. The mind-body relation: resume

A single item, as a body or a mind is, according to Spinoza, a single determination (a single mode or a single set of modes) of the attribute "extension", i.e. a single determination of God as an extended thing (*Eth.* 2, def. 1). Bodies and minds have duration: once they have begun to exist, they indefinitely continue to exist, until some external causes eliminate their existence (2, def. 5: Spinoza 1925, II, 100, 8-13). The single finite modes or the single finite sets of modes that have a determinate existence are called "single items" (i.e. particulars or individuals) and they are the objects we experience in our everyday life, e.g. my table, the dog which is now barking in my courtyard, myself. Many individuals that concur in performing a single action are considered, in the measure in which they concur to that act, as parts of one single thing (2, def. 7: Spinoza 1925, II, 100, 15-17).

Since thought and extension are essential attributes of God (2, props. 1-2: God is a thinking thing and God is an extended thing), each single mode of the Substance and each single set of modes of the Substance will always participate both in the attribute "extension" and in the attribute "thought". Among the attribute "thought" and the attribute "extension" there is a complete parallelism: to each mode of extension always corresponds a mode of thought which is the idea of that mode of extension, and the causal order among the single modes of extension is perfectly mirrored by the order among the corresponding ideas (2, prop. 7: Spinoza 1925, II, 108, 22). This happens because, exactly as thought and extension cannot exist as independent items, but only as attributes of God (i.e. as God considered in one way or in the other), so the single particular things that are in God have a mental side and an extended side, while always remaining the same identical single things (2, prop. 7, scholium).

8. The relation among thought and extension in the case of simple bodies. The mind of the simplest body

Here we come to our main point: given this resume about the thought-extension relation in general,[30] what should we think about the thought-extension relation in the case of simple bodies? Prop. 2.11 states that the mind of a man is the idea of the body of that man in God, i.e. the idea that God has of that part of Itself which is the body of that man.

In scholium to prop. 13, Spinoza extends this conception to *all* bodies:

> Nam ea, quae hucusque ostendimus, admodum communia sunt nec magis ad homines quam ad reliqua individua pertinent, quae omnia, quamvis diversis gradibus, animata tamen sunt. Nam cujuscunque rei datur necessario in Deo idea etc. (*Eth.* 2.13, scholium, Spinoza (1925), II, 124, 21 – p. 126, 3).

> For what we have so far demonstrated is of quite general application, and applies to men no more than to other individuals, which are all animate, albeit in different degrees. For there is necessarily in God an idea of each thing whatever etc.

All things, in different degrees, are animated; all bodies have a mind. Therefore, also simple bodies must have their minds. The mind of a simple body will be the idea of that body in God. Let us ask themselves: which is Spinoza's characterization of the simplest bodies?

The lemma 1 to axiom 2 of the part 2 affirms that bodies differ among them on account of motion and stillness, speed and slowness (Spinoza 1925, 128, 1-2). Simple bodies are specifically those bodies in which this characterization is most immediate: they differ among them *only* on account of their motion and stillness, speed and slowness.[31] Does this mean that they cannot differ by size, weight and shape? In this case, since composed bodies can clearly differ by size, weight and shape we have the proof that by "simple bodies" we must mean uncomposed bodies, (cfr. part 3, props. 6-7) – of whichever kind they could be. Their *conatus*, i.e. their momentum to perpetuate their existences, which constitutes their essence, will therefore be completely described in terms of motion and stillness, speed and slowness. Such bodies switch from stillness to motion, from motion to stillness, from one kind of motion to another, because they have been struck by other bodies, that were in motion, and which had been struck in their turn by still other bodies, *et sic in infinitum* (part 2, axiom 2 of the second set of axioms, lemma 3, plus axiom 2 of the third set of axioms). This model, which is clearly conceived to describe a physical world made up by rigid and discrete bodies in rectilinear movement, that bump among them and bounce, will apply in the most straightforward way to simple bodies.[32]

The idea in God of some single simple body, i.e. the mind of that simple body, will be God's perception (which must obviously be adequate) of what characterizes that body, i.e. of its motion. Spinoza is very careful in telling us that the mind of a body (*alias* the idea that God has of that body) not necessarily coincides with the actual cognition that that mind has of its own body; if the two things would always coincide, each mind should always have an adequate cognition of its own body, as God has. What happens, instead, is that the mind of that body knows its own body, and notices its existence, in an inadequate manner: only by noticing the affections of the body, i.e. only by noticing its interaction with other bodies.[33]

If, then, the simple bodies are characterized only by motion and stillness, speed and slowness, and their interactions with other bodies are just the strokes that cause the changes of their motions, what we must conclude is that the only items that the (obviously simple) mind of the simple body perceives are the strokes with other bodies.

