Changing the Cartesian Extension: Leibniz on Phenomenon and Body

Shohei Edamura

What did Leibniz contribute to the metaphysics of body? To judge from Leibniz commentaries, his contribution is supposed to be significant. Unlike Descartes and his followers, Leibniz claims that the extended body is a phenomenon; that it is never a substance[1] and that extension cannot be an attribute that constitutes a substance. However, what Leibniz really added to the ideas of his forerunners is not clear. One of the most critical reasons is that Leibniz used the term "phenomenon" and "body" in ambiguous ways. Without understanding the different meanings of these terms, Leibniz commentaries will stray in the darkness. That even the best scholars dismay at the various meanings of these terms is illustrated by statements like the following from a recent publication concerning Leibniz's metaphysics.

> Leibniz does not give us a well-developed account of the nature of the dependence of bodies, as phenomena, on perception. A simple identification of phenomena (and hence of bodies) with perceptions, or with collections of them, would position Leibniz's phenomenalism closer to the idealism of Berkeley. The interpretation of phenomena as intentional objects, which I favor, requires a more nuanced account of their relation to perceptions. (Adams 1994, p.219)

To be fair, the author of this passage does recognize that the term "phenomenon" could have different meanings in Leibniz (Adams 1994, p.220; p.261 etc.).[2] But even Adams does not trace the subcategories of phenomena using a clear terminology. In fact, however, it is Leibniz himself who offered two terms to distinguish meanings of phenomenon. In this paper, I will discuss two different notions of body　corresponding to introducing the notions of "internal phenomenon" (G4 477, G6 591) and "external phenomenon" (G3 465). The former means a modification or representational content of a perceiver, whereas the latter is an aggregate of simple substances which are external to the perceiver.

While Leibniz's explanatory innovations impact his treatment of all bodily entities, nowhere is the tension between the Cartesian and Leibnizian theories of body felt more acutely than in their respective accounts of extension, which provides the focus for this essay. After examining some of the chief differences between internal and external phenomena in Section 1, I turn to extension in particular. Section 2 sketches an account of extension which is found in external phenomena, that is,

aggregates of simple substances. Section 3 develops an interpretation of Leibniz's account of "internal phenomenon" that demonstrates the discrete character of phenomenal bodies. The essay concludes with the suggestion that Leibniz's attempt to change the Cartesian concept of extension illuminates the discrete and actual characteristics of body, which will fit the variety of our experience more than its counterpart.

1. Internal and External Phenomenon

1.1 Internal Phenomenon

I begin with internal phenomenon, which is supposed to be the more familiar meaning of phenomenon. By "internal phenomenon" I refer to the representational contents of minds or other simple substances,[3] that are produced merely by themselves. The following passages discuss the concept of internal phenomenon.

> The soul was created from the beginning in such a way that everything that the body can offer, and is presented in it by virtue of the representative nature which was given to it with its being, for being produced at a designated point. After that by a series of thoughts and, so to speak, like by dreams (or rather internal phenomena) which are regulated and so veritable that they are foreseen with success... (G4 477)

> But even granting that everything takes place in us ordinarily just as it would in the case of bodily annihilation, that is, admitting that we ourselves always produce within us (as I in fact believe) or that God produces in us (as Theodore believes) internal phenomena without the body having any influence over us, must this necessarily involve external ideas? Is it not sufficient to hold that phenomena are simple new transitory modifications of our souls? (G6 591/L 626)

On the Cartesian theory, a mode (modus) or modification (modificatio) is something that can never exist without a substance.[4] For example, shape, form, size and motion cannot be separated from something extended. A shape without extension can hardly be understood. In the same way, sensation, will and understanding cannot exist without a mind or soul, since all of these are modes of mind.

Leibniz often had the notion of internal phenomenon in his mind even when he did not use this term: "matter and motion, however, are not so much substances or things as they are the phenomena of percipient beings, whose reality is located in the harmony of the percipient with himself (at different times) and with other percipient beings" (G2 270/L 537). We can see from this passage that Leibniz holds that a matter or body is an internal phenomenon for a perceiver in that

context, and that its existence is to be found in the perceiver.[5] Thus, even though Leibniz regards bodies as aggregates of simple substances in many cases,[6] here we should understand a different notion of matter or body. And phenomena are not always objects of mind which cannot be reduced into perceptions. This point is made more explicitly in *Reply to the Comments in the Second Edition of M.Bayle's Critical Dictionary*:

> And perception, since it cannot be explained by shapes and movements, establishes the other part of my theory: we are obliged to admit an indivisible substance in ourselves, which must itself be the source of its phenomena. So according to this second half of my theory, everything happens in the soul as if there were no body, just as according to the first half, everything happens in the body as if there were no soul. (G4 560/W 247)

As these passages illustrate, Leibniz often had a body as internal phenomenon in mind, though it may not be the primary concept of body. "Phenomena" in this passage are produced only by a perceiving substance and do not depend upon other substances. Indeed, in the letter to Arnauld from April 30 1687, we learn that "a motion considered as a phenomenon is the immediate result or effect of another phenomenon in my mind, and similarly in the minds of others, but the state of a substance is not the immediate result of the state of another particular substance" (G2 92/AG 82). This passage provides support for the claim that Leibniz sometimes talks about internal phenomena even when he does not use that expression.

