
Descartes' "Cosmological Myths"¹

Draft Version²

Abstract

A striking and recurring feature of Descartes' various presentations of his natural philosophy is his use of supposedly hypothetical tales about the beginning of the world, which I refer to as his cosmological myths. In them we are invited to imagine that God creates a world of homogenous matter, introduces a quantity of motion into it without imposing any structure, and thereafter limits his action to sustaining the uniform operation of mechanical laws. Descartes argues that such a world would end up essentially indistinguishable from our own. These myths are independently fascinating, and present a range of interpretive difficulties when considered in relation to other features of Descartes' philosophy. In this paper the main features of the underlying argument of the myths are extracted, and a selection of possible interpretations surveyed.

'For God has established these laws in such a marvellous way that even if we suppose that He creates nothing more than what I have said, and even if He does not impose any order or proportion on it, but makes of it the most confused and muddled chaos that any of the poets could describe, the laws of nature are sufficient to cause the parts of this chaos to disentangle themselves and arrange themselves in such a good order that they will have the form of a most perfect world, a world in which one will be able to see that not only light, but all the other things as well, both general and particular, that appear in the actual world.' – Descartes, *The World*.

1. Introduction

A striking and recurring feature of Descartes' presentations of his natural philosophy is his use of supposedly hypothetical tales that I refer to as his 'cosmological myths'. In then we are invited to imagine that God creates a world of homogenous matter, introduces a quantity of motion into it, and thereafter limits his action to sustaining the uniform operation of mechanical laws. Descartes argues that such a world would end up importantly indistinguishable from our own. Versions of the tale appear in *The World* (also known as the *Treatise on Light*) the *Discourse on the Method*, and the *Principles of Philosophy*. Furthermore, there is

¹ An early 'seat of the pants' version of this paper was presented at a seminar at King's College, London on 18th August 1999. Another version was presented at the 27th annual conference of the Philosophy Society of South Africa in Johannesburg on 18 January 2000. I am grateful for the discussion and feedback which followed on these occasions.

² This paper is *very* much a work in progress, and the latter parts of it are especially sketchy at present. Any words in the main text or footnotes of this draft which appear in curly brackets are directed at the author.

evidence that a similar line of thought informed the argument of the *Treatise on Man* and other discussions by Descartes of the structure and formation of living things.³

It would be extraordinary if Descartes had asserted these tales to be true accounts of the beginning of the world, given that these yarns were spun in the first half of the seventeenth century,⁴ and that he was a sincere, if somewhat idiosyncratic, Catholic.⁵ What he does is, if anything, more perplexing still: at every point at which the myths are set out Descartes is careful to insist that the stories he is offering are *false*. He pointedly emphasises that we all 'know' that the account offered in the book of *Genesis* is essentially true, and that the world was made fully formed by God. Nonetheless, he contends that *despite* their falsity these stories are preferable from the point of view of natural philosophy, and specifically that we conceive the nature of material things better 'if we see them develop gradually in this way than if we consider them only in their completed form' (*Discourse 5*, CSMK I: 133-4).⁶ This is so whenever a version of the cosmological myth is developed: we are told that we know that the myth is false, and also that (perhaps despite this) it leads to better understanding. This is *prima facie* perplexing, although there might be various possible justifications for the didactic and other use of falsehood in the interests of truth.⁷

In the specific case of Descartes it is *extremely* perplexing, as even the most commonly known features of Descartes' thought make clear. It was Descartes, after all, who famously vowed to 'hold back assent from opinions which are not completely certain and indubitable just as carefully as I do from those which are patently false' (*Meditation 1*, CSMK II: 12). Yet here he urges us to entertain falsehoods in search of epistemic self-improvement. The famous remark just quoted occurs in the first *Meditation*, the *Meditations* having been published (with the first six sets of objections and replies) in 1641. The myth is first worked out, as far as we can tell, in *The World*, though, which was abandoned late in 1633. Perhaps that eight or so year period had seen some significant changes in Descartes' thinking, and the conflict to which I point is only

³ The early part of the *Treatise on Man*, if it was ever written, has not survived, but the surviving part begins with a reference to 'these men' who will supposedly be, as we are, composed of a body and a soul. The most likely reading is that Descartes is inviting us to think of certain 'new' men to be found in the new world discussed in *The World*. Related reflections are to be found in the *Description of the Human Body*, on the *Formation of the Foetus* and in the *Passions of the Soul*. Some questions on these topics are also put to Descartes in the course of the *Conversation with Burman*. {To add references, also return to this stuff at the end.}

⁴ Bruno had been burned in 1600, Galileo condemned for heliocentrism in 1633, after being forbidden to teach it in 1616. Since the Galileo incident played such a role in Descartes' decision not to publish *The World* it is striking that he openly entertains the forms of speculation contained in the cosmological myths in the *Discourse and Principles*.

⁵ Whatever benefit Descartes derived from living in the Netherlands, it was not the option of avoiding Catholicism. Despite the inconvenience he continued to practice as a Catholic (see Rodis-Lewis 1998: 71, 77-78), and was attended by a Catholic priest on his deathbed (Rodis-Lewis 1998: 202-3). {Note: See also letter to Mersenne, March 1630 on practising Catholicism in the Netherlands, and his attempts to reconcile his philosophy with the doctrine of transubstantiation, as well as the replies to Arnauld's objections to the *Meditations* and correspondence. See also Descartes on reconciling the myths with *Genesis*, in the *Conversation with Burman*, and possibly elsewhere.}

⁶ References to CSMK are to the three volume *Philosophical Writings of Descartes* edited and translated by Cottingham, Stoothoff, Murdoch and Kenny. References to AT are to the eleven volume *Oeuvres* edited by Adam and Tannery. {Task: get referencing uniform, all to AT.}