9. Paralipomena

If my hypotheses are right, the simplest cognitive acts in Spinoza's system (the cognitive acts of simple bodies) have intentional objects that are radically different from the cognitive acts that all previous theories of knowledge postulated to be the simplest ones. For Plato, Aristotle, Middle-Ages Scholasticism, the simplest sense-perceptions have as their objects the *qualia* of the five senses.[34] According to Aristotle, and to the whole Aristotelean tradition, the sense-perception

of movement is a derived and elaborated kind of sense-perception, whose relation to the simple *qualia* of the five senses is object of detailed analyses.[35]

In the case of Spinoza, instead, it seems that we must conclude that the exercise of sense-perception which is most simple in nature is the sense-perception of a strike, i.e. of a movement of a body against another body: a position that, as far as I know, has no match in previous scientific or philosophical theories. This is a very good example of how Spinoza, by apparently borrowing main theoretical elements of the previous thinkers, subverts them, by inserting them in his own system – an insertion which leads to an overall reinterpretation.

Endnotes:

1. "Quae scilicet solo motu et quiete, celeritate et tarditate ab invicem distinguuntur", (Spinoza 1925, 132, 2-3). Unless otherwise stated, all translations of passages by Spinoza are drawn from Spinoza (2002). In part II of the *Ethica* there are three couples of axioms 1-2: I refer here to the third couple.
2. "Propositio V. *Nullae dantur Atomi.* Demostratio. Atomi sunt partes materiae indivisibiles ex suâ naturâ (per Def. 3.): sed cùm natura materiae consistat in extensione (per Prop. 2. hujus), quae naturâ suâ, quantumvis parva, est divisibilis (per Ax. 9. & Def. 7), ergo pars materiae, quantumvis parva, naturâ suâ est divisibilis, h.e. nullae dantur Atomi, sive partes materiae naturâ suâ indivisibiles, q.e.d." "Proposition V. *There is no place for the atoms*. Demonstration. Atoms are parts of matter that are indivisible by their own nature (Def. 3): but, given that the nature of matter consists in extension (Prop. 2 of this part), which, by its own nature, is divisible at whichever level of quantity (Ax. 9 and Def. 7), then whichever part of matter, however small, is divisible by its own nature. So, in no place there are atoms, i.e. parts of matter that are indivisible by thier own nature" (trans. of my own). On Spinoza's early rejection of atomism, cfr. Rice (1971). At pp. 647-648 Rice provides an account of the simple bodies that tries to reconcile infinite divisibility of matter with the assumption of simple bodies: "What then are the corpora simplicissima if not atoms? It seems to me that Spinoza merely intends this term to refer to bodies with a sufficiently small quantity of motion and rest to be distinguishable from composite bodies. This means that the corpora simplicissima are divisible, and it also makes the distinction between complex and simple bodies one which is relative to the purposes at hand: what counts as a simple body might not so count in every conceivable situation". I will return on this point later.
3. Notice that a correspondent (although very different) problem would also arise if we ascribe to Spinoza the idea of continuous divisibility of matter. The question is thus equally interesting also if we do not assume that Spinoza, in physics, was an atomist.
4. According to a critical *vulgata* created by Aristotle (*de An.* 1.2, 404a27 ff.), the philosophers we call "Pre-Socratics" (among which is arbitrarily included Democritus) did not distinguish among the soul conceived as life-principle and the soul as cognitive principle, and conflated the two: according to the Pre-Socratics (Democritus included), to have a soul (according to this *vulgata*) would be to have a principle of cognition and intentional motion, which is what nowadays we call a "mind". Save for some exceptions (e.g. the Milesians and the Orphics), I think that this characterization of the Pre-Socratic psychologies, albeit extremely vague, grasps an important point, and I think that it is particularly fit for Democritus: this is the reason why, when I will speak about Democritus, I will take for granted that "soul", in his doctrine, is synonymous to what we use to call "mind".
5. Cfr. DK67 A28, *passim* = D132, D136 Laks-Most (pp. 193-194) = Arist. *De an.* 1.2, 404a1 ff. and 405a5 ff. (the soul is composed of fiery atoms); DK 68 A106, p. 110, ll. 4-5 = Arist. *Resp.* 4, 472a3-4

(*idem*) = R29a-b Laks-Most; DK A108 = Lucr. *De re. na.* 3.370-373 = R91 Laks-Most (the atoms of the soul are into the visible body, juxtaposed to the visible body's atoms).

