

Corporeal Substances and Physical Monads in Kant and Leibniz

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The Leibnizian discussion of the nature of *corporeal substances* is still too little known, one reason being the way in which the account that is offered of it in Leibniz's works subtly alters from the 1680's, when it is given a serious metaphysical basis in relation to the emerging concern with dynamics to the last writings when the concern with monadology threatens to overwhelm it. I want to suggest why the understanding of it is important in grasping one of the more elusive moments of the *Discourse on Metaphysics* and also to show how the further consideration of this topic in the correspondence with Arnauld develops. However, I also wish to contrast the discussion of corporeal substances in Leibniz with the young Kant's focus on the justification of physical monads. The brunt of my argument will be that whilst Leibniz offers a defence of the individuation of corporeal substances that Kant subsequently is unable to reconstitute that Kant in his turn provides a ground for a possible reconciliation between a physical account of monadology and a description of space that is at least partially Newtonian. This will lead in conclusion however to an indication of how there are at least two futures for the Leibnizian thought of corporeal substance, either of which may yet be developed in the direction of greater diversification. The movement of my argument will consist in first, an account of how the metaphysical basis is provided for Leibniz's account of derivative force by means of an exploration of how he achieves the breakthrough into dynamics, second, an exploration by contrast of the early

Kantian picture of physical monads as a description of the ground of derivative forces and finally a return to describing the Leibnizian picture of derivative force in order to open a contrast between the possible futures of thinking it.

Individual Substances, Complete Individual Concepts and Substantial Forms

In the eighth section of the *Discourse on Metaphysics* Leibniz sets out to explain the distinction between the actions of God and the activities of created things and in order to do this he presents his conception of individual substance. In contrast to the occasionalist view that God does everything Leibniz maintains that both activity and passivity belong to individual substances and then proceeds to ask what an individual substance is. Leibniz mentions the classical view that one notion of an individual substance is arrived at by means of an analysis of predication in the following manner: “when a number of predicates are attributed to a single subject while this subject is not attributed to any other”.¹ However, immediately after mentioning this definition, one that has the authority of Descartes, and according at least to some, of Aristotle, Leibniz rejects it as merely nominal. After stating this point Leibniz picks out from the view rejected what he takes to be correct in it, namely, that every true predication has some basis in the nature of things. Leibniz next indicates how to understand this point correctly by adding that predicates are contained in the subjects either expressly or virtually and this leads him finally to state his own view: “So the subject term must always include the predicate term in such a way that anyone who understands perfectly the concept of the subject will also know that the predicate pertains to it. This being premised, we can say it is the nature of an individual or complete being to have a concept so complete that it is

sufficient to make us understand and deduce from it all the predicates of the subject to which the concept is attributed.”²

Whilst Leibniz’s notion of the complete individual concept is one whose meaning is controversial what is evident from it is that the notion of an individual is rendered by it as equivalent to that of a *complete* being and the parallelism between the individual and its complete concept is a parallelism between a completeness of being and a completeness of conception. This is reinforced when Leibniz subsequently adds that God would see in the notion of an individual the basis and reason for all the predicates affirmed of it, a point there connected however to the relation between the distinct events that happen to any given individual being such that the distinct points of their experience are seen as part of a whole unity. This suggests that the parallelism between the completeness of the individual and the completeness of its concept is arrived at via the means of thinking the completeness of the events that collectively all belong *to* the individual. This point is indeed the next one made and forms the fulcrum of paragraph 9 of the *Discourse* where Leibniz deduces the entire sequence of events that occur to any individual from the completeness of its concept, demonstrates that each substance is a world apart and defends the principle that there is always a ground, separately from mere mathematical distinction, for the separateness of substances. However the point on which I wish to focus is the connection between the argument concerning the complete individual concept that must belong to every substance and the assertion, made in paragraph 10 of the *Discourse*, concerning substantial forms. Here Leibniz suddenly asserts without previous warning that the Scholastic idea of substantial forms has something in it even though we cannot use it to explain any particular effects.