⁷ The wax episode in the second *Meditation*, for example, need not be a report on a historical incident for the argument to work, and if it fails it is not because the experiment was never performed. {Note: possible cross reference to the material on story telling towards the end.}

apparent. There were, it is true, significant changes in Descartes' philosophy,⁸ but not of the kind which would be needed to dispel the worry here. The text of Rule Two from the *Rules for the Direction of the Mind*, composed *before*⁹ Descartes began work on *The World* includes the injunction to 'reject all merely probable cognition and resolve to believe only what is perfectly known and incapable of being doubted' (CSMK I: 10). The 1637 *Discourse on the Method* which includes a version of the cosmological myth in part V, also includes in part II Descartes' description of the self-imposed rule 'never to accept anything as true if I did not have evident knowledge of its truth' and to include in his judgements only what 'presented itself to my mind so clearly and distinctly that I had no occasion to doubt it' (CSMK I: 120). A similar situation is to be found in the *Principles* of 1644, part I of which recapitulates much of the content of the *Meditations* including the thesis that what is doubtful 'should even be considered as false' (PI: 2) but part III of which contains another version of the myth, the last which Descartes was to offer.

So, these tales which are explicitly and pointedly marked as false, are urged upon us for our epistemological self-improvement by an author who also repeatedly insists that what is not entirely and certainly true should be treated as if it were utterly false. In Descartes case, given his commitment to a generally deductivist epistemology the danger is significant, since the deduced consequences of falsehoods are all too likely to be false themselves. Avoiding this danger is part of the point of the method of doubt.

Charity demands that an attempt be made at interpreting Descartes in a way that makes sense of this. There are various ways of approaching this problem, and in what follows I focus my attention for the most part on two questions. First: How does Descartes really want the reader to regard the myths? That is to say, are they to be taken as simply true or false, or as something more complex than either? Second: How does he regard them himself?

There are some questions which I will deliberately not get into here, not because they are any less interesting or significant, but because I need to take answers to them for granted in order to focus on the difficulties which I am making central for the purposes of this discussion. The most important such question is that of how plausible it is to think that Descartes' physics, if applied to an unstructured world of the type he calls for, would in fact lead to anything remotely like he suggests. As far as I am concerned that view is almost obviously false,¹⁰ but my interest is in what use Descartes thought that the myths could be put to on the assumption that they are indeed plausible.

The first order of business, though, is descriptive, which is to say that I need to spend some time setting out the most important features of the various versions of the cosmological myths.

⁸ Descartes revised his notion of clear and distinct ideas (from the *Rules* to the *Meditations*), and rethought features of his views on the role of God and related metaphysical considerations in his system. Gaukroger (1995) covers some of this reasonably well.

⁹ Schuster (1980) has argued at length for a two stage development of the *Rules* concentrated in 1619 and around 1628. While ingenious, and being supported by, e.g., Gaukroger (1995), Schuster's case is based almost entirely on internal textual evidence concerning an incomplete manuscript. One thing is not in doubt, which is that the *Rules* were abandoned in 1628, placing the text unambiguously before *The World*.

¹⁰ If we can somehow fudge the fact that his laws of motion are false, and, taken as a set, possibly incoherent, {Task: References to Clark and Garber on the rules of impact.} there is still no reason to suppose that the physics he outlines is the type which could lead to increasing structural complexity in the ways he contends. In somewhat anachronistic terms we might say that Descartes thinks that the present arrangement of the universe is an attractor state for the laws as he sets them out.

2. *Myths and Variations*

The first version of the cosmological myth, which is also the most detailed and in some ways the most ambitious, is, as noted, that developed in *The World*. That work grew out of Descartes' curiosity about several parhelia (false or apparent suns) observed near Rome on 20 March 1629. Recognising that parhelia were similar in key respects to rainbows, Descartes widened his interest to meteorology in general, and came to envisage a work of physical meteorology concerning 'all sublunary phenomena'.¹¹ By November of that year Descartes wrote to Mersenne to tell him that his project was now to 'explain all natural phenomena' adding, in case that was not clear enough, that he meant to deal with the 'whole of physics'.¹² The original interest in parhelia endures – *The World* is subtitled 'a treatise on light' and in the fifth *Discourse* Descartes explains that, in *The World*, he 'added something about the sun and fixed stars, because almost all light comes from them; about the heavens, because they transmit light; about planets, comets and the earth, because they reflect light; about terrestrial bodies in particular, because they are either coloured or transparent or luminous; and finally about man, because he observes these bodies' (CSMK I: 132). *The World* was never completed, and the surviving text ends quite suddenly during a discussion of how the light from comets reaches the earth, and is refracted in the process (*The World* chapter 15).

The first five chapters of *The World* are a preliminary defence of Descartes' mechanism, that is his plenistic physics of matter, shape and motion, and more specifically his theory of the three basic sizes of material particle,¹³ which also includes an attack on the notion that our perceptual images of things need in any significant way resemble the things themselves. Towards the end of chapter five, though, Descartes shifts his mode of presentation, noting that there are many more arguments he could offer in defence of his position, and also that there is much left for him to explain. In order to make his account of some of these topics 'less boring' he proposes to 'clothe part of it in the guise of a fable' which will, he hopes, 'make the truth sufficiently clear' (CSMK I: 90).

It is in chapter six that Descartes is most emphatic about the supposedly fictitious character of the cosmological myth. He invites the reader to imagine an indefinitely¹⁴ large space some distance away from the world as we usually think we know it. The distance in question is 'far enough to lose sight of all the creatures that God made five or six thousand years ago', and we are told that the imaginary space should be large enough to contain the earth, planets, sun and major stars. Using the fictitious nature of the scenario as an opportunity Descartes stipulates that we should not attribute to the matter of this new world anything which we 'cannot know as perfectly as possible' and hence that we should not imagine it has 'the form of earth, fire, or air, or any more specific form, like that of wood, stone, or metal; nor does it have the qualities of being hot or cold, dry or moist, light or heavy, or of having taste, odour, sound, colour, light, or of any other quality in

¹¹ To Mersenne 29 October 1629, (AT i. 23). {Task: Check other correspondence of the period.}

¹² To Mersenne 13 November 1629, (AT i. 70).

