

„Für unser Glück oder das Glück anderer“  
Vorträge des X. Internationalen Leibniz-Kongresses  
Hannover, 18. – 23. Juli 2016

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Band VI



Georg Olms Verlag  
Hildesheim · Zürich · New York  
2017

## Leibniz on Time and Duration

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### 1. Introduction

This paper examines one aspect of Leibniz's philosophy of time which, despite its rich historical lineage, has been somewhat underplayed in recent treatments of his metaphysics and philosophy of science. In a number of works explicating his mature metaphysics of space and time, Leibniz emphasizes the distinction between space and time, on the one hand – where

“space is only the order of existing for possibles existing simultaneously, just as time is the order of existing for possibles that exist successively” – and extension and duration, on the other – where “extension is the extension of something, just as we say a multitude or duration is a multitude of something or a duration of something.”<sup>1</sup>

I will first consider the origins of this distinction in sources important to Leibniz. I will next attempt to isolate the most important aspects of the distinction. Leibniz, perhaps more than any other early modern metaphysician, tended to analyze space and time analogously while giving the lion's share of attention to the former. I will attempt to show that this methodology, however fruitful in the abstract realm of space and time, is more problematic in the concrete realm of extension and duration.

### 2. Historical Background

It is worth reviewing briefly the origin of the time/duration distinction in sources Leibniz knew and drew upon. In scholastic thought, duration is a generic notion common to God and created beings in so far as they persist in being. Aquinas writes that whereas God's eternal duration lacks any succession or 'before and after' created things endure successively: “the divine Being is simultaneously

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<sup>1</sup> To De Volder June 30, 1704; Gottfried Wilhelm Leibniz: *Philosophical Papers and Letters*, ed. by L. E. Loemker, Dordrecht 1989, p. 536 (further as L); Id.: *Philosophical Essays*, ed. by R. Ariew and D. Garber, Indianapolis 1989, p. 179 (further as AG).

without succession; but with the world it is otherwise."<sup>2</sup> Created beings are in "time itself, which is successive."<sup>3</sup> Somewhat more systematically, Suarez explains,

"Duration can be divided first of all between permanent and successive. Permanent duration is said to be wholly simultaneous without successive parts; successive duration is not permanent but rather one part always succeeds another."<sup>4</sup>

For both Aquinas and Suarez, successive duration is closely associated with motion, in line with the canonical Aristotelian formula: "time is the measure of motion with respect to before and after"<sup>5</sup> (although Suarez and other late scholastics admit an 'imaginary time' with successive structure prior to the creation of the world).

While retaining the duration/time distinction, Descartes transforms it in two important respects. First, he makes all duration intrinsically successive, even the duration of God and of rest:

"the duration which we find to be involved in movement is certainly no different from the duration involved in things which do not move."<sup>6</sup>

After commenting to Burman that "we can divide his duration into an infinite number of parts, even though God himself is not therefore divisible" Burman objected that God's "eternity is all at once and once and for all."<sup>7</sup> Descartes' reply is curt: "that is inconceivable."<sup>8</sup> But although he extends successive duration to all things, Descartes does not separate it from things themselves, as Newton would later do. Rather,

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<sup>2</sup> St. Thomas Aquinas: *Summa Theologica*, in: *Great Books of the Western World*, vols. 19 and 20, transl. by Fathers of the English Dominican Province Chicago, Encyclopedia Britannica 1952, 1, 46, 2 (further ST).

<sup>3</sup> ST 1, 10, 1.

<sup>4</sup> Francisco Suarez: *Disputationes Metaphysicae (1866)*, in: *Opera Omnia*, ed. by Carolo Berton, Paris, 50, 5, 1 (further MD).

<sup>5</sup> 220a24; Aristotle: *Complete Works*, 2. vols., ed. by Jonathan Barnes, Princeton 1971, I 373 (further ACM).

<sup>6</sup> René Descartes: *Oeuvres De Descartes*, 11 vols., edited by Charles Adam and Paul Tannery. Paris 1983, 8A 27 (further AT); Id.: *The Philosophical Writings Of Descartes*, 2 vols., translated by John Cottingham/Robert Stoothoff and Dugald Murdoch, Cambridge 1988, 1 212 (further CSM).

