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## Berkeley's case against realism about dynamics

While *De Motu*, Berkeley's treatise on the philosophical foundations of mechanics, has frequently been cited for the surprisingly modern ring of certain of its passages, it has not often been taken as seriously as Berkeley hoped it would be. Even A.A. Luce, in his editor's introduction to *De Motu*, describes it as a modest work, of limited scope. Luce writes:

The *De Motu* is written in good, correct Latin, but in construction and balance the workmanship falls below Berkeley's usual standards. The title is ambitious for so brief a tract, and may lead the reader to expect a more sustained argument than he will find. A more modest title, say *Motion without Matter*, would fitly describe its scope and content. Regarded as a treatise on motion in general, it is a slight and disappointing work; but viewed from a narrower angle, it is of absorbing interest and high importance. It is the application of immaterialism to contemporary problems of motion, and should be read as such. ...apart from the *Principles* the *De Motu* would be nonsense.<sup>1</sup>

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<sup>1</sup>*The Works of George Berkeley, Bishop of Cloyne*, ed. A.A. Luce and T.E. Jessop (London: Thomas Nelson and Sons, 1948-57), 4: 3-4.

In this paper, all references to Berkeley are to the Luce-Jessop edition. Quotations from *De Motu* are taken from Luce's translation. I use the following abbreviations for Berkeley's works:

PC *Philosophical Commentaries*  
PHK-I Introduction to *The Principles of Human Knowledge*  
PHK *The Principles of Human Knowledge*  
DM *De Motu*  
A *Alciphron*  
TVV *The Theory of Vision Vindicated and Explained*  
S *Siris*

There are good general reasons to think, however, that Berkeley's aims in writing the book were as ambitious as the title he chose. As Luce notes, Berkeley wrote the essay in hopes that it would win a prize offered by the Paris Academy of Sciences. He could hardly have expected a tract on the scientific consequences of immaterialism to receive serious consideration. It's also clear from *De Motu* itself that Berkeley saw himself as offering solutions to major conceptual problems confronting contemporary mechanics; problems which, he takes it, should be evident to any philosophically informed reader.

Moreover, although *De Motu* is certainly consistent with Berkeley's early works, and the views he puts forward are undoubtedly motivated in part by his metaphysics, he goes out of his way not to mention or overtly invoke any immaterialist or idealist tenets. The most general metaphysical claims that Berkeley appeals to in *De Motu* sound blandly Cartesian: "There are two supreme classes of things, body and soul." (DM 21) "Besides corporeal things there is the other class, *viz.* thinking things...." (DM 24) Of course, Berkeley himself would ultimately maintain that these bodies or corporeal things are not substances but bundles of ideas which are dependent upon thinking things; however, he is careful never to take this step explicitly in *De Motu*.<sup>2</sup> It seems, then, that Berkeley himself did not suppose that his conclusions in *De Motu* depended upon the truth of immaterialism.

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References to all of the above are by section number, except for references to *Alciphron*, which are by dialogue, section, and page number.

<sup>2</sup>In fact, one might well describe Berkeley as attempting in *De Motu* to pass himself off as an odd kind of Cartesian. For another example, see DM 53, where Berkeley speaks uncharacteristically of a faculty of pure intellect (which, as it turns out, has spirit and the actions of spirit as its sole objects). There seems nothing dishonest in any of this; Berkeley doesn't say anything that *contradicts* his own metaphysical views. It's clear, however, that this presentation is strategic-- Berkeley doesn't want to alarm the French judges who will be awarding the prize nor to alienate the scientific audience he hopes to convince. Such rhetorical tactics are quite characteristic of Berkeley.

One of Berkeley's central contentions in *De Motu* is that dynamics is problematic because positing physical forces is nonsensical. The most important and most general problem with positing forces, Berkeley maintains, is that they are supposed to be corporeal, that is, physical qualities, yet they are supposed to be active, that is, they are supposed to be efficient causes of motion.<sup>3</sup> He proffers an instrumentalist interpretation of Newtonian dynamics which avoids the difficulties he claims are involved in a realistic interpretation.

A careful examination of Berkeley's attack on dynamical realism in *De Motu* reveals specific grounds for disputing Luce's evaluation of the work. The main task of this paper is to reconstruct Berkeley's central argument for his contention that dynamics can't be understood realistically. The argument is original and interesting and is certainly the sort of sustained argument that Luce claims to find lacking in *De Motu*. It does not, moreover, rely on immaterialism or idealism; in fact, it is not based on any distinctively *metaphysical* views at all. Rather, the argument is rooted in Berkeley's rigidly empiricist epistemological views and a certain thesis about the requirements of reference.

