

# Change, Contradiction and Possibility. Outline for Leibniz's Metaphysics of Time

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## ABSTRACT

In this paper I consider some aspects of Leibniz's theory of time. On the whole, I point out how Leibniz relies in this, on one hand, on the inner experience of the mind; on the other, he works out a logico-ontological structure which underlies the temporal features of world.

In particular, then, I focus on the relationship between change and time. In the first part of my paper I take into account the thesis that time cannot be conceived without change, an important piece of a reductionist approach to the ontological status of time. It is endorsed by Leibniz, who in general professes the ontological priority of the 'history system' (the series of things and changes in time) with respect to the 'time system' (the system of properly temporal items). It does not fail to create some tension, however, with his characterization of time as an order of *possible* things – which seems to allow for the possibility of temporal vacua. In any event, the relation of time with possibility turns out to be a central one.

In the second part, I consider the fact that time, in its turn, seems to be required in order to conceive of change, insofar as it is taken by Leibniz as the way to neutralize the contradiction which would be implied by change itself.

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## INTRODUCTION

The relation with change has played a central role in the philosophical theory of time since its very origins. Already in Aristotle, change enters into the very definition of time. Change, in its turn, exhibits an intuitive link with contradiction. As is often the case in philosophy, we are faced here with a family of closely interrelated notions.

In his paper *Time, change and contradiction*,<sup>1</sup> G.H. von Wright put forward a clear articulation of this network of conceptual relations. According to von Wright, on the one hand, change is the condition of time from the epistemic point of view, while on the other, time is the condition of change from the logico - ontological point of view.

The first part of this statement points to the fact that change is required as a condition for the application of our temporal concepts; the intuition underlying the last part is that time allows us to conceive of change without falling into contradiction.

Now, Leibniz would subscribe to both lines of thought sketchily developed by von Wright on behalf of his double thesis. For his own part, however, he endorses a univocal conceptual and ontological chain of dependence, going from logical contradiction, to change, to time, in this order. I wish to try to explore here the Leibnizian articulation of these notions, and to show

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<sup>1</sup> (Von Wright, 1969).



how this matter is closely bound to the position he takes up in the great debate of his age about the ontological status of time.

### 1. NO TIME WITHOUT CHANGE. TIME, CHANGE AND THE REDUCIBILITY THESIS

#### *“Aristotle’s Principle”*

As I have hinted above, the idea that time is somehow inseparable from change is an ancient one, having got its standard formulation already in Aristotle’s theory of time, according to which time is nothing but the measure of change: “Time is the number of change according to the before and after”<sup>2</sup>. In the contemporary debate, indeed, the thesis according to which time depends – ontologically and conceptually – on change has been sometimes labelled ‘Aristotle’s Principle’ (AP). More precisely, the principle states that there is no time without change<sup>3</sup>.

Needless to say, this principle works as a necessary (if not sufficient) condition for those who want to defend a reductionist view, according to which talk about temporal items (instants, intervals and so on) is parasitic on talk about what is, or happens, in time (things, events, processes). In Leibniz’s age, however, challenging the old Aristotelian framework goes hand in hand with the rise of a view of time (and space) as fundamentally independent of things in time<sup>4</sup>. In this context, the discussion on AP – hence, on the alleged dependence of time on change – becomes a crucial test in the debate between two main ontological approaches to time itself. In order to better consider this background, let me start from Leibniz’s commentary to Locke’s ideas about time, in NE II, ch. 14.

#### *Time of the Mind and Time of the World: Time without Physical Change*

On the whole, Locke’s exposition reflects two leading threads in seventeenth century reflection on time: on one hand, the weakening of the conceptual link between time and physical (especially heavenly) motion; on the other, and more generally, the breaking of the dependence of time on things and their changes, and the rise of an idea of time as a kind of pre-existing container. Let me briefly consider the first one.

Traditionally, the change to which time was normally associated was – first and foremost – the physical, or better the cosmological one, such as heavenly motion: due to the fact that time had been defined as the measure, or number of change, and the motion of celestial bodies provided the means to measure all other changes.

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<sup>2</sup> Physics IV, 220 a 24-25.

<sup>3</sup> For the label of AP in contemporary debate, see Newton-Smith 1980, ch.2. For Aristotle’s arguments on behalf of AP, see Physics IV 218 b 21-30. For a well-known argument on behalf of the possibility of time without change, see (Shoemaker, 1969).

<sup>4</sup> For a standard statement of the two rival ontological views on time (labeled, respectively, reductionist and Platonist, see (Newton-Smith, 1980), ch. 1.



In the seventeenth century – together with the destruction of the ancient *kosmos* and the rise of a new philosophy of mind and subjectivity – there was a tendency to cut that privileged link with motion, and instead give a mental foundation to time: although, of course, the new notion of time worked out was bound to become one of the basic ones for the new physics. Thus, in Descartes' *Third Meditation*, the meditator discovers within himself the ideas of duration and succession, while still doubting the existence of the external world.

Half a century later, John Locke in his *Essay* also emphasized the foundation of the idea of time in the inner experience of the life of the mind: the idea of duration is drawn from the constant change of perceptions in our mind<sup>5</sup>.

Consider now Leibniz's reaction to Locke's stance. In NE II, 14, he seems to accept the privileged role of inner experience. As a matter of fact, the temporal experience of the mind turns out to be one of the primitive sources of some of his fundamental ideas. Think, e.g., of the significance of memory for the mind/body distinction and its constitutive role for the temporal sameness of substance – an idea which is well documented in Leibniz's writings, from the early *Hypothesis physica nova* until the *New Essays*.