The relationship between the doctrine of the complete individual concept of substances and the defence of

substantial forms is made somewhat clearer in the correspondence Leibniz subsequently entered into with Arnauld. In a letter sent late in 1686 Leibniz stated to Arnauld:

“Substantial unity calls for a thoroughly indivisible being, naturally indestructible since its concept involves all that must happen to it. This characteristic cannot be found either in forms or in motions, both of which involve something imaginary as I could demonstrate. It can be found, however, in a soul or a substantial form, such as is the one called the me.”³

Paragraph 8 of the *Discourse* suggested that there must be something *in* the substance by virtue of which its complete individual concept is true *of* it. Now, first I wish to consider a question concerning how to understand this doctrine in its generality and secondly illustrate how the statement in the letter to Arnauld can give us a first handle on Leibniz’s conception of *corporeal* substance. Paragraph 8 defined the complete individual concept in terms of the events that are taking place, have taken place and will take place with regard to the substance. Daniel Garber comprehends this in the following way: “an enduring truth requires an entity that endures for Leibniz”.⁴ However to this reading Deleuze offers an objection stating: “I can no more reduce ‘I travel’ to ‘I am a travelling being’ than I can reduce ‘I think’ to ‘I am a thinking being’”.⁵ If we simply move from an enduring truth to an entity that endures then we are eliding the distinction between acting in a certain way and being a certain way or, more starkly, taking the acting a certain way as a statement of the nature of being a certain way. Deleuze clearly identifies the key problem here by attending to the nature of thought: “Thought is not a constant attribute, but a predicate passing endlessly from one thought to another”.⁶ If thought is not a constant but that which is involved in the

process of change then the fact of thinking is not itself a statement concerning essential being as Descartes assumed.

Similarly the movement of something is not equivalent to the nature of the thing being given in its movement, a point that underlies Leibniz's objection to the Cartesian account of the conservation of motion. The parallel problem between thought and movement allows us to return to the question of the point of the introduction of substantial forms. In paragraph 12 of the *Discourse* Leibniz makes the point that the substance of body cannot be described by reference to extension, on the same grounds as we see him restate in the 1686 letter to Arnauld, namely that extension alone is, as he puts it in the *Discourse*, "relative to our perceptions", a fact that enables us to doubt that it describes accurately the nature of things. Just as in the letter to Arnauld he adds the point that something further is needed to assure us of the unity of bodies, adding here however that unless something further is added that "no body can ever subsist longer than a moment".

We saw earlier that the complete individual concept of a substance involves the temporal determinations of the substance and these determinations when we concern ourselves with souls are what are given as descriptions of the self. There must be hence something *analogous* to the self in bodies as the ground in the body *as a unity* to which predicates that are truly stated of the body in question belong. This entails the important discovery that just as we have a discrete way of referring to each soul, so we also need something by which we can uncover that which is substantial in bodies. This would appear, on the argument of the *Discourse*, to be the substantial form of the body and to have the consequence that just as there is an "I" or "me" of thought so also there is an "I" or "me" of body. Without such a substantial form then the body in question would be, as Leibniz states on countless occasions, a mere aggregate, a *collection* of qualities together for temporary purposes which we, merely for the sake of convenience, related to as

unified, a conclusion that would ensure that there was nothing substantial in matter. That something needs to be added to extension to avoid this conclusion is derived from the celebrated problem of the divisibility of the continuum which shows that if we merely have something occupying space then the divisibility of this will be infinite in duration.⁷

The vocabulary of substantial forms that is used in the *Discourse* has however a possible interpretation that is harmful to what Leibniz is here claiming and which is partially rectified in the correspondence with Arnauld. In stating that it is the substantial form that acts for the body in the manner that the “I” does for the mind Leibniz opens the way for the simple conclusion that form is imposed on matter and that form hence creates a unity in the matter that it was potentially open to receiving, a position that would lead right back to a classic Aristotelianism. However the problem of the continuum shows that this cannot be Leibniz’s thought and he indeed uses it to resist this interpretation in a letter to Arnauld dated April 30th, 1687 where he argues that “there is no exact and definite *form* in bodies because of the actual subdivision of the continuum to infinity”, with this reference to infinity being contrasted however to the one that he takes to be part of that which is substantial, namely the causal infinite according to which “each effect depends upon an infinity of causes and every cause has an infinity of effects”. The contrast between the mathematical infinite that applies to the continuum and the causal infinite that applies to substances would not arise should the essence of body consist only in a certain *form* that modified extension without adding something further to that which is corporeal. Hence there must rather be something else in the corporeal that renders it substantial and capable of being part of the infinity of substances rather than merely belonging to the infinity of continuum. This requires us to think however, now that we have got the contrast between these two infinities, of a parallelism between them as