<sup>7</sup> simul et semel. AT 5 148

<sup>8</sup> hoc concipi non potest. Ibid.

“since a substance cannot cease to endure without also ceasing to be, the distinction between a substance and its duration is merely a conceptual one.”<sup>9</sup>

And hence he dismisses Henry More’s postulation of ‘intermundane’ duration: “it involves a contradiction to conceive of any duration intervening between the destruction of an earlier world and the creation of a new one.”<sup>10</sup> For Descartes, empty time is as contradictory as empty space. Second, Descartes reserve the label ‘time’ for conventional measure of duration (clock time). In order to measure this duration common to all things,

“we compare their duration with the greatest and most regular motions, which give rise to years and days, and call this duration ‘time’.”<sup>11</sup>

But we must not conflate duration itself, which is intrinsic to all things, with its temporal measure, which is an intellectual abstraction:

“when time is distinguished from duration taken in the general sense (*duratio generaliter*) and called the measure of movement, it is simply a mode of thought.”<sup>12</sup>

So duration is real, successive and intrinsic to substance; time is ideal, abstract and dependent on the human intellect.<sup>13</sup>

The young Spinoza follows Descartes closely in his conception of time. In the 1663 *Cogitata Metaphysica* he defines duration as

“the attribute under which we conceive the existence of created things insofar as they persevere in their actuality.”<sup>14</sup>

So conceived, he notes, duration is

<sup>9</sup> AT 8A 39; CSM 1 214.

<sup>10</sup> AT 5 343; CSMK 3 373.

<sup>11</sup> AT 8A 27; CSM 1 212.

<sup>12</sup> Ibid.

<sup>13</sup> See Geoffrey Gorham: “Descartes on Time and Duration”, in: *Early Science and Medicine* 12 (2007), pp. 28–54.

<sup>14</sup> Baruch de Spinoza: *The Principles of Cartesian Philosophy and Metaphysical Thoughts*, transl. by S. Shirley, Introd. and Notes by S. Barone and L. Rice, Indianapolis 1998, 104 (further S); Id.: *Opera*, vols. I–IV, ed. by C. Gebhardt, Heidelberg 1925, 1, 244 (further G).

“distinct only in reason from the total existence of a thing” since “as much as you take away from the duration of thing so much necessarily you take away from its existence.”<sup>15</sup>

So Spinoza likewise agrees with Descartes that duration (and time)

“ceases when created things cease to exist and begins when created things begin to exist.”<sup>16</sup> As for time, “in order that duration may be determined, we compare it with other things that have a fixed and determinate motion, and this comparison is called time.”<sup>17</sup>

Such clock time, he emphasizes, “is not an affection of things [...] but rather a mode of thinking that we use to explicate duration.”<sup>18</sup> The same distinction between concrete duration and abstract time is found in the contemporaneous Letter 12 ‘On the Infinite’:

“when we conceive quantity abstracted from substance, and separate duration from the way it flows from eternal things, we can determine them as we please, there arises time and measure.”<sup>19</sup>

Such division is the source of Zeno-like paradoxes of infinity:

“when someone has conceived Duration abstractly, and by confusing it with time begun to divide it into parts, he will never be able to understand how an hour can pass.”<sup>20</sup>

Similarly, in the *Ethics*, duration is defined as “an indefinite continuation of existing”<sup>21</sup> while time is the conventional measure, derived from periodic motions, by which the imagination compares the durations of things:

“we imagine time from the fact that we imagine some bodies to move more slowly than others, or more quickly, or with the same speed.”<sup>22</sup>

<sup>15</sup> S 104ff; G 1, 244.

<sup>16</sup> S 129; G 1, 169.

<sup>17</sup> S 105; G 1, 244.

<sup>18</sup> Ibid.

<sup>19</sup> GP IV, 56, 15–19; C 203.

<sup>20</sup> GP IV 58, 5–7; *The Collected Works of Spinoza*, vol. I, ed. by E. Curley, Princeton 1985, 203.

<sup>21</sup> 2Def5; *The Collected Works of Spinoza*, vol. I, 447.

<sup>22</sup> 2P44schol; *The Collected Works of Spinoza*, vol. I, 480. See further Geoffrey Gorham: “Spinoza on the Ideality of Time”, in: *Idealistic Studies* 43 (2014), pp. 27–40.