1.2 External Phenomenon

On Leibniz's theory one can easily find another notion of phenomenon. Indeed, in some passages we cannot take phenomenon as internal (G2 251, 252 etc.). One of the typical examples is the following:

> Further, there must be simple beings; otherwise there would not be composite beings or beings through aggregation, which are phenomena rather than substances, and exist by convention rather than by nature (that is, morally or rationally rather than physically) as Democrite put it. (G3 69 1702)

Here "phenomena" or "beings through aggregation" presuppose the existence of many simple beings or simple substances, and are clearly different from internal phenomena which are produced solely by perceivers (cf. Rutherford 1990, p.19). Indeed, they are objects of perception which exist outside of a perceiver, that is, external objects (G4 453) or external things (G5 46 NE Preface etc.). And when Leibniz draws attention to Democrite, he is always talking about this

notion of phenomenon rather than an internal one: “since only simple things are true things, what remain are only entities by aggregation; to that extent they are phenomena, and as Democritus put it, exist by convention and not by nature” (G2 252/AG 177).[7] In addition, Leibniz speaks of phenomena as aggregates which contain forces in them (G2 251/AG 176). It is hard to understand it unless we take the term “phenomenon” as an aggregate of simple substances, since an internal phenomenon or representational content cannot include forces in it. So we need a new concept of phenomenon, which refers to an aggregate of simple substances which exist outside of a perceiver.

> The reason why the infants do not form the thoughts of adults is that their thoughts are parallel to external phenomena in relation to their bodies. (G3 465 1704.2.9)

External phenomena are contrasted with thoughts which are internal to the soul of an infant. The “parallel” relationship suggests that things correspond to each other and yet do not interact. And when Leibniz talks about external things or objects, he emphasizes that they do not directly act upon a perceiver (G5 46 NE Preface cf. G4 453). There are two reasons why Leibniz regards an aggregate of simple substances as phenomenon. First, the term “phenomenon” is contrasted with “substance,” and an aggregate of simple substances cannot be a substance by itself, and therefore it is categorized as a non-substantial entity.[8] The other reason is that the existence of an aggregate of simple substances in some sense depends upon a perceiver even though it is constituted by many external simple substances.[9] That is, each simple substance exists independently from a perceiver, but it is a perceiver or mind that regards it as a member of an aggregate. In the light of this dependence, Leibniz assigned the term “phenomenon” to an aggregate of simple substances.

But we have to see this issue a little bit more in detail. While Leibniz’s theory of how the primitive force of a perceiver generates its own internal phenomena is perhaps plausible given the framework of monadology, it is difficult to see how external things can be phenomena at the same time. We need to see the reason why external phenomena can appear to the perceiver. A perceiver or soul cannot be physically stimulated by other beings, but it can perceive and express external objects (G4, 453). But it should be noted that the relation between a perceiver and external things is explained quite differently from Aristotelian or Cartesian theory. Unlike Aristotle and Descartes, Leibniz does not argue that external things can have a direct influence on the soul through stimulating its body, which requires a particular explanation of the perceiving relation. Leibniz offers many clues about how external things are expressed by a perceiver. For example, consistent with his definitions of internal phenomenon, Leibniz defines perception as “the passing state which involves and represents a multitude in the unity” (M 14/AG 214),[10] and expression is defined as “a constant and regular relation between what can be said about one and about the other” (G2 112/L 339). The constant and regular relation Leibniz speaks of here consists of one-to-one

correspondence (cf. Adams 1994, p.286).[11] Thus, we should reasonably expect perceptions of external things to be explained along these lines: a perceiving simple substance has a representational state which corresponds to the states of other simple substances which exist outside of it. That is to say, when my soul has a sensation of the red color of my shirt, there are many other simple substances which belong to my shirt as an aggregate of substances and each of them has some states which can somehow explain the red color. In general, our internal phenomena make us to pick up a certain collection or aggregate of simple substances. Looking at the red shirt, I distinguish it from the surrounding air and other bodies. By doing so I determine an aggregate of simple substances which include some simple substances but not the other. And though we perceive other substances through our own representational mental state, these objects themselves are still external to us.

2. Extension in External Phenomenon

In this section, I will show that bodies as external phenomena are extended, but they are discrete rather than continuous. As we have seen, there is a significant difference between a body as internal and external phenomena. Indeed, a body as an aggregate of simple substances seems to be such a different animal from Cartesian body that it hardly shares any properties with extended things (res extensa) in Cartesian theory.[12] The Cartesian notion of extension (extensio, étendue) includes continuity. However, an aggregate of simple substances is discrete rather than continuous, since each simple substance exists independently from others, and they do not make up a continuous whole at all (G2 282 etc.).[13] The problem is Leibniz actually stated that bodies are extended (extensum, étendu). If an extended being is necessarily continuous, then the claim that bodies are extended beings will be incompatible with the claim that bodies are discrete or discontinuous. To evade a contradiction, I will show that Leibniz supposes that bodies as aggregates of substances are extended but not continuous.

First, we have to see the texts in which Leibniz states that bodies as aggregates of substances are extended. For instance, we learn in the letter to De Volder on June 23 1699: “Extension is an attribute; the extended, or matter, is not substance but substances” (G2 183/L 519). “Substances” means plural substances, of course, so the extended (extensum) has the same meaning as an aggregate of substances. And in the letter to De Volder in April 1702, we learn that “extension alone cannot suffice for an extended being, any more than number suffices for the things that are enumerated” (G2 241/L 527). For example, when there are three persons, the notion of the number three does not include that each person is a human being and has many properties as an individual. In the same way, an extended being consists of many substances which have properties other than extension, and the notion of extension cannot provide all these properties. This reading is also

supported in a passage from a letter to De Volder in 1705, where extended things [extensa] consist of innumerable unities:

> I do not say that "A unity exists in a mass of extension", or rather of extended things, or, as I would prefer, a multitude of things, but rather innumerable unities. (G2 276/Lodge 321)

Here extended things are identical to a multitude of things. And it is natural to suppose that a multitude of things or innumerable unities is an aggregate of simple substances, since the term "unity" is often used as a synonym of "simple substance" or "monad" (G5 359 NE 4.3.6 etc.). That is to say, when Leibniz states that a unity exists in a mass of extension, we can suppose that a simple substance really exists in an extended mass.