### **The argument**

Berkeley's target in *De Motu* is, as has been noted, *a certain kind* of realism about dynamics. It supposes, firstly, that forces are corporeal. This was certainly one obvious way of interpreting Newton's dynamics (and one followed by many later Newtonians), although it was by no means the only way or a way obviously advocated by Newton. Berkeley specifically declines to treat "spiritual force", which, he says, is not properly a subject for physics:

Those who derive the principle of motion from spirits mean by spirit either a corporeal thing or an incorporeal; if a corporeal thing,

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<sup>3</sup>See DM 5, 28, 29, 31, 67, 70.

however tenuous, yet the difficulty recurs; if an incorporeal thing, however true it may be, yet it does not properly belong to physics. (DM 42)

(Berkeley would, no doubt, maintain that the only sensible way of understanding the claim that there are spiritual forces is as merely stating that spirits causes the motions of bodies, but he does not argue this point in *De Motu*.) He assumes that no third kind of status (other than corporeal or spiritual) is available, an assumption shared by adherents of the mechanical philosophy.

The dynamical realism Berkeley attacks also supposes that forces are *causes* of motion. Certainly Newton and his followers accorded this status to at least some forces, although they may have thought that certain forces (e.g. attraction) could be reduced to more basic ones (e.g. impulse or repulsion).

The first premise of Berkeley's argument is taken from this sort of dynamical realism:

- (1) Physical forces are supposed to be active (i.e. causally efficacious) qualities of body.

The argument's second premise is not a broad metaphysical claim about the total passivity of body, but is importantly restricted:

- (2) But all the *known qualities* of body are passive.

Berkeley maintains and supports (2) in two central passages:

All that which we know to which we have given the name *body* contains nothing in itself which could be the principle of motion or its efficient cause; for impenetrability, extension, and figure neither include nor connote any power of producing motion; nay, on the contrary, if we review singly those qualities of body, and whatever other qualities there may be, we shall see that they are in fact passive and that there is nothing active in them which can be understood as the source and principle of motion. (DM 22)

Take away from the idea of body extension, solidity, and figure, and nothing will remain. But those qualities are indifferent to motion, nor do they contain anything which could be called the principle of motion. *This is clear from our very ideas.* (DM 29, my emphasis)

Berkeley's qualification in DM 22, "and whatever other qualities there may be," is, of course, crucial, since he is committed to the existence of more qualities of body than the corpuscularian "primary" qualities he casually lists. In Berkeley's view, color is a physical quality inseparable and unabstractable from (visible) extension. Likewise, temperature, taste, and smell are legitimate qualities of body. The known qualities of body are the sensible qualities.<sup>4</sup> (DM 29, by contrast, seems somewhat disingenuous insofar as it suggests that the corpuscularian concept of body exhausts the real qualities of body.)

But how is it established that the sensible qualities are uniformly passive? How can Berkeley rule out the possibility, for example, that solidity is an active quality which endows a body with the power to repel other solid bodies? DM 29 provides the beginnings of an answer-- the passivity of the qualities of body is supposed to be clear from our ideas of those qualities. Now, for Berkeley, our ideas of sensible qualities are all ideas of sense or ideas of imagination (which do not differ in kind from ideas of sense).<sup>5</sup> Thus, when Berkeley recommends that we "review... those qualities of body," he is directing us to recollect our sensory experiences, not to attempt to consult intellectual or abstract concepts. Even so, it's unclear how our sensory experience of the qualities of bodies could rule out those qualities being active, unless by "sensible quality" Berkeley *just means* "quality-as-sensed". If Berkeley were using "quality" in this special sense, it would follow from the plausible premise that we never directly perceive causal power that none of the sensible qualities are active; extension (i.e. extension-as-sensed) is thus passive, and likewise for solidity, et al. To put it another way, once it is granted that we

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<sup>4</sup>One might wonder whether impenetrability is sensible. It seems, however, that Berkeley means it to be equivalent to solidity, i.e. hardness, which is perfectly tangible.

<sup>5</sup>DM 21 and 53 confirm that Berkeley does not abandon or revise this opinion in *De Motu*.

don't sense any activity in sensing solidity, Berkeley is free to stipulate that "the sensible quality of solidity" is solidity stripped of any unsensed active aspect, which, if it existed, could be regarded as a separate quality.

That this is in fact Berkeley's line of reasoning here is confirmed by his clear use of it in a related section of *De Motu* where he argues that motion is passive:

Hence it is that many suspect that motion is not mere passivity in bodies. But if we understand by it *that which in the movement of a body is an object to the senses*, no one can doubt that it is entirely passive. (DM 49, my emphasis)

(2) thus amounts to the relatively uncontroversial claim that we do not directly sense any causal powers in body; the qualities-as-sensed of bodies are passive.