Leibniz forcefully maintains in his October 6th 1687 letter to Arnauld: “matter being divisible without end, no portion can be obtained so small that there are not in it animated bodies, or at least such as are endowed with a primitive entelechy and (if you will permit me to use the word life so generally) with the *vital principle*, that is to say, with corporeal substances, of all of which it may be said in general that they are alive”.⁸

This parallelism between the infinity of the continuum and the infinity of corporeal substances allows for the identification of the earlier Scholastic expression “substantial form” with one that is more fitting for Leibniz’s general argument, the *vital principle*, or life itself as that which makes a corporeal substance unified in its changes. If what unites the corporeal substance is the life that it has then this life, conceived of as a principle that stretches across all the moments of its being is internal to it as its principle and not something added or imposed upon it in the manner inaptly suggested by the term “form”. This also suggests however that the complete individual concept of the given substance is best understood as the *life* of it with this conception incorporating the relation of each moment to the next, such that moment A is a state from which state B follows as a consequence *given the relation of this substance to the elements of its experience*. Each moment thus emerges as a differential coefficient of the one previous. However we have also reached the position of stating that the infinite divisibility of matter correlates with an infinite number of corporeal substances, thus apparently threatening the very unity of the body that was being assured by the notion of the corporeal substance. To avoid this consequence Leibniz in a 1703 letter to De Volder writes the following:

“If you think of mass as an aggregate containing many substances, you can still conceive of a single pre-eminent substance or primary entelechy in it. For the rest, I arrange in the monad or the simple substance, complete with an

entelechy, only one primitive passive force which is related to the whole mass of the organic body. The other subordinate monads placed in the organs do not make up a part of it, though they are immediately required by it, and they combine with the primary monad to make the organic corporeal substance".⁹

Here Leibniz indicates the need for the body to be governed by an entelechy that is primarily and decisively its own in connection with a primitive passive force that combines with this active element. The other monads that are within the organs of the rest of the body are distinguished from the body itself, as, whilst they reside in the organs, they are still not *part* of the body. In denying that these subordinate monads are part of the body Leibniz is not departing from the positions advanced earlier since to assimilate the subordinate monads to the parts of the body would be to render them as purely elements of extension rather than placing them within the substantial infinity. The primitive entelechy and the primary passive element are what together are now said to form the complete monad and therefore to be what is the basis of the complete individual concept of the body in question. By contrast the subordinate monads concur in the secondary matter of the body, the element that is the basis of derivative forces. Since these derivative forces are in turn governed by the action that is produced in the unity of primitive entelechy and primary matter they can be metaphysically reduced to this unity. The change that belongs to the body itself is thus grounded in the complete primary monad and it is this that marks the corporeal substance as an *individual*. But the body that is thus reducible to the individuated corporeal substance is not only itself infinitely divisible but all other extensive quantities are likewise so divisible ensuring that the world is *full* of matter and there is not a space in which there not parts thereof.¹⁰ The relation between such matters is described by the dynamical principles of derivative force which derive

ultimately from the combination of active entelechy and primitive passivity in the monad. The detail of this argument involves a consideration of Leibniz's dynamics as a corrective to Cartesian physics but rather than the consideration of this I wish instead to now invoke the picture of such derivative forces that is presented by Kant in order to bring out the nature of the connection between the picture we have reconstructed and the account provided by Kant in his early writing on monadology. The rationale for this connection is precisely to bring out how, in setting out a description of these derivative forces in his own terms, Kant draws on the resources of Leibniz's system and to assess the manners in which he either corrects it or rather departs decisively from some of its key points.

Kant's *Physical Monadology*

In turning to Kant's *Physical Monadology* we encounter a text that sets out from a different set of problems than those we have discovered to be at the core of the Leibnizian conception of *corporeal substance*. Whereas this Leibnizian notion was introduced to describe the real unity in bodies, on an analogy with the real unity possessed by souls prior to the invocation of the detailed monadological doctrines that Leibniz began moving towards at the beginning of the eighteenth century, Kant's account of physical monads is produced as a consequence of a series of inter-connections formed within the Wolffian school between Leibniz's accounts of corporeal substance and his discussion of monads. The opening of Kant's work sets out for consideration a problem whose very terms are surprising when considered from the standpoint of the position we have thus far been outlining. Kant describes his problem as being how to reconcile two views, one maintained by metaphysics and one by geometricians. The "metaphysical" position is stated to be that space is *not* infinitely divisible

