

# Kant and Leibniz on Living Force

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The interpretation of Kant's works has been guided, since Kant's own time, by his suggestion that the works written prior to the publication of the *Critique of Pure Reason* are of lesser philosophical interest than either the *Critique* itself or the works published subsequent to it. I would like to suggest that in tending to abide by this hermeneutic rule that commentary on Kant has been deflected from understanding the sources of some central Critical positions and, furthermore, that many of the supposedly "pre-Critical" works are of serious philosophical interest. In pursuit of a partial defence of these general positions I will today focus on Kant's very first published work, *Thoughts on the True Estimation of Living Forces*.<sup>1</sup> The work's main aim was to respond to the controversy between Leibnizians and Cartesians concerning the understanding of the scope and construal of conservation principles in relation to physical bodies and their metaphysical basis. Broadly speaking, Descartes favoured the view that what is conserved is the quantity of motion in the world where force was understood to be directly proportional to velocity.<sup>2</sup> By contrast to Descartes, Leibniz presents an account of force that is not purely quantitative but also qualitative. On Leibniz's construal the equation of force with motion is a product of a mistake as motion is only a product of quantity of matter with velocity and Leibniz terms this "dead" force. By contrast with this he argues that there is a "living" force which is the measurement of the product of matter and the square of velocities and it is living force, not mere motion, that is conserved in quantity.<sup>3</sup>

The dispute that arose between these two forms of understanding of conservation is what leads Kant in this first

essay to probe the question of how to measure living forces, a question that is however probed in the first part of his treatise through a set of arguments concerning the definition of “certain metaphysical concepts bearing on force in bodies in general”(Ak. 1: 17). Since the dispute between Leibniz and the Cartesians was over the equation of force with motion it is not surprising that Kant opens the work by stating that it is a commonplace to remark that if a body is in motion then it has a force due to the fact that “all the world agrees” that action is the ability to overcome hindrances and displace masses.

That there is a problem with this commonly held view is immediately made clear when Kant states that this equation of force with the ability to act, an equation that is based on the assumption that motion involves force, is one that is based in its turn on “what the senses teach”. In immediately suggesting that the Cartesian understanding of force as measured by conservation of motion is something based on the opinion of the world, an opinion grounded on the appeal to the evidence of the senses, Kant is implying that in this respect Descartes did not follow his first rule of method, namely to commit his judgment to nothing that cannot be shown to be certain.<sup>4</sup>

The assumption that we should understand the force present in bodies by reference to the motions of them, the assumption that leads to the Cartesian understanding of the principle of conservation also has two consequences that Kant mentions, to the effect that force, viewed in terms of motion alone, is something that is communicated to a body entirely externally and, that force is not present in a body that is at rest.<sup>5</sup> The nature of these assumptions is effectively what Kant will go on to test though not without mentioning that Leibniz and Aristotle depart from the reliance on the senses that these views represent and that Leibniz is the one who teaches us that there is in body a force that is essential to it and which belongs to it even prior to the property of extension.<sup>6</sup>

The result of the first section of the work is thus that Kant would appear to be aligning himself with Leibniz against the Cartesians, an appearance that we will soon see has some justification but which is very swiftly complicated. The second section adds the point that Leibniz's notion of force is an active one and distinguishes between Leibniz's own view of this and the defence offered of his view by later thinkers such as Wolff who have tended to view force precisely in terms of movement. This tendency has led the later thinkers to view force in terms of "pressure" and "striving" which effectively renders the understanding of force through the concept of actuality, which, states Kant, is as bad as viewing temperature as based on faculties of heat and cold. The second paragraph thus makes clear that Kant's agreement with Leibniz, such as it is, is not one with the Wolffian school. The key paragraphs three and four then bring out firstly the nature of the disagreement with the Wolffian interpretation of force and the correct account of the relationship between movement and active force.