Next, let us confirm that the extension (extensio, étendue) is an attribute and one of the essential characteristics of a substratum or holder of attribute. By doing so we can understand that all bodies as aggregates of substances must be extended. In June 1699, Leibniz stated that "extension is itself, for me, an attribute resulting from many substances existing continuously at the same time" (G2 184/L 520). From the claim that extension is an attribute we may anticipate that extension cannot be separated from that which it belongs to (that is, an aggregate of substances). Indeed, Leibniz once stated that both extension and space are orders (G2 253 1703.6.20), but later distinguished extension from space (G2 269 1704.6.30). So even if a body moves and changes its position it holds the same extension (G7 399 1716.8.18). Here extension is inseparable from a body.

And when Leibniz referred to extension in the next passage, he seems to have an aggregate of substances in his mind:

> ...[I]t represents only a certain nonsuccessive ([unlike] duration) and simultaneous diffusion or repetition of a certain nature, or what comes to the same thing, it represents a multitude of things of the same nature, existing simultaneously, with a certain order among themselves. It is this nature, I say, that is said to be extended or diffused. (G2 269/AG 179)

It is natural to suppose that "a multitude of things" means not an appearance, but an aggregate of substances, since Leibniz usually used the term "thing (res, chose)" to refer to substance rather than phenomenon (G2 252 1703.6.20 etc).

So far we see that Leibniz argues that bodies as aggregates of substances are extended. But the substantial contents of extension in Leibniz's metaphysics are not explained. What kind of extension does an aggregate of simple substances have ? Leibniz's argument and terminology concerning extension is complicated, and it is not easy to make them clear. However, we can say

that if extension requires continuity in which a whole is prior to parts, then it will contradict with the claim that extension belongs to an aggregate of substances. For an aggregate of substances is composed of individual substances and such individuals must be logically prior to the aggregate which consists of them. So in this paper, I interpret that at least after 1704 the notion of extension does not necessarily include that of continuity. Adams also takes extended things to be discrete, and a body as an aggregate of simple substances that can hold extension even though it is not continuous (Adams 1994, p.328). There are three reasons why extension can belong to something discontinuous and an extended thing can be discrete:

(A) As I noted above, if continuity is a necessary condition of extension, it will contradict with the claim that an aggregate of simple substances, which cannot be continuous, holds its extension.
(B) After 1704 Leibniz distinguished extension from continuous space. If extension is not the same as continuous space, then we do not have to conclude that an extended thing is continuous because the space is continuous.
(C) Leibniz pointed out that continuity (continuitas, continuité) is an element of extension, but later he began to use the term "continuation (continuatio, continuation)" instead. If the notion of continuation is different from continuity and Leibniz consciously stopped using the term "continuity," then we can assume that Leibniz began to suppose that the notion of extension does not necessarily include that of continuity.

First, I will briefly review (A). Simple substances are ultimate ontological unities in Leibniz's metaphysics. Each simple substance exists independently from others and does not have mutual interactions at all. Also, simple substances do neither fuse together nor make up one continuous whole. Therefore, we can conclude that each simple substance is separated from others and hence discrete in an aggregate of simple substances. An aggregate of simple substances cannot be continuous. So even if an aggregate of simple substances is said to be extended, it cannot have a continuous extension.

Secondly, (B) shall be discussed. If extension is distinguished from space, then extension may not be continuous even though space is continuous.

> If by the mathematical body you mean space, it must be compared with time; if you mean extension, it must be compared with duration. Indeed, space is only the order of existing for possibles that exist simultaneously, just as time is the order of existing for possibles that exist successively. And the state or series of things add motion to space and to time, that is, they add action and passion and their source. (G2 269/AG 179

1704.6.30: Hartz and Cover 1988, p.509)

We can now see that space is compared to time, and extension is compared to duration. Notice that space is assumed to be a purely ideal entity but this is not the case with extension. It is natural to interpret that extension is, unlike space, not accessible in thought unless something is added in an ideal space, for example a repetition of impenetrability or resistance. Also, in the fifth letter to Clark on August 18 1716, Leibniz stated that one clear contrast between extension and space is that a body always keeps the former as its own, whereas it does not keep the latter:

> It appears that the author confounds immensity, or the extension of things, with the space according to which that extension is taken. Infinite space is not the immensity of God; finite space is not the extension of bodies, as time is not their duration. Things keep their extension, but they do not always keep their space. Everything has its own extension, its own duration, but it has not its own time and does not keep its own space. (G7 399/L 703: Hartz and Cover 1988, p.509)

Here it is abundantly clear that Leibniz reiterates the distinction between extension and space. An actual and determinate body cannot have its own space since it always changes the position and its relation to other bodies in the space. However, the body is always extended and does not change its extension. And if extension is different from space, even though space is an ideal being (idealia) and continuous, extension may be discrete or discontinuous.

Now I will explain (C). Adams also takes notice of the term “continuation (continuatio, continuation)” and supposes that the notion of continuation does not require continuity in which a whole is prior to parts (Adams 1994, p.328). For Adams an aggregate of simple substances is not continuous but merely dense.[15] That is to say, parts of body are so “thick” or crowded that we misunderstand it as something continuous, and the term continuation can be applied to an entity which is “thick” in such a way. Suppose that there are two bodies and their distance is a finite quantity (not zero). Then there must be another body which exists between these two bodies.

Now we have to see the texts to confirm the interpretation. The term “continuation” was used before 1701, when Leibniz intended to express the succession of motion,[16] but later he began to use this term to explain the notion of extension:[17]

> I intend the *diffusion* that I conceive of in extension, and which seems to have put into you the suspicion of I know not what hidden paradox, to be nothing other than a continuation in which the part is similar to the whole, as we conceive of whiteness diffused in milk… (G2 277/Lodge 323 1705.1)

After 1706, in letters to Des Bosses (G2 339 1707, G2 435 1712), Leibniz referred to continuaton as an element of extension. Also, in *Conversation of Philarète and Ariste* (1711), an expression "extension or diffusion" (G6 584-5/L 621) was often used as well as "diffusion or continuation" (G6 585/L 622) However, the term "continuity (continuitas, continuité) (G1 352, G2 169)" would never be used to explain the necessary conditions of extension. Therefore we have good reasons to suppose that the notion of extension does not necessarily include that of continuity after 1704.

