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Physics and Civil Science in Leibniz's Writings

Notes on a Shared Vocabulary

ABSTRACT: The article aims to provide a basic glossary of the lexical intersections between physics and politics in Leibniz's writings and to offer an interpretative framework for understanding these intersections. The leading idea is that linguistic and lexicographical analysis discloses a structural relationship – manifesting at times as symmetry, at others as radical continuity – between the domains of physics and politics, and, consequently, between corporeal and civil structures and their respective operative models. Taking all elements into account, including the metaphors frequently employed by Leibniz, it is proposed that – to some extent – one may legitimately speak of an analogical mode of thinking underlying Leibniz's approach to these two spheres. Furthermore, it is argued that this way of thinking is perfectly consistent with Leibniz's metaphysical assumptions, global view of the universe, and method of inquiry.

SOMMARIO: L'articolo si propone di fornire un glossario di base delle intersezioni lessicali tra fisica e politica negli scritti di Leibniz e di offrire un quadro interpretativo per la comprensione di tali intersezioni. L'idea guida è che l'analisi linguistica e lessicografica riveli una relazione strutturale – che si manifesta a volte come simmetria, a volte come radicale continuità – tra i domini della fisica e della politica e, di conseguenza, tra le strutture corporee e civili e i rispettivi modelli operativi. Tenendo conto di tutti gli elementi, e considerate anche le metafore frequentemente impiegate da Leibniz, si propone che – in una certa misura – si possa legittimamente parlare di un modo di pensare analogico alla base dell'approccio di Leibniz a queste due sfere. Inoltre, si sostiene che questo modo di pensare sia perfettamente coerente con i presupposti metafisici di Leibniz, la sua visione globale dell'universo e il suo metodo di indagine.

KEYWORDS: Systems; Structures; Biology; Dynamics; Civil Science

1. INTRODUCTION¹

Leibniz's texts confront us not only with an immense body of bibliographical references, but also with the stratified linguistic and conceptual habits of a profoundly erudite author. His use of language – particularly within the domain of natural theology – is undoubtedly the result of the intersection and overlap of various philosophical traditions, most notably Epicureanism, Stoicism, Roman natural law theory, scholastic Aristotelianism, Platonism, and both Renaissance and Early Modern Encyclopedism. Systematically disentangling these traditions and evaluating, case by case, the extent of their

1. All translation, where not otherwise specified, are my own.



influence on Leibniz's modes of expression would far exceed the scope of a single article and would require a dedicated study. What is certain, however, is that despite these well-documented influences, it would be an interpretative misstep to attribute to Leibniz a naïve or unreflective use of language and terminology, lacking any autonomous intention, particularly in those domains that were regarded as pivotal in the 17th century. As we shall see, there are numerous passages – beginning with his earliest writings – in which Leibniz demonstrates full awareness of the semantic resonances and lexical interrelations between two special domains: physics and civil science.² At the outset, his biography – which has already proven capable of shedding light on the theoretical cores of his thought³ – urges us to take into account that his initial engagement with the question of physical motion was shaped by his training as a jurist. Leibniz himself recalls that, at the time when Erich Mauritius presented him with Huygens' rules of collision, his mind was occupied by “very different concerns regarding jurisprudence”.⁴

While Leibniz scholarship has produced thoughtful studies showcasing the original continuity and coherence between metaphysics, ontology, and dynamics, on the one hand,⁵ and metaphysics, ontology, and politics, on the other,⁶ there has been no study thus far exploring the possibility to envisage a structural continuity and coherence – which lays the groundwork for cautiously speaking of an analogy – between physics and civil science based on this shared onto-metaphysical framework.

1.1 Theoretical Framework

In the interest of clarity, I shall begin by briefly outlining the theoretical framework in which the following analysis is grounded. This framework encompasses mainly two relevant and complementary speculative floors, which accounts, respectively, for the aspect of continuity/coherence and for the possibility of an analogy between physics and civil science: 1. the first ('higher' and more general) floor is defined by the onto-epistemological consequences of Leibniz's metaphysical assumptions; 2. the second (lower) floor arises from a more 'analytical' consideration of the matter at hand. Here follows a brief explanation:

1. In Leibniz's view of the universe, nothing is unrelated. Everything is bound and constituted by complex relations, interactions, and mediations. The existence of a God who ordered the world based on criteria of logical and moral perfection, which in turn require simplicity and intelligibility, constitutes the basic assumption underlying the

2. One of the very few existing studies devoted to this issue is Michel Fichant's introduction to the 1678 edition of *De corporum concursu* he edited, cf. Fichant 1994: 32-43. Other, less explicit, references to the subject can be found – to the best of my knowledge – in some insightful studies by Leroy Loemker and Francesco Piro; cf. Loemker 1961: 323-338, Piro 2003.

3. Cf., in this regard, Maria Rosa Antognazza's monumental work (Antognazza 2008).

4. *De rationibus motus*, A VI, 2, 160.

5. Cf., for example, Robinet 1984: 1-25; Châtelet 1993; Gale 1989: 95-102; Garber 1995: 270-352; Garber 2006: 270-352; Lawrenz 2010; Arthur 2018; McDonough 2022.

6. Cf., for example, Herbrich 1959: 113-136; Schneiders 2005: 121-144; Beiderbeck and Waldhoff 2011; Luckscheiter 2013; Basso 2015: 55-67.

original continuity among all parts of creation and, therefore, all corresponding areas of knowledge (even those that might seem completely unrelated on the surface). Some sixty years ago, Leroy Loemker described Leibniz's metaphysics, ontology of minds, logic of relation, and relational/dynamical view of actions and motions as a "social interpretation of the universe".⁷ It is readily apparent how the specific argument of an original continuity between the physical and civil domains can primarily be rooted in Leibniz's very early assumption of an enlightened 'regency' upheld by a wise Monarch-Architect who ordered the system of the world according to a *legem continuitatis inviolabilem*,⁸ in which there are no 'leaps', and everything conforms to criteria of rationality/intelligibility, economy, and goodness. The metaphysical root of the continuity between natural and civil sciences is explicitly and effectively pointed out in a very insightful excerpt from his 1682 text *Ad constitutionem scientiae generalis*, where he states that "History" (including both natural and civil history) "is a mirror of the Divine Providence and exhibits God [as] clothed with a certain morality", both in his role as "inventor of admirable machines, in physical matters", and as "King of the Minds in this Universal Republic". In this latter capacity, "He revealed his immense goodness especially to mankind through the government of the Empires".⁹ A readjusted version of this argument is then resumed in a text from a few years later, *De divisione orbis scientiarum universi* (1683-1685), where he notes:

what is asserted to be knowledge of mixed mathematics, of the world and of the bodies involved in it, and even of human habits (*humana consuetudo*) is derived from certain inductions [drawn] from natural and civil history, [...] associated with the demonstrations of higher sciences [which Leibniz also addresses as *scientiae purae* in that same text].¹⁰

2. On the other ('lower') speculative floor, the possibility of an analogy between the physical and the civil domain seems to be detectable in a particular and multi-layered mereology, which leads to a view of each of these domains as analysable in terms of part-system organisation and interaction. A 'system', in Leibniz's complex mereology, is composed of 'structures', as he will clearly point out in his 1688 text *Specimen inventorum de admirandis naturae Generalis arcanis*, and then again, a year later, in his *Dynamica de potentia et legibus naturae corporeae*, after carefully reflecting on the issue of the composition of bodies roughly since 1683.¹¹ Structures are mutually connected in the system through a common *milieu*, governed by a common basic set of laws, and

7. Loemker 1961: 335.

8. The Latin expression is found in Leibniz's letter to Guido Grandi, September 6th, 1713, GM IV, 219. In the *Allgemeine Monatsschrift für Wissenschaft und Literatur*, Braunschweig 1854: 225 we found "inevitabilem", as well as in the uncorrected transcriptions for the series A I; however, the manuscript confirms the reading "inviolabilem".

9. *Ad constitutionem scientiae generalis*, first draft, February 1682, A VI, 4A, 468.

10. *De divisione orbis scientiarum universi*, 1683-1685, A VI, 4A, 524-525.

11. Cf. *Specimen inventorum de admirandis naturae Generalis arcanis*, 1688, A VI, 4B, 1630 and *Dynamica de potentia et legibus naturae corporeae*, 1689, CFP I, 305, but also earlier texts such as: *Genera terminorum substantiae*, 1683-1685(?), A VI, 4A, 568; *Du rapport general de*

capable of various types of relations and interactions. Each of them is, then, further made of parts or organisms which conform and subordinate to the general end of the structure they belong to.¹² These parts, in turn, are held together by specific internal bonds or relations which determine the structure's level of cohesion. Thus, each structure features a unique internal organisation, specific mode of part-interaction and level of cohesion, which ultimately grants its capacity for action.¹³ The resulting picture can be seen as a kind of 'federal' biology supported by a fundamental dynamic of interactions, in which structures and their parts are livened up and disposed in a certain way by internal and external relations and motions. Looking at this biological-dynamical view of part-system organisation, one is easily reminded of Leibniz's view of the Empire and Europe.¹⁴ In this light, the reference – in his *Discours de métaphysique* – to the need of recognising “the wisdom of God in the details of the mechanical structure of certain particular bodies”¹⁵ can perhaps be regarded as open to more than one level of reading.

Based on this conceptual framework, my aim here is to show how a certain degree of continuity and correspondence between civil science and physics shines through Leibniz's use of language. This will require me to dwell a little longer on the theoretical implications of what I referred to as the 'lower' speculative floor. Specifically, it is necessary to clearly identify two complementary yet distinct aspects or layers of enquiry in it: one 'biological', that is, related to the sphere of the structural organisation of bodies, the other 'dynamical', that is, related to the sphere of their internal and external motions.

The latter is ultimately rooted in the Aristotelian conception of the 'kinetic' nature of change,¹⁶ from which Leibniz derived a fundamental insight informing his naturalistic outlook: namely, that any principle of 'activity' – including the decision-making capacity of acting subjects – can be analysed in terms of movement.¹⁷ However, this is only

toutes choses, 1686, A VI, 4B, 1615; *De totae cogitabilium varietatis uno obtutu complexione*, early 1685 (?), A VI, 4A, 596-597.

12. Particularly relevant to the topic are the studies of Antonio Maria Nunziante, see for example Nunziante 2019 and the collection of texts he edited in Nunziante 2011, which contains Leibniz's objections to Stahl's medical theory, followed by Stahl's replies. See also Duchesneau and Smith 2016.

13. For Leibniz's explanation of cohesion, see above all his *Animadversiones ad Cartesii Principia*, 1699, GP IV, 384-388, and his correspondence with Nicolaas Hartsoeker (which essentially went on from 1706 to 1712), esp. his letter to Hartsoeker of October 30th, 1710, GP III, 505. This correspondence is insightfully analysed in Mormino 2016.