Andrew Carpenter has described paragraph 3 of the work as "word for word, one of the most obscure passages Kant published".<sup>7</sup> Whilst I will be suggesting that this is an overstatement it is the case that this short section marks an extraordinary moment of compression in the development of Kant's argument. What he gives here are three examples meant to show that a body's motion is not commensurate to its action and, connected to these examples, are two arguments that aim to convince us that the understanding of force as something that essentially involves movement is an incoherent conception. To attempt to do this in a section that includes only seven sentences is something of a feat so, that the basis of the argument may require some uncovering, is not surprising. The central contention of the section is stated instantly; to the effect that motion is not correctly viewed as a kind of action. The first example is then given.

A body to which an infinitely small opposition is made, and one which therefore hardly acts at all, has motion in an especial degree. The motion is only the external

phenomenon of the state of the body; for the body is not here acting, and yet is striving to act. (Ak. 1: 18)

This body is one that faces almost no opposition and, since there is almost no opposition to its movement and we initially framed our understanding of action in terms of the overcoming of hindrances, we should say, since there is almost nothing to overcome, that there is also almost no action. This however does not imply that the body in question is hardly moving as the very fact that there is scant opposition to the movement of the body in question ensures that its movement is particularly pronounced. The nature of the movement in question is close to that of inertial motion which Kant describes in paragraph 15 as having “the characteristic of maintaining itself indefinitely in the body in which it was imparted, if no obstacle is set against it” (Ak. 1: 28).<sup>8</sup> The peculiarity of the passage is that Kant, in the first sentence of section 3, suggests that in this case there is hardly any action whilst in the second sentence of the same section, he hardens his position to saying that there is *no* action here at all, merely a striving to act. The reason for the movement between the two sentences is that the definition of pressure in the second paragraph had been in terms of an exertion that strives towards motion if we think of force in terms of movement. Since this example in fact shows, on Kant’s view, the distinction between force and movement we are led thereby to the position of thinking that movement is only an “external phenomenon” of the body’s state.<sup>9</sup>

The second example follows from the first one but is a development on from it. In this case we consider that the motion of the body stops due to the body having come into contact with another one. It has hence reached the obstacle indicated in Kant’s account of inertia. In this case there is a moment of being brought to rest in which movement halts but action does not. The thought here is clearly that the second body with which the first has come into contact is sufficiently dense to prevent our first body from moving further which does not however prevent our first body from

still exerting force on the second but this force is not one that is accompanied further by external manifestation in movement. Since however the hindrance that is preventing the external manifestation of movement does so precisely due to the *degree* of its hindrance so the force that is being exerted in this case would be *proportionate* to the hindrance and thus, despite the absence of movement, the force would be being exerted to a great degree. The first two examples are hence mutual counterparts. The first example shows movement being exercised without corresponding force, the second force being exercised without corresponding movement.<sup>10</sup>

Two surprising developments of Kant's arguments next emerge in this section and account for Carpenter's view that this section of the work is particularly obscure. Firstly, Kant draws a general conclusion from the two examples that is pitched in surprising terms, secondly he introduces a third example that appears less clear than the first two and thirdly he appears to make a statement about all three examples.

We should not, therefore, take our title for the force of a substance from that which is not an action; and still less should we say of the bodies which act while they are at rest (e.g., a sphere which through its weight presses upon the table on which it lies) that they strive to move. For since in moving they would not be active, we should have to maintain that in so far as a body is active it strives to fall into the state in which it does not act. (Ak 1: 18)

**T**he general conclusion is given in the first of these statements where we are warned against understanding force after a pattern of what is not an action which would appear to follow from the account of why action is not a movement and be a rejection therefore of the term *vis motrix*. This is a clear continuation of the argument of the section but what is surprising is that Kant here refers to "the force of a substance" not the force of a body although until now he has only discussed bodies. Since however we have been given no reason as yet to think that substances

should be characterised in corporeal or material terms this move is one that has no justification.