So far we have demonstrated the interpretation that the notion of extension does not require continuity after 1704. Then, what is required in an extension of an aggregate of simple substances? In the letter to De Volder in April 1699, Leibniz analyzed extension into plurality, continuity and coexistence (G2 169). But, again, the expression "continuity" changed into "continuation" (G2 277, G6 585 etc.). Therefore, we should try to find plurality, coexistence and continuation in extension.

What kind of plurality can we find in an aggregate of simple substances? As I will show in the following, any body is supposed to have an infinite number of simple substances or monads in it, which clearly satisfies the condition of plurality. Any simple substance "dominates" an infinite number of subordinate monads, and all of them make up an organic body together (G2 252).[19] Any body is either an organic body or an aggregate of organic bodies. Leibniz seems to think that the number of organic bodies in an inorganic body is infinite (AG 167-8). And even if the number of organic bodies is finite, an organic body does have an infinite number of simple substances in it. For, an organic body is supposed to have one and only dominant monad and many other monads which are subordinate to it. It should be noted that all monads or simple substances must have their organic bodies. Even a subordinate monad has an organic body which is a part of the organic body of the dominant monad. That subordinate monad also dominates its own organic body and has many monads which further subordinate to it. Since these monads have their organic body, this series does not end. Therefore, a number of monads in an organic body is infinite, and plurality for extension is guaranteed.

This leads us to coexistence. When Leibniz takes coexistence to be a condition of extension, it is compared to something successive, that is, duration or time (G2 269 1704.6.30). The parts of an extended thing exist simultaneously rather than successively. Then can we ascribe simultaneity to simple substances? Leibniz had a negative attitude towards absolute space and time.[20] Each simple substance has its own duration and develops its perceptions independently. In that case whether simultaneity can be ascribed to many substances or not is not easy to understand. But in fact, Leibniz supposes that we can ascribe simultaneity to many substances which are independent from each other.

Here we should take note of the fact that Leibniz said that soul and body are in a certain state at the same moment. For example, in a letter to Arnauld, he states that "at the moment (dans le

moment)" when a soul wills to move its body, that body moves in accordance with its own laws (G2 74 1686). The same kind of argument is also found in later texts, for instance, the soul of a dog feels pain at the moment when its body changes (G4 518).[21] When the soul of a dog feels pain, its subordinate monads have correspondent perceptions, and so do all the other monads in the universe. In general, when a monad or simple substance has a certain perception, all the other monads will have correspondent perceptions. Leibniz thus explained "simultaneity" of perceptions of many substances in terms of correspondence, and we can therefore see how coexistence is found in an extended thing.

Finally, we turn to continuation. It is important to conceive that any organic body corresponds to one and only one dominant monad. If an inorganic body has innumerable organic bodies in it, it seems that dominant monads or simple substances exist densely. Furthermore, we can say many simple substances or monads exist so densely even in a single organic body, since any organ of organic body corresponds to a subordinate monad (cf. G2 194). In that sense, a subordinate monad is regarded as a dominant monad of some organ. As an organ has many smaller organs as its parts, the number of subordinate monads in any organic body is infinite. Thus, Leibniz appears to explain the continuation of simple substances in a body by the fact that even a very minute body contains an infinite number of them, and Leibniz's analysis of extension succeeds without any commitment to extension being continuous.

So far we have seen that how an external phenomenon or aggregate of substances is said to be extended for Leibniz but it is discrete at the same time. Leibniz seems to have modified the Cartesian notion of extension to support this claim. Even though there are uncountable substances in an aggregate, we should not confuse it with continuous entities.

3. Extension in Internal Phenomenon

At present I have been discussing extension of aggregates of simple substances, or external phenomenon, which Adams also explores (Adams 1994, pp.327-9 etc.). However, I will now consider another form of extension, that is to say, the extension of bodies as internal phenomena.

An important passage that speaks to this issue can be found in a passage from Leibniz's comments to Bayle's dictionary in 1705. Leibniz stated that if God wills, He can destroy all the substances except one soul, and it would be left as only one created substance:

> It is true that if God were to decide to destroy everything external to the soul, but to keep the soul in isolation, with its affections and modifications, they would bring it, through its own dispositions, to have the same sensations as before, just as if bodies were still there, although this would then be nothing but a kind of dream. But since

> this is contrary to the design of God, who wanted there to be agreement between the soul and things external to it, it is clear that this pre-established harmony removes such a fiction: it is metaphysically possible, but it doesn't accord with the facts and their explanations. (G4 530/W 199)

In that case, all the affections and modifications of one's soul would be conserved. Everything would occur to him or her as if the bodies actually existed, but in fact all experiences would be like dreams. What appears to he or she would have no correspondence to other created simple substances. It is not surprising that he or she should not present phenomena as aggregates of simple substances here, since the ordinary meaning of phenomenon is just an appearance to a human mind.

But even if I assume that there is only one created substance, namely my soul, problems will still remain; for even if I am the only one substance in this world, I still perceive internal phenomena as they are, given Leibniz's understanding that even if God destroys all the other substances nothing will change in my perception and sensation. Then can we find extended beings in internal phenomena? Leibniz often used the term "extended being" in a quite general way. For example, the notion of extended being can probably be applied to internal phenomena when Leibniz states that "if an extended thing is conceived by itself, it is not in place" (G2 233 1701.12.27). Here Leibniz is suggesting that a position of an extended thing cannot be assigned without a relationship to other extended things. The position is merely a relational concept, and not absolute. To be sure, when I see a personal computer, it is possible to suppose that the display is above the keyboard, considering the passage in which he suggests that "extended things involve a plurality of things endowed with position" (G2 253/L 531). But in that case I do not think about the personal computer as one extended thing, but the relationship of two smaller extended things. If I see the whole extended thing without considering its relation to other bodies, I will not be able to recognize the place at all since we always find the place of something in relation to other bodies. I understand that a display is on the desk. If I do not consider the desk, I will not grasp the position or place of the display.