¹³ {Task/future direction: This enables Descartes to have a suppressed qualitative physics, since he permits himself to offer many explanations which are essentially elemental, once he has made the elements fit his own scheme. Compare with his pseudo Galenic physiology in *On Man*. Possible catalogue of these particles.}

¹⁴ Descartes is careful not to say that the new world is infinitely large. He had corresponded with Mersenne on the question whether there was anything theologically contentious about suggesting that God could have made an infinite world {references} and later claimed that the indefinite/infinite distinction was one which he had first formulated {Conversation with Burman}. The distinction between an infinite and an indefinite world is most carefully drawn in the *Principles*.

nature of which there might be said to be something which is not known clearly by everyone', which is to say that he urges us to think of the matter as what he would later call *res extensa*,¹⁵ and not along the lines of Aristotelean physics.¹⁶ This matter, which exhausts the imaginary space in question, can, says Descartes, be indefinitely divided, and assume as many shapes and motions 'as we can imagine'.

Thus far we are being asked to entertain a static image, but Descartes now has enough detail to introduce a dynamic element: we are told to suppose that God divides the matter up into a great diversity of shapes of many sizes, distributes among these parts a similar diversity of motions (speeds and directions), and, finally, that thereafter he sustains the 'ordinary laws of nature'. Descartes contends that:

... the laws of nature are sufficient to cause the parts of this chaos to disentangle themselves and arrange themselves in such a good order that they will have the form of a most perfect world, a world in which one will be able to see that not only light, but all the other things as well, both general and particular, that appear in the actual world.

The reason for this is, apparently, that God 'has established these laws in such a marvellous way'. What are these supposedly marvellous laws? Descartes sets them out in the following chapter, and there are three of them. One is a principle of the persistence of states, including motion, unless collision brings about a change. Another is a principle of the conservation of motion, and the third that all motion tends to take place in straight lines. There are various problems with these laws, which it is my intention to side-step,¹⁷ although it is important to note that Descartes defends each rule by reference to divine immutability, and also maintains that these laws would have to be observed in *any* world created by God.

Before discussing the laws, though, Descartes again emphasises his claim to be developing no more than a pleasing fiction. After directing a few barbs at the notion of 'prime matter' and at the philosophers who are 'so subtle that they can find problems in things that seem extremely clear to other men' he makes a show of not engaging directly with such problems at all, since his purpose is entirely different. Unlike the philosophers he does not want to 'explain the things that are in fact in the actual world, but only to make up as I please a world in which there is nothing that the dullest minds cannot conceive, and which nevertheless could not be created exactly the way I have imagined it.' That is to say, that while taking pains to avoid the

¹⁵ At this point in the text Descartes writes as though the matter is *in* space, ruling out the identification of the two. Shortly after, though, he explicitly identifies them. I suggest that the description of matter as being in space, or filling it, is a temporary sacrifice to the demands of exposition, rather than evidence for Descartes holding a theory of matter different from his mature one.

¹⁶ {Note: These are the qualities which he has just rejected. Note also that he offers no *argument* here or in the remainder of the work for the thesis that these qualities are less knowable than mechanist ones. In *The World* that argument has been developed already in Chapters 1-5. Compare with *Principles*, which has a similar division of labour. The point is that the myth is an *application* of his physics, and not, in any significant sense, a *defence* of it.}

¹⁷ {This is most notably the case with the second, since Descartes lacks a precise notion of the quantity of motion. The more detailed account of collision in the *Principles* {reference!} does not help, since he does not decide categorically between a notion of quantity as a function of speed and volume, and one where it is a function of speed and surface area. A further difficulty with the laws as set out in the *Principles* is that Descartes, for the most part, relinquishes his plenism in order to set the laws out, and gives no sense of how they might be expected to apply when, as has to be the case in his world, the plenum is restored and the condition of collision is consequently ubiquitous.}

implication that his purpose is to engage directly with Aristotelean physics, Descartes is emphatic that the scenario he conjures up represents a *possible* world.¹⁸

After setting out and defending his laws of nature in chapter seven, Descartes turns to describing what he thinks would happen in his new world following the initial act of unstructured creation. In chapter eight he explains how the Sun and stars would form, in chapter nine the planets and comets, with the Earth and Moon being described in chapter ten. Weight and the tides follow in chapters eleven and twelve, and the final three chapters of the surviving text concern the properties of light. A pervasive feature of all these discussions¹⁹ is the way in which Descartes alternates between explicit, and increasingly infrequent, reference to the new world and outright description of features of the actual world. Thus in chapter nine he considers a planetary system which has the same number of planets as ours was known to have at the time, arranged around the central star in the same order as dictated by the Copernican system, and his illustration uses the standard astronomical symbols for the planets. And in chapter ten he refers explicitly to the Earth and Moon. I return to the question of what to make about the ways in which the 'new' and actual world are not rigorously separated by Descartes shortly.

As already noted *The World* was never completed, and was not published in Descartes' lifetime. The condemnation of Galileo in 1633 provoked Descartes' decision not to publish the work {Check: letter to Mersenne, Nov? 1633} and his first real publication came in 1637 with the *Discourse* and the accompanying essays on *Geometry*, *Meteorology* and *Optics*. Since the text of *The World* is incomplete, we do not know what, if anything, Descartes planned to say by way of a conclusion to the myth. Nonetheless there are other versions of the tale which are complete, one of them in the *Discourse* which included a discussion of his physics, in part five. Here Descartes presents a selection of the arguments of *The World*, a treatise of which Descartes says merely that 'certain considerations' prevented him from publishing it (*Discourse* 5). This part of the *Discourse*, more than half of which concerns the physiological content of *On Man*, is considerably shorter than *The World* but Descartes includes the cosmological myth, strongly suggesting that he thought of it as important. Stating, as before, that his intention was to avoid having either to follow or refute the views of 'the learned' he describes his argument as follows:

So I decided to leave our world wholly for them ['the learned'] to argue about, and to speak solely of what would happen in a new world. I therefore supposed that God now created, somewhere in imaginary spaces, enough matter to compose such a world; that he variously and randomly agitated the different parts of this matter so as to form a chaos as confused as any the poets could invent; and that he then did nothing but lend his regular concurrence to nature, leaving it to act according to the laws he established (*Discourse* 5, CSMK I: 132).