The reference to the example of the sphere is clearly patterned after the second example of a body being brought to rest and with the reference to striving is an alternative description of pressure to the Wolffian one that views pressure through such striving with the argument being that in this case the sphere is indeed exerting pressure on the surface it is placed but that this pressure is a product of the force of the sphere not of any striving toward movement. This example is distinct from the second one as in that case it was the moment of being brought to rest which was being seen as a moment of great force and hence paralleled the first example where a point of significant movement was aligned with a description where no force was acting. The third example by contrast is of a stationary body and a description is being made of how to understand the pressure which such a body is exerting as being not a movement but an action. The understanding of this example is one of the things that Carpenter finds difficult. However there is a parallel to this example in the *Critique* where Kant refers to a ball being laid on a cushion and producing a hollow in the latter (A203/B248). Whilst the point of introducing this example in the *Critique* concerns the understanding of causal action as based on an *order* of time that need not be correlated to *lapses* in time and is hence not of a piece with the example of the sphere in *Living Forces* it is nonetheless possible to interpret the example used in the *Critique* in accordance with the point in *Living Forces*. After the ball has been left on the cushion it is stationary and this does not prevent it from acting on the cushion in the sense that the cushion, whilst the ball is placed upon it, continues to have a hollow and thus there is here “pressure” being exerted and the question of the nature of the pressure is answered by the argument from *Living Forces*, it is a pressure that indicates that the ball is acting by means of a force but this is clearly not a force that requires movement as the ball is stationary.

So the ball and the sphere on the table are acting in the same way.

Having focused on this example and its sense we can now move to the more obscure sentence that followed the third example. The third example was introduced as a case of a body that acts whilst at rest and hence was related to the second example which was acting whilst it had been brought to rest. In both cases we saw examples of types of action that Wolffian thinkers were presenting, due to the fact that pressure was being exerted, as involved in “striving” to move and the point of the description of them both is to show that, rather than “striving” to move they were cases that harmonized with the first example in demonstrating that action should not be thought in terms of movement as here action was occurring although movement was not. Now Kant rounds out his argument as to why the description of these bodies as involved in “striving” is incoherent stating that if we adopted this description we should have to say that “in so far as a body is active it strives to fall into the state in which it does not act” (Ak. 1: 18). The reason Kant argues this is clear which is that the fact of movement would not be correlated with the state of acting should either of these bodies partake of movement. If the first body was to move the reason for it would have to be connected to its relation to the body that was acting as an obstacle, it would therefore have to arise due to circumstances beyond the body in question. If the sphere were to move then it would also be due to external conditions as its presence on the table is one in which its state of being stationary is an adequate expression of its force so that the alteration of place would be one in which force was lessened, not increased. In either case therefore, if we understood the bodies in question to be striving, we would be seeing them as having an active orientation not to act. The basic argument of the section concerns a rationale for thinking that bodies do, as the title of the first section put it, have a force that is essential to them. The suggestion of the argument of the third section however is that this essential force cannot be measured in terms of the

movement the bodies in question are performing as if it could be so correlated then it would follow that bodies at rest would be bodies that possessed no force which in the first section Kant already mentioned as a consequence of viewing force in terms of the external phenomenon given to the senses. Force is hence to be viewed as something that is internal to a body, not merely external to it.<sup>11</sup> On my construal the argument of paragraph three of *Living Forces* is not as obscure as Carpenter suggests but there are two outstanding problems. The first is why Kant moved in the middle of this section from description of bodies to talk of substances only to return almost immediately to discussing bodies again? The second concerns the understanding of whether there is force operative in the first example where we found movement but an initial designation that the force was acting hardly at all to a second designation that it was absent. The second question is easier to address than the first as what follows from the discussion of the examples of section 3 is a re-description of Leibniz's distinction between two types of force.