6. I could find no match, for this DK testimony, in Laks-Most (2016).
7. Transl. by Laks-Most (2016).
8. Transl. of my own. The Laks-Most edition preserves only the first part of DK68 A117, which is a testimony by Aetius: they eliminate the second part, by Alexander, which contains our passage.
9. DK68 A164 = Albert. Magn. *De lapid.* 1.1, 4 (no match in Laks-Most (2016)): "D. autem et quidam alii elementa tum dicunt habere animas et ipsas esse causas generationis lapidum, propter quod dicit animam esse in lapide sicut in quolibet alio semine generandae rei" ("Democritus and some other thinkers say that also the elements have souls, and that these souls are the causes of the generation of minerals; and on this account he says that soul is in the stone as in whatever other seed of the things that are generated", trans. of my own). We can notice that "elementa" is here ambiguous, and can refer both to Aristotle's simple bodies (whose existence was postulated by the scholastic philosophy of Albertus' time) and to Democritus' atoms.
10. There is debate about the nature of the relationship of mental properties to material properties in Epicurus' theory. O'Keefe (2002, 160) argues (in a convincing manner, it seems to me) in favour of the reductionist account: "the mind is a real thing, but it is nothing above and beyond the atoms that constitute it". See also T. O'Keefe (2005, 73).
11. Daniel Sennert (1572-1637), professor in medicine at the University of Heidelberg. On his works, cfr. Hirai, 2012.
12. "A scholar in St. John's College, Oxford, he took his degree in Arts in 1592" (Massa, 1977, 227).
13. On Bruno's atomism, cfr. Banchetti-Robino (2018).
14. Levy affirms that the resemblance between the two pantheisms can be explained only by postulating that Spinoza had read Bruno ("L'influence de G. Bruno sur Spinoza est une conjecture, bien sûr, mais d'un très haut degré de probabilité. Elle dérive tout d'abord de la ressemblance théorique concernant le panthéisme. Mais nulle part Spinoza ne mentionne Bruno, ni dans ses livres ni dans ses lettres", 1987, 68). In order to get an idea of the degree of arbitrariness of this kind of assessments about the reciprocal resemblances of two systems, in the cases in which we lack both testimonies about their reciprocal influx and a detailed analysis of the technicalities these systems do or do not share, it will suffice to see that another scholar, Pearson, speaking about the same data at Levy's disposal, classify them as just a sign of a "superficial resemblance between Giordano Bruno and Spinoza" (1883, 342).
15. Offenberg, (1973, 309-321), Pozzi (2015).
16. According to Pozzi 2015, 147, Spinoza's friend Schuller removed some books from the stock, right after the death of the philosopher. If this move was dictated by prudence, it is possible that, among the books that Schuller had to take away, there could be also titles by Bruno.
17. *Aristotelis de Republica libri VIII. Interprete & enarratore Io. Genesio Sepulueda Cordubensi. Ad Philippum Hispaniarum Principem*: cfr. Green 1940, 339-342.
18. Cfr. Pozzi, 2015, 163. Manzini (2009, 9-12) too identifies this book with the complete works of Aristotle. Manzini's identification of the specific edition of Aristotle that Spinoza had in his possession is grounded on an *erratum* in a quote of Aristotle by Spinoza, that can be explained only if we assume that Spinoza was reading that specific edition of Aristotle, in which this *erratum* occurred.
19. "No atribute of substance can be truly conceived from which it would follow that substance can be divided" ("Nullum substantiae attributum potest vere concipi, ex quo sequatur substantiam posse dividi").
20. "Absolutely infinite substance is indivisible" ("Substantia absolute infinita est indivisibilis").
21. "Since therefore there is no vacum in Nature (of which more elsewhere) and all its parts must so harmonize that there is no vacuum, it also follows that the parts cannot be distinct in reality; that is, corporeal substance, insofar as it is substance, cannot be divided" ("Cum igitur vacuum in natura non

detur (de quo alias), sed omnes partes ita concurrere debent, ne detur vacuum, sequitur hinc etiam easdem non posse realiter dinstingui, hoc est substantiam corpoream, quatenus substantia est, non posse dividi" (Spinoza 1925, II, 38, 2-5).