At the same time, Leibniz is working out, during his philosophical development, a more abstract model of the '*series rerum*', which has a wholly general import, embracing both the fields of the philosophy of mind and of physical science. This duality of approaches, as we shall see, is a constant in his handling of time, which is rooted, on the one hand, within the inner experience of mind, and aiming, on the other, at clarifying an underlying logico-ontological structure.

#### *Temporal Vacua. Time without Actual Change?*

Besides breaking with physical changes, there was – in seventeenth century thought about time – the more radical tendency to cut the link with actual change in general, and to unfold in different ways the idea of imaginary times, outside the temporal boundaries of our world. For his own part Locke – still in order to detach the idea of time from actual physical motion – insisted on showing how a measure of time, drawn by some physical motions, can then be applied to periods where there is no such motion.

Interestingly enough, it is Leibniz who reinforces the import of Locke's remark. Where the English philosopher had simply spoken about a period without the sun's revolutions, he seems to take the situation in a more radical way as that of a period 'void' of any event: "Such a vacuum which can be conceived of in time, like that in space, shows that time and space extend to possible things, and not only to actual ones." (GP V 140). And when Locke positively hints at the infinity of space and time, by observing that we can well conceive of a finite world with a beginning, preceded by an eternal duration, Leibniz comments: "This is due to the fact that, as I have said above, time and space refer to possibilities, without presupposing

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<sup>5</sup> 'Duration' was commonly distinguished from time – both in Scholastic and post-Cartesian philosophical terminology – as a real attribute of thing, while time was acknowledged as an abstract device. Leibniz also follows this view, while not being always coherent in his terminological usage.



existences. Time and space share in the nature of eternal truths, which bear in the same way on the possible and the existent.” (Ibidem).

On the whole, these remarks on time in the NE seem to consider both intra-world and extramundane temporal vacua as a wholly legitimate possibility, made conceivable, and even necessarily implied, by the extension of the scope of time to possible things.

### *The Platonic Background and Modal Reductionism*

The reference to ‘eternal truths’ urges us to clarify the ontological background of Leibniz’s remark. While accepting the ‘mentalizing’ of change, Leibniz challenges the genetic role Locke attributes to it. He points out that “the succession of perceptions evokes in us the idea of duration, but it does not constitute it. Our perceptions do not have a succession regular and constant enough to correspond to that of time, which is a uniform and simple continuum like a straight line. The change in perception gives us the occasion to think of time and we measure it through uniform changes...” (GP V 139).

Leibniz’s qualification is in tune with his general concern, in the NE, to preserve the objective value and the meta-empirical import of our knowledge against Locke’s empiristic-subjectivist drift. In so doing, however, he seems to encourage a Platonist interpretation of the ‘idea of duration’. Time, Leibniz insists, by flowing in a perfectly uniform manner is the true measure of all other processes. It is grasped by our mind, but is wholly independent of it.

In the following chapter (15) Leibniz does confirm this status of time, by emphasizing its foundation in God: “He [sc. God] is the source of possibilities as well as of existences; of the former through His essence, of the latter through His will. Thus, space and time derive their reality from Him, and He can fill the Vacuum as He likes.” (GP V 141). The last sentence goes as far as to suggest the idea of a kind of eternal container, waiting to be filled according to the divine creative will.

This, however, is not the case with Leibniz, who never embraces the absolutist view<sup>6</sup>. More than ten years later, as is well known, in his discussion with Samuel Clarke, the attitude – still nuanced in the NE - towards the time of the ‘English philosophers’ will make room for an open fight.

In the course of this dispute, the status of Leibniz’s space and time is unequivocally clarified: they are mathematical beings, i.e. abstract (or better ideal) structures. As such, notice, they share most of the features of Newton’s space and time, exactly as it was shown by the remarks in NE. But the decisive divide lies in the way of conceiving the ontological status of mathematical objects in general. Whereas in the Newtonian perspective, space and time are somehow hypostatized, Leibniz is eager to stress their conceptual/abstract character, in contrast with concrete real beings. Admittedly, this radical ontological weakening coexists with a robust defence of their epistemical value, going far beyond the status of empirical devices.

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<sup>6</sup> Even when the neo-Platonic roots of this view are more evident, notice, Leibniz is eager to distinguish Immensity and eternity as Attributes of God from their mundane counterparts Space and Time – the latter finding their basis in the former, while being quite different. See e.g. A VI.3, 519-520. I owe this remark to an anonymous referee of this review.



This was the sense of the criticism against Locke, and it is also the reason why it is far more correct to speak about an ‘ideal’ than about an ‘abstract’ character of space and time.

Epistemological Platonism, therefore, together with an anti-**Platonistic** approach, on the ontological side: we are faced here with a typical Leibnizian strategy to get the pay-offs of both Platonism and Aristotelianism (or better, of a frankly nominalist view), without the respective drawbacks. It remains to be seen whether the resulting whole is coherent, or it is open to tension which cannot be actually disposed of. In the following, I shall try to collect the materials of the theory, leaving the question open.

In that strategy, a decisive role is played by the anchoring of ideas and truths in the divine intellect. Whereas this guarantees their peculiar ‘reality’ (in the sense of mind-independence, with respect to the human mind) and objectivity, their categorial qualification plays the decisive role, as far as their proper ontological evaluation is concerned. Space and time are not things nor attributes, indeed, but they belong, instead, to the category of Relation. More precisely, they are *orders* of relations. Accordingly, one can immediately see a quite natural sense in which they cannot but be something dependent on the existence of things located within them.