However, there is a problem again. If a body as appearance or internal phenomenon is also an extended being, what kind of characteristics does it have? Adams seems to undertake the position that even though an aggregate of simple substances is discrete, internal phenomena are continuous rather than discrete:

> We have just seen, however, that a body conceived as a phenomenon having a certain definite extension, shape, and motion is not complex enough to be an adequate expression of any real thing, according to Leibniz. (Adams 1994, p.230)

> For the time being, I will just say that as in section 1.3.1 I preferred the view that (determinate, finitely complex) shape only appears to belong to bodies, so here I think Leibniz probably ought to hold that bodies only appear to be continuous. (Adams 1994, p.233)

Here Adams seems to want to say that even though a body as an aggregate of substances is actually discrete, we have a continuous internal phenomenon as an expression (if not adequate) of the aggregate. Our minds are so limited that we could not recognize the actual properties of body enough. A similar view is also supported by Hartz:

> As noted in the detailed studies of Idealism and Realism, bodies that are "multitudes of an infinity of true substances" are almost always said to be real because they contain discrete unities, while a "well-founded phenomenon" is continuous and mind-dependent. (Hartz 2007, p.151)

According to Hartz, Leibniz simultaneously introduces two different theories of body (Hartz 2007, pp.18-27). But a phenomenon must be continuous for him whether we accept an idealistic theory or a realistic one (Hartz 2007, p.92, 126, 151 etc.). The idealistic position suggests that a simple substance exists independently from any other, and we have a continuous phenomenon as a representational content of many other substances. On the other hand, if we follow the realistic theory, many substances form an organism or aggregate without the aid of a perceiver, yet we have a continuous phenomenon when we perceive them.

But although there may be some evidence for their view, it is hard to see how it can be made consistent with other texts that speak to the issue. I would like to demonstrate three points:

(a) There is a passage in which Leibniz contrasted phenomenon with ideal entities, which are typical examples of continuous things.
(b) Leibniz admits that a conscious perception of physical object is composed of an infinite number of small perceptions. Each small perception is an actual and discrete part of the conscious perception.
(c) Each small perception is supposed to construct a small physical motion in internal phenomenon. If small perceptions are discrete, so are physical objects.

As for (a), consider the following passage from *Reply to the Comments in the Second Edition of M.Bayle's Critical Dictionary*:

> It is true that perfectly uniform change, such as a mathematical idea of motion, is never found in nature any more than actual figures which possess in full force the properties which we learn in geometry, because the actual world does not remain in this indifference of possibilities but arises from the actual divisions or pluralities whose results are phenomena which are present and vary in the least parts: (G4 568 1702)

Here Leibniz seems to contrast geometrical objects and phenomena. Geometrical objects, such as an equilateral triangle, are uniform and homogeneous. That is to say, if we divide an equilateral triangle into four smaller equilateral triangles, each of these is similar to another: we can pick up one of these and substitute it for another. Also, an equilateral triangle with a side is 6 inches can be divided into either four equilateral triangles whose sides are 3 inches, or nine equilateral triangles whose sides are 2 inches. One can choose any one of various divisions, and a choice would be arbitrary. Without actual division, we cannot find any parts in the equilateral triangle. Parts of geometrical objects are not actual in that sense. On the other hand, phenomena are not homogeneous at all, and each of them differs and varies. For example, a desk in front of me has many parts, and all of them have different color, weight and so on. Phenomenal bodies are actually divided since we can distinguish their actual parts when we find different motions of their parts. Indeed, we often take some bodies to be still and not moving. But it just means that our eyesight is too limited to find minute inner motions of the bodies. As a matter of fact, all bodies have many complicated internal motions by which this body is divided into actual parts. One part has a different velocity from another. Therefore, each part of body is different from the others and actually divided. To be sure, one may wonder whether we should understand phenomena here as internal or external. If we are to take it as internal, even a body as internal phenomenon is not uniform, and each part of it is actually different from others. And these bodies are supposed to be different from geometrical objects which do not have actual parts. The actual divisibility into parts of a body as internal phenomenon thus supports the idea that even bodies as internal phenomena are not continuous.

Now we should examine (b). If the term “phenomenon” in the previous passage (G4 568) refers to an external one, and “phenomenon” in the passage which Adams picks out refers to an internal one, then an internal phenomenon may not have actual parts whereas an external phenomenon or aggregate of simple substances is actually divided into individual substances. However, pace Adams and Hartz, I want to suggest that Leibniz thinks of small perceptions as real constituents of the conscious perception of physical objects, and the number of small perceptions is never finite. The relationship between conscious and small or unconscious perceptions is suggested in the *New Essay*:

> To hear the [roar of sea] as one does, one must hear the parts that compose this whole, that is the noise of each wave, although each of these little noises makes itself known only in confused collection of all of them together, and would not be noticed if the wave that made it were by itself. (G 47 NE Preface/RB 54)

What is important here is the account that Leibniz provides of the conscious perception of the roar, which is composed of multiple small perceptions. In fact, these small perceptions are logically prior to conscious perceptions, which can be understood through other passages:

> They are also the insensible parts of our sensible perceptions, which bring it about that those perceptions of colours, warmth and other sensible qualities are related to the motions in bodies which correspond to them : (G5 49 NE Preface/RB 56)

This kind of sensory qualities such as a vivid color of red have many "parts" each of which cannot be noticed. This raises the question of how a perception could have parts, since a perception is supposed to be a mental state which is not extended. However, even if a conscious perception does not have extension, small perceptions can be logically prior to conscious perceptions which are the result of an accumulation of small perceptions (cf. Simmons 2001, p.63)

We should notice that Leibniz actually used the term "compose" when he tried to explain the relationship between the conscious perceptions of light and color and small perceptions (G5 121 NE 2.9.4). This term has a special meaning to Leibniz. For example, Leibniz reiterated that "composed beings (êtres composés)(G3 68)"[22] presuppose simple beings or monads. Therefore, a conscious perception of light or color presupposes small perceptions which compose it (cf. G4 563). Furthermore, Leibniz used the terms "cause" and "result" in explaining small perceptions. Small perceptions "cause" an anxiety (G5 48-9 NE Preface), and unconscious actions or behaviors are "results" of cooperation of small perceptions (G5 105 NE 2.1.15).

