

**“I may tell you, between ourselves, that these six meditations contain the entire foundations for my physics.” (DESCARTES to Mersenne).
What has Descartes in mind?¹**

[Start of excerpted material:]²

What we have so far gleaned from the Cartesian texts yields an outline picture of Descartes’ intent in his 1641 letter to Mersenne. He at times says that the *Meditations* contain the ‘foundations’ of his physics,³ at times the ‘principles’.⁴ On textual grounds, I have argued the following:

‘Foundations’ refers only to first epistemic principles (which, confusingly for us, he calls ‘metaphysical principles’): the cogito, the existence of a non-deceiving God, and the principle that whatever one clearly and distinctly perceives is true.

‘Principles’ are hierarchically ordered. They may be first principles, as described above (principles¹). Or they may have merely relative epistemic priority within a given discipline, such as the primary axioms⁵ of physics (principles²).

In saying the *Meditations* contain the principles of his physics, Descartes primarily has in mind principles¹.

In sum: the *Meditations* contain {the foundations, or principles, of Descartes’ physics} in so far as they contain {the foundations of knowledge}, which latter are both necessary, and with suitable supplementation sufficient, to prove the former.

If, on the contrary, all Cartesian principles are equally foundations, then Descartes’ intent may simply be that arguments sufficient to establish his physical principles are found in the *Meditations*; not that the epistemological doctrines of the *Meditations* serve as essential premises in that demonstration. This alternative interpretation in effect posits a different ambiguity from the one I have identified: one, not in the term ‘principle’, but in ‘metaphysics’, and it is between (i) metaphysics as the quest for certainty and (ii) metaphysics as rational argumentation about the fundamental constituents of reality.⁶ And there is some evidence for this ambiguity:⁷ despite the whole *Meditations* being qualified by Descartes as ‘metaphysical’,⁸ he decides against naming them so, on the basis that the term refers properly to discussion of God and the soul.⁹

¹ **What follows is an excerpt starting in the middle of my full paper on this topic. Word count: 1977 words.**

² **Prior to this:** I discuss the question’s treatment in the secondary literature, noting the general lack of close textual analysis to establish Cartesian referents for our key terms; I analyse seven different Cartesian texts, including parallel passages where ‘foundations’ appear to be identified with ‘principles’; and I thereby establish definitions for these two terms and a better understanding of how they relate to each other.

³ To Mersenne, 28 January 1641; CSMK: 172-3.

⁴ To Mersenne, 11 November 1640; CSMK: 156-7.

⁵ Whilst modern physicists would prefer the empirical and tentative language of postulates and generalisations, or the more epistemically source-neutral language of laws, by Descartes - as I have argued - these fundamentals were often conceived as deductive consequences of our most fundamental instances of knowledge.

⁶ On this reading, the primary principles of physics, as well as the general epistemological foundations of all disciplines, may be termed ‘metaphysical principles’.

⁷ As noted in Nolan (2016), 498-506.

⁸ To Mersenne, 11 November 1640; CSMK: 157.

⁹ AT III 235; CSMK, 157.

With that observation, and a choice of interpretive frameworks in place, we may turn to examine more precisely which parts of the *Meditations* ground the principles of the physics. Before we proceed, here is an outline of those principles, so we know *what* Descartes seeks to show, before we determine *how* he shows it.

(i) The doctrine of matter

Extension - having length, breadth, and depth - is the essence/nature/form of body/matter.¹⁰ Specific shapes and sizes are not part of the essence of body for, while all bodies must have these, there is no particular shape or size that being a body requires.¹¹ This rules out, for example, bodies instantiating substantial forms (which Descartes conceives as a putative variety of non-material substance that nonetheless can exist only conjoined to a material one).¹²

(ii) The doctrine of motion

The physical world is made up of a single extended substance occupying space indefinitely. How to explain the variety in the physical universe? “All the variety in matter, all the diversity of its forms, depends on motion”.¹³

(iii) The doctrine of physical explanation

Building on (i) and (ii), Descartes is a mechanist: all physical explanation can, and must, proceed in terms of the motion of geometrical matter; that is, by appeal to the different variations that extension can undergo in terms of size, shape, position, and motion; non-extensive properties are excluded.¹⁴

I now turn to examining a concrete proposal in the secondary literature about how the *Meditations* ground the physics, according to which they do so through an argument which requires no special help from Descartes’ epistemology. Such an interpretation is at odds with what we would expect if the textual exegesis I have argued for is correct and therefore requires consideration.