In the *Specimen Dynamicum* Leibniz distinguished between living force and dead force describing the latter through such examples as centrifugal force and the force of gravity. The example of dead force thus appears to be of a pattern with the force of inertia, an impression reinforced by the fact that Leibniz does not even describe these cases as ones of motion but only as cases of what he terms "solicitation to motion". On the other hand, living force is manifested when something has for him actual motion in which the motion arises then from the body itself<sup>12</sup>. By contrast to these accounts what we have in Kant is rather a description in which motion and force are seriously disconnected from each other as the presence of motion of either of Leibniz's kinds is not itself a clue to the presence of active force as active force is present on occasions where there is phenomenal rest and is exerted by stationary bodies.

Given that Kant's work is concerned with the measurement of living forces we might wonder therefore how Kant

intends to present a measurement of force which distinguishes it from the cases where the movement of bodies is produced merely by the exertions of external phenomena? This question of how to measure the manifestation of force in the world requires a revisiting of the relationship between force and movement in the next section of the work and this revisiting should further help us to consider the slide within the third section between the description of bodies and the description of substances.

In section four Kant sets out to show how the source of movement is based on general concepts of active force and in doing so moves again away from talking of bodies to talking of substances. The description of a substance is of something that is determined to act “outside itself” where this action is presented however as a change in the *internal states* of other substances. Now there are two initially interesting points here. Firstly, the nature of substantial action is being determined through the relation of one substance to another. Secondly, whilst the *relation* between the substances is being described as the ground of their action the manifestation of this action occurs through the reception of the force of one substance on the internal, not merely the external, state of the substance affected. Now we begin to see part of the point of sliding between the discussion of bodies and the discussion of substances. The distinction between living and dead forces is presented by Leibniz in his original arguments against Descartes through the medium of different accounts of how to account for conservation, how that is, to describe what is being conserved in the world through a description of bodies and an account of a metaphysical basis of the relations between bodies. However, what Leibniz does here is to use Galileo’s work on the velocity of falling bodies in order to show that it is not motion that is measured as constant but force. Leibniz’s account moves from a discussion of certain mathematical-geometrical problems with Descartes’ view to the assertion that we need other properties than geometrical ones to account truly for bodies so that the forces involved

are seen as metaphysical. Hence the distinction between active force and passive movement is not exactly equivalent to that between living and dead force as living force is given a kind of geometrical measurement in the demonstration of a conservation law concerned with it. This entails that behind such living force the truly active element must be at work not at the level of bodies but at the level of substances with the account of bodies being only a phenomenal reflection of the true distinction. Further, at the level of the truly active forces there is not interaction at work at all as substances only manifest changes in internal states, not external connections. Given the complexity of this picture of how living forces play the role they do in Leibniz's view the obscurity of Kant's first writing begins to come into focus. What Kant wishes to do is to suggest that the movement between a force that is presented according to a kind of mathematical measurement when described as living force but as beyond mathematical measurement at the level of substances will not do and he attempts to show this by moving between the description of bodies and that of substances.

Whilst the first moment of this movement in section three of *Living Forces* is somewhat clumsy and not clearly justified the next section of the work turns to a demonstration of how movement is derived from force by an account of substances and this account is presented through a discussion of space and time with the effect that space and time are presented as existing as a *product* of the action of forces. The argument analyses the action of substances through the exertion of force that they have on each other. This suggests a picture of transeunt causation at the level of substances in contradiction of Leibniz's description of substances. The nature of the relation between substances is that one exerts its action on another through changing the internal state of the second. The manner of transmission of this action is however one that either occurs instantaneously through finding a second substance that is capable of receiving the whole force of the first substance or through

the first substance not finding another substance that is capable of absorbing the whole of its power.