whilst the “geometrical” position is that it is. Both these terms have to be understood cautiously since Kant’s further statements make clear that by “geometry” he really intends Newtonian accounts of nature whilst “metaphysics” is clearly a general term for positions of the Wolffian school. The Newtonian eschewal of hypotheses is implicitly referred to and its consequence stated to be that whilst on this basis we can “exhibit the laws of nature” we will not be able to show “the origin and causes of these laws” (Ak. 1: 475). The key point however that is then made in support of this contention is interestingly connected to the question as to whether or not space is to be understood as divisible when Kant adds that on Newtonian grounds alone we will not be able to attain “knowledge of the nature itself of bodies” (Ak. 1: 475).

So in some sense Kant wishes here to connect a discussion of the divisibility of space with that of the nature of bodies. In regard to Leibniz’s own positions we have already seen that the infinite divisibility of space is not only clearly accepted by him but that he even uses it to present his argument for the real unity of bodies being found in corporeal substances which he subsequently defends as governed by a dominant monad. These positions are clearly not the ones being defended by the Wolffian school however as the doctrine that space is not divisible is presented by Kant as connected to the assertion of the existence of monads.¹¹ In response to the contradictory positions that he has identified Kant states the point of his treatise as being to show that the principles of repulsive and attractive forces can be deduced from the elements of bodies, an argument which will, in his view, make “a substantial contribution towards explaining the inner nature of bodies” (Ak. 1: 476).

Physical Monads and Corporeal Substances

In the opening section of the work Kant makes clear that monads are understood as equivalent to simple substances but then describes these latter in as what “does not consist of a plurality of parts, any one of which could exist separately from the others” (Ak. 1: 477). Kant doesn’t give a proof of this description of monads, instead proceeding directly to a rationale for why bodies consist of them. The argument is given in a single paragraph and deliberately prescind from use of the principle of sufficient reason. Kant suggests here that bodies consist of parts which can be existentially distinguished but then adds that the composition of these parts together is a relation whose existence is contingent. To this is added the consideration that since the composition of these parts can be denied without the parts that are in this relation being existentially endangered then the composition that forms the body could be cancelled whilst the parts that are in such composition would continue to be. This leads him easily to his conclusion: “When all composition is abolished, moreover, the parts which are left are not compound at all; and thus they are completely free from plurality of substances, and, consequently, they are simple” (Ak. 1: 477).

This argument consists of an isolation of the parts involved in the composition, isolation guaranteed as being possible by the assertion of the existential independence of each part from the others. Since no ground for this independence is provided the argument scarcely counts as a demonstration of its point. It is followed by a conventional statement of an argument concerning the geometrical possibility of infinite division of space which is interpreted in a physical sense in order to try to escape the argument that geometrical space and physical space are distinct.¹² This leads Kant to restate the infinite continuum in stating that composition of the parts of space cannot be removed by

division and hence cannot be removed at all. This ensures that Kant has quickly upheld the position that there exist monads as the simple elements of bodies but it is still the case that space is infinitely divisible leading to the consideration that concerns us, namely how the infinite divisibility of space is to be thus reconciled with the fact that bodies contain indivisible parts?

It follows from what has been stated thus far, and is explicitly argued by Kant, that the simple elements of bodies that would remain were all composition of the body cancelled do themselves, like the body of which they are taken to be parts, fill space. However he now argues that the division of space is distinct from the separation of substances as the division of space is merely a display of “a certain plurality or quantity in an external relation” (Ak. 1: 480). Since the division of space is merely the external quantitative relation of parts the plurality of parts of substances cannot be derived from the division of space alone despite the infinite divisibility of the latter. Kant takes this to be a correction of a “Leibnizian” position since he objects to any distinction between geometrical space and real space and takes himself to have already offered a convincing demonstration of the physical character of geometrical divisibility. That the argument does not however offer here anything novel is clear when we attend to Kant’s description of space which is as being merely “a certain appearance of the external relation of substances” so that “the existence of a certain plurality does not amount to tearing the substance itself into parts” (Ak. 1: 480).