Finally, Thomas Hobbes famously called space in abstraction from bodies: “the phantasm of a thing existing thing simply insofar as it exists.”<sup>23</sup> Leibniz himself invokes Hobbes’ doctrine in support of his own.<sup>24</sup> It is less often noticed that Hobbes also admitted a real space: “the extension of a body, which is the same as its magnitude.”<sup>25</sup> This “real space”, Hobbes insists, “does not depend on our thought, as imaginary space does.”<sup>26</sup> Time is likewise conceived as imaginary “the phantasm of before and after in motion.”<sup>27</sup> But although he does not specifically articulate a corresponding “real time”, his physics seems to require it – presumably it is the intrinsic succession of motion itself (apart from its measure).<sup>28</sup>

### 3. Leibniz on Space/Time vs. Extension/Duration

From Leibniz’s brief comments scattered across a number of late works, a few salient features of the Space/Time vs. Extension/Duration distinction emerge:<sup>29</sup>

#### 3.1 Extension and Duration Fill Space and Time:

In the *New Essays* (1704), Leibniz comments on Locke’s claim

“by this idea of solidity, the extension of body is distinguished from the extension of space.”<sup>30</sup>

<sup>23</sup> Thomas Hobbes: *Elementorum Philosophiae, Sectio Prima: De Corpore*, ed. by K. Schuhmann, Paris 1999, 2.7.2 and 3.15.1 (further *De Corpore*); Id.: *Opera philosophica quae latine scripsit omnia*, 5 vols., ed. by W. Molesworth, London 1845, i, 83 and i, 176 (further OL); id.: *English Works*, 11 vols., ed. by W. Molesworth, London 1839–1845, i, 94 and i, 204 (further EW).

<sup>24</sup> L 583.

<sup>25</sup> *De Corpore* 2.8.4; OL i, 93; EW i, 105.

<sup>26</sup> Ibid.

<sup>27</sup> *De Corpore* 2.7.3; OL i, 84; EW i, 94.

<sup>28</sup> See further Geoffrey Gorham: “Hobbes on the Reality of Time”, in: *Hobbes Studies* 27 (2014), pp. 80–103.

<sup>29</sup> My reconstruction here is similar, in certain respects, to Glenn Hartz and Jan Cover’s reconstruction of the phenomenal/ideal distinction, though I focus more directly on time and duration: “Space and Time in the Leibnizian Metaphysics”, in: *Nous* 22 (1988), p. 493–519 and p. 504–506.

<sup>30</sup> John Locke: *An Essay Concerning Human Understanding*, ed. by P. H. Nidditch, Oxford 1975, II, iv, 5: 126, (further Essay).

Leibniz insists “there is no need to postulate two extensions, one abstract (for space) and the other concrete (for body).”<sup>31</sup> He compares this to number: to conceive of three apples is not to conceive of the three-ness of the apples as distinct from the number. But neither are the apples nothing but their number, nor a body nothing but its extension as the Cartesians hold. Body is rather the concrete instantiation of abstract space. He further observes that the “concrete one is as it is only by virtue of the abstract one.”<sup>32</sup> His point is not that space somehow produces extension but that a body has motion or situation in relation to the abstract orderings of space and time. We can even speak of a body filling a vacuum just as a couple might anticipate a third child though they only have two.

But how do concrete bodies “fill” abstract space and time?<sup>33</sup> For Cartesians, the question is trivial: corporeal extension fills space because it is space. Similarly, duration is a universal attribute, not really or modally distinct from things themselves as noted above. Similarly, a substance fills time simply by persisting: “we should regard the duration of a thing as simply a mode under which we conceive the thing insofar as it continues to exist.”<sup>34</sup> But although Richard Arthur is surely right to note the Cartesian source of the Leibnizian distinction between concrete duration and abstract time,<sup>35</sup> the Cartesian theories of extension and duration are ill-suited to Leibniz’s late metaphysics of body. This comes out clearly in Leibniz’ rejection of the Cartesian theory of extension and duration as *attributes*. Although he explicitly designates extension and duration as “attributes of things”,<sup>36</sup> Leibniz rejects the Cartesian conception of attributes, as he explains to De Volder:

“I do not at all approve of the doctrine of attributes which people are formulating today: as if one simple absolute predicate, which they call an attribute, constituted a substance.”<sup>37</sup>

<sup>31</sup> Gottfried Wilhelm Leibniz: *New Essays on the Human Understanding*, ed. by P. Remnant and J. Bennett, Cambridge 1996, 127 (further NE).