In much the same way as in *The World* Descartes argues that such a set of conditions would, without there being a need for any principles except for those his physics permitted, result in the formation of stars and planets, the phenomena of gravity and the tides the formation of mountains and other geographical

¹⁸ {Note: We might want to say in contemporary parlance that Descartes has in mind a physically possible world, except that he thinks that the laws of nature are metaphysically necessary, so that the set of metaphysically possible world coincides with the set of physically possible ones. Not sure whether this is interesting.}

¹⁹ A further pervasive feature is just how bad most of the explanations are, being almost exclusively quantitative and extraordinarily optimistic as well.

features, light and various chemical processes. Despite the explanatory power he takes his account to possess, Descartes states that he did not want to conclude that it was true, saying that it is 'much more likely that from the beginning God made it just as it had to be' (Discourse 5). Once again, he restrains himself and claims only that his account represents a *possibility*, but one the contemplation of which has certain advantages:

So, even if in the beginning God had given the world only the form of chaos, provided that he established the laws of nature and then lent his concurrence to enable nature to operate as it normally does, we may believe without impugning the miracle of creation that by this means alone all purely material things could in the course of time have come to be just as we now see them. And their nature is much easier to conceive if we see them develop gradually in this way than if we consider them only in their completed form (*Discourse 5*, CSMK: 133-4).

Bizarrely Descartes does not say why or in what way the nature of material things is 'much easier to conceive' if we contemplate them in the ways he suggests. It is also striking (given the contrast with the *World*) that here he talks of the differing *likelihood* of his version and what is, roughly, the *Genesis* account. Furthermore in this account of the myth it appears as though the laws of nature came first, at least in the order of presentation, and hence that the myth is an *application* of them. This does not conform to the order of presentation in *The World* although it does, as we will see, fit the logic. There is little more to be said at this point about the myth as it appears in the *Discourse* because this version is so cryptic.

The last time Descartes' sets out the cosmological myth is in the *Principles of Philosophy* of 1644, although he made some revisions to parts of the account for the French edition of 1647. This version is, in some ways, slightly different to those in *The World* and the *Discourse*. This is so even though he described the *Principles of Philosophy* as his attempt to teach *The World* 'to speak Latin' {reference!}. Here the laws of nature unambiguously *precede* the myth, and are supplemented with a set of detailed laws of impact.²⁰ In fact by the time Descartes sets out the myth, which is to say in Part III, propositions 44-47, he has already devoted an entire part of the *Principles* (Part II) to physics, in which he had set out and defended his laws of nature and offered a variety of explanations for numerous physical phenomena. Not only that, in the early sections of Part III, before the cosmological myth, he makes various claims concerning the philosophy of science which attempt to address some of the difficulties posed by the myth. Prior to the presentation of the myth he also details his views on the constitution of the heavens, in the course of which discussion he sets out his modified Copernican celestial physics.²¹

An especially striking feature of the presentation of the myth in the *Principles* is that it is preceded by some remarks about the explanatory power of certain 'principles' and also about the status of 'hypotheses' which seem to be in bald contradiction with one another. Thus in *Principles* (III, 43) Descartes asserts that the explanatory or predictive power of a 'principle' is an argument for the truth of that principle, saying that it can 'scarcely be possible that the causes from which all phenomena are clearly deduced are false.' He argues in partial defence of this claim that in the event that phenomena *could* be suitably deduced from certain

²⁰ {Note: It is not clear how far developed Descartes' thoughts about impact were at the time of *Monde*. The style of the work is quite unlike the *Principles*, and it is possible that he had detailed rules which he did not include in the earlier work.}

²¹ {Perhaps say something about how he fudges the issue of the motion of the earth by asserting a rather kooky and *ad hoc* conception of motion for celestial purposes. References to the text.}

principles then it would be 'an injustice to God to believe that the causes of the effects which are in nature and which we have thus discovered are false' since by doing so we would imply that the reason with which we had been endowed was faulty.²²

Descartes clearly believes that his cosmological myth has the explanatory-predictive power in question, but in the immediately following paragraphs of the *Principles* he says, first (III, 44), that the causes he proposes should be 'taken only as hypotheses', and then that he shall assume some hypothetical causes (i.e., as it turns out, the cosmological myth) '*which it is certain are false*' (III, 45 emphasis mine). The justification for taking his proposal as hypothetical is the same as in *The World* and the *Discourse*: that he wishes to avoid direct confrontation with received views, and rather set out a different way of thinking in such a way as to leave it up to the reader what to think. The explanation of the second point, that the hypotheses are actually false, is worth quoting at length:

Indeed, in order to better explain natural things, I may even retrace their causes here to a stage earlier than any I think they ever passed through. {For example}, I do not doubt that the world was created in the beginning with all the perfection it now possesses; so that the Sun, the Earth, the Moon, and the Stars existed in it, and so that the Earth did not only contain the seeds of plants but was covered by actual plants; and that Adam and Eve were not born as children but created as adults. The Christian faith teaches us this, and natural reason convinces us that this is true, because taking into account the omnipotence of God, we must believe that everything He created was perfect in every way.²³ But, nevertheless, just as for an understanding of the nature of plants or men it is better by far to consider how they can gradually grow from seeds than how they were created [entire] by God in the very beginning of the world; so, if we can devise some principles which are very simple and easy to know and by which we can demonstrate that the stars and the Earth, and indeed everything which we perceive in this visible world, could have sprung forth as if from certain seeds (even though we know that things did not happen that way); we shall in that way explain their nature much better than if we were merely to describe them as they are now, {or as we believe them have been created}.²⁴

