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Descartes on Changes in Motion

If I throw a tennis ball at a sufficient velocity towards a perfectly flat wall, it will come back to me at more or less the same speed. We know this to be the case from Newton's Third Law of Motion. From his Second Law of Motion, we can even observe and measure the tennis ball's velocity, force applied and so forth, assuming perfect conditions. But the questions that have always interested me are: metaphysically, what sort of interaction is going on between the tennis ball and the wall? Is the motion of the tennis ball a property of it or some separate entity that is transferred when it comes into contact with the wall? A different example: when I'm playing pool, I also observe many collisions, such as when the white ball hits a colored ball, leading to the latter gaining motion. In those cases, I always asked myself: if motion is not some separate entity but some property of objects, then why does one ball hitting another cause the latter to move?

To answer these questions, I will focus our examination on Descartes and his conception of physics. I will first reconstruct his definition of motion and his three laws of nature. Then, I will provide the Occasionalist interpretation of Descartes as articulated by Daniel Garber, which is the view that God is the only genuine cause of changes in motion. From there, I will outline issues with the Occasionalist interpretation, such as the question of why other modes of body are not necessarily kept constant. I will then discuss the Mere Conservationist interpretation, as defended by Tad Schmaltz, which holds that bodies themselves can be causes of changes in

motion, in contrast with the Occasionalist interpretation. Ultimately, I claim that Descartes' conception of a force is best understood if we adopt the Mere Conservationist interpretation because it is able to provide answers to many of the issues that face the Occasionalist interpretation.

I. Background

Before we examine Descartes' claims in natural philosophy, we must establish the definitions that he operated under. In Part 2 of his *Principles of Philosophy*, Descartes defines what I'll call "true motion" to be "transfer of one piece of matter, or one body, from the vicinity of the other bodies which are in immediate contact with it, and which are regarded as being at rest, to the vicinity of other bodies" (CSM I 233). This differs from his definition of what I'll call "relative motion", which he defines to be "the action by which a body travels from one place to another" (CSM I 233). "Relative motion" can occur even if a body is not in true motion. For instance, a passenger in a car is moving relative to the houses on the street, but is at rest relative to the car, which the passenger is in immediate contact with. Thus, the passenger is not in true motion. Now, it is important to note here that Descartes views true motion to be entirely internal. In his words, he claims: "motion is always in the moving body" (CSM I 233), which is a crucial claim because from here, he conceives of motion to be a mode of a body, rather than a distinct entity that is transferred between bodies.

With these definitions, Descartes then defines his three laws of nature. It is also worthwhile to note that these three laws heavily influenced Newton's three laws of motion. One can find that there is much similarity in them, especially with regards to Descartes' first two

laws. In his first law of nature, Descartes claims that “each and every thing, in so far as it can, always continues in the same state” (CSM I 241). This is quite similar to Newton’s law on inertia, however Descartes extends this idea to modes other than motion. He argues that in general, an object will “[remain] in the same state... and never [change] except as a result of external causes” (CSM I 241), where “state” here includes modes such as shape, weight, and so forth.

Descartes’ second law of nature is: “all motion is in itself rectilinear” (CSM I 241). Put simply, Descartes conceived of bodily motion as tending to occur in straight lines. Though it may seem like this law is irrelevant to our examination here, it is important to note that Descartes believes these first two laws hold because of “the immutability and simplicity of the operation by which God preserves motion in matter” (CSM I 242). More specifically, God preserves motion in “the precise form in which it is occurring at the very moment when he preserves it” (CSM I 242), which, at one instant of time, is always a straight line. Though I will not discuss God’s role in causing motion just yet, I bring this up to highlight that Descartes views God as operating concurrently with bodily events. Such a fact is important to the overarching claim that Descartes was an Occasionalist, something that we will investigate later.