<sup>32</sup> *Ibid.*

<sup>33</sup> *Ibid.*; see also Letter 5, 27; L 700.

<sup>34</sup> AT 8A 26; CSM 1 211.

<sup>35</sup> Richard Arthur: “Leibniz’s Theory of Time”, in: *Leibniz’s Natural Philosophy*, ed. by K. Okruhlik and J. R. Brown, Dordrecht 1985, p. 281

<sup>36</sup> AG 261.

<sup>37</sup> June 20, 1703; L 528.

His attack on the Cartesian theory of attributes is part and parcel of his campaign against the Cartesian theory of corporeal substance. But given his strong extension/duration parallelism –

“duration, time and the enduring thing are in relation to one another in proportional to the relations among extension, place and the placed thing”<sup>38</sup> –

he must also reject the Cartesian account of duration as simple persistence of substance.

Although I cannot go into this complex issue in detail, it is worth considering whether Leibniz’s alternative speculations about the nature and origin of extension can be applied easily to duration. In the 1702 anti-Cartesian tract *On Body and Force*, Leibniz explains that extension is a “simultaneous repetition” or, more specifically, the “extension of resistance, diffused through body” while duration is a “successive repetition” of some sort.<sup>39</sup> He does not explain more fully how resistance is diffused nor how succession constitutes duration, since his main concern is to confute the Cartesian doctrine that extension is the whole essence of body. And in the 1712/15 dialogue between Philarete and Ariste he stresses that duration and extension do not “stand alone” but are rather the durations/extensions *of* something, just as “in milk there is an extension or diffusion of whiteness.”<sup>40</sup> He tells us that extension is the diffusion of antitype<sup>41</sup> but neglects to explain what sort of diffusion duration is, though he is clear that it is the concrete, temporal analogue of extension: “extension is to space as duration is to time.”<sup>42</sup>

This alternative to the Cartesian picture of extension is developed more fully in the long exchange with De Volder. On De Volder’s theory of ‘mathematical body’ – basically Cartesian *res extensa* – Leibniz comments:

“If you regard this mathematical body as space, it must be correlated with time; if as extension, it must be correlated with duration”. But “as the physical body is to space so the status or series of things is to time”; he says both “add to” space and time.”<sup>43</sup>

<sup>38</sup> June 23, 1699; L 519.

<sup>39</sup> AG 251.

<sup>40</sup> Ibid.

<sup>41</sup> AG 262; L 622.

<sup>42</sup> AG 261; L 621.

<sup>43</sup> June 30, 1704; L 536.



What extension adds is a

“simultaneous repetition or diffusion of some particular nature or, what amounts to the same thing, a multitude of things of this same nature which exist together with some order between them.”<sup>44</sup>

This multitude of things are the simple substances: “extended things involve a plurality of things with position, but things which are simple.”<sup>45</sup> The correlated notion of duration arises from

“the law of the series” which “involves all of the future states of that which we conceive to be the same – that is the very fact I say which constitutes the enduring substance.”<sup>46</sup>

While there is much obscurity in this account, it seems to apply equally well (or ill) to extension and duration. The extension of corporeal substance derives from the simultaneous order of simple substances manifesting the force of resistance and its duration derives from the successive states of simple substances following the law of the series.

In the exchange with Des Bosses, Leibniz introduces a new, controversial tool to explain corporeal substance. He conceives of extension in a fairly traditional way: “the extension of a body seems to be nothing but the continuation of matter through parts external to each other (*partes extra partes*), or diffusion.”<sup>47</sup> But since it is fair to ask about the simple substances or monads:

“by what compact can they make an extended being when they are not themselves extended?” He says it “seems further necessary to resort to something unifying which can be called absolute accidental extension.”<sup>48</sup>

Without this *viniculum substantiale*

“all bodies along with all their qualities would be nothing but well-founded phenomena, like the rainbow or an image in a mirror.”<sup>49</sup>

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<sup>44</sup> Ibid.

<sup>45</sup> June 20, 1703; L 531.

<sup>46</sup> L 535.