Anyway, they extend - as orders – to *possible* as well as to actual things. Leibniz’s emphasis on this fact is important for the possibility of detaching time from every *actual* change, even while keeping firm with a reductionist approach, as Leibniz actually did. Thus, as we have seen, in NE II.14 he seems to suggest a way of accounting for temporal vacua through the relation of time to possible things and events. In contemporary debate, some authors have attempted in a similar vein to reconcile the giving up of strong AP – hence, the admitted possibility of time without change - with a broader reductionist approach. According to Newton-Smith’s definition: “There is a period of time between the events E1 and E2 if and only if relative to these events it is possible for some event or events to occur between them.”<sup>7</sup> Now, Leibniz might well appear as the ancestor of a kindred modal reductionism.

#### *Modal Reductionism and the Problem of Temporal Vacua*

Things are more complicated, however. As a matter of fact Leibniz, when considering closer the issue of temporal vacua, clearly denies their very possibility, or conceivability. It remains to be seen, how this denial can be reconciled with the modal reductionism he seems to profess.

Thus, at the end of the selfsame chapter 15 of NE, Leibniz introduces a warning concerning exactly the alleged possibility of (intramundane) temporal vacua. Before considering it, however, we should observe that, as a matter of fact, the rejection of temporal vacua had already been attested some decades before in his writings.

The denial is already stated in the Paris Notes of 1676, where it is drawn from a version of the Plenitude Principle: “After due consideration I take as a principle the harmony of things; that is, that the greatest amount of essence that can exist, does exist... It follows from this principle that there is no vacuum among forms; also that there is no vacuum in place and time, as far as it is possible. From which it follows that there is no assignable time in which

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<sup>7</sup> (Newton-Smith, 1980), p. 44



something did not exist.” (A VI.3, 473, P 21-23). Still, the denial has here a rather uncertain status, insofar as it relies on a notion of plenitude which depends, in its turn, on a kind of (presumably contingent) principle of perfection, ruling our actual world. Most of all, it might figure as a rule designed to fill up some temporal container which is ‘already there’.

In the later passage from the NE, instead, the conceivability of temporal vacua is challenged more radically: “Before leaving this topic, I would like to add a new comparison between time and place, beside those you have drawn yourself. If there were a vacuum in space (e.g. a void sphere), we could determine its magnitude; if there were a temporal vacuum, however – that is to say, a duration without changes – it would be impossible to determine its length. Hence, we can refute those who claim that two bodies, between which there is a vacuum, touch ... But we could not refute those who claimed that two worlds, one after the other in time, touch as far as their duration is concerned, so that the one necessarily does begin when the other ceases to be, without any possible interval. I say that we could not confute them, because this interval could not be determined.” (GP V 142).

This argument has an unmistakable verificationist flavour, which should not surprise us. A verificationist bent, indeed, is far from absent in Leibniz’s epistemological and metaphysical reflection. By the way: this is a case where the alleged space-time parallelism – which Leibniz himself seems usually to subscribe to – fails to obtain.

#### *No Time Before the World*

But the main Leibnizian discussion on temporal vacua will concern the other case adumbrated in Locke’s treatment – i.e., extramundane time, or time before the world’s creation - and it will unfold in the context of that debate with Clarke, where Leibniz launches his most vigorous attack against temporal absolutism.

A good deal of the discussion bears, indeed, on the hypothetical situation of a time without change. The anti-absolutist arguments Leibniz advances in this scenario are an exemplary case for his claim that his principles of *Sufficient Reason* (PR) and of the *Identity of Indiscernibles* (IdInd) are able to give metaphysics the status of a demonstrative science.

Clarke had used the homogeneity of space and time as a premise to show that, in some circumstances, the mere will works perfectly as a sufficient reason: only God’s will can explain His decision to move a system of matter from one position into another in space or time. In his reply, Leibniz promptly seizes the opportunity to overturn the significance of Clarke’s example into a refutation of the absolutist view of space and time: “[Clarke] makes use of an example which falls exactly under one of my arguments against absolute space, which is the idol of some modern English thinkers.” (GP VII 363)

Among Clarke’s premises, Leibniz subscribes, notice, to the homogeneity requirement. As I have said, the structure of Leibnizian time, as such – i.e. as a mathematical object – **basically** shares the **topological** features of the time of the ‘Englishmen’. **In particular**, time is a perfectly homogeneous quantity. That is to say, there is no difference – except in order – among the instants or intervals of time as such.



On the basis of homogeneity, however, taken together with the principle of sufficient reason (in his Leibnizian understanding<sup>8</sup>), Leibniz can overturn the sense of his interlocutor's conclusion: to change the location of some material object in space or time, without any other change, would amount for God to a violation of PR. Let me schematize:

- (1) Time is homogeneous (premise P1: homogeneity)
- (2) Time is a pre-existing absolute container (premise P2: absoluteness)
- (3) God creates the world in time at the instant  $t_1$  (Hyp)
- (4) There is no reason for this action of God (why not having created it at  $t_2$ , with  $t_2 < t_1$ ?)

But

- (5) God cannot act without a reason (premise P3: Principle of reason – PR)

Therefore, conclusion (4) is unacceptable, and as a consequence hypothesis (3) is falsified.

Later on, Leibniz will present this *reductio* explicitly in the form of the old 'why not sooner?' argument, put forward by the adversaries of the doctrine of creation in time: if it is not possible to mark a privileged instant for creation, one should give up creation itself and be finally committed to the eternity of the world.