We now arrive at Descartes’ third law of nature, which concerns bodily collisions. Descartes intended for this law to be widely encompassing, as he will go on to state that “all the particular causes of the changes which bodies undergo are covered by this third law” (CSM I 242). The first part of the law is as follows: “if a body collides with another body that is stronger than itself, it loses none of its motion” (CSM I 242). So for instance, when I throw a tennis ball at a wall, the tennis ball will bounce back to me at an equal speed as when it hits the wall. By stronger, Descartes seems to mean something with more force or “power” (which is the word he

uses), where the latter is something determined “firstly [by] the size of the body... and secondly on the speed of the motion” (CSM I 244). He continues his third law by claiming that “if [the body in question] collides with a weaker body, it loses a quantity of motion equal to that which it imparts to the other body” (CSM I 242). It behooves us to note here that therefore, in all bodily collisions, motion is conserved. This buttresses Descartes’ claim that God created the world with a definite quantity of motion, and He continues to conserve that amount of motion under all circumstances.

Having now outlined Descartes’ definition of motion and the laws that govern it, I now wish to discuss his conception of force, which, in its most abstract form, can be defined as a “cause of change in motion,” which is a phrase that Descartes uses repeatedly in his writings. This is also the abstract conception that Newton operates under when he gives his second law of motion, where he claims that force applied is proportional to acceleration. Acceleration itself is understood to be a change in velocity, and thus force can be legitimately defined as the cause of a change in motion.

The general question of “what is a force”, then, can be better stated as “what causes changes in motion?” However, this question is still unsatisfyingly broad. If we consider it in terms of Descartes’ substance dualism, then a change of motion can be caused by either a body or a mind, and the thing moved can also be either a body or a mind. For the scope of our investigation, we’ll limit our inquiry into body-body causation, that is, where a body is at least somehow involved in causing motion in another body, though the question of to what extent is something that we must explore further.

II. Occasionalism

The most instinctive interpretation of Descartes' natural philosophy will seem to point to God being the cause of all changes in body-body causation (and indeed of motion in the bodily world as a whole), a position that I've alluded to above called Occasionalism. This seems contradictory to our label "body-body causation", and thus I will spend a decent amount of time investigating why Descartes is sometimes attributed to be an Occasionalist.

In his article "Descartes and Occasionalism", Daniel Garber says: "It seems to me as clear as anything that, for Descartes, God is the only cause of motion in the inanimate world of bodies" (Nadler 12). Taking this one step further, Garber claims that "bodies cannot themselves be genuine causes of change" (Nadler 12). Thus, consider the scenario of some Ball A hitting some Ball B and Ball B subsequently gaining motion. An Occasionalist interpretation would insist that B accelerates because of God's doing alone, rather than because of Ball A. Why would this be Descartes' stance, as opposed to the more intuitive and straightforward explanation of Ball A being the cause of Ball B's change in motion?

To answer this, we must understand how Descartes' conceived of God. This conception is in fact crucial because Descartes' metaphysics hinges upon his understanding of God's nature and His characteristics. The first characteristic we will discuss is God's immutability, which is defined to be the attribute in which a being is not only unchanging but unable to change (Kaufman 3). In *Conversation with Burman*, Descartes writes: "From the point of view of metaphysics, however, it is quite unintelligible that God should be in any way alterable" (Descartes 17). This follows from the logic that if Being A were to be mutable, then being A couldn't be perfect, something that God fundamentally is.

And furthermore, because God is immutable, so is His will. In David Cunning's article "Descartes on the Immutability of the Divine Will", he writes: "Since God is immutable, His will cannot change 'now', and it could not change 'then'" (Cunning 80), meaning that God's will is eternally immutable. Moreover, God is "free" in the sense that "nothing influences His activity" (Cunning 82). This establishes that God is "[independent] from non-divine influences" (Cunning 81), and thus reinforces the idea that His will is immutable. Thus, Descartes concludes in *The World* that "God is immutable and that, acting always in the same way, he always produces the same effect" (CSM I 96).

The next attribute of God that I'll discuss is that he is a causal agent or a being that creates change. In his book *Descartes' Metaphysical Physics*, Garber writes: "and so, [Descartes] concludes, it must be God that both creates and sustains us" (Garber 264). Garber also notes that this conclusion extends to all of the physical world, and indeed, God's creation. This follows from Descartes' claim that "should we doubt that if God ceased his concourse, everything he created would vanish immediately... since before he created them... they were nothing" (AT III 429 [K 116]). Then God, as creator and sustainer of bodies, must necessarily be creator and sustainer of all modes of bodies, which includes motion. Thus, Garber concludes that "what will be important is that ...[God], the sustainer, is immutable and constant in his operation and... preserves motion" (Garber 266).