14. This 'federal' biology perfectly matches the political view Leibniz expressed in one of his most representative political writings, written in 1677 (and therefore prior to his actual reflection on the biology of bodies): the lengthy *Caesarinus Fürstenerius*, in which Leibniz defended and showed the possibility of the functioning of a political body based on a federal structure, such as the Empire, cf. A IV, 2, 54.

15. *Discours de métaphysique*, §21, A VI, 4B, 1563.

16. Cf. Aristotle's concepts of *kinesis* and *metabolé* in his *Physica*, esp. I 9, II 1, II 3, II 8, III 1, IV 3, V 1.

17. Cf., for example, *Consilium de Encyclopaedia nova conscribenda methodo inventoria*: “The fourteenth is Moral Science, that is, the Science of the Mind and its Motions; of knowing them and governing them” (A VI, 4A, 349).

part of the story. Another crucial point is that, at the beginning of his physical studies, Leibniz drew from Hobbes' *Elementa philosophiae* the idea that motion via *conatus* was the elementary explanatory unit of all reality, and hence of a philosophical 'grammar' – so to speak – capable of connecting the three essential elements of philosophy: *corpus*, *homo* and *civis*, that is, physics, anthropology, and politics.¹⁸ Referring to this idea in Hobbes' philosophy, the Italian scholar Antimo Negri highlighted Hobbes' ambition to establish the conditions for “the rise of *physici civiles*”, but he also pointed out that Hobbes mainly considered physics “under the species of geometry”.¹⁹ As early as 1670, Leibniz confessed to Jakob Thomasius that he felt that same need, namely – in his own words –, the need “for naturalist philosophers” capable of “exhibiting a civil science in natural science”.²⁰ But he will essentially rework this Hobbesian idea in an original way, on the thrust of his disagreement with Hobbes on the issue of the role of geometry in physical science. Indeed, Leibniz criticised Hobbes' purely 'geometrical' foundation of physics, as it was ultimately based on a purely quantitative/mechanical view of the composition of *conatuses*; instead, he firmly held that the prevailing *conatus* “is not chosen with addition and subtraction”,²¹ for *conatuses* “merge rather than hindering one another”.²² According to Leibniz, a geometrical approach to physics led to Hobbes' errors in metaphysics, ontology, and, above all, moral and civil science. Geometry alone, as a 'pure' science, is inadequate to fully account for physical motion. For Leibniz, geometry is suited to describing only a rudimentary aspect of an inherently interconnected and complex reality, that is, it could only describe the trajectories of motions, and not how these trajectories “and the velocities of motions are changed by the conflict of bodies”.²³ Geometry also fails to explain what causes the essential qualities of bodies, such as cohesion. Therefore, Leibniz calls for a “more sublime science”,²⁴ a physics that incorporates elements of mechanics, chemistry, philosophy of mind, and natural law.

After discovering dynamics, then, he will clearly and finally state that geometric demonstrations based on the theoretical assumption of a “complete uniformity” are nothing but “fictions” that does not reflect the true nature of things.²⁵ In the physical world, everything unfolds under specific conditions. This principle had been recognised as applying to both physical and political phenomena as early as 1669.²⁶

18. Cf. Hobbes's *Vita carmine expressa*, OL I, XC; see also *ibid.*, LXXXIX.

19. Negri 1972: 11 (English translation of quoted excerpts is my own). See especially what Hobbes states in §§6 and 7 of chap. VI of *De Corpore*, OL I, 63-65 and EW I, 70-75.

20. Leibniz to Jakob Thomasius, December 1670, A II, 1, 119.

21. *De conatu et motu, sensu et cogitatione*, A VI, 2, 282.

22. *Summa hypotheseos physicae novae*, A VI, 2, 333.

23. *Consilium de Encyclopaedia nova conscribenda methodo inventoria*, A VI, 4A, 346.

24. *Ibid.*

25. Cf. *Nouveaux Essais sur l'entendement humain*, *Préface*, A VI, 6, 57. Cf. also Leibniz's letter to the Electress Sophie, October 31st, 1705, A II, 4, 343. Glimpses of this idea can already be found in the Mainz-period writings, cf. *Theoria motus abstracti*, A VI, 2, 269.

26. Cf. *Specimen demonstrationum politicarum pro eligendo Rege Polonorum*, prop. XIII, A IV, 1, 12.

Notably, this supports Leibniz's theoretical trust in non-uniform political bodies, namely the so-called *Respublicae irregulares*, such as the Holy Roman Empire, whose legitimacy and political nature he defended against both Hobbes and Pufendorf.²⁷

2. LINGUISTIC ANALYSIS

We shall then see if, how and to what extent lexical and linguistic analysis supports the idea of a 'naturalised' civil science and of a 'civilised' physics, so to speak. In other words, we shall see whether each of these domains offered Leibniz meaningful insights into the exploration and understanding of the other.

As a matter of fact, a careful examination of Leibniz's writings provides noteworthy indications of both the use of physical models in civil science and of civil science in his physics. The first line of inquiry is supported by Leibniz's specific use of terms such as 'body' (*corpus*), 'perturbation' (*perturbatio*), 'concourse' (*concursus*), balance (*equilibrium*), 'potency' or 'power' (*potentialpuissance*), 'stability' (*firmitas*). The second finds support in his equally distinctive use of terms and concepts such as 'public' and 'private' (*publicus-privatus*), 'civil' and 'natural' (*civilis-naturalis*), 'Republic' (*Respublica*), 'conspiration' (*conspiratio*), 'restitution' (*restitutio*), 'accommodation' (*accommodatio*).

2.1 Physics in Politics

The title of this paragraph echoes the title that Leibniz himself assigned to a short draft of a text he never finished: *Mechanica in politicis*, from around the Paris years.²⁸ In that case, the very few lines that make up the draft merely point to the practical value of mechanics in political affairs – for (metaphorically speaking) “military and economic affairs are the nerves and veins of the civil body”²⁹ – while politicians who ignore (or even despise) mechanics are portrayed as ill-equipped for their task. Nonetheless, the signs that Leibniz was trying to bridge these two fields at a deeper level, especially in those years, are abundant.

2.1.1 Body

A preliminary and decisive question is: what is the relationship between the two uses of the word 'body' to refer both to physical and political bodies? Obviously, this question alone would require a separate article. The short and – at this point – predictable answer is that a certain 'congruence' and conformity between those two kinds of 'body' revolves around the key notion of 'aggregate'.

27. Cf. *In Severinum de Monzambano*, A IV, 1, 500-502; *Caesarinus Fürstenerius*, ch. XI, A IV, 2, 59; Leibniz to Jean Gallois, December 1678, A III, 2, 574-575; Leibniz to Ezechiel von Spanheim, October 26th, 1703, A I, 22, 639.

28. *Mechanica in politicis*, 1672-1676 (?), A VI, 3, 375.

29. *Ibid.*

Indeed, civil 'bodies' (also referred to as civil "persons" whenever the element of will is involved) are defined as "aggregates of [natural] persons"³⁰ – albeit "in perpetuo fluxu"³¹ – who unite and cooperate in pursuit of common security and happiness in a form suitable for these ends, i.e. a state form with autonomous decision-making capacity, which presupposes a certain level of corporeal unity and internal cohesion.

But, before delving into the analogy between natural and civil aggregates, it is important to briefly try and explain Leibniz's preference for the Latin expression *corpus civile* over *corpus politicum*.³² Prior to the 17th century, the latter expression is mainly (and almost exclusively) attested in the political tradition of Tudor England and has been notoriously translated as 'body politic'.³³ In that context, the expression has been used to designate the specific theory assigning the King two bodies: "a Body natural and a Body politic".³⁴ This theory of the *corpus politicum* or "body politic" descends directly from the theological doctrine assigning Christ two bodies: one natural and the other "mystical", representing the entire Catholic Church united in him.³⁵ Indeed, beginning in the 11th century, the expression *corpus reipublicae mysticum* appears in English political literature, carrying the allegorical and ontological background associated with the term "mystical" into the political realm.³⁶ Although Leibniz too addressed the issue of how the Church can be said to be one mystical body, his way of conveying this notion into his political view is extremely different, rather episodic, and admittedly not always perspicuous. He was certainly far more influenced by the Ancient Latin and French cultural traditions than by the English one; however, the matter extends beyond this.

First of all, he was deeply aware that a comprehensive political thinking could not solely rest on the image of a Christian sovereign anymore, as one could not overlook the proliferation of religious schism,³⁷ nor ignore the reality of a culturally richer and more differentiated world, marked by the political consequences of the Peace of Westphalia, where federal and polycentric forms of state organisation had become fully established, and the figure of the sovereign had lost much of its symbolic and allegorical power. In short, this was a world where political union had begun to depend more and more on economic and social stability and cohesion, and Leibniz was no stranger to its mechanisms.

30. *Definitionum Juris Specimen*, 1676, A VI, 3, 627.

31. *Specimen demonstrationum politicarum pro eligendo rege Polonorum*, 1669, prop. XLII, A IV, 1, 37.

32. The expression only occurs twice in all Leibniz's texts published so far. Cf. *Sur Pellisson, Réflexions sur les différends de la religion*, July-August 1690, A IV, 4, 516; *Verthaydigung der Hohen Stände des Reichs gegen die harte Beschuldigungen eines falschgenanten Caesarei Turriani*, February-Summer 1696, A IV, 6, 205.

33. Cf. Kantorowicz 1997: esp. 449 n. 429. See also Hale 1971.

34. Plowden 1816: 212a.

35. Cf. Kantorowicz 1997: esp. 15-16, 199, 207-232.

36. *Ibid.*: 207 n. 41.

37. Indeed, having himself worked towards the reunification of European Christianity, he came to know firsthand the formidable obstacles such a pursuit involved.