However this argument is based clearly on the same considerations that led to the view that geometry describes something imaginary as if space is purely an appearance of external relation then there is no need for the distinction between real and imaginary space as space *as such* can simply be described as imaginary.¹³ Clearly if the division of space produces a line within a physical monad that is

thought to split it then this will not be an actual split in the monad but merely a demonstration of a set of relational properties within it and since the monad can thus be thought to have plural parts the innovation will consist merely in this thought with the reversion to simplicity protected by the existential inseparability of these plural elements, an existential inseparability that prevents these plural parts from actually being separated and rendering their plurality a purely nominal one. That this plurality is not what leads the space occupied by the monad to be filled is next articulated by Kant in terms of a demonstration that the sphere of activity of the monad is rather what does this. The point here is that the plurality within the monad is not itself a plurality of substances but is merely a description of parts that cannot seriously be distinguished from punctual points. Since this is what the plurality of parts consists in, the filling of space must be accounted for not by reference to the properties that the plural parts possess but rather by reference to the relations between the distinct monads. Here Kant imports the point made by Leibniz that monads include within themselves a principle of action and he uses this to describe the filling of space in terms of the action of the monad limiting “the degree of proximity” between monads (Ak. 1: 481.)

This is still obscure and Kant moves to clarify the relationship between the monads further when he answers the query whether the division of space is not a division of substance with the assertion that “this space itself is the orbit of the external presence” of the elements of the monad. The relational determinations of the monad are located as inherent in the internal determinations and the latter, given their internality, distinguished from space. So the *internal* determinations are not divided by the distinction of the *external* determinations. Rather the external determinations of the substance are accidents of it which are dependent upon the substance and would not be without it, an argument

that demonstrates clearly the commitment Kant has here to the reducibility of relations.¹⁴

If space is not occupied simply by the accumulation of points in places that would be the ground of Cartesian extension then there must be a ground in the physical monads for the distinction that emerges between places. Space is occupied by the discrete monads, each of which takes an element of space but none of which intrudes on any of the others. The basis of this claim is that the monads possess the force of resisting each other. This resistance must be part of the original nature of the monads and thus impenetrability is grounded on a primitive element of substance. This is further reinforced by the claim that the distinct substances each possess a force of resistance so that the forces oppose each other and balance. To this deduction of impenetrability is added an argument in favour of attraction when Kant mentions that if the only force possessed by the physical substances was one of repulsion that bodies would lack all cohesion as each part would repel every other and we could never arrive at determinate limits. “It is, therefore, necessary that there be opposed to this striving another striving which is opposed to it and which is equal to it at a given distance, and which, by occupying a space, determines its limit.” (Ak. 1: 484)

Here Kant finally arrives at his real goal: a description of the metaphysical basis of the properties of physical space. Since space is determined for us through divisibility it is manifested in terms of the capacity of bodies to be circumscribed and shown to have definite limits. These limits require a coordination of the properties of bodies with regard to each other, not merely a determination of the spatial coordinates as an account of extensive presence as if this latter were the sum of the relations between substances there would be nothing other than aggregation and no basis for true unity. This implied strong Leibnizian premise guides Kant’s argument here. Striving of a substance to repel is not

merely balanced by an equal striving of an opposite repulsion, as this coordination of forces, whilst demonstrative of a distinct physical property other than geometrical coordinates, could not alone supply the ground of such coordinates. In order for the grounds of them to be provided, something that demonstrates the basis of physical limitation is required and this involves another equality of striving, not one merely of substances to repel one another but also of them to attract each other. This equality is subsequently cashed out by Kant in terms of the inverse-distance laws of forces which are formulated in terms of inverse cubes.¹⁵ As he puts this: “both the named forces will always be equal to each other at the same distance, and thus..they will necessarily determine an equal volume of elements” (Ak. 1: 485).

The importance of the type of demonstration advanced here which concerns what Leibniz would have viewed as derivative forces is less the manner in which Kant borrows Newtonian formulations than the way in which the expression of these formulations is couched. The derivative forces of inertia, impenetrability and equality of resolution between attraction and repulsion are all derived directly from the primitive elements of the physical monads. Hence Kant, despite the problems that beset his supposed corrections of Leibnizian formulas, shows a clear rationale for thinking of the *filling* of space as premised upon ultimate metaphysical foundations. For example in his discussion of Proposition XII of the work which concerns the specific densities of bodies he grounds this on the specific difference of the inertia of their elements and in the process attacks the “arbitrary account” of these elements provided by Descartes in the *Principles of Philosophy* as well as directly opposing the position advanced by the young Leibniz in the *New Physical Hypothesis*. Kant had described the distinction between repulsive and inertial resistance in terms of the former being that which kept substances separate from each