Further, any conscious perception is composed by an *infinite number* of small perceptions. Leibniz often said that we have infinite small perceptions (G5 24 NE Preface)[23]. It turns on the issue of whether our conscious perception of a finite body (like a desk) has an infinite number of small perceptions in it. As we learn in the New Essays, a simple substance has a certain relation (liaison) to all the other simple substances in the universe (G5 48 NE Preface). If a simple substance perceives all the other substances, and any aggregate has an infinite number of simple substances in it, then a simple substance has an infinite number of small perceptions of an aggregate. Leibniz also pointed out that the reason why a conscious perception comes from small perceptions is that things always and everywhere contain a real infinite (G5 49 NE Preface). This seems to mean that an aggregate of simple substances has an infinite number of members, and a

perceiver has an infinite number of small perceptions to these simple substances. Indeed, Leibniz clearly stated that our "large" perceptions consist of an infinite collection of small perceptions (G3 657). We can understand that any conscious perception is actually composed of an infinite number of small perceptions.

Now we can turn to (C). In addition, it should be noted that motions play an essential role in explaining actual parts of body. Parts of body are considered to belong to one body in so far as they share the same motion (G5 59 NE Preface). For instance, parts of a ball which is flying in the air are supposed to keep a certain motion in relation to the surrounding air. On the other hand, we can find inner motions in body, and the parts of body is distinguished by these inner motions (G2 268-9). Bodies, however hard, in fact have complex inner motions, and these parts are actually divided by these inner motions (G7 561). There are many minute molecules which are incessantly moving even in an iron statue, for example.

Then what is the ontological status of motions? One may find motions outside of a perceiver: others may find them in it. Simmons supported the former view and argued that a mental state constituted of small perceptions is as complex as the external physical world.[24] That is, every small perception exactly corresponds to a minute motion (Simmons 2001, p.68). Indeed, Leibniz stated that motions in bodies correspond to insensible parts of perception or small perceptions (G5 49 NE Preface). It is natural to suppose that this relationship is a one-to-one correspondence, since Leibniz stated that when we hear the roar of the sea we have to actually hear actually the noises of each small wave (G5 47 NE Preface).

If motions are to be found outside of the perceiver, even though actual parts of body are given by motions, these actual parts belong to external phenomena and the existence of actual parts of internal phenomena will not be guaranteed. However, I would like to point out two problems concerning Simmons' interpretation. First, if we reduce motions into transitions of perception of simple substances, the expressions like "roar" and "wave" will be a mere metaphor. Physical waves and sounds actually do not exist since there is just an aggregate of simple substances and each simple substance has nothing but perceptions and appetitions. Physical events are reduced to perceptions and appetitions of many simple substances. Secondly, and more important, Leibniz stated that motions are phenomena:[25]

> And in fact, since motions are real phenomena rather than beings, a motion considered as a phenomenon is the immediate result or effect of another phenomenon in my mind, and similarly in the minds of others, but the state of a substance is not the immediate result of the state of another particular substance. (G2 92/AG 82)

> Matter and motion, however, are not so much substances or things as they are the phenomena

of percipient beings, whose reality is located in the harmony of the percipient with himself (at different times) and with other percipient beings. (G2 270/L 537)

> The movements and the collisions are just appearances, but well-founded appearances which never deceive, and like exact and constant dreams. The movement is the phenomenon of change in accordance with the position and time, and the body is the phenomenon which changes. (G3 623)

From these passages we can infer three points: First, motions in perception are actually produced by a perceiver. This fits the idea that internal phenomena would be given even in the case of solipsism in which there is only one perceiver.[26] Second, motions do not exist independently from a perceiver. Motions may be coherent among perceivers, but each motion belongs to each individual perceiver. Third, motions are likened to dreams. Considering that Leibniz used a metaphor of dream when he first used the term "internal phenomenon" (G4 477), we should think that motions are within the realm of internal phenomenon.

And when we consider motions as internal phenomena and that all bodies are actually divided by minute inner motions, even bodies as internal phenomena are actually divided by the motions as internal phenomena. Even if parts of internal phenomenon are not consciously distinguished, it does not mean that bodies as internal phenomena are homogeneous. It is possible that a minute difference of internal phenomena is perceived on the level of small perception (cf. G4 568).

Given that the minute motions belong to phenomenal bodies rather than corporeal substances which are supposed to be extended as such, we can see that the minute motions in a phenomenal body are inseparable from petite or small perceptions which are assumed to be mental states. Moreover, consider a possible world in which only one perceiver exists. That perceiving substance cannot perceive or express other substances. In that case we cannot understand minute motions as something in other corporeal substances. But if we take minute motions to be in phenomenal bodies, then they could be still found in that possible world. This should imply that at least in some possible world the realistic understanding of minute motions cannot hold or we cannot find any of them in some possible world.