But there is another, even more compelling and structural reason, which concerns the very model of rationality embraced by Leibniz. The model of the *Ecclesia* – while certainly retaining some intriguing elements – cannot be regarded as a viable political model to draw upon, as it constituted a unique kind of ‘body’. Indeed, in several passages, the traditional paradigm appears to be reserved, with the unity of the Church’s mystical body being explained by comparison to the unity achievable by the civil body of a *Respublica*.³⁸ Ultimately, laying ‘scientific’ basis for politics, or better yet, raising the foundations of what he calls a “Scientia Civilis”,³⁹ required clearing the field of any ‘mysterious’ aspects (to which the adjective “mysticum” intrinsically refers). He was aware that the distinctive form of unity achievable by the body of the *Ecclesia* – through the Eucharistic participation of its members – was neither readily available to “civil” bodies, nor capable of serving as a model that could simply be replicated.⁴⁰

In this light, Leibniz’s view of political bodies is articulated primarily at an operational (biological-dynamical) level, and – in the majority of cases – when he speaks of the “soul” of the States he is referring metaphorically and analogically to their Constitution, i.e. to what legally/ethically and functionally binds them together.⁴¹ It is then time to analyse a passage that might seem misplaced in this context, given the subject of the writing where it is found – the 1685 *De schismate et fide ecclesiae catholicae* – and the theological subtext at play in it, but which is an important starting point for explicating the origin of the idea of the civil ‘body’, and – when compared with other texts of the same period – I believe also shows a ‘functional-operational’ intent:

Indeed, the essence and perfection of natural bodies (*corpora naturalia*) consists in the union of the parts; once [the latter is] dissolved, not only the external form and beauty, but also the strength (*vis*) and life (*vita*), perish. The same is the case with societies of men (*hominum societates*), which are comparatively called bodies (*corpora*); since both the nature and the excellence of these depend on the union of the members of which they are composed.⁴²

38. Cf., for example, *Reunion der Kirchen*, 1683, A IV, 3, 287-288; *De schismate et fide ecclesiae catholicae*, 1685 (?), A IV, 6, 717; *Apologia catholicae veritatis*, 1685 (?) A IV, 6, 722, 736. See also *Nova methodus discendae docendaeque Jurisprudentiae*, 1667, pt. II, §20, A VI, 1, 306.

39. Cf., for example, *Tria axiomata primaria*, 1674-1676 (?), A VI, 3, 427; Leibniz to Placcius, May 1676, A II.1, 407; *Studia ad felicitatem dirigenda*, 1678-1679 (?), A VI, 4A, 137.

40. I discussed the matter at length in Manzo 2024, arguing that, while Leibniz was undoubtedly fascinated by the power of a politico-religious option capable of establishing strong ontological and spiritual bonds among the members of a secular state, he also remained acutely aware of the intrinsic limits and ultimately utopian nature of such a model. It is important to clarify, in this regard, that the two approaches – that we might classify as ‘scientific’ and ‘theological’ – are not mutually exclusive nor do they stand in opposition in Leibniz’s thought. Rather, they operate on two very different levels of analysis and perspective.

41. Leibniz, indeed, recognises that a principle of unity, understood as the cause of a certain disposition of the parts, can be identified in “that which is called Soul” or in “something that has analogy with the soul” (Leibniz to Thomas Burnett, February 2nd [12th], 1700, A I, 18, 376).

42. *De schismate et fide ecclesiae catholicae*, 1685 (?), A IV, 6, 717.

We are clearly presented here with the fact that Leibniz identifies natural bodies as a model for civil ones, and that he explicitly draws from the former the use of the term 'bodies'. It is also important to note that, in his reference to the concepts of 'vis' and 'vita', he is implicitly referring to the more comprehensive concept of 'activity'. This is also consistent with the fact that the term 'corpus' and the term 'persona' referred to civil entities are mostly interchangeable, and the preference for one over the other is to be ascribed, depending on the context, to Leibniz's intention to highlight either the organisational/functional aspect – that is, the underlying collective and cooperative mechanism – or the decisional/moral aspect, that is, a fundamental willing capacity. In both cases, essential conditions are undividedness and unity.⁴³ It is therefore of little use to dwell on the distinction between *corpus* and *persona* in this context. The important thing is to reflect on the increasing interest Leibniz took in the body regarded as an organic machine from the mid-1680s onwards, and to assess how this development might be relevant to the present discussion. The notion ultimately and most profoundly at stake here is that of 'individuality' as Ohad Nachtomy explained it. Nachtomy convincingly argued that Leibniz can be considered an absolute pioneer in the field of theoretical biology precisely because of a theory of "nested" individuality, in which individuality is rooted in agency and in which there are simultaneously different levels of individuality. "This model" – as he put it – "stresses activity and pluralism: it accepts simultaneous coexistence of individuals at different levels, nested one within the other".⁴⁴

To better understand the meaning of this statement and its relevance to the relationship between natural and civil entities, we need to further consider two things:

1. Around the same year (1685) or possibly a little earlier, Leibniz composed his *Genera terminorum substantiae*, where he defined the living body as "Machina sese sustentans et sibi similem producens",⁴⁵ that is, a self-sufficient machine capable of preserving and of reproducing – which is a way of 'perpetuating' – itself. This allows us to assume the terms 'body' and 'machine' as synonyms.⁴⁶

43. Especially enlightening on this point is Leibniz's *Verthaydigung der Hohen Stände des Reichs gegen die harte Beschuldigungen eines falschgenannten Caesarei Turriani*, February-Summer 1696, A IV, 6, 203, 205-206.

44. Nachtomy, Shavit and Smith 2002: 205.

45. *Genera terminorum substantiae*, 1683-1685(?), A VI, 4A, 568.

46. Just to give a few more supporting references, see the various occurrences of expressions such as "machine du corps" (Leibniz to Arnauld, April 30th, 1687, A II, 2, 182; *Lettre sur l'éducation d'un Prince*, 1685-1686, A IV, 3, 552), "machina corporea" (Leibniz a De Volder, March 24th-April 3rd, 1699, A II, 3, 548); "machine corporelle" (*Système nouveau pour expliquer la nature des substances et leur communication entre elles, aussi bien que l'union de l'âme avec le corps*, 1695, GP IV, 484), "machina corporis humani" (*Novissima Sinica*, April 1697-1699, A IV, 6, 468). The general idea is also expressed in his *De corporum concursu Scheda Septima*, January 1678, A VIII, 3, 628, and in his *Animadversiones circa Assertiones aliquas Theoriae Medicae Verae*, 1709, LSC 16-51. Furthermore, ever since his 1686 *Du rapport general de toutes choses*, Leibniz supported a theory of the "organism" as a constituent of bodies fully consistent with the lexicon of the 'machine'. This will be plainly acknowledged in his *Animadversiones* to Stahl's medical theory, where he wrote: "all organism is in fact mechanism" (LSC 31).

2. In his 1697 letter to Christoph Sturm, Leibniz will undertake to lay down the difference between “natural” and “artificial” machines:

Therein lies the true but perhaps hitherto little-known distinction between Natural and Artificial Machines: not so much that the former are held together by a Substantial Monad, or a spirit (as the ancient Stoics and jurists put it), while the latter are not; but that by the very force of their structure they are perpetual and indestructible, while these [Artificial Machines] must sooner or later lose their function (*officium*).⁴⁷

The argument clearly revolves around two key notions: “structure” and “function”, the former being the defining condition of the latter and of its durability. On close reading, this passage reveals which feature of natural bodies most attracted Leibniz’s attention and, indirectly, the reason why he was interested in making a comparison with civil bodies in the first place: because, by virtue of their structural *organisation*, natural bodies are able to fulfil the purpose of self-preservation, that is, to preserve the “union of the parts”, which he had previously recognised as the essential condition for life, form and excellence of civil bodies as well.

Now, in the context of the quoted excerpt, the terms “artificial” and “natural” may appear to stand in mutual opposition (with the ‘civil’ clearly falling within the former category). Yet, as briefly noted above, the ‘civil’ is not to be understood as the opposite of the ‘natural’.⁴⁸ Rather, at a deeper level, the natural components constituting a civil person confer upon it a moral character by virtue of their capacity to will as one. This is how Leibniz expresses the idea in a letter to Christoph de Rojas y Spinola dated 1694: “It is necessary that, as in a State or Republic (*Civitate aut Republica*), the multitude come together (*coire*) in a single body, connected as if by a single Spirit, and thus form, as it were, a moral person”.⁴⁹ This way of thinking “as if” tells us that the natural and the artificial – and, more specifically, the natural and the civil – are far from being opposed or irreconcilable domains; rather, they occupy opposite ends of the same “chain of being”, and can thus be situated within a common “series”, allowing for meaningful correspondences to emerge. The origin of this line of reasoning lies, once again, in the realm of natural theology, which makes possible a two-way passage between nature and artifice. As Leibniz wrote to Johann Andreas Schmidt in 1697: “nature is nothing other than the Art of God”.⁵⁰ In that same letter, he further noted that this God assumes, as it were, an “ethical-political” character in ordering “the ends of natural things”.⁵¹ It thus seems legitimate to infer that, for Leibniz, natural entities and their operations follow a distinctly ‘civil’ *ratio*.

47. Leibniz to Johann Christoph Sturm, July 5th, 1697, A II, 3, 341.

48. Cf. *supra*, nn. 30, 31.

49. Leibniz to Christoph de Rojas y Spinola, A I, 10, 159.

50. Leibniz to Johann Andreas Schmidt, August 27th (September 6th) 1697, A I, 14, 460. The idea had been previously expressed in his *Protogaea*: “Nature is nothing but a kind of great art” (*Protogaea*, after 1693, first ed. 1749; CW 26, modif.).

51. *Ibid.*

This, of course, does not resolve the difficulties related to the *ontological* nature of bodies as aggregates, but it was precisely in the moment of greatest uncertainty – beginning in the mid-1680s – that Leibniz glimpsed a more reliable and tangible field of enquiry, and attempted to direct his reflection toward aspects of the issue that might be called ‘biological’, or, better yet, ‘organical’. A particularly bright example of this is found in a 1687 letter to Arnauld: Leibniz is arguing that aggregates can only attain to a kind of accidental – that is, non-substantial – unity. Yet he immediately adds that it is nonetheless a form of ‘unity’, which may admit of degrees. He then goes on to outline a sort of hierarchy of aggregates, based on the degree of internal relationality among their constituent elements.

I remain convinced that there are degrees of accidental unity, that a regulated society has more unity than a confused crowd, and that an organised body or a machine has more unity than a society, i.e. it is more appropriate to conceive of them as one, because there are more relations between the ingredients.⁵²

It is precisely because of this ‘disproportion’ and difference in degree of organisation between “a body or a machine” and a “society” that one can meaningfully speak of ‘analogy’, and it also what makes such an analogy fruitful and capable of yielding valuable insights. Indeed, according to Leibniz, the very possibility of an analogical method of inquiry rests upon the existence of observable diversity.⁵³ To this end, it is especially important to perceive the differences in the degree of possession of a given quality and then search for a ‘quantitative’ explanation. In Leibniz’s thought, the possibility of an analogical method is structurally grounded in the idea that there is a “series, an order, a progression” in which all things are gradually connected, for nature makes no ‘leaps’.⁵⁴ From this, it follows that the scientist’s ultimate goal lies in tracing natural phenomena back to the same series and finding their order of succession. At that point, it will be possible to compare neighbouring ‘members’ of a continuous sequence, as well as arbitrarily distant ‘members’ or ‘moments’ of the series. Being composed of a number of living bodies, civil entities inherit – *mutatis mutandis* – the same fundamental purpose, namely self-preservation, which in the case of States requires a form of internal organisation capable of ensuring both the security and the common happiness of their members.⁵⁵ Accordingly, Leibniz maintains that whenever a civil body fails to guarantee either of these two conditions “it is soon dissolved”.⁵⁶

2.1.2 Perturbation

The second of the terms listed is ‘perturbation’. With regard to this term, a preliminary clarification is in order. Its Latin form, *perturbatio*, originated within the cultural context

52. Leibniz to Arnauld, April 30th, 1687, A II, 2, 190.

53. See *De vita beata*, February–Autumn 1676 (?), *De la Sagesse*, A VI, 3, 673.

54. Leibniz to Thévenot, August 24th, 1691, A I, 7, 176. Cf. also *Nouveaux Essais* IV, 16 §12, A IV, 6, 471, 473. On this matter, see Duchesneau 1993: esp. 37.