Meditation II: ‘The wax argument’

Despite its being seen as “obscure and troubling” and “famous but confusing”,¹⁵ the wax passage of the Second Meditation is often thought to play a central, and sometimes the only, part in the *Meditations’* grounding of Descartes’ physics.

Bennett, for example, advances the wax passage alone as the answer to his question, “How did Descartes argue that extension is the whole essence of matter?”. He is in good, scholarly, company; Garber has essentially the same attitude to the passage.¹⁶ Both treat it as a

¹⁰ CSM I: 92, 210; CSMK: 189.

¹¹ CSMK: 280. Still, such specific attributes *are* genuine properties of matter, as they can be “referred” to its “principal attribute”, extension; that is, they are all *ways of being extended*, or, as Descartes calls them, modes (see CSM I: 210-11).

¹² AT II: 364, 367. More will be said on the nature of substantial forms below, but for now we may adopt this rather abstract characterisation.

¹³ CSM I: 232. As for the cause of this motion, it is first and foremost God, and secondarily, certain laws of nature, of which three are primary: a law of inertia, a law of rectilinear motion, and a law of impact (CSM I, 233 and 240-2).

¹⁴ CSM I: 247.

¹⁵ Respectively: Wilson (1978): 77; Ayers (1993), vol. 2: 27.

¹⁶ Bennett (2001): 28-9; Garber (1992): 77-80.

metaphysical argument from premises that do not depend on any distinctively Cartesian foundation, to a conclusion that consists in establishing the doctrine of matter.

That argument is something like the following (Descartes' text is provided in the footnotes to facilitate comparison):

Take a piece of wax to stand, for the purposes of the argument, as representative of body or matter in general.¹⁷

It will display a number of qualities that can be sensed, such as smell, taste, colour, and hardness.¹⁸

Yet it can lose all of these and remain a body.¹⁹

From which it follows that none of the sensory properties is essential to the wax and only that which remains constitutes the true nature of the wax, namely extension.²⁰

Here, more precisely, is what I think is being suggested by this interpretation:

- a) Something is an essential property of matter just in case no matter can lose it and still remain matter
{This is a particularisation of: **F** is an essential property of (a kind) **k** iff (for all **x**) (if **x** is a member of **k**, then **x** can at no time lose **F** and still remain a member of **k**)}
- b) Being heavy, hard, coloured, sound-making, hot, cold etc., are all such that matter can lose those properties and still remain the same kind of thing
- c) Being extended is the one property of matter which it can at no time lose and still remain matter
- d) Therefore, being heavy, hard etc. do not belong to the essence of matter; extension and only extension does.

Evaluation

The argument, as I've reconstructed it, is valid. The interesting questions are whether it is sound (which will depend on whether the premises have been shown to be true) and whether it is useful (in the sense of establishing the conclusions Descartes needs).

Soundness

Here, it is premise b) that is most evidently problematic. The argument relies on taking geometrical properties generically (to secure premise c), but sensory properties specifically (to secure premise b). All it establishes is that, for any given colour, matter can be without

¹⁷ "Let us consider the things which people commonly think they understand most distinctly of all; that is, the bodies which we touch and see... Let us take, for example, this piece of wax..."

¹⁸ "It has... the taste of honey... the scent of the flowers... its colour, shape and size are plain to see; it is hard, cold and... makes a sound."

¹⁹ "I put the wax by the fire, and look: the residual taste is eliminated, the smell goes away, the colour changes, the shape is lost, the size increases; it becomes liquid and hot and... yet the wax remains."

²⁰ "Let us concentrate, take away everything which does not belong to the wax, and see what is left: merely something extended, flexible and changeable." All quotations from: CSM II: 20.

that colour, not that it can be without *some* colour or other. Again, for any given size, matter as such can be without that size; yet, as Descartes himself accepts, it doesn't follow from this that something can exist as matter without instantiating some size or other.

Usefulness

What does the elimination argument (as I will now call it), even if assumed sound, establish? There are two reasons for saying 'not enough', the first more easily addressable than the second.

Let us accept that extension and only extension is the essence of matter, so that the doctrine of matter is perhaps established. Why should only the essence of matter, understood as the set of universally permanent properties, enter into scientific explanations? Take boiling water. Isn't a non-essential property on these terms, like *the fact that it is boiling*, explanatory of much of its behaviour?²¹

This objection is arguably surmountable by insisting on the fundamentality of any putative explanatory properties, such that they themselves do not stand in need of scientific explanation. What, after all, does it *mean* to say something is boiling, in so far as this state of affairs is capable of having broad explanatory significance within a relatively complete science? The answer cannot consist in some subset of typical superficial appearances (bubbling, hissing and the like) but must be given in the broadest possible physical terms, in terms of a certain arrangement of universally permanent properties of physical things; that is, in terms of essential properties in precisely the sense that the elimination argument trades on. And this assumption requires no knowledge of how any science in fact proceeds; the intuitive principle that we should explain what changes by what is permanent suffices.