And an even stronger conclusion seems possible. For I shall argue that even if we only consider this best of possible world in which all phenomenal bodies are well-founded by simple substances, strictly speaking it would still not be possible to maintain that the extension of phenomenal body is identical to the repetition of simple substances. To be sure, at least in this world, a phenomenal body which is a correlate of the repetition of small perceptions is not a mere appearance, but a well-founded phenomenon to which other monads or simple substances

correspond. But for all that, the phenomenal body and the repetition of small perceptions are at most expressions of simple substances whose objective reality may be identical to simple substances themselves. We know that Leibniz held that simple substances or monads themselves do not belong to the spatio-temporal order as Rutherford nicely points out:

> For Leibniz, space and time are orders directly indicative of the relatedness of phenomenal material things, not unextended monads. It is the key to his solution of the problem of the 'labyrinth of the continuum' that truly real beings -monads- are neither parts of space nor located in space. (Rutherford 1995, pp.190-1)

Thus we recognize the notion of extension through phenomenal extended bodies rather than other simple substances themselves, though the objective reality of phenomenal extended bodies are somehow identical to simple substances since all phenomena are assumed to correspond to simple substances which exist independently from a perceiver.[27]

So far we have offered an interpretation of Leibniz's notions of extension and extended body: the result represents a significant reduction of them. According to Simmons, by a metaphysical hypothesis, we can assume that there are small perceptions which are supposed to construe conscious sensory perceptions and each small perception brings a minute phenomenal body which is an actual part of larger phenomenal body. And as an infinite number of minute motions—which are discrete—which appear to a perceiver will construe an extension of body. However, an extended body is not homogeneous as their actual parts have various kinds of properties (color, etc.), and an extension of that body is something abstracted from it. That is to say, when we conceive an extension of body we ignore various kinds of properties in that body and only consider a certain property which is diffused or repeated in it. And we have shown how an extension of body is still available for someone even if God were to destroy all the created substances except that person. Consider first that in that case even though a correspondence of my perception and *external* things fades out, there would still be my mental states and my phenomena as *internal* representational contents. It is only in light of such a scheme that Leibniz's notions of extension and extended body may be understood.

Conclusion

In summary, I have argued that Leibniz *did not* suppose that either internal phenomenon or external were continuous in the late period. On the contrary, Leibniz had regarded not only simple substances but phenomenal bodies as actual and discrete entities; hence phenomenal bodies are not extended with continuity. Moreover, there are suggestions in many texts after 1704 that Leibniz

regarded the notion of *extension* as something different from that of *space*. Extension is an attribute of phenomenal body and defined as a dense diffusion of coexistent things. Thus the claim that phenomenal bodies are extended does not contradict with the discontinuity or discreteness of them, but rather the notion of extension allows us to understand the characteristics of phenomenal bodies in Leibniz. Given the assumptions of the preestablished harmony, a diffusion or repetition of phenomenal qualities like resistance is an expression of passivity of other simple substances; and under this supposition we can regard a phenomenal body as an aggregate of simple substances.

Abbreviations

A *Sämtliche Schriften und Briefe.* Herausgegeben von der Deutschen Akademie der Wissenschaften zu Berlin. Darmstadt, 1923 ff., Leipzig, 1938 ff.., Berlin, 1950 ff. Cited by series, volume, and page.

AG *G. W. Leibniz Philosophical Essays.* Trans. and eds. by Roger Ariew and Daniel Garber. Indianapolis: Hacket. 1989.

AT *Oeuvres de Descartes*. Ed. Adam and P. Tannery. Paris: L. Cerf, 1897-1913. Cited by volume and page.

DM *Discours de métaphysique.* In G4, cited by section number.

G *Die philosophischen Schriften von G. W. Leibniz.* Ed. C. I. Gerhardt. Berlin: Weidmann, 1875-1890. Reprint, Hildesheim: Georg Olms, 1978. Cited by volume and page.

GM *Leibnizens Mathematische Schriften.* Ed. C. I. Gerhardt. Berlin: A. Asher, and Halle: H.W.Schmidt, 1849-1863. Cited by volume and page.

Lodge The Leibniz De Volder Correspondence. Trans. by Paul Lodge: Yale University Press. 2013.

M *Monadology.* In G6, cited by section number.

NE *Nouveaux Essais sur l'Entendement.* In G5, cited by book, chapter, and section.

RB *New Essays on Human Understanding* Trans. by P. Remnant and J. Bennett. Cambridge: Cambridge University Press, 1982.

W *G. W. Leibniz Philosophycal Texts.* Trans. and eds. by R. S. Woolhouse and Richard Francks. New York: Oxford University Press. 1998.

Bibliography of Secondary Sources

Adams, Robert Merrihew. 1994. *Leibniz: Determinist, Theist, Idealist*. New York: Oxford University Press.

Boehm, A. 1938. *Le "Vinculum Substantiale" chez Leibniz*: *Ses origines historiques*. Paris:Vrin.

Earman, John. 1977. "Perceptions and Relations in the Monadology." *Studia Leibnitiana* 9(2): pp.212-30.

Furth, Montgomery. 1967. "Monadology." *Philosophical Review* vol.76: pp.169-200.

Hartz, Glenn A. 2007. *Leibniz's Final System.* London: Routledge.

Hartz, Glenn A., and J. A. Cover. 1988. "Space and Time in the Leibnizian Metaphysic." *Nous.* 22(4): pp.493-519

Kulstad, Mark. 1991. *Leibniz on Apperception, Consciousness, and Reflection.* Munich: Philosophia Verlag.

Levey, Samuel. 1999. "Matter and Two Concepts of Continuity in Leibniz." *Philosophical Studies* 94:1-2. pp.81-118.

Lodge, Paul. 2001. "Leibniz's Notion of an Aggregate" *British Journal of the History of Philosophy* 9: pp.467-86

Loeb, Louis E. 1981. *From Descartes and Hume.* Ithaca, NY: Cornell University Press.

Look, Brandon. 1999. *Leibniz and the 'Vinculum Substantiale.'* Franz Steiner Verlag Stuttgart.

Rescher, Nicholas. 1979. *An Introduction to his Philosophy.* Basil Blackwell.

Russell, Bertrand. *A Critical Exposition of the Philosophy of Leibniz.* 1937. 2nd ed. London: Allen and Unwin.

Rutherford, Donald. 1990. "Phenomenalism and the Reality of Body in Leibniz's Later Philosophy." *Studia Leibnitiana* vol.22 (1). pp.11-26.