55. Cf. *Elementa juris naturalis* 12₂, A VI, I, 446; Leibniz to Mentet Kettwig, November 7th, 1695, A II, 3, 106–107.

56. *Elementa juris naturalis* 12₂, A VI, I, 446.

of Roman Stoicism. In that context, the term was used with at least three distinct senses:

1. To indicate physical phenomena (mainly atmospheric) resulting in a disruption, understood as a change of state.
2. To indicate actions and initiatives that modify a certain consolidated political setting.
3. In a moral context, referring to the ‘status’ or ‘motus’ *animi* (the states or movements of the soul, that is, affections). It is in this sense that *perturbatio animi*, starting from Cicero, later became a classical theme. This latter sense is the one in which the term ‘perturbatio’ is most frequently employed in the Roman Stoic tradition.

Leibniz is undoubtedly an heir to this tradition and consistently uses this term in all three of these senses, but with some significant developments around the mid-1680s, which reveal the originality of his thinking on the subject.

We can now turn to examine some of the occurrences of the term ‘perturbatio’ (as well as of the verb ‘perturbare’) in its various forms throughout Leibniz’s writings. The earliest occurrence dates from 1670, in the context of a juridical text, where Leibniz observes that “entirely new laws with no relation to Roman law cannot be conveniently established without the greatest disturbance (*perturbatio*) of things”.⁵⁷

He then goes on, in his most comprehensive political work, the *Caesarinus Fürstenerius*, to make the following observation:

If our state were well constituted (*si bene constituta esset nostra Respublica*) [...] there would be no need for perilous remedies, such as I do not deny alliances to be, and out of the ordinary (*extra ordinem*). But now, in such general turmoil (*perturbatione*) of affairs, who does not perceive that, if we still have our Empire (*aliquam Rempublicam*), we owe it to alliances?⁵⁸

A distinctive feature of Leibniz’s use of this term begins to emerge here, in the context of an ‘organical’ analysis of the civil body, and this line of inquiry deserves to be pursued further. In his 1683-85 *Genera terminorum substantiae*, Leibniz begins to classify bodies by their degree of internal ‘order’, upon which depends both their efficacy and their capacity to fulfil their purpose; this classificatory scheme applies equally to natural and artificial bodies. Indeed, as noted above, every organisational or biological aspect is tightly bound to a dynamical one, and the two are impossible to separate in concrete, for any change in the structural organisation of a body necessarily entails a corresponding change in its functioning. On the basis of this criterion, bodies can be described – regardless of their ontological status – as either ‘perturbed’ or ‘organic’, with the former denoting a state of disorder and the latter, correspondingly, a state of order.⁵⁹ This distinction underscores that what is essential to a body’s efficient functioning and persistence through time is the possession of an “organic” structure, which implies being well-ordered. Leibniz further maintains that only bodies of this kind are “fit to

57. Leibniz to Chapelain, first half of 1670, A II, 1, 85

58. *Caesarinus Fürstenerius*, ch. XXII, A IV, 2, 101.

59. *Genera terminorum substantiae*, 1683-1685, A VI, 4A, 567.

compose a machine”.⁶⁰ The key notion at stake here is therefore that of ‘order’: disordered bodies are not fit to compose a working and enduring machine. This, in turn, helps to shed light – also retrospectively – on the use of the term in political contexts.

In 1695, in a mature text on law, *Initium institutionum juris perpetui*, in discussing justice and happiness and the alignment between external and internal states, Leibniz returns to the term *perturbatio* in a manner fully compliant with its classical usage (for example, Ciceronian), and – unlike the texts of the 1680s – it is now set in a context that shows a marked physical-dynamical subtext:

Furthermore, it is the goal of those who pursue justice to extend happiness as far as possible. Since happiness entails a state of enduring joy, they will strive to promote as much joy as possible and ensure its continuity, while actively eliminating potential sources of disturbance (*perturbare*). Therefore, one must seek to increase the number of those who can be made happy, within the limits where they do not hinder each other: this means that propagation (*propagatio*) and preservation (*conservatio*) must be promoted.⁶¹

Finally, in a seminal text from 1697, the term ends up showing a marked physical connotation in the context of a clear parallel between the moral/civil sphere and the physical one (where ‘physics’ must be understood as encompassing the rudimentary chemistry of the time):

As for afflictions, especially those experienced by good people, we must believe that these lead to their greater good, a truth that holds not only in theological terms but also in natural terms. Just as a seed sown in the earth suffers before bearing fruit. In general, it can be said that although afflictions are temporary evils, in fact, they are good because they serve as shortcuts to greater perfection. Similarly, in physics, liquids that ferment slowly are also slower to settle, while those where there is a stronger disturbance (*perturbatio*) settle more readily, expelling impurities with greater force.⁶²

The importance of this passage will be highlighted and fully disclosed in the following paragraph.

2.1.3 Concourse

According to Leibniz, the physical laws of concourse should be regarded as highly useful in ‘civil science’. He acknowledged this principle in 1669, in his *Doctrina conditionum*, where he wrote: “parts are defined in concourse”, and then immediately added: “this matter implies a sort of physical principle drawn from the nature of motion”.⁶³

Several years later, during the very period in which he was intensively working on the physical laws of concourse, he authored his main political work, the *Caesarinus*

60. *Ibid.*

61. *Initium institutionum juris perpetui*, 1695, Mollat I, 2-3.

62. *De Rerum originatione radicali*, 1697, GP VII, 302-308.

63. *Specimina juris (Doctrina conditionum)*, 1669, A VI, 1, 392.

Fürstenerius. Its specific aim was to define the relationships among multiple sovereignties and competing powers within a unified political structure.⁶⁴

Here, the term “concourse” is only hinted at, while the emphasis falls on a ‘biological’ understanding of the political body. However, an implicit idea of concourse among the parts in a civil context is clearly discernible. The term itself is explicitly mentioned in another text from the summer of that same year, where Leibniz returns to the issue of the *Jus legationis* of princes and of the authority to be accorded to their envoys. In this regard, he argues that, “in the event of concourse”, those who “perform the same acts (*actus*)” – are differentiated solely by their “rank of honor” or dignity.⁶⁵ Thereafter, a distinctly physical vocabulary – and, in particular, the term “concurrency” – appears in the text *De libero territorio*, where it is stated that to hold dominion over a territory (*obtinere*) means that “one cannot be readily or ordinarily expelled [from it] either by tumultuous force (*tumultuaria vis*) or with the sudden concurrence (*concursus*) of persons from neighbouring places”.⁶⁶ Here, the reference to a sudden expulsion ties in with the passage quoted at the end of the previous paragraph – which is chronologically subsequent – where it is stated that in physics, when a “perturbation” occurs in liquids, impurities – that is, bodies with a different configuration and extraneous to that structure – are expelled “with greater force”.

2.1.4 Balance

“Anyone who has taught men how to construct a balance has certainly bestowed upon them a greater art than that legendary science of gilding”. This is what Leibniz wrote in an early legal text, the *Commentatiuncula de Judice Controversiarum*.⁶⁷

The symbol of equilibrium *par excellence* is undoubtedly the double-pan balance. This mechanical tool, this ‘machine’, serves the purpose (or has the ‘function’) of weighing – which is not simply ‘counting’, as Leibniz repeatedly points out. In this strive to follow the stream of his thoughts, one can quite easily infer that the mechanism of the balance must have appeared to him as standing in a profound analogy with the organisation and dynamic functioning of things in the physical, moral, and civil realms.

[T]here must also be [...] a natural jurisprudence, from which one learns demonstratively how to estimate the degrees of proof. For many probable arguments taken together sometimes yield moral certainty, and sometimes they don’t. A method is therefore required to determine when this is the case. It is often rightly said that reasons should not be counted, but weighed; however, no one has yet given us this balance that should serve to weigh the strength of reasons.⁶⁸

64. In the *Entretien de Philarète et d’Ariste*, Leibniz openly states that his *Fürstenerius* reconciled “the plurality of sovereignties with the unity of the Republic of the Empire (*Republique de l’Empire*)” (*Entretien de Philarète et d’Ariste*, October 1677, second edition, 1682, A IV, 2, 291).

65. *Quaestio*, Summer 1677, A IV, 2, 273. See esp. previous drafts.

66. *De libero territorio*, 1682, A IV, 2, 395.

67. *Commentatiuncula de Judice Controversiarum*, 1669-1671, §60, A VI, 1, 556.

68. Leibniz to Thomas Burnett, February 1697, GP III, 193-194.

A balance of reasons is essentially the model upon which practical sciences should be constructed to fully mirror the balance inherent in every existing thing, and it is obvious that those sciences would be more reliable if this balance had been crafted. Reflecting on this model, the first thing that comes to Leibniz's mind is that, on a basic physical level, the balance, as a 'machine', would not fulfil its function if its parts were not 'organised' and disposed in a certain way, according to a certain order. Following this insight, he started to devise a possible way of building such a balance, precisely on the model of the double-pan scale:

And just as it is necessary to ensure that each weight is properly applied, not exceeding [the capacity of the balance], that none of them were adulterated with any other metals, ensuring they are neither heavier nor lighter than they should be, and also that the balance has arms equidistant, equally weighted pans, etc., so in this balance of reasons attention must be paid to propositions as to weights, to balance as to connection, not leaving any of the weights or propositions unexamined. Just as the load (*gravitas*) of the weights must be assessed, so must the truth of propositions. The method for evaluating the truth of propositions mirrors that for determining the load of the weights: as the latter is assessed based on their materials, so each proposition should be examined as thoroughly as the main premise. Just as no weight should be overlooked or added erroneously, so must one be careful not to overlook any burden or advantage pertaining to the thing under evaluation; or, in other words, that the same thing is not weighed twice. The structure of the balance corresponds to the connection between propositions; indeed, just as one pan must not be lighter than the other, if one of the two premises is weaker than the other, the conclusion must follow the weaker one; as the arms must be joined together by a yoke, so nothing follows from particular propositions alone, because they are *sand without lime*; as the arms must be equidistant from the yoke, so must be the positioning of the propositions, with the middle term standing at an equal distance from the higher and the lower [...].⁶⁹

Beyond the logical subtext at work in this passage, it is easy to see here that the balance itself presents a certain organisational model that ideally and metaphorically meets the need for equity and proportionality in relations between the parties. The analogy between the physical and civil domains is unmistakable in this context.⁷⁰ But there is more: in its functioning, the machine shows that balance between the parts is achieved only through the 'concurrence' of their forces, which in this case are the weights, that is, when at least two forces are brought into comparison. Moreover, in this comparison, the balance serves as a means that both 'connects' and balances the weights, by virtue of the specific physical features that make this possible. In this view, balance between the parts is always 'dynamic', never static. Now, according to Leibniz, this dynamic balance reflects the operational logic of the universe, and it is possible to show that

69. *Commentatiuncula de Judice Controversiarum*, 1669-1671, §65, A VI, 1, 557 (italics mine).