(2), then, is clearly much weaker than the claim that body *is* passive. It is so weak, however, that it seems that little of substance could follow from it, that, for example, its truth could not be taken to rule out the possibility that body might *have* active qualities, causal powers. Interestingly, however, Berkeley does not here attempt to conclude that body can't *have* active qualities; rather, he argues that it is nonsensical to *posit* any such qualities. He continues his argument as follows:

And so about body we can boldly state as established fact that it is not the principle of motion. But if anyone maintains that the term body covers in its meaning occult quality, virtue, form, and essence, besides solid extension and its modes, we must just leave him to his useless disputation with no ideas behind it, and to his abuse of names which express nothing distinctly. But the sounder philosophical method, it would seem, abstains as far as possible from abstract and general notions (if *notions* is the right term for things which cannot be understood).

The contents of the idea of body we know; but what we know in body is agreed not to be the principle of motion. But those who as well maintain something unknown in body of which they have no idea and which they call the principle of motion, are in fact simply stating that the principle of motion is unknown, and one would be ashamed to linger long on subtleties of this sort. (DM 23-4)

If therefore by the term *body* be meant that which we conceive, obviously the principle of motion cannot be sought therein, that is, no part or attribute thereof is the true, efficient cause of the

production of motion. But to employ a term, and conceive nothing by it is quite unworthy of a philosopher. (DM 29)

From what has been said it is clear that those who affirm that active force, action, and the principle of motion are really in bodies are adopting an opinion not based on experience, are supporting it with obscure and general terms, and do not well understand their own meaning. (DM 31)

A preliminary unpacking of the argument of these passages might look like this: From (1) & (2), Berkeley deduces (3):

(3) Force is an unknown quality of bodies.

From (3), he indicates that (4) follows:

(4) The term 'force' is empty.<sup>6</sup>

And (4), he supposes, rules out dynamical realism by dictating that 'force'-terms don't name anything.

How compelling is this argument? The first thing to note is, given the interpretation of (2) deduced above from Berkeley's attempts to support it, (3) amounts merely to the claim that we have no direct sensory experience of force.<sup>7</sup> But then, does (4) follow from (3)? An importantly qualified version of (4), (4-a) follows readily enough:

(4-a) The term 'force' is empty of sensory significance.

But (4-a) does not seem nearly damning enough to rule out dynamical realism.

### **The significance of 'force'-terms**

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<sup>6</sup>And likewise, of course, for other terms for forces, e.g. 'gravity'.

<sup>7</sup>One might object that, strictly speaking, (3) only follows from (1) and (2) if its supposed that force is *nothing but* activity. (The idea is that we might have some sensory access to forces without having access to their activity.) This is not a serious objection, however, since 'force' could simply be replaced by 'the activity of force' in (3)-(4). It would follow, then, that we cannot intelligibly posit *forces* in the sense of (1), forces that are active.

In the passages cited, Berkeley emphasizes the vacuity of dynamical terms. One obvious way of interpreting his remarks is as claiming that the term 'force' is *utterly without significance*, i.e. meaningless. This claim would seem to be strong enough to rule out dynamical realism. Two distinguished commentators, Karl Popper and Gerd Buchdahl, have represented Berkeley as arguing in this way. The resulting account of Berkeley's argument, however, is seriously oversimplified because it is based on a misrepresentation of Berkeley's semantic views. A brief excursion into Berkeley's views on the significance of 'force'-terms is therefore required in order to arrive at a more precise understanding of (4).

Popper sees Berkeley as basing a claim that dynamical terms are meaningless on the thesis that "to have meaning, a word must stand for an idea."<sup>8</sup> Buchdahl, while taking note of the exception made for general terms, attributes very nearly the same semantic view to Berkeley, and seems to see this view as a primary source of his anti-realism about dynamics.<sup>9</sup>

For convenience, I will refer to the semantic thesis that every meaningful word must stand for an idea as "strict Lockeanism", although it represents something of an oversimplification of Locke's own semantic views.<sup>10</sup> The important point, for my purposes, is that Berkeley emphatically rejected strict Lockeanism (which he

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<sup>8</sup>Popper, "Berkeley as a Precursor of Mach and Einstein," in *Berkeley's Principles of Human Knowledge, Critical Studies*, ed. G.W. Engle and G. Taylor (Belmont, Cal.: Wadsworth Publishing Co., 1968), 96.

<sup>9</sup>Buchdahl, *Metaphysics and the Philosophy of Science* (Cambridge: MIT Press, 1969), 289.