Should it be the case that each substance found another substance capable of absorbing all its power then, states Kant, there would be no movement at all and it could never arise that we would give the name of movement to bodies. This assertion indicates the direction of the connection that Kant is going to make between substances and bodies. Since the instantaneous transmission of force from one substance to another would, if universal, prevent movement from ever arising at all there must be something in substances that is preventing this from occurring. That the complete transfer of force from one substance to another is a situation in which there is not movement resulting indicates again the point of the second example in section three as there we discovered that the appearance of a body at rest due to its being halted by a body with greater density was correlated with the exertion of active force in the body resting. Similarly the stationary body in the third example is exerting pressure and hence acting whilst at rest. Complete instantaneous substantial action would correlate then with universal stasis between bodies. So, since we witness phenomenal movement, there must be a ground within substances for this. What that indicates is that substances frequently are incapable of instantaneous action on each other as many substances are incapable of receiving such force instantaneously. So what must be occurring is that if a substance cannot instantaneously exert all its force that it must be only utilizing part of its force. However, if substances at one moment are only exerting part of their force the question arises as to what happens to the rest of the force?

Should the rest of this force be inactive then it would in a sense cease to be force in a true sense and the substance in question hence in ceasing to possess true force would basically lose its ontological status since its capacity to act is precisely what, following Leibniz and Aristotle, Kant would use to characterise it as a substance at all. So the rest of the force must be also exerted but since it cannot be expressed in

such a way to as to be instantaneously received then it must rather be the case that it is received in successive stages. Force must, that is, be being expressed and received gradually. However not only is this the case but, since the force that the substance is expressing could not be received instantaneously by the first substance it comes into contact with, then this first affected substance will be unable to receive the force in question over time as well. The ground for this assertion is that if the first substance that has been affected were capable of receiving the whole force being expressed then they could have received it at the first point of expression. Since they could not they must be intrinsically incapable of accepting the whole force in question at all. Hence the active substance must, as it gradually exerts its force, be acting continuously on other substances. Not only does this provide a ground for a relation between a plurality of substances but Kant adds that if the first acting substance could not exert the whole force on the first one it affects then the next one that it affects must have a different location from the first one it came into contact with. The reason for this is that otherwise the first acting substance could have instantaneously affected the second substance it came into contact with. Hence not merely must there be a condition of temporality for at least some of the substantial force that is being exerted but the nature of this force must also be something that is spread through distinct locations as it is expressed successively. So space and time are the conditions for the expression of the action of substances.

Whilst it would be of serious interest to evaluate the steps of this argument it is more to my point to bring out some of the implications of it. Firstly, we see that the expression of the action of force is the basis of the fact that there is movement. Movement effectively occurs due to the inability of substantial force to be instantaneously expressed. Motion hence arises due to the lack of instantaneity of force or to its deferment. This shows the basis of the suggestion of the Wolffians that there is a connection between force and motion. There is such a connection but rather than it being

the case that the “improvement” on Leibniz’s conception of living force occurs by proposing a better account of its measurement, a manoeuvre that effectively by-passes the point of the metaphysical active basis of phenomenal living force it is instead the suggestion of Kant that we rather see movement as arising due to the inability of substances to exercise force on each other in an instant. The reason why he takes movement to arise however is due to the fact that the relation of force expressed to the substances receiving the power of this motion is one that is given by the force having to be directed to other substances than they first approach. Since the substances are distinct from each other there must be a point in between them even if we do not think of the distinct points as literally spatial as we need not. The points between the substances are something like the ground of difference for locations of bodies just as the distinction of the substances themselves is the correlate of the distinction between bodies. Hence Kant retains from Leibniz the metaphysical basis of the ground of force and further retains from him the suggestion that movement is ultimately based on force but he departs from Leibniz in thinking that substances are in interactive relation with each other rather than being isolated from each other.