70. On the theme of 'equilibrium' and European balance in Leibniz's thought, see Basso 2005: esp. 36, but also the now classic Robinet 1993. For an in-depth analysis of the occurrences and meanings that the metaphor of the balance takes on in Leibniz's writings, see Marras 2010: 129-149.

it is compliant with two other fundamental principles of his physics: the rejection of absolute rest and a need for ‘proportionality’. Both these principles find strong parallels in the civil realm.

The reflection on the principle of absolute rest resonates throughout Leibniz’s writings on physics, as he derived several paradoxes from it. The idea that there can be a *summa quies* implies that bodies within the same system are not structurally and mutually connected by the environment; this leads to some absurd consequences, such as that a body might possess an invariable ‘perpetual’ motion, as well as that there is no proportionality between the magnitude and force of a moving body and the effects produced by its motion. These criticisms are frequently directed against Descartes.⁷¹

With regard to the idea of a ‘perpetual’ motion, Leibniz believes that his discovery of the law of equivalence between cause and effect is sufficient to prove its absurdity, and he is likewise convinced that he has refuted Descartes’ laws of motion and impact through his *dynamica*.⁷² But how does this bear upon Leibniz’s political view? In the political domain, traces of this criticism can be recognised in the outright rejection, in 1712, of Saint-Pierre’s project to make peace in Europe “perpetuelle”. In this regard, Leibniz commented:

I have seen something of the project of M. de St Pierre, for maintaining a perpetual peace in Europe. I am reminded of a device in a cemetery, with the words: *Pax perpetua*; for the dead do not fight any longer: but the living are of another humor.⁷³

Every time the issue is raised, his arguments to dismiss the possibility of perpetual peace all appeal to experience, nature, and systemic rationality. Following this trail, the idea of “perpetual peace” can be easily seen as the political translation of *summa quies* and the related idea of a perpetual motion.

As for the other principle – the principle of proportionality –, it must be noted that it is found in Leibniz’s juridical and political writings as early as the *Nova methodus*, where it is stated that “equity or equality” is “the relationship or proportion between two or more”.⁷⁴ Yet, in 1667, when this statement was made, Leibniz had neither formulated the physical law of equivalence between cause and effect, nor even begun to reflect on the principles of motion that would lead to the formulation of his two early physical theories. This means that this reference to proportion had predominantly mathematical roots. Nonetheless, as I shall argue in Section 2.2.1, Leibniz would very soon (in 1671) identify a convergence between physics and politics grounded in the notion of proportionality, and, in this light, it is more than reasonable to suppose that

71. In his *Hypothesis physica nova*, Leibniz wrote that from Descartes’ account of the property of bodies and laws of collision it would follow that “if a body in motion were to strike another at rest, the former would perforate the latter entirely without any refraction, even if the striking body were the size of a grain of sand and the struck body a thousand leagues thick” (*Hypothesis physica nova*, 1671, A VI, 2, 229).

72. The issue is brought up in several places, but it is more clearly explained in Leibniz’s letter to Claudio Filippo Grimaldi, mid-January-early February 1697, A I, 13, 424.

73. Leibniz to De Grimarest, June 4th, 1712, Dutens V, 65; Eng. trans. in R 183.

74. *Nova methodus discendae docendaeque Jurisprudentiae*, 1667, pt. II, A VI, 1, 343-344.

he came to regard the discovery of the law of physical 'equivalence' as the final and supreme post-hoc validation of the legal principle of "equality or equity". I shall return briefly to this point in Section 2.2.5, in the context of an analysis of Leibniz's use of the term 'restitution'.

2.1.5 Potency/Power

What does potency/power mean according to Leibniz's vocabulary? Properly speaking, it is a physical quantity, and in his 1689 *Phoronomus seu de potentia et legibus naturae* Leibniz explains the criterion by which it is to be evaluated: "potency (*potentia*) must be evaluated by means of the effect it produces, not by the way it operates".⁷⁵ This means that "potentia" is assessed retrospectively, based on the effects it generates, and is closely related to a capacity for production.

Now, 'potentia' in itself is a multifaceted term with a great semantic scope, which lexically connects the physical and the civil domain. Obviously, in a context where action is considered in terms of motion, any explanation of physical interactions may have politically relevant echoes. However, this does not necessarily imply that this parallel is openly recognised or effectively cast in allegorical terms. Therefore, it is worth highlighting the way Leibniz expresses himself in a text from a few years earlier, titled *Dialogue entre un Politique et un Ecclesiastique*:

A prince vested with that great authority which God has put into his hands should not be considered as a man, but as a powerful creature akin to a mountain or an ocean, whose extraordinary movements can bring about strange effects in the alteration of the order of things. Do you not see that he can set armies and peoples in motion with the slightest blink of an eye? That mountains are levelled and the course of rivers changed when he makes marks on a sheet with a little black liquid?⁷⁶

As early as 1679, the notion of potency/power is employed in defining Descartes' God in a specific relation to action and its effects:

Descartes's God, or perfect being, is not a God like the one we imagine or hope for [...]. Rather, Descartes's God is something approaching the God of Spinoza, namely, the principle of things and a certain supreme power (*puissance*) or primitive nature that puts everything into motion (*action*) and does everything that can be done.⁷⁷

In that same year, in the prospectus for the classification of sciences that was to serve as a draft guide to the redaction of an encyclopedia, the term "potentia" was specifically evoked in the definition of Mechanics. Indeed, the latter was defined as the "science of action and passion", or alternatively as the "science of potency (*potentia*) and motion".⁷⁸ A few years later, he would then revise this definition in a way that seems to present me-

75. *Phoronomus seu de potentia et legibus naturae*, 1689, *Dialoghi*, 718.

76. *Dialogue entre un Politique et un Ecclesiastique*, Second Draft, 1679-1681, *Dialoghi*, 292, 294.

77. Letter to unknown addressee, 1679, A II, 1, 777-779; Eng. trans. in AG 242.

78. *Consilium de Encyclopaedia nova conscribenda methodo inventoria*, June 15th (25th), 1679, A VI, 4A, 346.

chanical science as consisting of two distinct parts: “one concerning the potency to act or move (*potentia agendi seu movendi*), the other concerning the power to suffer or resist (*potentia patiendi seu resistendi*), or [which is the same] concerning the stability/solidity of bodies (*firmitas corporum*)”.⁷⁹ It seems, then, that a structural intertwining is established here between the second type of ‘potentia’ (the capacity to suffer and resist) and the stability (*firmitas*) of bodies. In this light, it seems reasonable to assert that a certain degree of potency/power to endure and oppose disaggregation corresponds to a certain degree of stability and unity in the body. Many years later, this same correlation seems to be operating in the background of Leibniz’s analysis of the Spanish Empire, which is regarded as a territorially fragmented, heterogeneous, and thus unstable entity. In that context, he maintains that only the permanence of a united ‘puissance’ through the figure of a single ruler made it possible to hold some degree of unity and stability in the body.

Even though there was no real union among the countries to form a civil body or State (*corps civil ou Estat*), there was always the personal union of the same ruler, and consequently that the same prince succeeded over all territories, in order to keep the power united (*pour conserver la puissance unie*).⁸⁰

In other words, the only bond, the only internal ‘lime’ in the body of the Spanish monarchy allowing it to remain formally united and thus capable of opposing disaggregating forces, was a hereditary continuity. This was, of course, a weak and exterior bond, as the Monarch’s puissance could not flow through the scattered limbs of that body, thereby leaving it virtually powerless.⁸¹

In the majority of cases, in the political context, ‘potency’ or ‘power’ is referred to as ‘puissance’, while in the physical context as ‘potentia’, but the concept is inevitably the same. Reinforcing this idea, in the last quoted passage, the term ‘puissance’ is associated with the idea of the ‘body’.

2.1.6 Stability

At last, we turn to a term that has already surfaced in our discussion of potency: “firmitas”. First and foremost, Leibniz is keen to emphasise that “solidity (*firmitas*) cannot be explained except through the consideration of the system”.⁸² Indeed, each body “has its own system”, in which it is embedded.⁸³

The term, which holds a strong physical root, is found rather early in a legal context, where Leibniz addresses the subject of the “construction of a system” of laws.

In this system we must consider both the material and the form or the order. The laws themselves constitute the MATTER of the system; with regard to these, it

79. *Demonstrationes Novae De Resistentia Solidorum*, March/April 1683–end of June 1684, A VIII, 3, 221.

80. *Lettre écrite d’Amsterdam*, 1701, A IV, 9, 197.

81. Particularly revealing, on this subject, are the following writings: *Conspectus Brevis Juris Austriaci in Successionem Hispanicam*, 1700, A IV, 8, 164–184, *Inquirenda ut desiderata ratione juris Austriaci in Successionem Hispanicam*, 1700, A IV, 8, 133–134.

82. *Specimen inventorum de admirandis naturae Generalis arcanis*, 1688 (?), A VI, 4B, 1627.