So, what are the actual assumptions? The answer is given in paragraph 46, and is supposed to enable us to work out by reference to experience which of the infinite possible ways in which God *could* have divided up the world and set it in motion are plausible, given the theory of motion Descartes has already demonstrated to his own satisfaction. The guiding role of experience is supposed to eliminate some configurations, since those which produce results not in conformity with experience can be rejected for that

²² {This is the type of argument used strikingly in *Meditations* 4 and 6 especially, and which recurs in parts of the *Principles*.}

²³ It is unclear what 'perfect' is supposed to mean here, since Descartes gives no real indication of the manner in which the creation might be perfect. {Recall Leibniz (?) on how the broken clock follows the laws of nature just as faithfully as a working one}

²⁴ In quotations from the *Principles* text in curly brackets indicates changes made by Descartes for the French translation of the original Latin.

reason.²⁵ The suppositions Descartes makes here are somewhat more moderate than those made in *The World* since here he allows a certain amount of 'design' in the initial arrangement:

Let us therefore suppose, if you please, that God, in the beginning, divided all the matter of which He formed the visible world into parts as equal as possible and of medium size, that is to say that their size was the average of all the various sizes of the parts which now compose the heavens and the stars. And let us suppose that He endowed them collectively with exactly that amount of motion which is still in the world at present. An, finally, that He caused them all to begin to move with equal force {in two different ways, that is}, each one separately around its own center, by means of which they formed a fluid body, such as I judge the heaven to be; and also several together around certain other centers equidistant from each other, arranged in the universe as we see the fixed stars to be arranged to be now; and also around other somewhat more numerous points, equal in number to the Planets {and the comets}.

As noted, Descartes maintains these hypotheses to be false. Nonetheless, despite his earlier claims concerning the ways in which we may properly infer from explanatory power to truth, he also insists that the falsehood of these hypotheses 'does not prevent what will be deduced from them being true and certain' (*Principles* II, 47). The supposed justification for this thesis is that since, supposedly, the laws of nature entail that the universe will, over time, 'assume successively all the forms it is capable of assuming'²⁶ it does not *matter* what we assume as an initial arrangement. Suggesting that uniformity is better known than other forms of disorder Descartes resolves to suppose that all the particles 'in the beginning' were 'equal to one another in both size and motion'.²⁷

Immediately hereafter Descartes sets about explaining how these particles would become spherical, separate into the three elements of his physics, and develop into the type of arrangement we see around us. His arguments here are, while more detailed, no better than those in *The World*, which is to say that they are almost obviously false. The myth is put to additional work in the *Principles* since Descartes makes use of it in Part IV ('of the Earth'), which opens with the claim that:

That the false hypothesis which we have already used must be retained here, in order better to explain the true natures of things (*Principles* IV, 1).

The justification for this claim does nothing to dispel the sense that Descartes is tying himself in knots, since he states his intention both to show that 'the causes of all natural things can be understood by means of that hypothesis, though by no other' but also noting that 'the world was not formed in that way in the

²⁵ {Task: two points to make here. (1) This shows quite nicely how grossly inadequate the standard image of Descartes the 'rationalist' is. (2) Given the latter part of paragraph 47, the restriction concerning experience does no real work, it cannot distinguish between the case where the myth is true and the case where it is false.}

²⁶ This is also a Lucretian view. (*De Rerum Natura* V 416f.) {See Garber p 119.} This, though, is at odds with the passages in other versions of the myth where Descartes writes as though the current state of the universe is one towards which the laws drive matter, rather than simply one state among many which it will pass through given enough time.

²⁷ The equality of motion here would have to mean quantity of motion, i.e. speed, rather than direction, otherwise Descartes description is incoherent. {Explain more?}

beginning, but was created directly by God'.²⁸ Thereafter Descartes sets about describing the history of his hypothetical earth, which cools, forms a crust, atmosphere, geographical features and so forth.

So much for description. In three texts, between around 1630 and 1647, that is between the early stages of *The World* and the French edition of the *Principles*, Descartes sets out the cosmological myth three times. Each time he makes the same opening gesture of leaving 'the learned' to do their own thing while he makes up an imaginary world, specifically identified as false, in which God makes an unstructured mass of Cartesian matter and imposes the laws of nature onto it, leading to a world indistinguishable from our own. Each time we are told that even though the myth is false, it leads to better understanding of the actual world. The very fact that the myth is so pointedly repeated and developed rules out any notion of it being a presentational device from his earlier work which he did not see as having any significant role to play in the way he conceived of his physics. The myth is important to Descartes, but what does it do for him?

3. *Reading the Myths*

What are we to make of all this? Am I even correct in thinking that this is interesting or problematic at all? If not, then that would be because there is some way of taking Descartes at face value. That would, in turn, mean accepting for the purposes of argument that they myth, while (a) false in point of fact, nonetheless (b) represents a genuine possibility and, *also*, (c) facilitates better understanding of the physics of the actual world. There is no difficulty with accepting (a) and (b). The problems set in when one tries to take (c) on board.

In order for (c) to do any work the myth has to *add* something to our understanding. That is to say, in Descartes' words, we should conceive the nature of material things and the laws of nature better 'if we see them develop gradually in this way than if we consider them only in their completed form' (Discourse 5, CSMK I: 133-4). Given, though, that Descartes' laws of nature, and, indeed, all of his explanations of actual physical processes are defended by considerations independent of the myths it is hard to see how this could be so. Indeed the myth, in significant ways, *presupposes* Descartes' physics, which is to say that it is far more of an application of that physics than it is an elaboration or a defence.