In order to block this outcome, according to Leibniz, one should give up, instead, the absoluteness clause (2). Thus, Clarke's argument has been overturned into a true *reductio ad absurdum* of the absolutist view: "his conclusion would be true, if time were something outside things in time, because it would be impossible to give any reason why things should have been associated with these instants rather than those. But this proves that instants are nothing outside things..." (GP VII 364).

Leibniz wants to substitute his view of space and time as 'orders' for the conception of a self-subsistent independent container 'being there' to be filled; he continues, indeed, with the positive statement: "they [sc. the instants] are, instead, nothing but the order of succession of things themselves..." (ibidem). Then, in the second part of his strategy, he can show that, on this new basis, the puzzling situation can (should) be simply dismissed as incoherent: "...and if it [sc. the order] remains the same, one of the two states – as is the case in the imagined anticipation – would not be different in any way, and could not be distinguished from the actual state." (ibidem).

The appeal to PR could work as an argument *ad hominem* against the hypothesis of creating something in a perfectly homogeneous time; but taking into account IdInd shows that the hypothesis is one we simply cannot make any sense of. As Leibniz explains in his following letter: "To pose two indiscernible things amounts to posing the same thing under two names. Thus, the hypothesis according to which the universe would have had at its beginning a different position in space and time as the one it actually received, and all its parts would have

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<sup>8</sup> That is to say, a way of intending it, according to which mere will cannot figure as a good candidate to satisfy the claim for sufficient reason.



maintained, instead, the same position among themselves: all this is *an impossible fiction*.” (GP VII 372).

The nature strictly *ad hominem* of the first battery of arguments is clearly acknowledged by Leibniz, who assimilates the arguments moving from hypothetical situations of purely numerical difference to the technical case of the mathematical proofs *per absurdum*, where a state of affairs is assumed, whose impossibility is finally demonstrated.

Thus, Leibniz’s move works as a radical restatement of Augustine’s solution to the why-not-sooner problem. The classic answer – according to which the beginning of the world does actually coincide with the beginning of time - turns out being now a matter of conceptual necessity.

A further, brief remark on homogeneity is in order. As purely abstract objects, space and time are not subjected to *IdInd*. Their falling outside the scope of this principle, however, is the mark of their being not real. Saying that they constitute a homogeneous plurality (something ‘different without difference’, as Hegel will say) only insofar as they are taken in abstraction, indicates that also their conceivability ultimately depends on their being grounded in some concrete discernible ‘contents’. Far from being sufficient to ground the numerical difference of things, spaces and times themselves require these discernible things in order to be distinguished. The underlying intuition is that we cannot refer to and individuate spaces and times without relying on things and events located in them – the indistinguishability of the latter being, in its turn, excluded by *IdInd*. Hence the inconceivability of the ‘fictions’ at stake is easily concluded.

#### *Anticipating Creation, again: Time and Possibility*

So far so good. But what about the seeming justification of *vacua* in the NE with regard to space and time as orders of the possible? Leibniz’s statement can be interpreted in a ‘weak’ sense: insofar as the order of places and times is independent of this or that thing – in this sense, it is not bound to the actual – the thought of a ‘void’ place or time can be explained, but not justified. In his last writing against Clarke, however, Leibniz feels the need of further clarification, taking into account the modal dimension of his definition of time. Thus, the problem re-opens: does this dimension – that is to say, the fact that *possibles* are taken into account – not go unavoidably beyond the boundaries of our actual world and its changes? Let us consider Leibniz’s words in his Fifth Letter to Clarke: “As far as the issue is concerned, whether God could have created the world before He did, we should be clear: having shown that time, without things, is a simple ideal possibility, it is clear that, if someone said that the same world which has been actually created could have, without any change, been created before, then he/she will not be saying anything sensible.” (GP VII 404-405). And this is the point we are already familiar with: taken in this way, the hypothesis of anticipated creation simply makes no sense, being equivalent to the incoherent idea of a ‘change without change’.

But there is a second way of understanding the possibility of anticipated creation, which cannot be dismissed as easily: “Absolutely speaking, however, one can well conceive that a universe began earlier than it actually did.” (GP VII 405) This is the case, when one imagines



that other events, or things, have been created: “This is because, the things being increased, time will be increased in its turn.” (Ibidem).

Ultimately, however, also this hypothesis turns out to be untenable – though for a different kind of impossibility: “Whether such an increase, however, is reasonable and matches with divine wisdom – this is quite another issue; and we should answer negatively, otherwise God would have made it.” (Ibidem)

We should carefully evaluate the full import of this apparently hasty Leibnizian clause. First of all, it is clear that the extending of the time system outside the boundaries of our actual world depends entirely on the corresponding extending of the history system. But the further point is that the last operation is – within the framework of Leibniz’s metaphysics of possible worlds – not possible, as a matter of fact and in principle. We know, indeed, that a possible world (*each* possible world, the actual one included, of course) is, by definition, a *maximal* set of compossible substances with their respective and interrelated states. And no further addition can be made to a maximal set, on pain of contradiction. Accordingly, a (relativized) principle of plenitude holds within each possible world: all which is possible relatively to its inhabitants is included in the world itself.