<sup>10</sup>Given Locke's discussion of language in Book III of the *Essay*, it's certainly *prima facie* plausible to attribute to Locke the view that significant words, excepting particles, stand for ideas. The question of whether *Berkeley* was right to attribute this view to Locke is complicated by further questions about the extent to which Locke and Berkeley have a common understanding of what ideas are. John Locke, *An Essay Concerning Human Understanding*, ed. Peter H. Nidditch (Oxford: Clarendon Press, 1975). (References to the *Essay* in what follows are by book, chapter, and section number.)

did indeed associate with Locke<sup>11</sup>) as early as 1708, when he wrote the "Draft Introduction to the Principles." In the published Introduction, Berkeley attacks strict Lockeanism as the source of the doctrine of abstract ideas and argues that language may be significant despite not suggesting ideas, e.g. by provoking certain emotions.<sup>12</sup> Most significantly, in the seventh dialogue of *Alciphron*, he argues for a broader exception to strict Lockeanism:

A discourse, therefore, that directs how to act or excites to the doing or forbearance of an action may, it seems, be useful and significant, although the words whereof it is composed should not bring each a distinct idea into our minds. (A VII, 5, 292)

Berkeley's primary *example* of a discourse which has significance in virtue of its use is Newtonian dynamics.<sup>13</sup> 'Force'-terms, he holds, acquire a sort of significance through their role in guiding action.<sup>14</sup>

Of course, one might interpret Berkeley as simply having changed his mind about the significance of 'force'-terms sometime in between publishing *De Motu* and *Alciphron* (that is, between 1721 and 1732). There are good reasons, however, for supposing that the two works are consistent on this issue. One important consideration is the previously-noted fact that Berkeley consistently maintained (from 1708 or so, when he wrote the "Draft Introduction to the Principles," throughout his philosophical career) that words *could* be significant despite not suggesting ideas. And this fact alone requires interpreting Berkeley as occasionally overstating his point in *De Motu* for rhetorical effect. Such passages (e.g. DM 29) are readily understood as making the point that employing a term *as a*

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<sup>11</sup>This is evident from the fact that Berkeley held that the doctrine of abstract ideas was motivated by the thesis that every significant word must stand for a determinate idea, and Locke, of course, was the explicit target of Berkeley's anti-abstractionism. Entry #667 in Berkeley's philosophical notebooks also contains a telling allusion to Locke's semantic views.

<sup>12</sup>See I-PHK 20.

<sup>13</sup>A VII, 7.

<sup>14</sup>A VII, 8, 296-7.

*name* and conceiving nothing by it (i.e. having no associated idea or notion) is “unworthy of a philosopher”. Moreover, the fact that Berkeley footnoted *De Motu* approvingly in *Siris* (section 250), published in 1744, and republished *De Motu* in 1752 indicates that Berkeley saw the essay as consistent with his later views.

A comprehensive look at Berkeley's semantic views, then, makes clear that he would not have argued that dynamical terms lack *all* significance. Rather the cited passages from *De Motu* should be understood as asserting that dynamical terms lack a particular sort of significance, the sort of significance which would allow them to *refer*. This thesis, (4-b), is strong enough to rule out dynamical realism:

(4-b) The term 'force' is empty of any significance adequate to secure reference.<sup>15</sup>

If 'force'-terms don't name anything, then it is nonsensical to posit forces.

### **The role of Berkeley's empiricism in supporting the argument**

The crucial move in Berkeley's argument, then, is the leap from (4-a), the claim that 'force'-terms lack sensory significance, to (4-b). How is this leap to be justified? Evidently, Berkeley needs to argue that the only significance appropriate for securing the reference of 'force'-terms is sensory significance. In effect, Berkeley defends a more general claim, from which (4-b), given (1) and (4-a), follows:

(Bridge) The only significance appropriate for securing the reference of terms for physical items is sensory significance.<sup>16</sup>

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<sup>15</sup>Here and throughout, by 'secure reference' I mean 'secure reference, all else permitting.' Of course, no matter how clear our force-concepts are, 'force'-terms won't refer if forces don't exist.

<sup>16</sup>(Bridge) has an air of anachronism about it which is easily dispelled by seeing it as a consequence of two more general and more obviously Berkeleyian principles: 'You can't name anything of which you can't conceive' and 'Conceiving of something physical requires having an idea of it.' I focus on (Bridge) itself in what follows because it is precisely what is required for Berkeley's case against

Berkeley attempts to support (Bridge) in several passages, most notably *De Motu* 21:

To throw light on nature it is idle to adduce things which are neither evident to the senses, nor intelligible to reason. Let us see then what sense and experience tell us, and reason that rests upon them. There are two supreme classes of things, body and soul. By the help of sense we know the extended thing, solid, mobile, figured, and endowed with other qualities which meet the senses, but the sentient, percipient, thinking thing we know by a certain internal consciousness. Further we see that those things are plainly different from one another, and quite heterogeneous. I speak of things known; for of the unknown it is profitless to speak. (DM 21)