That this is the basic argument of section four is corroborated by the first and most decisive consequence Kant derives from the argument of the first four sections. In sections 5 and 6 he turns back to the level of the phenomenal and in doing so addresses the relationship between soul and body. This relationship, whose nature was of such trouble to Descartes and indeed to the whole of modern philosophy, is here addressed in a new fashion. Kant points out that the basis of the problem with mind-body interaction is how the body, which can only be assessed through mass and motion, can have an effect on the mind, which is the seat of ideas and representations? In assessing this Kant draws on the account that has emerged from section 4 concerning the nature of position. He writes: “The concept of that which we entitle position, as we find upon analysing it, itself refers us to the

mutual action of substances.” (Ak. 1: 21) Since substances act on each other by reference not to movement but through temporal succession the nature of this action presents space as a possibility. Hence space is not transcendently real but is rather the external phenomena of action. Since this is so the relation between mind and body has to be seen as patterned after the mutual interaction of substances. Both mind and body would be phenomenal correlates of distinct substances which entails that mind is not intrinsically distinct from body. On this basis what we can say is that the internal states of minds and bodies are related to each other whilst the external phenomena are distinct. The inner relation between mind and body can furthermore be pictured through the way in which the mind presents to itself in the generality of its conceptions (such as figures) the inward articulation of outward matter.<sup>13</sup> Furthermore, we have also noted that the absence of movement between two phenomena is not itself a signal of the absence of force but quite the opposite. Hence the substantial analysis of force provides us with a basic ground for assuming that not only is there interaction between mind and body but that this interaction can be understood firstly on the grounds of substantial interaction and secondly through the analysis of the states of bodies at rest. This double determination of the grounds for thinking a basis for mind-body interaction announces the first publication of Kant as a bold work that provides a set of interconnections between noumena and phenomena that strikingly suggest ways of thinking the Critical demarcation of them.

In the *Critique's* Third Analogy Kant returned to the question of substantial interaction, again patterning the understanding of motion on the grounds of the relation between substances and drawing the appropriate conclusion in the argument of the Paralogisms that there is no ground when thinking of the internal nature of mind to assume that minds are not of a piece with matter. This argument is even taken further in his denial of any fundamental understanding of psychology in its own transcendental terms and his

further suggestions that what binds together the totality of the world is a force that is fundamentally physical in nature.<sup>14</sup> These suggestions are were I will leave the argument for today with the fundamental argument emerging that perhaps the metaphysical investigations the young Kant undertook are capable of providing surprising vantage points on which to view the achievement of the Critical philosophy.

## Endnotes

<sup>1</sup> Whilst *Living Forces* was first written in 1747, it was not published until 1749 and there is evidence that Kant made alterations between the date of first composition and eventual publication.

<sup>2</sup> Whilst Newton's view is broadly consonant with that of Descartes and expressed in terms that are in alignment with the latter's position things are complicated slightly by the introduction of "mass", a term Descartes did not use and which is not deployed either by Leibniz.

<sup>3</sup> This is the basic argument of Leibniz's *Specimen Dynamicum* (1695) although it is first presented in a mathematical form in *A Brief Demonstration of A Notable Error of Descartes* (1686) from whence it is abstracted in the *Discourse on Metaphysics* (1686). These earlier demonstrations are based on an interpretation of Galileo's free fall experiments and show clearly the mechanical sense Leibniz gave to "living force" where it is used to measure the difference in velocity of different weights in free fall in which Leibniz argues that the identification of motion and force in the case of dead force is an accidental feature of the latter. See Loemker pp. 297-8.

<sup>4</sup> This is the first rule in the *Discourse on Method* and is repeated in the 1<sup>st</sup> Meditation where it provides the basis for the path of radical doubt that does not permit reliance on the senses.

<sup>5</sup> As Andrew Carpenter points out this assertion that bodies at rest possess no force "sounds odd to modern ears" due, as he puts it, to the fact that notions of kinetic energy and work were not seriously developed in the seventeenth century. (Carpenter, p. 35.) Martin Schonfeld mentions that the dispute, concerning as it does quantity of matter, is clearly marked by non-Newtonian positions since the concept of mass is not clearly given here and on this basis he explicitly marks the argument in terms of the measurements of  $mv$  and  $mv^2$  as a *translation*. (Schonfeld, p. 22.)