other whilst the latter is the means by which the substance strives to persevere in motion despite the resistance of the other substance. If however the elements all possessed an equal force of inertia and an equal volume then there would be a need to posit an absolute vacuum to explain the difference in the density of the bodies. This leads Kant first to state the Cartesian and early Leibnizian attempts to overcome this difficulty before stating the rationale for both why these attempts must be misguided and how to circumvent them. If one was faced with the equality of inertia and equality of volume of all elements one would, states Kant “have to indulge an exaggerated passion for conjecture” to explain the infinite diversity of densities. His examples are then drawn directly from Descartes and Leibniz:

“One would have to fabricate a rash and arbitrary account of the structure itself of the elements....imagining it to have the form sometimes of the thinnest bubbles, sometimes of branches and winding coils. For, in this way, matter can be thought of as distended in a wondrous fashion, and an immense space as filled with very little matter.” (Ak. 1: 486)

The Cartesian recourse to minute thin bubbles or the Leibnizian recourse to tiny fibres both face the same problem that they would need to contain a vacuum, that, relative to the matter contained in them would be enormous and they would eventually be ground down by the continuous collision of bodies. As Kant points out, this would have the consequence that the particles in question would thus eventually fill the empty spaces so that the whole space of the world would become paralysed by an overwhelming inertia which would bring all motion to a rest. Furthermore, the distinction of density between bodies and forces would be effectively abolished on this view. So rather

than operate with conjectures that require implausible relations and which are unable to account for diversity of density it is preferable, in accordance with the true Leibnizian spirit, to grant that there exists a specific difference between the simplest elements “and that it is in virtue of this specific difference that it is possible to construct masses which are sometimes smaller and sometimes much greater, though they exactly fill the same space” (Ak. 1: 486).¹⁶

The conclusion of Kant’s demonstration is that the bodies or media which are elastic, which includes aether or the matter of fire, is grounded on the primitive impossibility of any force penetrating a basic element in its inmost part. This impossibility demonstrates the impenetrability of each force with regard to every other in terms of its infinite proportion at the central diameter of its presence. However two points are worth making about the picture Kant presents in conclusion. Firstly, the distinction between the density of bodies is defended on the basis of a primitive distinction between simple elements and this effectively requires the postulation of distinct inertial powers in different bodies. Secondly, whilst the introduction of this solution to the filling of space is presented by Kant in the context of the postulation of a vacuum, a notion that depends on the mathematical relation to space as concepts of “full” and “empty” are quantitative characterisations and hence mechanical rather than dynamical, the resolution offered by Kant does not involve the rejection of this vacuum. Hence, unlike in his later Critical philosophy, Kant is not here committed to the rejection of “empty” space but is giving a dynamical undercurrent to this conception through the variant estimate of the manners in which inertial force keeps monads distinct from each other to varying degrees which would still provide a dynamical account for the appearance of the relational property of “emptiness”.

Derivative Force in Leibniz

The demonstration of the ground provided by Kant for both physical monads and the filling of space by them is one that prompts me in conclusion to look at the manner in which the Leibnizian picture of corporeal substances relates to a dynamical account of how derivative forces permit the filling of space. As mentioned earlier the Leibnizian conception differs fundamentally from the one Kant presents in the *Physical Monadology*. Leibniz does not allow for the presence of the vacuum that is left intact by Kant's argument due to the derivative forces that are within the corporeal substance filling the entirety of space. However, Leibniz also conceives the monadological elements in complete simplicity, in contrast to the plurality of parts permitted in the Kantian conception. The commitment of Kant to this plurality of parts ensures that there are mereological-mathematical considerations integrally sewn in to his account of the physical monads and this discussion of the plurality of the monad only combines with a presumed simplicity due to an existential inseparability of the parts. To these differences needs to be added the equation that is stated in the preliminary considerations of the *Physical Monadology* of force with movement, an equation precisely denied by Leibniz as motion requires temporal succession and is hence never given as a whole whilst force, by contrast, is intact at each moment and hence productive of time rather than dependent upon it. In the *Specimen Dynamicum* Leibniz presents derivative force as arising from a limitation of primitive force and this limitation is presented as necessary for the purposes of explanation as phenomena cannot be accounted for in terms of primitive forces.