In *De Motu* 21, Berkeley outlines an epistemology which justifies (Bridge). From other passages in *De Motu*, we can fill out the account as follows: The sources of knowledge are three-fold: sense, imagination, and reflection on mental processes ("internal consciousness" or "intellect"). Imagination, however, is parasitic on sensation; nothing can be imagined which is not of a sensible kind, possessed of sensible qualities:

For nothing enters the imagination which from the nature of the thing cannot be perceived by sense, since indeed the imagination is nothing else than the faculty which represents sensible things either actually existing or at least possible. (DM 53)

Reflection can supply us with knowledge only of spirits and their activities:

Pure intellect... is concerned only with spiritual and unextended things, such as our minds, their states, passions, virtues, and such like. (DM 53)

This is certainly a rigidly empiricist epistemology, and one which might well have been resisted by Berkeley's more Cartesian readers. Certainly the limited scope allotted to "intellect" would have seemed quite mistaken to Descartes. Leibniz, moreover, held that the intellect is the source of a *metaphysical* notion of

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dynamical realism and because a discussion of the nature of "conceiving" would take me too far afield.

force which provides a necessary foundation for physics.<sup>17</sup> Berkeley's empiricism, which he does not defend against alternative epistemologies, rules out any such picture of how we attain a concept of force.

What makes this account still more restrictive, and what enables it to justify (Bridge), is that Berkeley builds into it a great divide between sense/imagination and reflection, such that it is illegitimate to use reflection on mental processes to give content to terms for physical things (and, likewise, illegitimate to use imagination to give content to terms for spiritual things). Locke's empiricism, by contrast, includes no such restriction. Locke maintains that we acquire our most clear and distinct idea of active power from reflection on the operations of our minds. He holds, further, that this very idea of active power, so derived, is applicable to bodies, although an idea of active power can only be *derived* from bodies in an obscure form.<sup>18</sup>

Berkeley supports the restriction by eloquent appeals to the heterogeneity of body and spirit:

A thinking, active thing is given which we experience as the principle of motion in ourselves. This we call *soul*, *mind*, and *spirit*. Extended thing also is given, inert, impenetrable, moveable, totally different from the former and constituting a new genus. Anaxagoras, wisest of men, was the first to grasp the great difference between thinking things and extended things, and he asserted that the mind has nothing in common with bodies, as is established from the first

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<sup>17</sup>See "A Specimen of Dynamics", 119, "New System of Nature", 139, and "On Nature Itself", 159, in *Philosophical Essays*, ed. Roger Ariew and Daniel Garber (Indianapolis: Hackett, 1989).

Interestingly, in the *Nouveaux Essais*, Leibniz seems to endorse Locke's account (briefly described below) of the origins of the idea of active power. One suspects, however, that the agreement is somewhat superficial; Leibniz seems to be using Locke to make the point that forces are soul-like. *New Essays on Human Understanding*, ed. Peter Remnant and Jonathan Bennett (Cambridge: Cambridge University Press, 1981), 169-172 (II, xxi, 1-4).

<sup>18</sup>Locke explicitly mentions the possibility that matter might in fact not possess any truly active powers, but he clearly holds that it makes sense to suppose that matter has such powers. *Essay*, II, xxi, 2-4.

book of Aristotle's *De Anima*. Of the moderns Descartes has put the same point most forcibly. What was left clear by him others have rendered involved and difficult by their obscure terms. (DM 30)

This restriction is crucial for Berkeley, since he admits, even insists, that we have some notion of spiritual activity or force:

Besides corporeal things there is the other class, *viz.* thinking things, and that there is in them the power of moving bodies we have learned by personal experience. (DM 25)

...we feel it [mind] as a faculty of altering both our state and that of other things, and that is properly called vital, and puts a wide distinction between soul and bodies. (DM 33)

This restriction might appear to be easily the weakest step in Berkeley's argument against dynamical realism. Given that a notion of activity is readily available, it's not at all clear why that notion should not be applicable to the physical realm, such that it could give the physicists' use of the term 'force' enough significance to permit reference and save realism.

### **Anti-abstractionism as support for the argument**

One suspects that Berkeley would respond to such a suggestion (and to Locke, as I interpret him) by denouncing abstraction. And indeed, it seems that Berkeley has an anti-abstractionist argument available to block such a move. Although he does not make such an argument in *De Motu* (unsurprisingly, since he does not explicitly consider the objection made above), he does allude to its main ingredient:

Too much abstraction, on the one hand, or the division of things truly inseparable, and on the other hand composition or rather confusion of very different things have perplexed the nature of motion. (DM 47)