83. *Ibid.*, 630.

should be observed that the stones with which we build a building must be cut in such a way that they can be conveniently and firmly (*firmiter*) joined together – so that, consequently, there is no empty space between them – and, in coordinating the laws, that they do not conflict with each other and leave no business (*negotium*) in doubt.⁸⁴

About a year earlier, the term had appeared in his above-mentioned political text – the *Caesarinus Fürstenerius* – where Leibniz argues that, because the body of the Empire lacks a firm (*firma*) capacity for self-preservation (owing to the absence of a strong internal bond), external help is needed to ensure security:

Quite accurately, a very learned person wrote: “Since the bond of our State is too loose (*laxum est*), so that we cannot ground it with sufficient confidence on the solid (*firma*) capacity for preservation of the Empire, we must resort to the backup plan of ensuring security with the help of foreigners”.⁸⁵

Several years later, once again in a political context, the term is employed in an even more explicit and unequivocal manner:

To delve more into detail, the Emperor, the King of Spain, Sweden, Bavaria, Franconia, Brunswick, Hesse, and their associates will lay the foundations of a close and inviolable trust, which will be cemented by the generous zeal of the Prince of Orange and the States General, the only ones capable of imparting unity and movement to this great body of Allies. [...] It is therefore necessary to examine how great the danger is, and, to this end, first to compare the forces so as to demonstrate that the competition is uneven. [...] The slightest disorder can dislocate a body made up of so many pieces, even when its largest ones remain firm (*fermes*).⁸⁶

At this point, it is necessary to suspend the discussion, even though the argument is not yet complete, because the theme of *firmitas* is inextricably linked to that of *conspiratio* – the conspiring motion of parts in the same system toward a common end – which will be analysed at length below, in Section 2.2.4.

2.2 Politics in Physics

The second part of the analysis begins here and focuses on the various ‘civil’ terms and their respective uses in Leibniz’s writings on physics. Owing to the biographical factors already discussed – namely, Leibniz’s legal education – a considerable number of the textual references examined in this section are drawn from his earliest writings. Accordingly, it would be inappropriate to infer from some of the entries that follow (particularly the first three) the existence of stable or fully developed concepts within Leibniz’s philosophical system. Apparent inconsistencies or peculiarities can thus be explained by recognising the provisional nature of certain concepts, which must be un-

84. *De legum interpretatione, rationibus, applicatione, systemate*, Summer-Winter 1678-1679 (?), A VI, 4C, 2791.

85. *Caesarinus Fürstenerius*, ch. XXII, A IV, 2, 101.

86. *Raisons touchant la guerre ou l’accommodement avec la France*, 1684, AIV, 2, 519, 559-560, 566.

derstood in light of the evolution of Leibniz's views on physical laws and motion. Nevertheless, these early instances are crucial for understanding how Leibniz consciously and repeatedly articulated lexical and conceptual resonances between the physical and the civil domains. In doing so, he revealed an underlying approach that – despite all subsequent specific shifts in perspective – remained central to his conception of the relations and the motions at work in the system of the universe.

2.2.1 Public and Private

The use of categories such as 'public' and 'private' applied to physical motion is documented in some of Leibniz's most significant writings on physics from the Mainz period, including an appendix in 1690.⁸⁷

"It should be known" – Leibniz states in 1671 – "that, in the world, there exist two types of motion: some are pure or private, while others are public or influenced by the system".⁸⁸ The distinction he sought to establish is that between 'pure' and 'concrete' motions, and, in the remainder of the text, he explains in detail what exactly this distinction amounts to by identifying seven key differences that also clarify the sense of that peculiar use of the terms 'public' and 'private' in a physical context. Particularly relevant for the purpose of this analysis are three:

1. The first and most important difference can be summarised as the difference between being isolated and being in a mutual relation. 'Private' motion refers to the motion of bodies "considered in a vacuum or in a medium at rest", while 'public' motion describes the motion of bodies immersed in a shared environment or "medium". The importance of this medium lies in the fact that it does not simply oppose motion, "it [also] contributes significantly to it, by moving itself or by transmitting it", that is, by 'assisting' bodies. In 'private' motion – i.e. when bodies are regarded as moving in a vacuum – the moment they encounter an obstacle, "they do not regain their impetus (*impetum non resumunt*), even when the obstacle is removed".⁸⁹ In 'public' motion, when a body that had previously encountered an obstacle is suddenly freed from it, its strength increases because "the system seizes the opportunity to restore itself". Consequently, Leibniz observes that "bodies considered as moving according to public motion will always seek a way to avoid obstacles", whereas

[bodies regarded as] moving according to private motion are compelled to move solely by the composition of forces and do not deviate from a predetermined trajectory. Thus, if two bodies concur in opposite directions along the same line with equal

87. Cf. *Demonstratio legum Reflexionis et Refractionis*, A VI, 2, 310; Leibniz to Jakob Thomassius, early May 1671, A II, 1, 155; *Leges Reflexionis et Refractionis demonstratae*, 1671, A VI, 2, 314-315; *Propositiones quaedam physicae*, A VI, 3, 19; *Conséquence de l'Hypothèse générale publiée il y a quelque temps, pour expliquer le phénomène de l'attachement dans le vide, ou dans une place dont l'air a été tiré*, A VIII, 1, 427; *De impulsu eccentrico*, scheda 2a, LH XXXV, 11, 14 Bl. 3-4.

88. *Leges Reflexionis et Refractionis demonstratae*, 1671, A VI, 2, 314.

89. *Ibid.*

speed by private motion, they will eventually come to a stop [after impact]. However, if they concur by the rules of public motion, they will push each other backward.⁹⁰

2. The second relevant difference amounts to the fact that “in public motions, the size of bodies is very important, whereas in private motions it does not matter”.⁹¹

3. The last one can be seen as a synthesis of the previous ones:

in the pure [i.e. private] state of nature [...] everything is brute, determined by the composition of conatuses; in a systematic state everything seems to be crafted by a certain intelligence. This state seems to require remarkable reasons for the laws of harmony, wisdom, and justice, whence everything conspires for the use of all, everything is accommodated.⁹²

Let us now analyse them in order. The first difference points to a natural tendency towards cooperation underlying the action of the parts in a ‘public’ system. This cooperation is made possible by the active role played by a common *milieu*, which on the one side hinders, on the other complements and helps the action or motion of the parts, and can be identified – based on this use of a civil vocabulary – with the State.

The second difference emphasises the importance of observing ‘proportional’ relations in a public or – one might now also say – ‘political’ system. In this extremely brief formulation, the concept is expressed in a very rudimentary manner, with proportion seemingly related only to size. However, in that same year’s *Hypothesis physica nova*, Leibniz resorted to arguments that refer to the physical laws of refraction in support of the need to observe proportional relations.⁹³

From the third difference, in this early formulation, it becomes fully evident that the ‘public’ – synonymous with ‘systematic’ – is characterised by cooperative relations, utility, proportion, and compromise (positively understood as mutual ‘accommodation’).⁹⁴ On the other hand, the ‘private’ – synonymous with ‘natural’ – is characterised by geometrical necessity.

It is worth mentioning that the last quoted excerpt features two key terms that will be examined in greater detail below: *conspiratio* and *accommodatio*. Before turning to them, one final remark about this distinction between ‘public’ and ‘private’ is in order. In its earliest occurrence, this distinction serves as part of the explanation of the fundamental laws of optics. In short, Leibniz uses the ‘public-private’ division to explain the difference between reflection and refraction, stating that reflection only occurs in ‘public’ motion, that is, within an actively (co)operating common environment. On the other end, refraction follows the laws of ‘private’ motion, and thus bodies moved according to private motion are not reflected but only refracted.⁹⁵

90. *Ibid.*, 315.

91. *Ibid.*

92. *Ibid.*

93. Cf. *supra*, n. 74.

94. On Leibniz’s use of the word ‘accommodation’, cf. *infra*, §2.2.6.

95. A VI, 2, 314.

It is crucial to note that, in that same year, he had begun to address the theme of authentic glory, arguing that minds – functioning as mirrors – can attain such glory only through mutual recognition, which requires a mechanism analogous to the composite reflection of light:

the larger the number of the mirrors, that is, the minds that recognise our good, the greater the light will be, since the mirrors not only combine [their light with] the light in the eye, but also with each other. The gathered splendor constitutes glory.⁹⁶

This, along with providing a first insight into how the elements of a *scientia de mente* can lay the ground for the foundations of jurisprudence, ethics and politics, confirms the fact that Leibniz saw an ‘elementary’ congruence between the functioning of the physical universe and the functioning of civil societies and human relations.

2.2.2 Civil and Natural

In 1669, Leibniz had already begun to address the issue of the relationship between the motion of bodies and the conditions under which bodies are considered. The roots of his use of a civil vocabulary in physics can be traced back to that year. A passage relevant to the current analysis is found in his *De rationibus motus*, where it is stated: “bodies considered in their prime and natural state have no ramifications, no cohesion, no continuity”.⁹⁷ At this point, it is easily recognised that this definition of the ‘natural’ state must be closely linked to his later definition of ‘private’ motion, in the sense that the rules of ‘private’ motion hold for bodies considered in the so-called ‘natural’ state. In light of this, and considering that the term “private” is consistently paired with “public” in a binary opposition, one may already conclude that Leibniz’s use of ‘natural’ to refer to certain conditions of bodily motion always entails an implicit reference to the ‘civil’.⁹⁸ To fully confirm this thesis, it will ultimately be necessary to provide textual evidence showing that Leibniz consistently employs the adjective ‘civil’ in conjunction with, and in contrast to ‘natural’ in the context of his analysis of physical motion. Before doing so, however, it is worth examining two further brief excerpts, respectively from Leibniz’s letter to Hermann Conring of January 1670 and from the 1671 *Theoria motus abstracti*.

The first one shows, in a particularly explanatory manner, how and in what sense the ‘political’ sphere is regarded as ‘public’. The second one unequivocally confirms that the civil sphere remained an active point of reference in Leibniz’s reflections on the principles of motion.

In his letter to Conring, Leibniz draws the following distinction between ethics and politics:

[Ethics] is about commutative justice, [Politics] is about distributive justice. The former [i.e. Ethics] treats human beings as separate individuals in the natural

96. *Elementa juris naturalis* 12₄, A VI, 1, 464.

97. *De Rationibus motus*, A VI, 2, 161.

98. It is extremely important to bear in mind that ‘opposition’ in this context, is to be intended as the ‘distinction’ between the first and last term of the same series, and not as any kind of ‘contradiction’.

state (that is, outside the community, *extra civitatem*), while the latter [i.e. Politics] brings them together in a community (*in civitatem*). The former gives rise to natural law in the strictest sense, whereas the latter gives rise to a nomothetic science with many consequences. The former is mostly about particular justice, while the latter addresses universal justice.⁹⁹

In short, the difference between Ethics and Politics comes down to the difference between private and public, natural and civil law, between a state in which men are considered as separate (*extra civitatem*) and a state in which they are considered as conjoined, united within a common context. Ethics operates only within a limited scope, whereas Politics, being a complex nomothetic discipline, possesses a broader, universal scope.