<sup>6</sup> In a letter to De Volder from 1699 Leibniz argues specifically that extension is an incomplete concept that is analysable and relative since "it can be resolved into plurality, continuity, and coexistence or the existence of parts at one and the same time" whilst force "is the attribute from which change arises, and whose subject is substance itself" (Loemker, p. 516). The relationship between extension and coexistence is worth noting since Leibniz states that coexistence "really applies to extension only" thus seemingly bringing it into close contact with spatial coordinates.

<sup>7</sup> Carpenter (1998) p. 40.

<sup>8</sup> This characterisation bears comparison with those given by Descartes and Newton. Descartes' first law of nature, as stated in the *Principles of*

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*Philosophy*, is that each thing “as far as in its power, always remains in the same state; and that consequently, when it is once moved, it always continues to move” (Pr II 37) whilst Newton states in his first law that “Every body preserves in its state of being at rest or of moving uniformly straight forward, except insofar as it is compelled to change its state by forces impressed” (*Principia*, p. 416). Notable contrasts between the three formulas: Kant’s merely describes motion without reference to force whilst Descartes brings in a reference to power and Newton to force (although in the latter case force is seen purely externally). Whilst Newton’s law brings in a reference to straightness this involves an incorporation of characteristics of Descartes’ second law of nature into his first law of motion (although Newton’s second law also has a relation to Descartes’ second law). Given Descartes’ reference to the power of the body moved it is difficult to make sense of Schonfeld’s claim that Descartes does not understand the importance of internal resistance.

<sup>9</sup> The point that motion is not a process but a state is generally recognized to be the point of Galileo’s innovations in physics and it clearly underlies the formulations of inertial motion given in the previous note. Here we find a phenomenalist interpretation of the view that motion is a state: namely that it is an outward manifestation of force but cannot be seen as the same as force. This is clearly the basis for Kant’s subsequent distinction between mathematical and physical bodies (#115).

<sup>10</sup> If the first example gives weight to a phenomenalist construal of what is occurring when movement is being observed we here find a surprising counterpart to that which is that rest is in fact as phenomenal as movement. However both are clear interpretations of the Galilean understanding of the fact that both rest and movement are states and not processes and accord with the relativist understanding of these that are in fact common to both Descartes and Leibniz.

<sup>11</sup> The consequence of the *vis motrix* view is thus that force is a *contingent* property of bodies. Carpenter suggests that this objection is not biting as adherents of the *vis motrix* view are not committed to the Leibnizian position of seeing force as essential to bodies a point Kant supposedly made “in section one” (Carpenter p. 44). However this is not what Kant indicates in section one. What he is doing there is drawing out that the view of force based on sensory observation leads to the conclusion that force is only contingently attached to bodies, a position there indicated to be held by philosophers prior to Leibniz (with the exception of Aristotle). It is hence aimed at Cartesian accounts of force that view it in terms of motion. The adherents of *vis motrix* by in section two by contrast are thinkers who come after Leibniz and attempt to define active force more definitely than Leibniz did and in the process produce the notion of “moving force”. The point of the conclusion of the argument to section three is to show that these post-Leibnizians end with the same picture as the Cartesians against whom they hoped to pit themselves by means of providing a more exact measurement of Leibniz’s active force. That this construal of the point of the first three sections is more correct than Carpenter’s is suggested both by the fact that it makes coherent sense out of the three sections, something Carpenter’s interpretation finds difficult and by the fact that it relates the argument of these opening three sections to the demonstrations of the second part of *Living Forces* where Kant argues decidedly against measurement of living force, even against the measurement provided by Leibniz himself.

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<sup>12</sup> Loemker p. 438: Leibniz here goes on to invoke the authority of Galileo and clearly suggests that living force is infinite whilst dead force is finite.

<sup>13</sup> This is a slightly stronger formulation than is directly given in *Living Forces* but a form of this argument is implied in section 6.

<sup>14</sup> On another occasion the relationship between gravity and aether would be well worth assessing in these terms.