The argument, modelled on one he offers in several other works, would run like this:<sup>19</sup> What is impossible is inconceivable. Therefore, what cannot exist separately (as two things) cannot be conceived of as existing separately. Now, it is not possible for a spirit's activity to exist apart from the spirit. Therefore, it is not possible to conceive of a spirit's activity existing apart from the spirit. Therefore, we cannot attain any notion of spiritual activity separate from spirit which we could then *transfer* to the corporeal domain.<sup>20</sup>

The argument thus constructed on Berkeley's behalf is significantly different from those he actually makes in attacking abstract ideas, in that what is under attack is something more general than abstract *ideas*, that is, separate or abstract *conceptions*. This shift is necessary, of course, since Berkeley maintains that we cannot have ideas of spirits or their actions. I take it that this generalization of the argument is legitimate for two reasons. First, Berkeley does hold that we somehow conceive of spirits and their actions (i.e. we have notions of them), although we do not do so "by way of idea." Second, Berkeley holds that what is impossible cannot be conceived of *at all*: it's not just that we can't form *ideas* of impossibilities. It is clear that Berkeley does object to this sort of abstraction and does consider it to *be* a sort of abstraction from PHK 143:

It will not be amiss to add, that the doctrine of abstract ideas hath had no small share in rendering those sciences intricate and obscure, which are particularly conversant about spiritual things. Men have imagined they could frame abstract notions of the powers and acts of the mind, and consider them prescinded, as well from the mind or spirit itself, as from their respective objects and effects.

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<sup>19</sup>See "First Draft of the Introduction to the Principles," *Works* 2: 125; "Defense of Free-Thinking in Mathematics," *Works* 4: 143; and A VII, 6 333-4.

<sup>20</sup>This argument might at first glance appear to beg the question, but it does not. It does not require assuming that activity couldn't exist in body without spirit, but only that a particular spirit's activity couldn't exist without that spirit. The argument then (purportedly) blocks an attempt to extract a separate notion of activity from a particular active spirit.

There are three obvious ways to try to resist the argument. First, one might simply deny the first premise. However, although this premise might seem questionable, it was a commonplace of 17th and 18th century philosophy.<sup>21</sup> (Whatever is conceivable is non-contradictory, and thus, it was thought, possible, since God *could* make it so.) Secondly, one might (in a Humean mood, perhaps) assert that it *is* possible for a particular instance of spiritual activity to exist without spirit. Although Berkeley himself went through a Humean phase with respect to his view of spirit (wherein he identified spirits with bundles of volitions), his considered view rules out this response by dictating that particular volitions and ideas require the support of spiritual substance, the essence of which is to will and to perceive/understand.<sup>22</sup> This conception of spirit or mind certainly would have seemed familiar and uncontroversial to Berkeley's Cartesian readers. And, although it will doubtless seem more controversial to present-day readers, it could scarcely be called unintuitive. Thirdly, one might try to turn Berkeley's own alternative to abstraction against him. Although Berkeley argues that we cannot form an abstract idea of triangularity, he does acknowledge that "a man may consider a figure merely as triangular, without attending to the particular qualities of the angles, or relations of the sides." (PI 16) Presumably, then, he would also allow that we can selectively attend to activity, i.e. consider a spirit's activity without attending to other aspects of its spiritual nature. Isn't that enough, one might ask, to ensure that when I talk of physical forces, that talk isn't so empty as

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<sup>21</sup>It was accepted, in particular, by defenders of abstraction. See Julius Weinberg, *Abstraction, Relation, and Induction* (Madison: University of Wisconsin Press, 1965), 17-18, Douglas Jesseph, *Berkeley's Philosophy of Mathematics* (Ph.D. diss., Princeton University, 1987), 21, and Kenneth Winkler, *Berkeley: An Interpretation* (Oxford: Clarendon Press, 1989), 37-8.

<sup>22</sup>For evidence of Berkeley's Humean phase, see PC 615, 478a, 712. For an account of the changes and tensions in Berkeley's view of spirit, see Charles McCracken, "Berkeley's Notion of Spirit," *History of European Ideas* 7 (1986), 597-602.

to be obviously non-referring? Berkeley, it seems, would simply have to insist that something somehow more distinct and concrete-- a directly applicable idea or notion-- is required to make sense of 'force'-terms as potentially referring. This undefended (while not obviously implausible) position on the requisites of reference, then, is in effect the foundation for his claim, in *De Motu*, that positing forces is nonsensical. The position itself seems quite Lockean, which is unsurprising since Berkeley's semantic views are derived from Locke's (although, as I have shown, Berkeley rejects what he sees as strict Lockeanism about meaning/significance).<sup>23</sup> When this requirement for reference is combined with Berkeley's anti-Lockean views on abstraction, however, the results, as we have seen, are quite unLockean.

