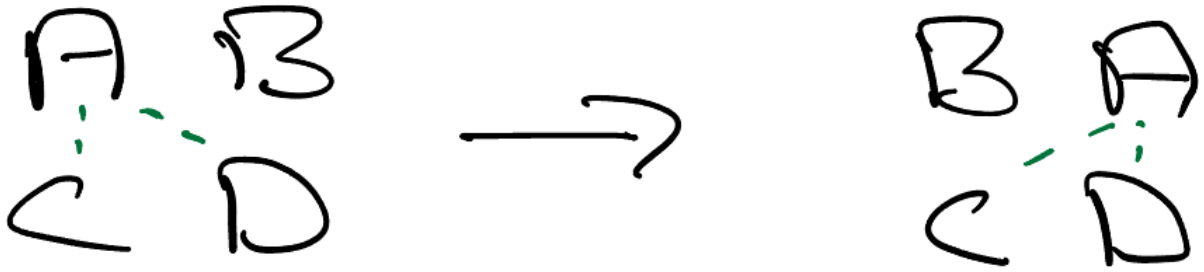

Leibniz claims that we do not need to have an idea of absolute reality to have an idea of space. Consider the 4 objects: A, B, C, D as shown above. Leibniz would say that we observe that

1. many things (A, B, C, D) exist at once
2. there is an order of coexistence

For example, A has an order of relation with objects C and D in the first diagram as indicated by the green dots. In the second diagram, A has changed its relation to objects C and D. But now B has the same relations to C and D in the second diagram as A did in the first. Leibniz says that our mind searches for an *identity*-- something that remains the same through this transition that doesn't depend on the objects A and B. This leads to the idea of a *place* since we think of B as being in the 'same place' as A was before the transition. Importantly, the idea of a *place* appears independent of the object in the *place*. Finally, we obtain the idea of space by considering the collection of all these places. Leibniz concludes that we arrived at the idea of space by considering the relations of the objects, without needing to have an idea of space existing independently (i.e. absolute space).

Du Châtelet disagrees with Leibniz about the idea of space. While she agrees with Leibniz on the metaphysics of space— space as an order of things— she thinks that we *represent* space as something that exists independently. In other words, Du Châtelet thinks that the metaphysics and the cognition of space diverge, but Leibniz thinks that they don't need to.

Newton thinks that space exists independently and has the further properties of being *continuous*, *penetrable*, *immutable*, and *infinite*. Du Châtelet thinks that Newton's metaphysical conception of space is incorrect-- she accepts Leibniz's *principle of sufficient reason*, and agrees that it allows us to reject his conception of *absolute space*. However, she claims that our *idea* of space-- that is, how it appears to us-- corresponds with Newton's conception of space. In particular, she thinks that space appears to be *independent*, *continuous*, *penetrable*, *immutable*, and *infinite*.

She thinks that we represent space as existing independently for the following reason: We can imagine a set of objects in space, for example, and maintain a representation of some *being* that exists even when we remove all the objects from our imagination. Thus, we can represent *empty space*. Since we can represent space without any objects, space appears to exist *independently*.

She argues that space appears *continuous* to us in the following way:

1) A being is *continuous* if we cannot place anything between parts of the being
2) We can represent in our minds several objects that are not *contiguous*, that is, not touching each other
3) Since the objects are not touching each other, we can imagine placing something between them
4) Thus, we imagine that there is *space* between them
5) Therefore, space appears *continuous*

She argues that space appears *penetrable* to us because we can imagine empty space, and subsequently imagine an object in the space.

She argues that space appears *immutable* to us, that is, we cannot remove it. If we represent space, we cannot remove space from our representation, as it is from space itself that we imagine we can remove anything from.

She argues that space appears *infinite* to us. If we start by representing empty space and start placing objects in our representations, there is no limit to the number of objects we can place.

I agree with her claims that space seems *independent*, *penetrable*, and *immutable* to us. However, I do not agree with her claim that space seems *infinite* to us. I agree that I can represent empty space and place objects in my representation of space. However, I cannot do so without limit. In order to represent the increasing number of objects in my imagination, I necessarily need to make them smaller and closer together. In the limit, one of the following must occur: 1) the objects become so small that I can no longer imagine them 2) the objects begin to appear contiguous or conjoined. In other words, I cannot endlessly sustain an increasing number of objects in my imagination.

I agree with her conclusion that space appears *continuous* to us, but I do not find her argument for why space appears *continuous* compelling. I agree with her argument until (4), that we can imagine that there is space between objects that do not appear contiguous. However, it does not follow from this that space itself is *continuous*. In order for space to be considered *continuous* by her own definition, we shouldn't be able to place anything between two parts of space.

I think the issue stems from her definition of *continuity*. In mathematics, we say that the real numbers are *continuous* because between any two real numbers, say 1.01 and 1.02, there is always another real number (eg. 1.015) between them. I propose that we conceive of the *continuity* of space in a similar way. If we take any two points in our representation of space, there is always another point of space in between them. Thus, using this definition, I agree with her claim that space appears *continuous* to us.

Stavan Jain