<sup>47</sup> February 5, 1712; L 600; see also L 601.

<sup>48</sup> L 602.

<sup>49</sup> L 600. Cf., L 603. For detailed discussion see Brandon Look: “Leibniz and the Substance of the *Viniculum Substantiale*”, in: *Journal of the History of Philosophy* 38 (2000), pp. 203–220.

Leibniz says almost nothing about how *vinculum substantiale* accounts for real or concrete duration. This is unsurprising since it is designed specifically to account for the unity of corporeal substance; still, it is hard to see how such a unity characterizes duration and succession. Perhaps a substantial bond is needed to account for the unity of my body at this time; but how does it help to account for the successive duration of my body? We could, of course, call on the appetitions of monads, combined with their mutual perceptions and harmony – and indeed Leibniz assures us that the substantial chain “corresponds accurately in the course of nature to the affections of the monads, that is, to their perceptions and appetite”<sup>50</sup> – but then we will have abandoned a strictly symmetrical treatment of extension and duration.

### 3.2 *Space and Time are ideal; Extension and Duration are real*

I am sympathetic with the view that space and time are ideal, above all, in virtue of being *abstract*.<sup>51</sup> On this view, we should expect that extension and duration are real, above all, in virtue of being *concrete*. This is what Leibniz tells Clarke:

“The parts of time and space considered in themselves, are ideal things and therefore they perfectly resemble one another, like two abstract units. But it is not so with two concrete ones, or two real times, or two spaces filled up, that is, truly actual.”<sup>52</sup>

To say that extension and motion are concrete, and hence real, simply means they inhere in actually existing bodies, whereas space and time are merely the possible orders of co-existence and succession among bodies. Thus, Leibniz has Philarete observe on his behalf:

“extension is to space as duration is to time. Duration and extension are attributes of things (*attributs des choses*), but time and space are taken to be outside of things (*hors des choses*) and serve to measure them.”<sup>53</sup>

And because extension and duration are inherent, but space and time are not:

<sup>50</sup> L 608.

<sup>51</sup> Arthur: “Leibniz’s Theory of Time”.

<sup>52</sup> Letter 5, 27; AG 334; L 700.

<sup>53</sup> AG 261.

“Things keep their extension but they do not 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.”<sup>54</sup>

The space-time parallelism evinced in this passage is typical of Leibniz.<sup>55</sup> But even within the Clarke correspondence he also declares: “From extension to duration, *non valet consequential*.”<sup>56</sup> Leibniz might have more carefully heeded his own warning. Presumably, things keep their extension but give up their space when they move. But things do not ‘move’ in time by transferring their duration out of temporal place. Although my very same extension can fill distinct spaces, my very same duration occupies only a single time (even if I time travel). Still, there is a sense in which even my concrete duration could have filled a different time. Leibniz concedes this about the duration of the universe as a whole: “absolutely speaking, one can conceive that a universe began earlier than it did.”<sup>57</sup> He says

“one might conceive something added to the beginning, so one might also suppose something taken off towards the end.”<sup>58</sup>

I can conceive that I was born a week earlier, and will die a year earlier, and in this sense my counterpart has the same duration but a different time. If we stick to this world, however, the duration and time of something do not come apart in the ways its extension and space routinely do. As Leibniz says,

“God created things at what time he pleased, for this depends on the things he resolved to create. But things being once resolves, together with their relations, there no longer remains any choice.”<sup>59</sup>

It is worth noting one other asymmetry regarding the reality of extension and duration. Against Clarke’s assertion of the eternity of time, Leibniz observes

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<sup>54</sup> Letter 5 46; AG 337; L 703.

<sup>55</sup> “the analogy between time and space will easily make it appear that the one is as merely ideal as the other” (Letter 5, 49; AG 340).

<sup>56</sup> Letter 5, 74; AG 54; L 711.

<sup>57</sup> Letter 5, 56; AG 342; L 707.

<sup>58</sup> Ibid.

<sup>59</sup> Letter 5, 56; AG 342; L 708.