We saw the account of inertia in Kant as providing a basis for distinct inertial powers as the ground for divergent densities of bodies. This was presented in the *Physical*

Monadology as an explicit correction of Leibniz's early *Theory of Abstract Motion*. In the *Specimen Dynamicum* the primitive primary matter is the ground of the derivative forces of resistance but the relationship between them is often somewhat elusive. In an early 1699 letter to De Volder for example Leibniz writes the following: "Since matter in itself...resists motion by a general passive force of resistance but is set in motion by a special force or entelechy, it follows that inertia also constantly resists the entelechy or moving force during its motion".¹⁷ Since Leibniz is here claiming that the resistance occurs *during* the motion then this is clearly a description of *derivative* inertia and yet, whilst this account should thus be properly part of the account of the corporeal substance the prior invocation of the passive force of resistance being involved not merely with active force but the *entelechy* of it suggests a relation to the primitive active force. In other words, "inertia" here appears to be doubled in Leibniz's description. Motion itself should be properly seen as it is expressed a few lines later in the same letter as ascribed to secondary matter and hence to the "complete body" (or corporeal substance) which results from active and passive combined. What is the ground however of the apparent slippage here in Leibniz's expression?¹⁸ The ground of it shows the central difference between corporeal substances in Leibniz's conception and the Kantian view of physical monads. For whereas in the Kantian conception precisely this slippage is inscribed into an attempted alignment of the discussion of monadic principles with Newtonian accounts of space and movement in Leibniz it effectively undercuts the ground for any such alignment.

To see this we need merely to remember Leibniz's arguments in the second half of the *Specimen Dynamicum* for the relativity of rest and motion. Mere phenomenal contact and connection is a set of relational properties and these properties are rooted in the situation of observation of

what is in relation. Further, what are in relation with each other are engaged in constant observation with these observations, *even at the level of the corporeal substance*, being forms of movement. Hence, Leibniz, who states that true attraction is not found in nature, precisely denies the claimed cohesion of bodies that Kant wished to save through the force of attraction. The ground of this difference is drawn closely from the description of motion as necessarily relative as if the motion is always assessed as and from the point of view of that which is involved in motion in relation to the positions it has occupied and is coming to occupy then it follows that the firmness of the body at any given point is effectively always a composition from the relation of its elements in connection with the relative equilibrium of the derivative forces. The result of these thoughts is a rejection of absolute motion, empty space and complete cohesion of the phenomenal property of bodies in favour of the binding of the corporeal substance into unity by means of its own properties rather than as a result of the actions of bodies beyond it. Thus the slippage between levels occurs in terms of how the derivative forces and the primitive forces are in the most rigorous statements of Leibnizian dynamics presented as equally statements of internal properties. For example Leibniz writes in the *Specimen Dynamicum* that: “Repercussion and repulsion...arise from elasticity within the body itself, or from the motion of an ethereal fluid matter which permeates it, and so from an internal force existing within it.”¹⁹

Whilst the ground of the derivative force effectively collapses into the expression of the primitive force the effect of this is not merely a denial of the cohesion popularly thought to be grounded in firmness but also a metaphysical difficulty that results in the movement in Leibniz’s later work towards a resolution of the true unity he always strived to advocate on the grounds not of a *mere analogue* with the “I” of the soul but an *effective assimilation* of body to soul.

The resistance to this late idealism that is possible within the traces of the Leibnizian system is not however best located as Kant wishes in the articulation of a physics that will permit accommodation of physical monads with empty spaces. It is preferable, as Deleuze suggests, to push in the other direction, towards the multiplicity of centres within each element so that the corporeal substances become infinite as each substance is the ground of several others. As Deleuze writes:

“Primary forces are monads or substances in themselves or of themselves. Derivative forces are *the same*, but under a vinculum or in the flash of an instant. In one case, they are taken in multitudes and become plastic, while in the other they are taken in a mass and become elastic, because masses are what change at every instant.... Derivative force is neither a substance nor a predicate, but several substances”.²⁰