A similar point is made in the correspondence with Bourguet of the same years<sup>9</sup>. Here also, notice, this topological property of time – having or not having a beginning, i.e. a first instant – is not discussed by considering the time system in itself. Thus, time before the world is not considered, properly. What is at stake, instead, is the infinite or finite extension of the ‘history system’, in our jargon; or of the *series rerum*, in Leibniz’s. This goes as far as to make metaphysical considerations concerning the content in perfection of our world decisive, in order to take either one or the other side of the alternative: if the perfection of our world is steadily increasing, then, at least according to a certain increase scheme, it is likely that there is a first stage, hence also a first instant in the temporal series. To see this type of argument in detail would require taking into account the other great aspect of the concept of time – I mean, order – and thus I stop here. For now, it suffices to confirm that the property of the temporal series at stake depends, in Leibniz’s view, on the related property of the history series.

Anyway, faced with this conclusion, one might reply: well, possible times cannot be conceived of through the (possible) implementation of the actual world, but they can, by considering a quite different alternative possible world. This is true, but it shows exactly that the idea of an earlier beginning of the actual world, making sense of time outside the created world (but the point holds also for each possible world - would be an inappropriate one, and should be spelt out, instead, in terms of the possibility of another world.

Moreover, there is no comparison to be made among the times of different possible worlds. That is to say, it makes no sense to talk about possible events happening before, or after, events in our world. It is interesting to dwell a bit on this aspect, which has important connections both with Leibniz’s mature theory of time and the working out of his view of possible worlds. Moreover, it can introduce us to the other aspect of the relationship of time to contradiction

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<sup>9</sup> See GP III 581-582.



### Interlude: *Unconnected times?*

In the *Initia rerum mathematicarum metaphysica*, contemporaneous with the Clarke correspondence, we can find the sketch of a theory of time in a quasi-axiomatic form. Leibniz makes explicit here a postulate of connectedness. According to this, every state of a world must be either simultaneous with, or before, or after each other state of the same world.

This systematization – which is already documented in several drafts from the Eighties on – formally expresses, of course, our fundamental intuition concerning the temporal unity of a world. But the negative side of this intuition is also bound with an idea lying at the origins of Leibniz's conception of possible worlds. In the intensive experimental working out of a metaphysical view during the Seventies – as is reflected especially in the so-called *Paris Notes* – Leibniz is concerned, among other things, with the principle of plenitude. As I have shown above, a version of it is occasionally even invoked by him, in this context, to deny temporal vacua. But on the whole, he looks for a way out of the undesired modal consequences of it – when the scope of the possible is narrowed to what happens or exists before or after in time. As is well known, indeed, to maintain the possibility of things and events which have no place in the history of our world is taken by Leibniz as a decisive step toward breaking with bad plenitude and the related fatalism, to rescue contingency. A kind of plenitude remains within the actual world, still excluding any temporal vacua. Other things are possible, however, and their extrusion from the sphere of the actual is the seed for the constitution of Leibniz's possible worlds. A crucial step in this move – what distinguishes them from the plurality of the Epicurean or Stoic worlds<sup>10</sup> - is the breaking of every spatio-temporal (and causal) connection with the actual world itself.

Interestingly enough, this move is sometimes seen from the point of view of a phenomenistic approach, where the notion of reality is tentatively reconstructed in terms of the coherence of our perceptions. Thus, in some suggestive 1676 drafts, the real world and the dreamt-of ones are distinguished as different coherent sets of perceptions, each having its own space – and the remark can well be extended to time.

At this point, it is tempting to think of Leibniz's possible worlds as each having its own spatial and temporal structure, unconnected with the others. I think, however, that this suggestion should be taken with care, and ultimately resisted. First of all, we should take care to avoid a Lewisian-style reading, which would directly contrast with Leibniz's intention in introducing his possible worlds. They are not only spatio-temporally (and causally) unconnected; or better, they are such because, first and foremost, all possible worlds on the one hand, and the actual one on the other, do not share the same ontological status. Leibniz, indeed, takes care to exclude the possibility of attributing any form of existence to the worlds different from the actual one. In a draft of December, 1676 we read: "There is no need for the multitude of things to be increased by a plurality of worlds; for there is no number of things

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<sup>10</sup> The worlds of the Stoics follow one another in time, in tune with their well-known view of cyclical time. Leibniz is also concerned with this view. See (Fichant, 1991).



which is not in this world... To introduce another genus of existing things, and as it were another world which is also infinite, is to abuse the name of existence; for it cannot be said whether those things exist now or not. But existence, as it is conceived by us, involves a certain determinate time; or, we say that that thing exists of which it can be said at some certain moment of time, 'That thing now exists.'" (A VI.3, 581, P 103-105). Thus, a thing having no common temporal measure with actual things simply does not exist. Nor is there any common 'super-space' or 'super-time', ideally embracing the special spaces and times.

Moreover, I have already stressed Leibniz's attribution to the spatial and temporal structure of the status of eternal truths. And this certainly means that it holds in all possible worlds<sup>11</sup>. Accordingly, the attempt at distinguishing the **concept** of time (one and the same across different possible worlds) on the one hand, and the different possible spaces and times on the other<sup>12</sup>, is doomed to failure, if it is meant to suggest that every concrete time is different from the others.

Time, on the contrary, as a wholly abstract structure, is simply the same for all worlds. In one sense, we might say that the times of different worlds are unconnected not because these worlds are located in different times, but just because they are supposed to occupy the same time<sup>13</sup>. And this is why Leibniz sometimes goes as far as to speak as if space and time were containers of a given capacity, which different sets of compossibles fight to occupy – which might give the wrong impression that he is assuming an absolutist view.