Let us concede that properties such as colours, sounds, weights etc. are not admissible into scientific explanation without being reducible to permanent properties of extension. The second and major problem with the elimination argument remains: even given the intuitive appeal to a certain kind of reductionism, that ontological criterion is too weak for Descartes' purposes, because it doesn't rule out substantial forms.

Earlier, we gave only the roughest Cartesian characterisation of these scholastic entities. Here is more detail, from a scholastic source:

"Natural things are not composed of matter alone... There are individual and particular behaviours appropriate to each individual natural thing, as reasoning is to a human being, neighing to a horse, heating to fire, and so on. But these behaviours do not arise from matter which... has no power to being anything about. Thus, they must arise from the substantial form."²²

Substantial forms were natural powers - 'principles of motion' - which determined the characteristic modes of activity of a kind, and were introduced because it was thought that bare unformed matter lacked the causal efficacy necessary for explanatory primacy.²³

²¹ Cottingham (1986), ch. 4, makes this kind of objection: "the permanence requirement is not enough for Descartes to disdain 'sensible' properties... Being hard at 10 degrees Celsius seems a permanent property of wax. It seems that if we are careful enough to specify background conditions, then sensible qualities may appear in the specification of permanent properties."

²² The Coimbra Commentary on Aristotle's Physics in Gilson (1979), section 209.

²³ See Hatfield, in Holland (1985).

And herein lies the problem for Descartes. Who is to say that there aren't lower-level essential properties, properties which *are* permanent for members of a genus (or species), but a less universal one than matter? While the appeal to reductionism may facilitate the move from establishing the doctrine of matter to establishing the doctrine of explanation *within the kind matter*, it cannot show that the kind has any members in the actual world. For the scholastics it doesn't - there's no such thing as bare matter, rather matter is always 'conjoined' to a substantial form, and which form it is conjoined to determines what kind of thing there is. Holding this is entirely consistent with holding that impermanent properties of a kind must be explained and therefore reduced to permanent properties of that kind.

So, the elimination argument on its own establishes only an existentially inconsequential form of the doctrine of matter, and can't establish the doctrine of explanation at all. Descartes needs some supplementary argumentation specifically directed against substantial forms. In the secondary literature, two such arguments have been identified.

The first is **the parsimony argument**, that we do not *need* substantial forms for successful scientific explanation;²⁴ a reasonable argumentative strategy if it works, and an essentially metaphysical one, depending on no distinctively Cartesian view about knowledge, certainty etc. Yet, if this *is* the argument against substantial forms, then Descartes' claim that he has proven his metaphysics with as much or more certainty than geometry won't be true with respect to the (negative) doctrine of matter.²⁵ And if, as seems plausible, this supremely certain metaphysics is the same as that to which he pointed Mersenne, then Descartes' *Meditations* must contain *some* certainty-attaining argument which yields his doctrine of matter. Even if we suppose that Descartes was under the misapprehension that the parsimony argument meets that bar, the argument is nowhere to be found in the *Meditations*; I've been able to find no evidence for it, and both Hatfield and Clarke, who recognise the importance of this kind of pragmatic argument in Descartes, draw on sources entirely outside the *Meditations*.²⁶

The second is **the obscurity argument**, that substantial forms can't be clearly and distinctly understood by the intellect.²⁷ This, if successful, would be a more-nearly deductive argument, yet it clearly depends on Descartes' epistemology of clear and distinct perceptions; it is not a purely metaphysical argument starting from elimination and ending in Descartes' (negative) doctrine of matter.

Conclusion

Interpreting Descartes' claim that his *Meditations* ground his physics as referring to the wax passage has been shown to be an unfruitful hermeneutic strategy. This fact, and the observed need to bolster the wax argument with epistemological premises, together with the textual exegesis presented towards the beginning of this essay all point in one direction: when Descartes said of his *Meditations* that they contain all the foundations of his physics, it was epistemological foundations that he had in mind.

²⁴ "... the philosophers invented these real qualities only because they did not think they could otherwise explain all the phenomena of nature; but I find on the contrary that these phenomena are better explained without them." AT III, 649.

²⁵ To Mersenne, 15 April 1630; Bennett (2017), 15.

²⁶ Hatfield, in Holland (1985): 154-56; Clarke (1982): 117-8.

²⁷ See, e.g., CSMK: 216.

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