This account of an identity between primary forces and derivative is an identity of that which is diverse undertaken for the motivation of the saving of the diverse, just as Kant articulated a case for the diversity of inertia which protected the infinite nature of the identity of each substance. The ground for this defence in Deleuze and in Leibniz’s own dynamics is distinct from that in Kant as the elastic nature of the internal force of each *derivative* expression of corporeal substance emerges as a consequence of what Leibniz terms the “integral of the impetuses...existing in the moving body multiplied by the corresponding intervals of time”.²¹ The inherent elasticity of the body in question is a part of its infinite engagement with every movement and perception undertaken, each of which, down to the smallest, fills not merely space, as is Kant’s concern, but time also. This constitution of phenomena by the fullness of expression of each corporeal substance derived as a basis from its own

action is both what gives the several substances involved in the corporeal together a relation and what ensures that this relation, a relation constitutive in its *movement* of an identity in diversity and what prevents this diversity from achieving the stability that Leibniz will later attempt to impose through the invocation of the central unity that requires an idealist resolution of his dynamics. Resistance to this resolution in favour of the dynamism of Leibniz's own project has two possible resources, unequal to each other and divided within themselves. *On the one hand*, the Kantian movement of relative stabilisation that permits the accommodation with Newton by means of the multiplication of inertia, a multiplication that advances on the slippage between primitive passivity and secondary passivity already marked in Leibniz's work. *On the other hand*, the attention to this slippage in terms of a relative identity in diversity of the primary and the secondary force permitting a non-Wolffian equation of movement and force which however asserts the primacy of force in movement thus permitting the rescue of the infinity of substance in the difference of each action. This latter movement, equivalent to the acceptance of repetition *as* difference would be the Deleuzian retrieval of Leibniz. Between these two I offer today less a choice than a possible engagement that may permit each to further identity the possibilities for maximal diversity in the other.

Endnotes

¹ Loemker, p. 307.

² *Ibid.*

³ Montgomery, p. 161.

⁴ Garber, p. 61. This statement is a clear improvement on that of Russell who describes the complete individual concept as amounting to "the obvious fact that every proposition about the future is already determined as true or false, though we may be unable to decide the alternative" (Russell, p. 46).

⁵ Deleuze p. 53.

⁶ *Ibid.*

⁷ The obvious move of trying to find unity in the atoms of bodies is dismissed by Leibniz on the grounds that this gives merely "an imagined mass with an infinite duration" (Montgomery, p. 164).

⁸ Montgomery, p. 221.

⁹ Loemker, p. 530.

¹⁰ For a classic statement of this view see section 3 of the *Principles of Nature and Grace*.

¹¹ A point that would be worthy of examination elsewhere is that Kant has also reversed his position here with regard to the understanding of active force as moving force. Whilst in *Living Forces* he not only rejected this Wolffian conflation but presented detailed arguments against it (§§2-3) he opens the *Physical Monadology* with a simple assumption of this identification (Ak I: 476).

¹² Effectively this would have been alright for Newtonians and so the argument as given is purely a statement of the Newtonian view. The Leibnizian response would have involved the invocation of Cartesian analytic geometry which does not require diagrams or construction and hence could not be interpreted without additional questionable assumptions as applicable to physical space. Just as the argument of the first paragraph is a *petitio principii* so the argument of the second makes assumptions that are precisely in dispute.

¹³ As Leibniz puts it in *First Truths*: “Space, time, extension and motion are not things but well-founded modes of our consideration. Extension, motion, and bodies themselves, in so far as they consist in extension and motion alone, are not substances but true phenomena” (Loemker, p. 270). This chimes entirely with the view of space presented in the *Physical Monadology*.

¹⁴ This is denied by Rae Langton on the grounds that dependence of one property on another does not demonstrate the reducibility of one set to the other. Whilst this is so the argument of Proposition VII is explicit in its assertion that the relational properties are not merely grounded on the intrinsic but are expressions of these latter and hence it must be possible to describe them in a vocabulary that would reduce them to the latter. See Langton p. 102.

¹⁵ Kant here again draws directly on Keill but gives the mathematical states of attractive force provided by him a metaphysical import.

¹⁶ Since Kant drew as a corollary from Proposition X that the volume of all elements is equal therefore the problem was the combination of this assertion with the equality of inertia. If the combination of the equality of volume with the equality of inertia is the stasis indicated then we need to account for the assumed difference of inertia between bodies.

¹⁷ Loemker p. 517.

¹⁸ This slippage is pressed as a problem particularly forcefully by Buchdahl, pp.415-25 though it turns most on the consideration of this passage from the correspondence with De Volder.

¹⁹ Loemker, p. 448.

²⁰ Deleuze, p. 117

²¹ Loemker, p. 437.