The situation is somewhat different with living things, since the issues of creation and development can be significantly separated. Malebranche (*Search After Truth* p. 464f) explains how the question of how chickens develop is independent of the question how God might have made the first chicken (i.e. whether as egg or as fully grown fowl). From this point of view it is indeed correct that we need not worry whether the chicken or the egg came first, when what centrally concerns us is the issue of how chickens develop from eggs. What makes this so is that *whatever* comes first, it is a feature of the actual world that chickens and eggs relate in this way. Or, in other words, whether the story about the initial conditions is counterfactual or not, it can nonetheless be factual with respect to all subsequent chickens and eggs.

But this is exactly what does not hold with the world as a whole – if God did make a fully formed world, then the story about the initial confusion will always be contrary to fact, and is at least unlikely to help explain the properties of the actual world.

²⁸ The latter quotation is from the French (1647) version. The original Latin, though, opens with the insistence that Descartes 'does not wish it to be believed that the bodies of this visible world were ever created in the manner which was described above'. {See also the very end of the *Principles*.}

In any event the deduced consequences of falsehoods are, according to Descartes, likely to be false themselves,²⁹ and nothing he says about the supposed falsehoods in the myth can dispel the conflict here. Recall that in *Meditation* 1 he states that 'Once the foundations of a building are undermined, anything built on them collapses of its own accord' (CSMK II, 12).

More significantly still, there is independent evidence that Descartes' claim that the myths were false is a pretence. Two reasons for this are particularly conspicuous. Firstly, in the *Conversation with Burman* for example, Burman draws Descartes' attention to article 45 of Principles III, where it states that 'there is no doubt that the world was *created* from the very first *with every perfection that it now has*.' (Cottingham 1976: 36-7).³⁰ Descartes' recorded response is striking:

The author could give an adequate explanation of the creation of the world based on his philosophical system, without departing from the description in Genesis. (Incidentally, if anyone can provide an explanation of this book the author will regard him as a 'mighty Apollo', and the same goes for the Song of Solomon and the Revelation.) The author did at one time attempt such an explanation of the creation, but he abandoned it because he preferred to leave it to the theologians rather than provide the explanation himself. As far as Genesis is concerned, however, the story of the creation to be found there is perhaps metaphorical, and so ought to be left to the theologians. In that case, the creation should not be taken as divided into six days, but the division into days should be taken as intended purely for the sake of our way of conceiving things; this was the way Augustine proceeded when he made the divisions by means of the thoughts of the angels. Why, for example, is the darkness said to precede the light? With regard to the waters of the flood, they were undoubtedly supernatural and miraculous. The statements about the cataracts of the deep is metaphorical, but the metaphor eludes us. Some say they came down from heaven, and argue that this was where the waters were originally placed at the creation, on the grounds that God is said to have placed the waters above *ha shamayim*. But this word is also very commonly used in Hebrew to denote the air, and I think that it is out of a prejudice of ours that we regard this as 'heaven'. Accordingly, the waters placed above the air are clouds. There is another word in Hebrew to denote the air, namely *ha aretz*. (op cit)

Not only that Cottingham notes (1976: 106) that Descartes 'long hoped to provide a detailed reconciliation between his own theory of the origin of the world and the account in Genesis', and written a letter to Mersenne in 1641 stating his intention to send his own account of *Genesis* in terms of his own principles, which also explained how he saw the miracle of transubstantiation, to the Sorbonne.³¹

A related query (1976: 38) provoked by a later passage in article 46 concerning vortices results in Descartes making some strikingly ambitious (even by his standards) claims about the development of animals, and suggesting that he was willing to kick up further theological difficulties than those he has already entertained:

²⁹ {Task: fill in references to *Principles*, also *Rules* p12, 14, 14-15 and note the twin strategies of intuition and deduction, which leave little room for such concoctions as the cosmological myth.}

³⁰ (Emphasis in Cottingham, hence presumably in Burman. Not in the original *Principles*.)

³¹ {See also *Discourse* 5. Also GRL pp101-2: Descartes on Genesis.}

[After taking a few swipes at Regius, who is mentioned in the original question from Burman] However, this hypothesis of the author is very simple, if we consider the almost infinite number of things he has deduced from it; and the deductive chain confirms the hypothesis. For the author subsequently saw that he could deduce practically everything from it. And he is willing to swear before God that when he was putting forward these hypotheses he had not yet thought about fire, magnetism and the rest; it was only afterwards that he saw that these things could be explained quite beautifully in terms of the original hypotheses. Indeed in the *Treatise on the Animal*, which he worked on this winter, he noticed the following: although his aim was merely to explain the functions of the animal, he saw that he could hardly do this | without having to explain the formation of the animal right from the beginning. And this was something that he found to be derivable from his principles, to the extent that he was able to give a reason for the existence of the eye, nose, brain, and so on. He clearly saw, moreover, that the nature of things was so constituted in accordance with his principles that it could no be otherwise. But these were all matters which he did not wish to go into at such length and so he gave up writing the treatise. However he confesses that the few thoughts he had concerning the universe are a source of the greatest pleasure for him to look back on. He values them most highly, and would not wish to exchange them for any other thoughts he has had about any other topic. (Cottingham 1976: 38-9).

This is not the place to get into Descartes' views about the development of individual creatures, and his more specific discussion of the development of the foetus.³² What is important is to note that he extends the form of argument of the myth to cases other than the overall structure of the universe, and also that when pressed on the matter he makes clear that he thinks his account can be reconciled with orthodoxy, even if at the usual expense of making orthodoxy metaphorical.

The second reason to suspect that Descartes never seriously meant the myths to be taken as strictly false is the already noted ways in which in the course of his discussion he slips back and forth between carefully hypothetical talk, and the bald formulation of his account in terms of the actual world.³³

So it seems fair to conclude that Descartes' protest that the myths are false cannot be taken at face value – his own conception of how explanatory power permits inference to truth stands at odds with it, and how own attempts at reconciliation between his account and the biblical one belie it. In some sense he wants us to regard the myth as a plausibly true account of the beginning of the world.³⁴

This way of looking at things brings difficulties of its own.