22. Many individuals that concur in performing a single action are considered as parts of one single thing (Spinoza 1925, II, def. 7). This single point had already found an upholder in Adler (1996, 255): "the *ratio motus and quietis* is not to be understood as a quantitative ratio. Rather, the word 'ratio' is best translated here as 'pattern' or 'configuration'".
23. On some interesting issues that can be raised about the relevance of Spinoza's concept of "pattern of motion", cfr. Lachtermann (1977).
24. Adler's position seems to be the same as Rice's (1971).
25. Thus interpreted, Spinoza's concept of "simplest body" turns out to be very similar to Aristotle's notion of "physical element" (cfr. Arist. *Metaph* 5.3, 1014a26-34, a passage Adler explicitly quotes: 1996, 263). The resemblance must be obviously meant as significative only at a very abstract level, since the kind of simplicity Aristotle and Spinoza endow their respective simple bodies with are very different from each other.
26. "When a moving body collides with a body at rest and is unable to cause it to move, it is reflected so as to continue its motion, and the angle between the line of motion of the reflection and the plane of the body at rest with which it has collided is equal to the angle between the line of incidence of motion and the said plane. So far we have been discussing the simplest bodies, those which are distinguished from one another solely by motion-and-rest, quickness and slowness" ("Cum corpus motum alteri quiescenti, quod dimovere nequit, impingit, *reflectitur*, ut moveri pergat, *et angulus lineae motus reflectionis cum plano corporis quiescentis*, cui impegit, aequalis erit angulo, quem *linea motus incidentiae* cum eodem plano efficit. Atque haec de corporibus simplicissimis, quae scilicet solo motu et quiete, celeritate et tarditate ab invicem distinguuntur", Spinoza (1925, II, 130, l. 19 – 132, l. 3, italics of my own).
27. The great accomplishment of Laveran (2015), in my opinion, has been the construal of a sound argument against an interpretation of Spinoza's minimal bodies in terms of an atomism where atoms are defined in terms of indivisibility of matter, of body or of extension; this is the kind of atomism Spinoza explicitly rejects in *PPC* 2P 5 *Dem.* (*loc. cit.*) and still rejects in the *Ethica*, a fact which explains why he never calls "atoms" the minimal bodies: any usage of the word "atom" would have convoyed the undesired suggestion that minimal bodies should be conceived as Democritus and Epicurus did.
28. Among the other difficulties, it would also resolve the difficulty about why Spinoza never mentions weight, shape, or size among the features of the simple bodies: cfr. Spinoza 1925, II, 132, 2-3.
29. "That which constitutes the actual being of the human mind is basically nothing else but the idea of an individual actually existing being" ("quod actuale mentis humanae esse constituit, nihil aliud est quam idea rei alicujus singularis actu existentis", Spinoza 1925, II, 120, 7-8); now, which is the actually existing thing whose idea constitutes the human mind? It is human body: cfr. prop. 12 and expecially prop. 13: 'The object of the idea constituting the human mind is the body' ("Objectum ideae humanam mentem constituentis est corpus", 124, l. 3).
30. I assume that the topic of thought-extension relation in Spinoza is a too wide and too much debated topic to be discussed here.
31. Cfr. the sentence (which I already mentioned in n. 1) "which are distinguished from one another solely by motion-and-rest, quickness and slowness" ("corporibus simplicissimis, *quae scilicet solo* motu et quiete, celeritate et tarditate ab invicem distinguuntur", II, 132, 2-3, italics of my own), which seems to be meant as a definition: while for other bodies, whose complex structure allows the insurgence of many other properties, also other ways of characterization are possible, in the case of simple bodies the only distinctive properties are motion and stillness, speed and slowness.
32. It seems to me that the model Spinoza had in mind was that of the uniform rectilinear movement. Messeri (1984, 776) suggests that each simple body could be characterized by its own determinate

pattern of vibratory motion, and that Spinoza could have chosen the pendulum-model due to its interest in Huygens physic. But Messeri (1984, 777) is ready to underline that an oscillatory motion cannot be simple (it is always the product of at least two forces) and that both Huygens and Spinoza knew it. Messeri's conclusion is therefore aporetic.

33. This is explicitly said about human mind in prop. 2.19 (cfr. the demonstration, too).
34. As far as Plato is concerned, cfr. *Tht.* 184c-185e; for Aristotle, cfr. *de An.* 2.6-12.
35. Cfr. *de sensu et sensibilibus* 6-7. On this Aristotelean doctrine, cfr. Block (1988), Brunschwig (1991), Brunschwig (1996), Frede (1992), Modrak (1981).

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