Now, we have established that God is immutable and that He creates and sustains the world according to His immutable will. It would seem to follow that because God created bodies with motion, he also would sustain the quantity of motion present in his creation. This claim is reiterated in *The World*, where Descartes writes: "For, supposing that God placed a certain quantity of motion in all matter in general at the first instant he created it, we must either admit

that he always preserves the same amount of motion in it, or not believe that he always acts in the same way” (CSM I 96), the latter which we know cannot be the case because of the immutability of God’s will. Thus, from these attributes of God arises the Occasionalist interpretation of Descartes’ physics, which states that God is the genuine cause of changes in motion.

The most immediate understanding of Occasionalism lends itself to an interpretation that Garber calls the “cinematic view” of motion. In the cinematic view, God “moves bodies not by shove or impulse, but by his recreation alone” (Garber 275). That is, motion is understood as “the divine recreation of bodies in different places with respect to one another in different moments” (Garber 275), similar to how “a cartoonist creates the illusion of motion on the movie screen” (Garber 275). This view follows from the idea that “conservation of body and conservation of motion are, in *some* sense, the very same thing” (Garber 275, his emphasis). Because of this view’s grounding in the characteristics of God that Descartes attributed to Him, one can see how this is a reasonable attempt at explaining how Descartes conceived of motion.

With this cinematic view, we are equipped to now answer our original question, which is: how is God the genuine cause of changes in motion? To answer this question, I will first provide an impossible scenario.

Imagine a Ball A moving with a significant amount of speed collides with a Ball B at rest, where both these balls are the same size. However, instead of Ball B moving, as we would expect it too, Ball A simply stops, and Ball B also remains at rest, having moved not even an inch. This, we now know, couldn’t be the case, because then motion would have been lost, and if motion was lost, then God is in fact not sustaining his creation. Specifically, the quantity of motion in the world would have decreased, which can’t be the case because God is immutable

and so is His will. Thus, when Ball A hits Ball B, it follows that God, not Ball A, is the one who then begins to move Ball B so that the total quantity of motion is conserved.

Garber, however, raises some possible worries with the cinematic view that are important to touch on. First, he points out: “there are many other modes of body that can be treated quantitatively” (Garber 282), such as length or heaviness. But, Garber continues, “it is unlikely that Descartes thought that these particular quantities remain constant in the world” (Garber 282). He also points out that “if God really is immutable, then, it would seem, the world should not change *at all*” (Garber 282, his emphasis).

To answer these difficulties, Garber proposes a new position which he calls the “divine impulse” view, which is very similar to Tad Schmaltz’s Mere Conservationism view that I’ll discuss later. In the “divine impulse” view, Garber states that it is “[God’s] direct shove, so to speak, that keeps things in motion” (Garber 283). This view is also corroborated by text from Descartes’ *Principles*, when he says “Thus, God imparted various motions to the parts of matter when he first created them, and he now preserves all this matter in the same way” (CSM I 240).

In light of our above problems, this view seems much more intuitive. Firstly, the “divine impulse” view is able to explain why motion might be kept constant while numerical quantities of other modes are not. Garber claims that under this view, “God creates motion... in a way in which he doesn’t create a particular number of things” (Garber 283). That is, God creates motion by causing a certain number of objects to start moving, which itself doesn’t change other modes of objects, such as their shape. Of course, this “shove” that God gives to objects may cause further activity, such as collisions, which change some objects’ shapes, but it is not a direct result of God’s “divine shove.”

Furthermore, the “divine impulse” view is also able to explain how God would keep motion constant, given his immutability. Garber points out that “on the divine impulse view, God’s causing motion is distinct from his sustenance of bodies” (Garber 284). What God sustains and holds constant, then, is not necessarily “the quantity of motion itself... but its *cause*, the *impulsion* [God] introduced into the world at its creation” (Garber 283). And it follows that by “conserving the same amount of cause, [God] conserves the same amount of the effect, the same quantity of motion in the world” (Garber 283).