### **Underdetermination as grounds for anti-realism?**

W.H. Newton-Smith attributes a very different argument against dynamical realism to Berkeley.<sup>24</sup> Newton-Smith sees Berkeley as foreshadowing Duhem and Quine by premising his argument against scientific realism on the "thesis of the underdetermination of theory by data." He bases this interpretation on one intriguing section of *De Motu*:

It is clear, moreover, that force is not a thing certain and determinate, from the fact that great men advance very different opinions, even contrary opinions, about it, and yet in their results attain the truth. For Newton says that impressed force consists in action alone, and is the action exerted on the body to change its state, and does not remain after the action. Torricelli contends that a certain heap or aggregate of forces impressed by percussion is received into the

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<sup>23</sup>See Locke's *Essay*, III, iii, 2:

For the signification and use of Words, depending on that connexion, which the Mind makes between its *Ideas*, and the Sounds it uses as Signs of them, it is necessary, in the Application of Names of things, that the Mind should have distinct *Ideas* of the Things, and retain also the particular Name that belongs to every one, with its peculiar appropriation to that *Idea*.

<sup>24</sup>W.H. Newton-Smith, "Berkeley's Philosophy of Science," in *Essays on Berkeley*, ed. J. Foster and H. Robinson (Oxford: Clarendon Press, 1985), 149-161.

mobile body, and there remains and constitutes impetus. Borelli and others say much the same. But although Newton and Torricelli seem to be disagreeing with one another, they each advance consistent views, and the thing is sufficiently well explained by both. For all forces attributed to bodies are mathematical hypotheses just as are attractive forces in planets and sun. But mathematical entities have no stable essence in the nature of things; and they depend on the notion of the definer. Whence the same thing can be explained in different ways. (DM 67)

The first thing to note about this interpretation is that it attributes a gross non sequitur to Berkeley. Newton-Smith paraphrases Berkeley's argument in this passage as follows: "Forces are not determinate since Newton and Torricelli tell different stories about them."<sup>25</sup> But, of course, a mere example of two contradictory theories which have so far both agreed with observation has no implications for realism. Anti-realist consequences for dynamics might be held to follow from the limited underdetermination thesis that both theories "make exactly the same predictions" and "fare equally well on any principle of theory choice which is of epistemic value"<sup>26</sup>, but nowhere in this passage does Berkeley support any such claim, nor is it clear that he *makes* one. Certainly, there is absolutely no textual evidence that Berkeley ever entertained the thesis that Newton-Smith sees him as assuming without argument, the thesis (labelled "UTD" by Newton-Smith) that "for any subject matter there will be a pair of evidentially equivalent theories which are logically incompatible,"<sup>27</sup> that "for any Newton there is a Torricelli."<sup>28</sup> Interestingly, Newton-Smith seems to acknowledge that his interpretation leaves Berkeley's position looking rather embarrassing; the main virtue of the interpretation, as he sees it, is that it gives Berkeley's views "contemporary significance":

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<sup>25</sup>Ibid., 157.

<sup>26</sup>Ibid., 156.

<sup>27</sup>Ibid.

<sup>28</sup>Ibid., 158-9.

Berkeley's semantical instrumentalism rests then on an entirely speculative conjecture of UTD. While there is no good reason to think the conjecture is true, his philosophy of science would be appropriate should it be true. And while the science of his day did not render the conjecture plausible, the arguments of Duhem and Quine have generated sufficient interest in UTD to give Berkeley's philosophy of science contemporary significance.<sup>29</sup>

Newton-Smith, however, misunderstands Berkeley's point in the passage. A closer examination of the latter half of the passage shows that Berkeley's argument is very nearly the reverse of the argument Newton-Smith attributes to him.

Berkeley argues that *because* dynamical terms refer to nothing in the nature of things, so that forces are mere fictions, seemingly contradictory theories may be equally satisfactory, for they may work equally well and provide equally good scientific explanations (in Berkeley's sense of "scientific explanation"). Berkeley notes that the theories are not really inconsistent, for they do not make literal claims and their significance derives from their results. Thus the plurality of equally adequate dynamic theories is for Berkeley a *consequence* of the fact that 'force'-terms don't refer to any underlying entities.<sup>30</sup> Berkeley's point in the first sentence of the quoted passage is just that in the proliferation of dynamical theories, we should see the effects of employing non-referential terms in physics.

Berkeley's "semantical instrumentalism," as Newton-Smith labels it, is thus grounded (as far as his explicit arguments in *De Motu* are concerned) in his *semantics* and epistemology, not in a Quinean thesis about underdetermination.<sup>31</sup>

### **The argument's rhetorical role and implications**

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<sup>29</sup>Ibid., 159.

<sup>30</sup>Here I am in agreement with Popper, who, unlike Newton-Smith, in my view correctly understands the direction of Berkeley's argument in this passage. See Popper, "Berkeley as a Precursor of Mach and Einstein," 94-95.