If we allow, as I am allowing throughout this paper, that Descartes' is entitled to think that the myth, whether true or false, represents a genuine possibility, then it is clear that what it does is establish a competition between at least two accounts of the beginning of the world. I say at least two, since although the only explicitly mentioned possibilities are *Genesis* and the myth itself, it is possible that there is some other

³² {Task: references to the actual texts.}

³³ {Task: Possible give more detail on this point, look at the evidence in all three versions of the myth.}

³⁴ {Malebranche takes the orthodox line more emphatically, but he is more theologically conventional than Descartes it seems. There will be other differences between them which throw the key issues into useful relief – spend more time looking at Malebranche.}

target in the background. Since both predict, or at least culminate in, an indistinguishable world we must have recourse to considerations other than outcome to decide between them, and Descartes makes clear time and time again that he takes his version to have the key advantages of simplicity, clarity, and even certainty.

Indeed one way of looking at cases of this type is as establishing a certain burden of argument.³⁵

But then *which* hypothesis (perfect creation, or unstructured) becomes unnecessary? Is Descartes arguing that we can do without *design* in some way and if so why? How could we decide which hypothesis to reject, given the centrality of the perfection issue?³⁶ Put another way, if explanatory power argues for truth (since the opposite would impugn God) but God also tends to produce perfection then where are we left? A perfect God would make an intelligible world, which suggests that the myth is true. But such a God would also, apparently, make a finished world, which indicates that the myth is false. Matters are made worse, rather than better, by the ways in which the perfection issue arises elsewhere in Descartes' work, especially *Meditations* 4 and 6, which demand a significant degree of purposive design with respect to the forms of our bodies and arrangement of our faculties. To save those arguments Descartes has to make the myth even more detailed and ambitious than it is already, by saying that the structures of living bodies also follow from the action of the laws of nature on an initially unstructured world, or violate the simplicity of the myth by inserting episodes of divine intervention and tinkering at crucial points. But to do the latter would be to raise difficulties for his already noted views about the mechanical process of development from egg or foetus to fully grown adult. Making the myths come out true is a very large interpretive step.

Reading the myths as broadly true might seem like a step towards a more secular conception of the cosmos. This impression is somewhat misleading, though, and we need to assemble a few reminders in order to avoid making any simple mistakes here.

While it is clear enough that taking the myths as true means rejecting the biblical creation story as a literal account, this is not the same as rejecting it outright. As Malebranche notes:

The principle criticism of the way Descartes explains the origin of the sun, stars, earth, and all the bodies around us, is that it appears to be contrary to what Sacred Scripture teaches us about the creation of the world; and that if we believe this author on that subject, it seems the universe was formed as it were by itself, just as we see it today (*Search* p.463).

Malebranche also claims, though, that Descartes' views are 'perfectly consistent' with the orthodox account of creation, at the expense of insisting that the myths be read as false. This won't help us here, though, since as noted the view that the myths were intended as false is implausible. That is to say, the myths are just what they appear, in Malebranche's words 'contrary to what Sacred Scripture teaches'.

This, though, does not make Descartes more secular in any simple way, and certainly provides no support for the common but incredible image of Descartes as a closet atheist. This is so for several reasons.

³⁵ {Note: An example from, e.g. vitalism might help. When Schlick (1953: 524) states emphatically that the laboratory production of Urea in 1828 by Wöhler 'refuted once and for all the doctrine that the synthesis of organic compounds requires a special force' he claims that vital forces were shown to be unnecessary.}

³⁶ That is, of the requirement that the creative labour of God be perfect in every way. In some places (e.g. *Meditation* 4) Descartes works out in some details what this perfection supposedly consists in, here he is considerably more laconic.

God is indispensable to the story of the myth, both as creator of the matter which forms the world, and also as guarantor of the laws of nature. Furthermore it is divine providence which justifies Descartes' confidence in the intelligibility of the natural order, or, looked at another way, the suitability of our cognitive powers for the task of understanding the world in which we find ourselves. In any event, as noted, there is no doubt about Descartes' sincerity as a Catholic, even if somewhat unorthodox in many ways.³⁷ He was properly observant, when he would have been able not to, especially in the Netherlands. He evidently detested atheism,³⁸ took confession on his death bed, appeared to believe in an afterlife, etc.³⁹

So perhaps we can say, as is almost always the case with Descartes, that he wants to keep a large number of what were commonly accepted as truths, but also to radically transform them, in both their nature and relations. This is very much his philosophical routine, the *Meditations* being a case in point. The *Meditations* begins with the dramatic casting into doubt of the senses, the world, the body and even aspects of Descartes own capacity to reason and his confidence in God. By the end of the final *Meditation* all of that is back in place: Descartes exists, has a body, knows that there is a God, and that the world is full of knowable material objects. But things have changed dramatically too: God is guarantor of all properly conducted thinking, material things are known by reason even though the senses can be trusted with caution some of the time, and the Cartesian programme in philosophy is in full swing.

But if the analogy with the *Meditations* is going to work then we want to know what exactly has changed with the cosmological myths, and how. And, for that matter, what if anything follows from this. I don't know the answers to these questions, but have a few suggestions and hypotheses, and am also aware of a number of interpretive difficulties which stand in the way of any attempt at understanding the role of the myths in Descartes thought. I bring this discussion to a close by briefly surveying these matters.

One thing which is changed, and changed (in a sense) *whether we or not* we regard the myths as true is that Descartes has, by means of the myths, massively broadened the scope of physical enquiry. Unlike Aristotle he does not restrict the domain of physics to the sublunary sphere. So his physics is always the science of the entire material world. But with the myths he makes clear that it is also the science of the whole history of the material world as well.