“whatever exists of time and duration, being successive, perishes continually and how can a thing exist eternally which (to speak exactly) does not exist at all?”<sup>60</sup>

He draws the conclusion that time “can only be an ideal thing” and furthermore “the analogy between time and space will easily make it evident that one is as merely ideal as the other.”<sup>61</sup> Richard Arthur rightly points out that the fleeting nature of duration clearly does not extend to extension.<sup>62</sup> A more problematic implication of the argument is that time and duration are equally ideal, undercutting the supposed reality of the latter. However, Leibniz makes it clear that his concern about time is not so much the that it is fleeting but that it reduces to points or instants: “nothing of time does ever exist but instants, and an instant is not even itself a part of time.”<sup>63</sup> He does not allege this about duration or the time ‘filled’ by an enduring thing: on the contrary he says:

“if in saying that a thing is eternal is meant only that the thing endures eternally, I have no objection.”<sup>64</sup>

So on this point, space and time are asymmetrical, but the crucial symmetry between real extension and duration is maintained.

### *3.3 Space and Time are Homogeneous and Infinitely Divisible; Extension and Duration are Heterogeneous and Reducible to Parts*

Leibniz holds that

“space is something absolutely uniform and without the things placed in it, one point in space absolutely does not differ in anything from another point in space” and “the case is the same with respect to time.”<sup>65</sup>

And we have already noted his observation that

“the parts of time and space considered in themselves, are ideal things and therefore they perfectly resemble one another, like two abstract units. But it is not so

<sup>60</sup> Letter 5, 49; L 705.

<sup>61</sup> Ibid.

<sup>62</sup> Arthur: “Leibniz’s Theory of Time”, p. 282f.

<sup>63</sup> Letter 5, 49; L 705.

<sup>64</sup> Ibid.

<sup>65</sup> Letter 3, 5f; AG 325; L 682f.

with two concrete ones.<sup>66</sup> So “I deny that there are any two parts of water perfectly alike, or any two other bodies perfectly indiscernible from one another.”<sup>67</sup>

And he tells De Volder that, unlike the parts of space abstractly considered, e.g. geometrical objects, “in nature there cannot be two bodies at the same time perfectly similar and equal.”<sup>68</sup> Later in this careful exchange Leibniz insists that whereas “continuous quantity is something ideal”, pertaining strictly to possibles, “in actual things nothing is indefinite” [...] they are “composed as a number is composed of unities.”<sup>69</sup> The continuity of space/time vs. the aggregate structure of extension/duration is also noted in letter to Princess Sophie:

“although matter consists of a numberless collection of simple substances, and although duration along with motion likewise consists in a mass of momentary instants, it must nevertheless be said that space is not at all composed of points not time of instants.”<sup>70</sup>

Although it is plausible that the parts of concrete extension or matter satisfy the principle of the identity of indiscernibles, thus distinguishing concrete extension from ideal space, it is far from clear that the principle extends to the parts of duration. In his concise but path-breaking treatment of time and duration, Descartes does not go so far as to postulate duration independent of substance; like Leibniz, he rejected empty time as much as empty space. However, he insisted in opposition to the long Aristotelian tradition that made time the number of motion that

“the duration which we find to be involved in movement is certainly no different from the duration involved in things which do not move.”<sup>71</sup>

Leibniz seems to be with Aristotle in ruling out changeless duration. But, for the sorts of reasons given by Descartes – we do not reckon the duration of something strictly by the changes it undergoes – it is implausible to deny concrete duration to unchanging things. Leibniz insists that, unlike the parts of abstract time and space, the parts of concrete duration and extension do not

<sup>66</sup> Letter 5, 27; AG 334.

<sup>67</sup> Letter 5, 25; AG 334; Cf., Letter 5, 21f.

<sup>68</sup> June 20 1703; AG 175.

<sup>69</sup> January 19, 1706; AG 185.

<sup>70</sup> 1705; GP VII, 562.

<sup>71</sup> AT 8A 27; CSM 1 212.

“perfectly resemble one another.”<sup>72</sup> Similarly, he tells De Volder that “nothing is permanent in things except the law itself which involves a continuous succession.”<sup>73</sup> But the insistence that all duration in bodies involves change seems to be motivated only by a dogmatic attachment to the analogy between extension and duration.