Indeed, less than a year later, in the opening section of his *Theoria motus abstracti* – which features the section *fundamenta praedemonstrabilia* (the universal foundations of motion) – Leibniz notes:

there is nothing without a reason. The consequences of this principle are that as little as possible should be changed, that the mean is to be chosen between contraries, that whatever is added to one thing need not even be subtracted from another, and many other things that are important in civil science as well.¹⁰⁰

Finally, in the text of the *Hypothesis physica nova* or *Theoria motus concreti* (where bodies are considered as immersed in a common medium, the ether, and connected by it), he explicitly establishes the association between ‘abstract motion’ and ‘state of nature’, and between ‘concrete motion’ and ‘civil state’, as follows:

[i]n the free or natural state, any quantity can be easily moved by any minimal quantity. However, in the current systematic and, as it were, civil state, [nothing is moved] except sensibly proportional quantities by proportional quantities.¹⁰¹

Proportionality and relationality are, thus, the essential characters of a ‘civil’ or ‘public’ state of bodies, where their motion is observed and studied under ‘concrete’ or ‘systematic’ conditions. In this state, bodies are considered to act and move within a common *milieu*, and as interconnected by it.

This – in addition to supporting the reading proposed at the end of Section 2.1.4 concerning ‘balance’ – demonstrates, above all, that for Leibniz ‘civil’, ‘public’, ‘concrete’, and ‘systematic’ are essentially synonymous terms, and that each of them frequently carries an underlying political subtext.

2.2.3 Civil State and Republic

Let us now consider Leibniz’s use of the term *Respublica*. Indeed, as well as using expressions such as “pure or natural state” and “systematic or civil state”, he also employed the term “Respublica” to refer to the physical world. In an early letter to Jakob Thomasius – partially quoted above – one can read:

99. Leibniz to Hermann Conring, January 13th (23rd), 1670, A II, 1, 47.

100. *Theoria motus abstracti, fund.* 24, A VI, 2, 268; Eng. trans. in L 142.

101. *Hypothesis physica nova*, A VI, 2, 227.

There is a need for naturalist philosophers who not only introduce geometry into the field of physical sciences (for geometry lacks final causes), but who also make a civil science apparent in nature. Indeed, the world itself is a kind of great republic (*respublica*).¹⁰²

Some twenty years later, in the 1689 *Phoronomus*, Leibniz revived this terminology and took it a step further by explicitly linking the “systematic or civil state” to a “Republic of bodies”.¹⁰³ The passage in itself contains a rejection of his early distinction between ‘abstract’ and ‘concrete’ motion, as it was mostly based on an erroneous (Cartesian) conception of the body, but the conceptual validity of the association ‘private’-‘natural’/‘public’-‘civil’ (referred to the motion of bodies) remains undisputed.¹⁰⁴ This terminology is adopted twice in that text, thereby indicating that it is not casual or merely rhetorical nor unworthy of consideration.¹⁰⁵

This latest development of Leibniz’s reflection on the “civil state” of bodies, where the latter becomes associated with the term “Respublica”, proves that his view of physical interactions continues to be permeated by references to the civil sphere.

The other terms analysed below will further reveal the civil roots of three fundamental motions in Leibnizian physics: ‘conspiracy’, ‘restitution’, and ‘accommodation’.

2.2.4 Conspiracy

The dynamic of ‘conspiracy’ is largely responsible for the cohesion (*firmitas*) of bodies in Leibniz’s physics. One of the earliest occurrences of the term in a physical context – already mentioned – is found in his 1671 *Leges Reflexionis et Refractionis demonstratae*, where it is stated that, “in a systematic state [...], everything conspires for the use of all”.¹⁰⁶

Leibniz’s general idea, which remained mostly unchanged over the decades, is that the level of stability and cohesion – that is, the level of internal ‘organisation’ – of both the ‘system’ as a whole and its individual ‘parts’ or ‘structures’ depends, to varying degrees at different stages of his thought, on their level of internal ‘conspiracy’. The importance of ‘conspiracy’ becomes fully apparent when considering that it is one of the very few ideas that remain a constant throughout Leibniz’s thought, dating back to 1669 or even earlier. Consequently, it is particularly noteworthy that this concept is systematically employed across writings on physical, moral, legal, and political matters.

102. Leibniz to Jakob Thomasius, December 1670, A II, 1, 119.

103. *Phoronomus seu de potentia et legibus naturae*, *Dialoghi*, 874.

104. The general topic of the distinction between an ‘abstract’ and a ‘concrete’ level of investigation in Leibniz’s mature physics remains somewhat challenging. For an informed recap of the main positions on the subject and sensible interpretative hypothesis, see Costa 2016. It is also worth emphasising here that one of the most relevant suggestions has been made by François Duchesneau, who argued that – in the abstract-concrete division reiterated by Leibniz in his *Dynamica de potentia* – one can see a persistence of the epistemological model of Hobbes’ *De Corpore* (see Duchesneau 2017). A thorough examination of how the evolution of Leibniz’s thought toward overcoming the abstract-concrete dichotomy affects and shapes the analogy between physical science and civil science must necessarily be left to future inquiry.

105. See *Phoronomus*, *Dialoghi*, 782.

106. Cf., *supra*, n. 93.

In the available texts, the earliest, still rudimentary reference to conspiracy is found in a 1664 writing, the *Specimen quaestionum philosophicarum ex iure collectarum*, where Leibniz metaphorically refers to the improbability of “so many heads [of lawmen] conspiring with the heart against themselves”, to explain why in legal writings the head is normally considered superior to the heart.¹⁰⁷ Likewise, in his 1667 *Dedicatio introductiva* to the *Nova methodus discendae docendaeque Jurisprudentiae*, it is stated: “nothing is impossible to the conspiring minds of the Princes; and yet, they need a kind of Guide and like an Instigator”.¹⁰⁸

These early and rudimentary uses of ‘conspiracy’ are consistent with his later use of the term and highlight an important aspect of the matter: the origin of the idea of ‘conspiracy’ lies within the civil/moral sphere, and – from the very beginning – the term is used as a synonym for cooperation. As subsequent uses will confirm, conspiracy allows many to act as a unified whole when there is a common goal to be achieved and conspired towards. The feature of conspiracy is to operate from within the parts to produce their unity, which serves as a prerequisite for action. However, for a *motus conspirans* to be initiated or triggered, the parts must be assigned a distinct end or purpose. Therefore, they need something or someone that acts as a leading and binding principle (a “Guide” or an “Instigator”).

Two later occurrences of the term ‘conspiracy’, in 1669, support this reading: the first one is found in the political writing *Specimen demonstrationum politicarum pro eligendo Rege Polonorum*, written in February of that year; the other one is in the *Computatio linearum navigationum*, a physical writing where the exact Latin expression “*motus conspirans*” makes its first appearance.

In the first text, when discussing the marriage agreements devised by Sigismund I of Poland and the Emperor Maximilian I of Habsburg, it is said that, “for a truly marvellous disposition of destinies”, the two houses “are brought together through a covenant [aimed] at [generating] conspiring marriages, as [if] two channels of equity were finally united in the same person’s riverbed”, namely in the person of the Duke of Neuburg.¹⁰⁹ In the *Computatio linearum navigationum*, likely written only a few months later, the expression “*motus conspirans*” is employed to explain the rotational mechanism of vehicle wheels. In Leibniz’s account, it is the *motus conspirans* of the parts that enables them to act as one by facilitating the activation and rotation of the wheels.¹¹⁰

A few years later, in January 1670 (in the already mentioned letter to Hermann Conring), “conspiratio” is once again used in a political context, serving as a synonym for political cooperation.¹¹¹ In terms of its occurrence, then, from 1664 to 1670, there is only one explicit mention of the concept in a physical writing, while there are at least four in a political context.

107. *Specimen quaestionum philosophicarum ex iure collectarum*, December 3rd (13th), 1664, A VI, 1, 82.

108. *Nova methodus discendae docendaeque Jurisprudentiae*, A VI, 1, 263.

109. *Specimen demonstrationum politicarum pro eligendo Rege Polonorum*, A IV, 1, 66.

110. A VIII, 1, 55-56.

111. Leibniz to Hermann Conring, January 13th (23rd), 1670, A II, 1, 46.

The evidence suggests that, in the development of Leibniz's physical thought, this concept was progressively adapted, used, and explored to echo, within the physical domain, a principle of civil science. Indeed, when conceived as a form of physical motion, conspiracy retains those same characteristics, namely of being an 'internal' motion (it is also referred to as "motus intestinus"),¹¹² of being oriented towards cooperation, and hence of being the cause of stability and cohesion.

After all, it was precisely the weakness of the internal bond – which was ultimately a failure of *conspiratio* – that caused the Empire's lack of *firmitas*, as Leibniz recognised in his *Caesarinus Fürstenerius*.¹¹³

Notably, during the years 1670-71, while working on his two theories of motion, and consequently on a countless number of preparatory writings, the concept of conspiracy received clear and full formalisation.¹¹⁴ In a way, the dynamic of 'conspiracy' could be seen as Leibniz's response to Bisterfeld's notion of 'sympathy'. Unlike 'sympathy', conspiracy or *motus conspirans* occurs exclusively among coherent (*cohaerentes*) parts, those parts that are in mutual contact, thus fitting seamlessly into a rational physical perspective and into a model of mechanical causality.¹¹⁵

In Leibniz's perspective, conspiring motions serve as the binding force (the "glue") that holds bodies together and makes them appear at rest, although absolute rest does not, strictly speaking, exist. Conversely, "fluidity" arises from "a variously irregular, coarse external motion that disrupts [the] internal motion [of bodies]".¹¹⁶

This conspiring or internal motion underwent a number of developments that cannot be examined in detail here. What is generally worth highlighting is that, from the end of his stay in Paris up to the correspondence with Hartsoeker (towards the end of his life), Leibniz reflected on the role of conspiracy in relation to collision. In this respect, the *motus conspirans* also exhibited a 'defensive' character. Indeed, "[it] must be such as to resist separation"¹¹⁷ and external penetration. Thus, in addition to its unifying function, it also serves a 'defensive' purpose by opposing the pressure exerted by the surrounding environment.¹¹⁸

When considering the entire evolution of the concept of conspiring motion, its political ascendance is further reinforced, as it mirrors classic political dualities: in-

112. Cf., for example, Leibniz's letter to the Duke of Hannover, 1671, A II, 1, 172, his letter to Henry Oldenburg, October 1671, A II, 1, 271, and above all his *Animadversiones ad Cartesii Principia*, 1691, GP IV, 388.

113. Cf. *supra*, n. 86.

114. Cf. *Hypothesis physica nova*, A VI, 2, 345-347.

115. Cf. Leibniz to Arnauld, November 1671, A II, 1, 278-279; *Specimen inventorum de admirandis naturae Generalis arcanis*, 1688 (?), A VI, 4B, 1627; *Dynamica de potentia et legibus naturae corporeae*, 1689, CFP I, 436 (also in GM VI, 400); *Animadversiones ad Cartesii Principia*, 1699, GP IV, 384-388.