Anyway, space and time are deeply bound to the central notion of compossibility, and to its puzzling constitution. To better see this, we should now turn to the relationship between time and contradiction.

## 2. NO CHANGE WITHOUT TIME. TIME, CHANGE AND CONTRADICTION

### *An abstract model for Change*

Change is something basic for time; it is required in order to have time, as we have seen. Change in its turn implies contradiction. This fundamental aspect emerges when Leibniz applies himself to a philosophical analysis of this pervasive phenomenon. An important stage in this reflection is the dialogue *Pacidius Philalethi*, written by Leibniz in 1676 in a ship, crossing from England to Holland. It is devoted to the problems of motion, starting from Zeno's aporias; it represents, indeed, a milestone in Leibniz's handling of the continuum issue. Leibniz finds here a way out of this intractable problem, by attributing a discrete character to motion. According to Pacidius – his counterpart in the dialogue – a moving body is destroyed and recreated at every instant of its motion.

Now, this odd solution is confined to this stage of the development of Leibniz's physics, and it will be presumably abandoned not much later. Pacidius' analysis, however, goes beyond

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<sup>11</sup> Thus, geometry, hence the properties of space holds for Leibniz in all possible worlds.

<sup>12</sup> See on this (Rescher, 1981).

<sup>13</sup> There is however, I think, some objective tension between this intuition on one hand, and the idea of defining simultaneity, as a basic temporal notion, through compossibility on the other.



physical motion, to provide a definition of change in general. Ultimately, change is conceived of as the passage from a state A to its contradictory not-A. Therefore, by applying the principles of Non-Contradiction and of the Excluded Middle, Leibniz simply excludes the possibility of the instant of change. As a consequence, change turns out to be not a state, but the aggregate of two immediately close contradictory states – a situation that can be captured by the Aristotelian model of the ‘contiguous’<sup>14</sup>.

It is worth noting that the general definition of change worked out in the *Pacidius* will survive its specific application to spatial motion and the related idiosyncratic thesis of ‘transcreation’. We find it anew at the beginning of the suggestive psychological study *De affectibus*, of 1679, where ‘change’ is taken as the genus to which both action and passion – the two fundamental notions in ethico-psychological inquiry – belong: “Change is the aggregate of two contradictory states.” (A VI.4, 1411). And in a draft dated to the same year – hence, when Leibniz has abandoned the physics of the *Pacidius* – we read: “An attribute is either a state or a change. Although, to be true, a change is the aggregate of two opposite states at the same time [*in uno temporis tractu*], without any moment where change occurs, as I have shown in a dialogue.” (*Definitiones*, A VI.4, 307). Moreover, this appears again and again as the standard definition in several later drafts, devoted to a kind of categorial inquiry: “*Mutatio est aggregatum duorum statuum contradictoriorum*”.

The discrete character of this model is likely to appear difficult to reconcile with the emphasis constantly put by Leibniz on continuity in nature, and with the continuous character he is normally eager to acknowledge to time itself. Here, I do not want to enter into the intricacies of the continuum problem, with respect to the different layers of reality. Two general remarks are in order, however. Firstly, time, indeed, as a theoretical construction – as a mathematical object – does possess a certain topological micro-structure: beyond any doubt, at least for the ‘mature’ Leibniz, time is a continuum. This matches well exactly with its ontological status of ‘ideal thing’. Hence, we should accurately distinguish this structure of time *qua* abstract tool from the possibly or supposedly discrete character of things in time.

Interestingly enough, von Wright himself – when construing a ‘Tractarian’ model of the world, very close to Leibniz’s series rerum – is not far from a kindred view. Thus, he writes, concerning the continuity we attribute to physical processes, in contrast to the discrete model of the series-of-states: “This highly sophisticated and complex conception and its relation to reality is not easy to determine. The idea of continuity can perhaps be called an ‘idealization’ smoothing the rough surface of reality”<sup>15</sup>.

Secondly, we should realize, I think, that also this representation of changing things is to a large extent still an abstract one. In this type of categorial inquiry, in fact, Leibniz is moving at the level of an abstract model of ‘series rerum’: a quite general logico-ontological framework – exactly, a *model* - which can be applied, in principle, to both the phenomenal and the properly metaphysical level, leaving unexplored the differences between them. In any case, it is within

<sup>14</sup> See *Pacidius Philalethi*, A VI.3, 534-537.

<sup>15</sup> (Von Wright, 1971), p. 46-47.



this abstract model of the discrete succession of states that Leibniz goes on to think of the relationship between contradiction and time.

### *Time as the Way Out of Contradiction*

One of the most relevant categorial drafts of the Eighties – the *Divisio terminorum* – presents an interesting approach to the problem of change. On the whole, this text is an outstanding example of Leibniz's double approach to categorial analysis, to which I hinted above: moving from a kind of phenomenological inquiry, rooted in the life of the mind, on the one hand, and from a more abstract logico-linguistic analysis on the other.

Here, indeed, the model of the series-of-states, and change itself, are introduced in a sort of phenomenological style: "Then, we observe Novelty and Change, that is to say [we observe] contradictory attributes of the selfsame thing. E. g., things which are contiguous come to be separated one from another, while all their remaining properties remain, contact being excepted. And this is why we are more inclined to think that the same things become separate from being contiguous, and others separated are substituted for them." (A VI.4, 561-562).