_____. 1995. *Leibniz and the Rational Order of Nature*. New York: Cambridge University Press.

Simmons, Alison. 2001. "Changing the Cartesian Mind: Leibniz on Sensation, Representation and Consciousness". *Philosophical Review,* vol.110. pp.30-75.

Vailati, Ezio. 1997. *Leibniz and Clarke: A Study of Their Correspondence*. New York: Oxford University Press.

[1] This is not to say that an organic body cannot be one corporeal substance for Leibniz. In this paper, I do not determine whether a substantial bond which is proposed in letters to Des Bosses after 1712 makes up a corporeal substance for Leibniz (G2 435 etc. cf. Boehm 1938, Look 1999).

[2] For example, Adams suggests three levels of reality of phenomenon (Adams 1994, p.261). The first level is achieved when phenomena "belong to a scientifically adequate system of harmonious perceptions of a single perceiver." Secondly, phenomena are more real if they fit into "a single scientifically adequate system of harmonious phenomena of all perceivers." Lastly, if phenomenal organic bodies appropriately express real monads, phenomena are real in a fuller sense.

[3] All simple substances are supposed to have perceptions (G2 270, M19 etc.). Not all of them have conscious perceptions, but at least animal souls are conscious of what they sense (M 25-6 cf. Kulstad 1991, p.166 etc.), and our minds are not only conscious of something but can reflect upon innate ideas and recognize eternal truths (M29 etc.).

[4] Descartes himself usually uses the term "mode" in stead of "modification" (AT3 504, AT7 37, 40, 73, 306 etc.). In the Third Meditation, he takes a mode of my cogitation as a certain entity which exist in his mind and cannot exist independently (AT7 40).

[5] Louis Loeb also takes phenomena of percipient beings as appearances within perceivers (Loeb 1981, pp.303-5). Though I do not support his idea that Leibniz tries to reduce bodies into sets of perceptions, I think we should understand phenomena as internal here. For previous phenomenalistic interpretations, see Furth 1967 and Earman 1977.

[6] For example, Leibniz states that "one body is repelled away from another by its own force rather than being propelled by the other" (G2 251/ L 530). Since internal phenomena or representational contents can hardly have forces in them, we should understand body as an aggregate of substances here.

[7] Also see G2 101 (1687); G4 472 (1695); G3 69 (1702); G2 252 (1703); G2 282 (1706).

[8] Cf. G2 126 (1687) ; G2 252, 256 (1703).

[9] Cf. G2 256 (1703) ; G5 133 NE 2.12.7 (1703-5).

[10] In a letter to Bayle, Leibniz simply defines the perception as "the expression of the multitude in the unity [*l'expression de la multitude dans l'unité*]" (G3, 69).

[11] Leibniz argues that an organic body has to be infinitely organic or complex, since it expresses the whole

universe (G2, 251). It is natural to suppose that something that expresses an infinitely complex entity must be itself infinitely complex.

[12] Descartes characterizes bodies as extended things (res extensa) many times. See AT5 221; AT5 239; AT7 21; AT7 78; AT7 86; AT7 132; AT7 199; AT7 203-4; AT7 335-7; AT8a 42; AT8a 51.

[13] For an explanation of discrete quantity, see G5 142 NE 2.16.4 (1703-5); G7 562 (1705); G7 468 (1706). For a discrete character of matter and infinite actual division, see G2 278 (1705).

[14] In fact, density of matter involves a difficult problem. According to the normal definition of density in mathematics, we can always find the third between any two members of dense set. However, some commentators suggest that matter is not even dense in this sense. For example, Ezio Vailati states that we cannot find any body between two contiguous bodies (Vailati 1997, p.119). I will not discuss this problem in detail, but even if bodies are not rigidly dense, it is possible that any finite body has an infinite actual parts.

[15] Cf. G2 80 (1686); G2 93 (1687); G4 396 (1702).

[16] Also see G7 328, in which Leibniz states that extension is a continuation in space.

[17] Also see G2 194, in which Leibniz refers to a dominant soul of whole organism.

[18] Cf. G7 363-4 ; G5 100 NE 2.1.2 G5 145 NE 2.17.3 (1703-5) ; G3 659 (1715) ; G3 595, 674 (1716).

[19] Also see G2 114 (1687); G4 484 (1695).

[20] Also see G2 101 (1687); G6 598, 601, 607 (1714).

[21] Also see G4 551 (1705);G6 402 (1710);G3 657 (1715).

[22] In fact, it should be noted that Simmons admits that sensations are not only isomorphic to external motions, they exactly resembles to those motions (Simmons 2001, pp.67-8). But she does not use the term “motion” to express these sensations.

[23] Also see the margin of a letter to Bourget in 1714 (G3 567n).

[24] Cf. G4 530 (1705); G6 589, 591 (1711).

[25] Concerning this issue, in some passages Adams seems to identify phenomena with the representational contents of what appears to us and says “ our own phenomena can still be understood as the intentional objects or representational contents of our perceptions －what appears to us－the objective rather than the formal reality of our perceptions, in Cartesian terms.” (Adams 1994, p220) But it seems to be difficult to identify phenomena with simple substances in a metaphysical rigor, since simple substances does not follow the laws of mechanical explanations. Adams says “while [perceptions’] formal reality follows from the formal reality of previous perceptions and appetitions of the same substance by laws of teleological explanation, their objective reality follows from the objective reality of previous perceptions by laws of mechanical explanation” (Adams 1994, p.223). Then he should not have identified phenomena which follow the laws of mechanical explanation with simple substances as he actually did (Adams 1994, pp.246-7 etc.). And it should be noted that Hoffman points out a tension between the notion of phenomena and that of aggregate in Adams (Hoffman 1996). Hoffman says that the objective being or reality of idea can be something that actually does not exist, for example, Paul Bunyan and so on (Hoffman 1996, p.114). In the same way, I think it is possible that my idea or perceptual state still represents or expresses my phenomenal body even though there are no simple substances which found my phenomenal body at all. But in that case, my phenomenal body is never an aggregate of subordinate monads.