III. Mere Conservatism

We have now discussed the Occasionalist interpretation of Descartes’ physics, and within it, two views that were brought up by Daniel Garber, one that states that motion is just God’s recreation and another that states that God is constantly “pushing” the same amount as He was when he first created the world. We have discussed why this “divine impulse” view is the stronger view, namely because it answers many of the problems that plague the “cinematic” view. Building on the “divine impulse” view, I will discuss Tad Schmaltz’s Mere Conservationist interpretation of body-body causation, which, though aligning itself quite closely with the “divine impulse” view, allows for bodies to be true causes of change in bodily motion.

The main question that Tad Schmaltz uses to motivate his position is “whether Descartes’s physics requires an act of concursus on God’s part that differs from his act of conservation” (Schmaltz 125), a question which Schmaltz answers no. To be clear, by “conkursus” (also commonly referenced as “God’s concurrence”), Schmaltz is referring to the philosophical view that God’s activity runs parallel to the activities of the world, a view that

Descartes held. For the topic of motion, “concurus” is important because it’s necessary to understand and delineate what exactly is God’s role in sustaining the current quantity of motion. What Schmaltz argues is that God’s concurus “consists simply in the continued creation of a constant total quantity of motion” (Schmaltz 87), hence the Mere Conservationist view of Descartes’ Physics.

The Mere Conservationist view contrasts with the Occasionalist interpretation of Descartes, because in the former bodies themselves can be causes of change in motion. In a further explanation, Schmaltz writes that “God’s universal causation of motion is to be understood in terms... of God’s continuous conservation of the same total quantity of the motive forces responsible for particular changes in motion” (Schmaltz 89). The Mere Conservationist view is heavily inspired by the work of Durandus, who argued that “[God’s] only contribution to the action of secondary causes is his conservation of such causes” (Schmaltz 126), where secondary causes include bodily causes of motion.

Under this view, the logic for how body-body causation would occur follows naturally. Knowing that God creates a certain amount of motion that he keeps constant, Schmaltz argues that in a collision, “particular bodies change the distribution of this total quantity among themselves” (Schmaltz 123). To support his claim, Schmaltz cites work by Fontanelle, who claimed that “the moving force of God is that by which he produces a motion that was not” (Fontenelle 1989–2001, 1:562). However, with regards to bodily motion, “the moving force of creatures is that by which they pass a motion that is already there from one body to another” (Fontenelle 1989–2001, 1:562), such that the total quantity of motion hasn’t changed.

Through this reading, we have an answer to how body-body causation could occur such that bodies themselves are genuine causes of motion. When some Ball A is moving with a

significant amount of speed and collides with some Ball B at rest and of the same size, some of the motion in Ball A is transferred to Ball B, causing it to start moving. Thus, the aggregate quantity of motion in the world is kept constant, but the two balls have just changed its distribution.

The Mere Conservationist interpretation of Descartes, I conclude, is the strongest because it has many of the advantages of the “divine impulse” view. Specifically, the Mere Conservationist interpretation explains how an immutable God would keep the quantity of motion in His creation constant as well as how God could keep motion while not doing the same to other quantifiable modes of body.

To summarize, in this paper I first provided a general summary into Descartes’ physics, including his three laws of motion and how they relate to the attributes he assigns to God. I have also brought to light two main ways of understanding Descartes’ physics, namely Daniel Garber’s Occasionalism and Tad Schmaltz’s Mere Conservationism. I showed that though Occasionalism is the most instinctive interpretation from Descartes’ *Principles*, Mere Conservationism is the most well-supported.

For many people, however, this investigation into the metaphysics of motion and causes of motion may have seemed unnecessary.

“What does it matter,” one may begin, “if we know or don’t know why one ball moves another? The important thing is that we know that it does and that we are able to observe and quantify the velocity, force applied, acceleration, and so forth of the interaction.”

To these skeptics, I would ask them whether they have ever wondered what does it mean to live a happy life, or what is the nature of justice, or is it ever okay to lie. These questions cannot be answered and experimented on using the tools of science, yet they require urgency and

correct answers. Descartes' claims and theories on the metaphysical nature of motion and force draw upon this same motivation of wanting to answer a question that might not be answerable. Thus, I believe that it is only right that we seek to understand his claims and evaluate them for ourselves. I hope that by discussing Descartes' physics, I was able to make it more understandable to readers and thereby more defensible to the greater philosophical community as a whole.

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