Change does imply sameness – and contradiction also. Observation, by itself, exhibits, however, only a series of states. Acknowledging sameness is presented as a further interpretative option – and not one going without saying. In the following, indeed, Leibniz goes on to discuss, whether it makes more sense to conceive of the permanence of the same thing, or of admitting, rather, a succession of different things, according to the old *transproductio* model. And the solution, notice, is to be found on the terrain of the life of mind: it is the experience of self-awareness, in fact, which guarantees sameness. But I cannot dwell here on this highly interesting issue. I shall instead focus my attention on what immediately follows.

Contradiction, I have said, properly arises only if there is a true identity of a subject, and not a series of *entia successiva*. Thus, if we are ready, as Leibniz is, to assert true sameness, we are faced with an apparent violation of the IndId, hence with contradiction. Here, temporal difference comes to play its decisive role: "Now, given that it is impossible that two quite contradictory predicates are said of the same thing, that difference which alone holds, all the rest being unchanged, and thus makes true that there is not a plain contradiction, when the same thing is said to be contiguous and separate from another: this is the temporal difference." (A VI.4, 562).

In a probably close draft, the *Enumeratio terminorum simpliciorum* – an exemplary one for categorial inquiry – we read: "If two propositions are true, and they seem to be contradictory, except for one difference alone, which can be recognized with respect to something external: then, these propositions do differ as for time" (A VI.4, 390). Here, *propositions* are explicitly in view. Notice Leibniz's precision: they are not contradictory, but only *appear* to be so. Or better, they would appear as such, unless for the temporal difference they embody. In order to neutralize, *caeteris paribus*, the contradiction implied by predication (A and not-A), temporal difference should be clearly located on another level with respect to the other predicates, or differences. The precision that this difference can be known only with respect to some external



thing is an unmistakable clue that we have to do with a predicate in the category of Position. I shall return below to this nature of temporal difference and its role in blocking contradiction.

### *Simultaneity and Compossibility*

Certainly, the dimension of time turns out to be a powerful factor for the increase of the logical space of compossibility, hence for the structuring of a world. Already at the beginning of the Seventies we find this remark: “*Compatible* are those which can exist at the same time in some common place. *Compossible* are those which, once one of them is given, it does not follow that the other is destroyed, that is to say, those of which one is possible, the other being assumed. E.g. it is possible that an Eclipse happened nineteen years ago, and a similar one happens now. But it is not possible that one happened nine years ago, and a similar one happens now. Those two Eclipses, however, though being compossible, are not compatible, because they cannot happen at the same time. Compatibility, therefore, is among things, compossibility among propositions.” (*Vorarbeiten zur Characteristica universalis*, A II,2, 498)

Compatible things are defined here as those which exist (can exist) in the same time. When Leibniz later on defines simultaneity, however, no mention is usually made of time. Simultaneity, instead, is simply defined through compatibility, i.e. the logical possibility of being-together; sometimes also, and more strongly, through reciprocal implication. In this way, Leibniz gets, through purely logical means, the characterization of a single time-slice, so that simultaneity appears as the fundamental temporal notion<sup>16</sup>: although, as a matter of fact, in the categorial tables Leibniz prefers to speak of time only when succession is involved. All this is in tune with his prevailing attitude to reducing somehow temporal concepts to some more basic relationships.

Here, however, I wish to call attention to the distinction traced between compatibility and compossibility. Admittedly, this terminological distinction will be left aside later. Anyway, it shows the emergence of an important conceptual shift. Temporal difference – insofar as it creates a logical space where it is possible to distribute contradiction - allows for arriving at the wider notion of compossibility.

The operation is complementary (or better preliminary) to the one which I have taken account of in the previous section, concerning the structuring of the model of possible worlds. Temporal difference allows for expanding a compatibility slice to a whole series of states, according to a maximization rule. What lies outside the resulting series – hence, outside this extended compatibility set (or more exactly, if one should insist on the terminological distinction above, compossibility) – cannot find its place in any time, and goes to constitute the alternative possible worlds. In the example, notice, the two compossible eclipses – i.e. two phenomena which are part of the same world, while occurring at different times – might not occur at different times, because they belong to a certain law-like order.

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<sup>16</sup> See for this point, and for Leibniz’s sketched quasi-axiomatic theory of time, (Arthur, 1985), one of the best available accounts on Leibniz’s theory of time, in general.



Our text from the Seventies also reserved the terminology of ‘compossibility’ to propositions. Maybe, we could talk of states-of-affairs, to translate Leibniz’s intuition into our jargon. Thus, a Leibnizian possible world necessarily presents itself as a series of states: that is to say, it possesses a temporal structure. At the level of his categorial analysis, a kind of formal ontological inquiry, Leibniz uses these building blocks to construct a model of a world which is, in itself, still neutral with respect to the more specific interpretations it can receive. Thus, the relationships of compatibility/simultaneity and causality/succession which structure it can be read differently: either according to a phenomenal interpretation, where real inter-substantial causality is admitted, or to a rigorous metaphysical one, having no room for it. In the second **reading**, the postulate of connectedness suffices to have a coherent image of a world according to Leibniz’s ‘metaphysical strength’, i.e. assuming only intra-monadic causality, and the different simultaneity slices corresponding to inter-monadic simultaneity relations. Finally, the temporal character of each possible world in no way contrasts with Leibniz’s emphasis on the link of time (and space) with existence. As we shall see immediately, a world is a set of (possible) interrelated individuals, and having spatio-temporal positions is an important feature for individuals, in order to distinguish them from (possible) abstract or general essences.