In doing this he is being extremely radical, especially for his time. Recall that he discusses the formation of mountains and other geological features of the world, and in various other ways entertains the notion of a broadly naturalistic chronology of the universe and specifically the Earth. He does so between the late 1620s and mid 1640s. The various parts of Lyell's *Principles of Geology* were published around 200 years later, in 1830, 1832 and 1833. Darwin's *Origin of Species* followed in 1859. Palissy had, it must be noted, suggested that some fossils should be regarded as evidence for extinct species in the sixteenth century but there is no reason to believe that Descartes was aware of his work, and in any event Descartes approach does not begin from the fact of fossils. Hooke had done some descriptive work on wood fossils, presented to the Royal Society in 1665, but Archbishop Usher's famous chronology also appeared in the 1650s, dating the

³⁷ {This did not extend to any particular tolerance for Protestant Christianity - see the correspondence with Elisabeth of Bohemia.}

³⁸ {Correspondence, the pamphlet which fed into his work on the *Meditations*, etc.}

³⁹ {Task: fill in references to Burman, GRL}

creation at around 4004BC. The earliest work I have been able to find referring to the scientific dating or ageing of the world is Halley's discussion of the salinity of the oceans, from around 1715.

Another reason for reading Descartes as taking the myths as roughly true arises from the ways in which they differ from the various other instances where he presents his philosophy by means of narrative devices. Descartes is, of course, a consummate philosophical story teller, one who uses narrative devices for the purposes of presenting his philosophy in a variety of ways. The *Discourse* is written like an autobiography, and is structured like a confessional novel, an epistemological *Great Expectations*.⁴⁰ Near the beginning of the *Discourse* Descartes says that it would be possible to read it as a 'fable' (that word again) even though it is in fact a history. The degree to which the *Discourse* is historically accurate is open to debate, but it is generally agreed to be a reasonable reflection of the facts of Descartes' life up to that point. Leaving the *Discourse* aside for a moment, there is the *Meditations*, which is written in the style of a diary, its fictional six days belying the years spent on reworking and refining the text. Reé (1987:19) has pointed out that the diarist of the *Meditations* is engaged in a project very similar to that of the Jesuit retreat, a practice of which Descartes was well aware, where the person on retreat would select some defect which they intended to remedy, and day by day record their progress. Descartes' retreat concerns epistemology rather than sin, although the fourth *Meditation* makes clear that the two are not so different as far as he is concerned. The *Meditations* contain a selection of dramatic episodes which stand as stories in their own right; Descartes' fitful night between the first two *Meditations* while vexed by the hypothesis of the Evil Demon, the transition from permissiveness to rigorous discipline regarding his senses in the discussion of the lump of wax in the second *Meditation*. These fictions are all importantly different from the cosmological myths, though, and what makes them work need not help explain the functioning of the myths.

The *Meditations* works whether it is literally true or not: it presents a chain of reasoning, which we can experience and follow individually, indeed the imperative is that we adopt the first person approach and think it through for ourselves.

The *Discourse*, on the other hand, works by establishing a relationship, the narrative legitimates (See Reé (1987) on autobiography as a narrative where the protagonist is one who *becomes* the narrator) Descartes' credentials to judge on the matters discussed, and in any event the *Discourse* is a polemic, or a challenge rather than the work itself, since its official position is that of a preface to the three *essays* which accompanied it.

There is no such candidate for a first person perspective with the cosmological myths, though. Neither for the reader, nor for Descartes himself. Nonetheless, Descartes frequently treats conceivability as an argument for truth.

There are some difficulties facing the project of reading the myths as true, though.

The first of these is an apparently insoluble textual challenge: There is no real evidence for Descartes' views on the time-scale of the processes which he describes. In the *Discourse* the change from creation to the world as we know it happens 'gradually', while in the *Principles* we are told that the world 'sprung forth.' Neither of these counts for much as evidence.

⁴⁰ {References: Reé's *Philosophical Tales*, and J. M. Bernstein who calls the *Discourse* the first real novel. Note that the *Discourse* was originally published anonymously, although the pretense was fairly flimsy.}

The second difficulty is also raised by the state of the surviving texts: Descartes' works on the development of animals were either less developed than those on the world, or the relevant texts have not survived.⁴¹ Either way, his remarks on the development of living things from their early stages, and in particular his comments about divine creation of life by means of 'seeds' are tantalising in the extreme, and are likely to stay that way. In the case of living things the worry about time-scales need not arise, since there is a standard measure for how long it takes, say, for a chicken to mature. No such measure is available for the universe as a whole, and there would be no reason for Descartes to conform to the implied biblical chronology.

A third, and for present purposes final difficulty is technical: Descartes clearly takes it that the laws of nature are such that the present state of the universe is a dynamical attractor state no matter what the initial arrangement of the matter in the universe is. (Depending on how the second difficulty above is resolved he may even be committed to the view that the existence of living things is similarly entailed by the laws.) While it is certainly the case that some sets of laws can have this sort of property, there is little reason to think that Descartes own laws do so. The explanation for this would be rather technical, and given the peculiarities inherent in Descartes' system of laws at best difficult to work out. Even so, it is clear that a major burden is shifted onto the laws of nature by the requirements of the myth, which is to say that on Descartes view God designs the world by means of the laws of nature, rather than directly. Exactly what to make of this, in the light of Descartes' own epistemological remarks on the laws, is at least unclear.

4. Conclusions

By way of a very schematic and tentative conclusion, we can say that Descartes, in the first half of the sixteenth century, works out a fairly detailed and highly ambitious precursor to mid twentieth century style 'big bang' speculations. In doing so, even as the chief architect of modern dualism, he massively broadens and extends the scope of physics and physical enquiry. This alone shows Descartes to have far deeper naturalist commitments than is generally acknowledged.

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⁴¹ Especially frustrating here is the fact that the extant text of *On Man* is incomplete at the beginning, where the surviving text indicates clearly that a version of the cosmological myth from *The World* was extended for the purposes of discussing the working of living things, and especially humans.

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