116. Leibniz to Henry Oldenburg, October 1671, A II, 1, 271.

117. *De firmitate, vi elastica, explosione, attraction*, A VI, 4C, 2079.

118. The defensive character of the *motus conspirans* is highlighted in many texts, cf., for example, Leibniz's 1677 letter to Honoré Fabri, A II, 1, 452; the above mentioned *De firmitate, vi elastica, explosione, attraction*, A VI, 4C, 2079; the lengthy *Animadversiones ad Cartesii Principia*, GP IV, 384-388, and finally his letter to Hartsoeker of October 30th, 1710, GP III, 505.

side-outside, cooperation-defence, prevention of internal disruption- resistance against external attacks.

2.2.5 Restitution

The second dynamic motion that needs to be highlighted is that of 'restitution'. As briefly mentioned at the end of Section 2.1.4, right from the outset, Leibniz held a strong belief that one of the main duties of the State was to ensure regularity in the administration of justice, which is essentially aimed at preserving the capacity for action of each and everyone. Regularity and 'equality' (*equitas*) in justice involve the systematic "restitution" of wrongs, that is, granting "the harmony or congruence" between "right" and "obligation".¹¹⁹ When he expressed this view, in 1667, his knowledge of physics was still quite limited, as already noted. At that stage, he understood the principle of restitution in accordance with the mathematical laws of equivalence and proportion.¹²⁰ However, even then, Leibniz observed that, through this 'restitutive' function of the State, one can avoid engaging in a "deadly war", that is, a physically destructive conflict against "those who have harmed me".¹²¹

Not long afterward, he came to recognise restitution at work in physics, through the phenomenon of elastic collision, and developed a physical explanation for restitution based on the concept of 'elasticity' in the theoretical framework of his hypothesis of concrete motion. In that context, he presented the idea that bodies immersed in the ether – the common environment permeating the space between them – can undergo elastic deformation and rebound, thus avoiding 'destruction'. In that condition, bodies can "restitute" themselves, along with the whole system.¹²²

It is important to emphasise that Leibniz substantially revised his account of the dynamic of rebound at least twice throughout his life:

- 1) the dominant view in the Mainz period was that rebound was the result of the interaction between matter and ether;¹²³
- 2) after Paris – and precisely from 1677-78 to the second half of the '80s – he engaged to show that rebound was due to a *vis elastica* inherent in bodies,¹²⁴ explaining in a later text – his 1695 *Specimen dynamicum* – how exactly bodies can rebound right before making contact.¹²⁵

119. *Nova methodus discendae docendaeque Jurisprudentiae*, pt. II, A VI, 1, 343-344.

120. *Ibid.*

121. "Equity requires that I do not wage a mortal war against the one who has harmed me, but rather seek restitution" (*ibid.*).

122. Cf. the above mentioned *Leges Reflexionis et Refractionis Demonstratae*, 1671, A VI, 2, 314. See also Leibniz's letter to Günther Christoph Schelhammer of February-March 1681, A III, 3, 356, in which the use of 'restitution' in physical context is particularly recurrent.

123. For a detailed account of Leibniz's view of elasticity in the Mainz period, cf. Breger 1984.

124. Cf. *Corpora impulsa agunt a seipsis*; A VIII, 3, 20-21; Leibniz to Arnauld, September 1687, A II, 2, 232; *Principia Logico-Metaphysica*, A VI, 4B, 1647.

125. Cf. GM VI, 248-249.

The importance of this change lies in the fact that the latter solution seems to successfully translate Leibniz's ambition at radically eliminating destructive conflict from the picture. Furthermore, from 1676 onwards, the discovery of a law of conservation of "vis" or "potentia"¹²⁶ – understood as the power to act – retrospectively provided a stronger physical foundation for the early idea that the function of the State lies in its capacity to compensate and preserve, thereby safeguarding the lives of its subjects in analogy with the physical-dynamical order. Indeed, if the parts were to destroy one another, the very possibility of equity – which is grounded in the principle of restitution – would fail. A dispute can only be equitably resolved if each of the parties remains an identifiable agent.

In this light, Leibniz's remark in the *Phoronomus* – that from a law of equality between cause and effect derives a "scientia vitae utilissima" – may be understood as carrying a deeper significance.¹²⁷

2.2.6 Accommodation

It is, at last, the moment to focus – although very briefly – on the dynamic of accommodation, which enters Leibniz's writings through the gate of law.

The first occurrence of the term is found in his bachelor's dissertation, the 1665 *Disputatio juridica de conditionibus*.¹²⁸ In Roman law, the term 'accommodatio' was commonly used to refer to 'adaptation', and there are several examples of its usage in the works of Cicero.¹²⁹ Leibniz heavily drew from Roman law codes and texts, making them significant sources for his legal thought.

After this early usage, he began to apply the term to divine action, which ordered the physical world according to a principle of mutual 'adaptation', utility, and compatibility of things. The very first passage in which the term appears to be used in this sense has already been quoted above.¹³⁰ The other, very explicative, passage is from Leibniz's 1707 *Antibarbarus physicus*, where it is stated: "God (the common, ultimate and efficient cause of things) accommodates (*accommodare*) everything to his ends through intermediate means operating spontaneously (*per media spontanea*)".¹³¹ However, long

126. The evolution of the idea of a conservative *vis* or *potentia* can be observed roughly in this textual progression: *De Arcanis motus, et Mechanica ad puram Geometriam reducenda*, A VIII, 2, 133-138; *Meditatio de principio individui*, A VI, 3, 490; *De motu et materia*, A VI, 3, 493; *De corporum concursu, Scheda Octava*, A VIII, 3, 636-637; *De permutatione potentiarum deque motuum compositione*, A VII, 3, 480-487; *Phoronomus seu de potentia et legibus naturae, Dialoghi*, 718-719; *Dynamica de potentia et legibus naturae corporeae*, CFP I, 14-21; 556-588 (also in GM VI, 287-292; 435-464).

127. *Phoronomus seu de potentia et legibus naturae, Dialoghi*, 698.

128. A VI, 1, 109.

129. Cf., for example, Cicero's *De oratore*, 2, 250. On this point, see also Krebs and Schmalz 1905: 70.

130. Cf. *supra*, n. 93.

131. *Antibarbarus physicus*, GP VII, 344. See also Leibniz to Bossuet, April 8th (18th), 1692, A II, 2, 516-517.

before 1707, this principle of adaptation – which has legal roots – was already frequently employed, not only in politics¹³² but also in physics. For example, in designing an instrument for calculating longitude, he thus describes wings which, like sails, must be well adapted for receiving air: “pinnas velorum instar aeri recipiendo accommodates”.¹³³

In a text on acoustics from the mid-1680s, one can read:

The air continues to retain the vibrations received from the previous impressions of the same string, and a certain perturbation follows from this. [...] However, [...] since the stronger string, which produces the present vibration, prevails over the residual vibrations of the previous one, and since the vibrations of the strings are always uniform and of the same duration, it follows that the air gradually adapts itself (*accommodare*) to the string, so that the vibrations of the air get soon in tune with the vibrations of the string; if this did not happen, the sound would not propagate but would soon be destroyed due to the perturbation.¹³⁴

These two excerpts seem sufficient to show the great utility and indispensable value of accommodation among the parts in the physical domain to prevent their mutual destruction.

3. CONCLUDING REMARK

This paper has sought to uncover the subtle yet firm interconnection, in Leibniz's writings, between physics and civil science, highly reflected in an informed and deliberate use of terms shared by both domains, which indicates a degree of structural comparability between the functioning of the physical universe and the organisation of human societies. This might seem to place Leibniz in continuity with the earlier naturalistic conception of the political body – a conception drastically overturned by the modern notion of ‘political representation’ and by the Hobbesian understanding of the political body as an ‘artifice’, mostly detached from any natural condition and arising from the subjects’ alienation of a portion of their natural right. However, not only would such a conclusion be reductive, but would also misrepresent the overall aim of this article.

What proves more fruitful in Leibniz's thought is the way in which the early modern notion of ‘legality’ underlying the physical order serves as a driving force for uncovering general dynamic, relational and informational processes, as well as for identifying “guarantors of truth”:¹³⁵ principles of equilibrium and guarantee, together with reliable predictive tools that make progress in the unfolding of the series possible.¹³⁶

132. Cf. *Raisons touchant la guerre ou l'accommodement avec la France*, A IV, 2, 503-573.

133. *De longitudinibus inveniendis*, end of 1668-beginning of 1669, A VIII, 1, 35.

134. *Cogitationes novae quomodo formetur sonus et per aerem propagetur atque in organo auditus exprimitur*, February 1682-first half of 1685, A VIII, 3, 127-128.

135. Leibniz to Thévenot, August 24th, 1691, A I, 7, 176.

136. “Il est tout à fait remarquable que ce soit dans ce contexte d'opposition entre l'état de nature abstrait et l'état civil concret que Leibniz ait été amené à faire usage pour la première fois et pour son propre compte du syntagme *Lex Naturae* pour désigner les énoncés exprimant la légalité propre à la physique des corps bruts” (Fichant 1998: 248). For a more detailed account,

Lastly, this lexical reconstruction was itself justified and somehow called for by the large amount of new materials made available by the work of the *Akademie Ausgabe* in the almost thirty years since Michel Fichant first detected and highlighted the use of a juridical vocabulary in Leibniz's early theories of motion in the *Introduction* to his 1994 edition of the *De corporum concursu*.¹³⁷

ABBREVIATIONS

- A = G. W. Leibniz, *Sämtliche Schriften und Briefe*, Darmstadt & Leipzig & Berlin, Akademie Verlag, 1923-.
- AG = G. W. Leibniz, *Philosophical Essays*, ed. by R. Ariew and D. Garber, Indianapolis, Hackett, 1989.
- CFP = G. W. Leibniz, *Dynamica de potentia et legibus naturae corporeae tentamen scientiae novae*, 2 vols., ed. A. Costa, M. Fichant et E. Pasini, Hildesheim, Georg Olms, 2003.
- CW = G. W. Leibniz, *Protogaea*, ed. by C. Cohen and A. Wakefield, Chicago & London, University of Chicago Press, 2008.
- Dialoghi = G. W. Leibniz, *Dialoghi filosofici e scientifici*, a cura di F. Piro, in collaborazione con G. Mormino e E. Pasini, Milano, Bompiani, 2007.
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see the chapter Fichant devoted to the notions of 'law' and 'system' in Leibniz's physics, as well as to the idea of intelligibility in the wake of Kepler's and Galileo's legacy (*ibid.*: 245-266).

137. Cf. *supra*, n. 2.

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