<sup>31</sup>I do agree with Newton-Smith's basic characterization of Berkeley's instrumentalism; see Newton-Smith, "Berkeley's Philosophy of Science," 150.

To recapitulate, Berkeley's argument against dynamical realism can be broken down as follows:

(1) Physical forces are supposed to be active qualities of body.

(2) But all the *known qualities* of body are passive.

(3) Force is an unknown quality of bodies. (from 1 and 2)

(4-a) The term 'force' is empty of sensory significance. (from 3)

(Bridge) The only significance appropriate for securing the reference of terms for physical items is sensory significance.

(4-b) The term 'force' is empty of any significance adequate to secure reference. (from Bridge, 1, and 4-a)

(4-b) rules out dynamical realism, for if 'force'-terms don't name anything, then dynamical realism is fundamentally confused. (Bridge) is supported by appeal to a strictly empiricist epistemology and might be further shored up by anti-abstractionism and a thesis about the conceptual requirements for reference.

Given the intricacy of this argument, one might well wonder what advantage Berkeley saw in offering it rather than arguing that dynamical realism is impossible because body *is* passive, that is, bodies are never efficient causes. After all, Berkeley did hold that only spirits are causally efficacious. The obvious way of arguing for this metaphysical thesis, however, would have exposed Berkeley's more controversial metaphysical views, which he evidently sought to keep under wraps in *De Motu*<sup>32</sup> Berkeley does allude in *De Motu* to various grounds (none of them immaterialist or idealist) for thinking that body *is* passive, e.g. he appeals to a Cartesian conception of God's relation to the world.<sup>33</sup> However, Berkeley's central

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<sup>32</sup>The argument of PHK 25 is easily extendable into an argument against dynamical realism. I agree with Philip Cummin's claim that the argument of this passage presupposes idealism. See Cummin's paper, "Berkeley's Manifest Qualities Thesis," *Journal of the History of Philosophy* 28 (1990), 385-401.

<sup>33</sup>See DM 34.

argument against dynamical realism does not employ the metaphysical thesis, but rather, (2), a much weaker claim. Berkeley might rightly have expected (2) to be much more appealing than the metaphysical thesis to anyone with a skeptical bent, who might be inclined to deny that we can be sure of our grasp of the nature of body (or of God's relation to the world). Since Berkeley was quite sensitive to the possibility of skepticism and was always concerned to combat it, one might plausibly speculate that this sensitivity shaped his choice of argument here. Moreover, Berkeley might reasonably have expected many readers, especially the skeptically inclined, to jump immediately from (3) to a rejection of dynamical realism simply out of a horror of occult qualities.<sup>34</sup> (Berkeley seems to deliberately obscure the fact that he's only really argued that forces are *unsensed* in order to encourage this leap; still, even a reader who noted that fact might be inclined to make the leap out of vaguely empiricist sentiments.)

Of course, the most fundamental explanation of why Berkeley gave *this* argument is the simple fact that he held the semantic and epistemological views that make it a compelling argument against realism about dynamics.

One very interesting implication of this analysis of Berkeley's argument should be noted: The argument, when generalized, does not rule out realism about all theoretical (i.e. unobserved) entities, nor even all *unobservable* entities. Rather, it applies only against purported entities which are not supposed to possess qualities *of a sensible kind* (i.e. extension (visible or tangible), color, taste, smell, sound). Thus, Berkeley maintains in *De Motu* that it's nonsensical to posit *unimaginable* entities.<sup>35</sup> Theoretical particles which are supposed to possess figure and motion count as imaginable by Berkeley's criteria:

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<sup>34</sup>A horror Berkeley is careful to cultivate in *De Motu*. See DM 4.

<sup>35</sup>Likewise, it's nonsensical to posit unimaginable qualities of otherwise imaginable things.

And here it may not be amiss to observe that figures and motions which cannot be actually felt by us, but only imagined, may nevertheless be esteemed tangible ideas, forasmuch as they are of the same kind with the objects of touch, and as the imagination drew them from that sense. (TVV 51)

Thus, Berkeley's case against realism in *De Motu* does not rule out positing such particles, but does proscribe any (realistically understood) attribution of forces to particles. In this respect, Berkeley's instrumentalism about dynamics is in harmony with his apparently realistic corpuscularian speculations in *Siris*.<sup>36</sup>

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<sup>36</sup>Berkeley does retain his dynamical anti-realism in *Siris*:

Sir Isaac Newton asks, Have not the minute particles of bodies certain forces or powers by which they act on one another, as well as on the particles of light, for producing most of the phenomena in nature? But, in reality, those minute particles are only agitated according to certain laws of nature, by some other agent, wherein the force exists and not in them, which have only the motion.... (S 250)

See also S 155, 234, 246.