### *Time, Substance and Concept*

Later on, also the terminology of compossibility will be commonly used in a looser way by Leibniz, to refer both to things (individuals) and to propositions. The opposition is not so dramatic for Leibniz, however. As a matter of fact, indeed, Leibniz’s ‘states’ should always be taken as states-of-a-substance. Remember that, without assuming the sameness of a subject, we would not even have any contradiction, nor any true change, but only a succession of more or less similar states.

Now, the idea of substance as a continuant underlying change was also a venerable one, going back to Aristotle’s legacy. In *Categories* 5, substance was presented as a ‘power of contraries’, i.e. as something of which contradictory statements can be true. In Aristotle’s model, the sameness of substance is thought of as the permanence of a substratum, on the model of the role played in change by matter.

Leibniz, on the contrary, tries to give a new reading of the transtemporal sameness of substance, by grounding it on the unity of a concept which dominates and rules the whole temporal unfolding of an individual. This transtemporal dimension turns out to be one of the central intuitions that gave rise to his theory of the individual concept. In the *Notationes Generales* - a draft very close to the 1686 *Discourse* - we read: “The same thing can subsist, even if changed, if from its very nature it follows that the same should have different states successively. I am said to be the same, insofar as my substance involves all my states, be they past or present or future. And it does not matter that thus contradictory predicates are referred to me; this is, indeed, the very nature of time, that contradictory predicates can be true of the same thing according to different times.” (A VI.4, 556)



Leibniz's line of thought seems to be this: the nature of an individual thing, expressed by its concept, implies change, that is to say the successive unfolding of predicates which cannot coexist. But change does not violate *IndId*, insofar as predicates are relativized to times, and time is, by definition, what allows **contradiction to be neutralized**. This is the idea we are already familiar with, and which is now put at the core of the logico-ontological structure of the individual substance.

*Concluding Remarks. Contradiction and the Priority of Change*

We should consider a bit closer the way in which temporal difference neutralizes contradiction – an assumption we have so far taken for granted, to a large extent. In order to do this, a closer look into the nature of temporal determinations would be required. I have said that they belong to the category of Position. The existence of the whole thing, or its properties, are located at different times. But what is modified, exactly, by those determinations? If one tries to give them a place in Leibniz's analysis of proposition, one might be uncertain between the adverbial reading and the adjectival one. I suspect that the first corresponds more to Leibniz's intention. Only, if we combine this analysis with the properly categorial one, the adverbial modification turns out not to refer to some 'quality' of existence, but rather to some location it receives – analogously to the adverbs of place.

Remember, however, that in Leibniz's reductionist view, positions are not a system independent of their 'contents'. This means that temporal difference presupposes, and is based on, the discernibility among the states of substance and their order.

This is why, considering temporal difference as what allows us to think of change does not imply, in Leibniz's view, any ontological priority of time over change, as is the case in von Wright, or in Kant. On the contrary, time appears as the phenomenon of the underlying logico-ontological structure of change. The sameness of the subject is presupposed by contradiction; taken together, they give rise to change, which in turn produces temporal difference. At least, this is, the picture we can draw from Leibniz's categorial schemes. I say 'phenomenon' because sometimes Leibniz exploits the connection of time and perception and seems actually to think of temporal order as the phenomenal expression of the logico-ontological underlying structure: "[Of two things] Prior is what is conceived of in a simpler way than the other. If, then, we add the relation to existence, or perception, it becomes prior by time." (AVI.4, 873)

From the point of view of a theory of time, this is a highly controversial view, of course. One might ask whether change can be actually conceived of, unless we previously assume the concept of time taken in the sense of the A-series. As I have hinted above, Leibniz himself seems to presuppose, in his inquiry about those logico-ontological structures, some primitive experience of the temporal life of the mind. In his final categorial scheme, however, the *explanans* of the temporal dimension turns out to be entirely articulated in terms of the B-series, implemented with causal relation. This can be palatable for present-day tenseless theories, but it does not cease to be a highly controversial issue. Anyway, all this should be the theme of another wider study.



#### ABBREVIATIONS

A = G. W. Leibniz, *Sämtliche Werke*, Akademie-Ausgabe, Berlin 1923-; series, volume and page.

GP = G. W. Leibniz, *Die philosophischen Schriften*, ed. by C. I. Gerhardt, Berlin, 1875-1890. Repr. Hildesheim – New York, OLMS, 2008; volume and page.

NE = G. W. Leibniz, *Nouveaux Essais sur l'entendement humain* (ed. in GP V and A VI.6).

#### REFERENCES

Arthur R. (1985), *Leibniz's Theory of Time*, in K. Ohrhlik, J. R. Brown, *The Natural Philosophy of Leibniz*, Dordrecht-Boston, Reidel, pp. 263-313.

Newton-Smith W. (1980), *The Structure of Time*, London, Routledge & Kegan.

Fichant M. (ed.) (1991), *G.W: Leibniz, De l'horizon de la doctrine humaine. La restitution universelle*, Paris, Vrin.

Rescher N. (1981), *Leibniz and the Plurality of Space-Time Frameworks*, in Idem, *Leibniz's Metaphysics of Nature. a Group of Essays*. Dordrecht-Boston, Reidel, pp. 84-100,

Shoemaker S. (1969), *Time without Change*, *Journal of Philosophy*, LVVI, pp. 363-81.

von Wright H.G. (1969), *Time, Change and Contradiction. Arthur Eddington Memorial Lecture*, Cambridge, University of Cambridge Press.

von Wright H.G. (1971), *Explanation and Understanding*, Ithaca, Cornell Univ. Press.