In the exchange with Clarke he insists that the same arguments which rule out an extramundane spatial vacuum also exclude a local or intramundane vacuum: “for they differ only as greater or less.”<sup>74</sup> But it is not clear that the corresponding temporal vacua differ only in this way. An extramundane temporal vacuum is an abstract time before the world began (or between worlds), which Leibniz confutes repeatedly in the exchange with Clarke. An intramundane temporal void is the cessation of change of the world for some finite duration, like the “freezer world” of Sidney Shoemaker’s thought experiment.<sup>75</sup> Certain of Leibniz’ arguments against extramundane time might be as effective against mere freezes, for example, there would be no sufficient reason or even distinction among freezes of different lengths.<sup>76</sup> But others seem not to apply. Thus, Leibniz says

“extension must be the affection of something extended. But if that space is empty, it will be an attribute without a subject, an extension without something extended.”<sup>77</sup>

But a frozen world, unlike time before creation, does not posit an enduring nothing.<sup>78</sup>

<sup>72</sup> Letter 5, 27; AG 334.

<sup>73</sup> January 21, 1704; L 534.

<sup>74</sup> Letter 4, 7; AG 328; see also Letter 5, 33.

<sup>75</sup> Sidney Shoemaker: “Time Without Change”, in: *Journal of Philosophy* 66 (1969), pp. 363–381.

<sup>76</sup> Letter 5, 55; AG 341.

<sup>77</sup> Letter 4, 9; AG 328.

<sup>78</sup> So I think Futch rightly emphasizes the importance of such considerations in Leibniz’s case for reductionism about space and time. Michael Futch: *Leibniz’s Metaphysics of Time and Space*, New York 2008, p. 43f. I do not agree they extend as forcefully to concrete duration. Futch emphasizes Leibniz’ remark that “if space is an affection or property of the things which is in space, the space will sometimes be the affection of one body, sometimes of another body [...] but this is a strange property or affection which passes from one subject to another.” (L 5, 39) This does not apply to duration or extension since, as we have noted, “Things keep their extension but they do not 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.” (Letter 5, 46; AG 337).

Nothing that Leibniz maintains that any vacuum violate the principle of sufficient reason, since there would be no reason to prefer one ratio of matter to void than another,<sup>79</sup> Michael Futch has suggested in passing that the same applies to local temporal vacuum: “one would be unable to provide sufficient reason for one particular ration of change to empty time.”<sup>80</sup> I’m not sure the case is parallel, especially if we allow the world to endure through a local freeze, since it seems God might have reason to prefer a ‘day of rest’ for the world vs. a week of rest. In any case, the application of Leibniz’ argument to time would seem to entail that there is never any rest or stasis, but only maximal change, in the material world.<sup>81</sup>

There is a final asymmetry between local spatial vs. temporal vacua, which Leibniz himself notices in another context. But this asymmetry favors intramundane spatial voids as compared with freezer-worlds. In the *New Essays* he notes this difference: “If there were a local vacuum within extension we could “determinate its size” by the surrounding bodies.

“But if there were a vacuum in time, i.e. a duration without a change, it would be impossible to determine its length.”<sup>82</sup>

Since it is one-dimensional, a limited changeless duration is less ‘accessible’ empirically than a local void;<sup>83</sup> but it is more intelligible ontologically since it does not lack a subject.<sup>84</sup>

#### 4. Conclusion

Leibniz’ commitment to parallelism in the abstract realm of space and time falters in the concrete realm of extension and duration.

<sup>79</sup> Letter 4, 46; AG 332.

<sup>80</sup> Futch: *Leibniz’s Metaphysics*, p. 51.

<sup>81</sup> I’m not sure whether this is a principle Leibniz can live with. He does say that “exactly speaking there is not any one body that is perfectly and entirely at rest.” (Letter 5, 53; AG 341) But the target here is absolute rest.

<sup>82</sup> Letter 4, 46; AG 332.

<sup>83</sup> Futch makes a similar point about this passage in his compelling case against the possibility of Leibnizian vacuums, in: *Leibniz’s Metaphysics*, p. 49.

<sup>84</sup> Clarke pressed Leibniz that mere order or succession does not seem to determine quantity of time (Clarke letter 4, 41; L 695). Leibniz responded that in “if the time is greater there will be more successive and similar states interposed there will be fewer” (L 5 105; L 715). A similar suggestion is made in the *Initia Rerum* around the same time (L 666f.). But as Arthur has observed this account is sketchy and far less detailed than the parallel account of spatial quantity. Richard Arthur: *Leibniz*, Cambridge UK 2014, p. 164.