Mathematical Similes in Leibniz's *Theodicy*

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Abstract Two kinds of metaphors used by Leibniz in *Theodicy* are of particular philosophical interest: explicit metaphors introduced by 'like', 'similar to', etc., and metaphors featuring mathematical entities or procedures as terms of comparison. Both kinds are relevant to our understanding of the relation between metaphoric reasoning and more formal argumentations. I argue that they should be distinguished, for practical reasons, from allegories, which are also present but have different structure and functions. My focus is especially on the following Leibnizian metaphors: the recurring declaration that *essentiae rerum sunt sicut numeri*, erroneously considered as a Pythagorean or Platonic saying, whereas it is a traditional tenet of Aristotelianism; the *calculus de maximis et minimis*, a family of comparisons recurring in Leibniz's works; geometry, variously declined; and the famous comparison of possible worlds and their ramifications to the *loci geometrici* of points.

Keywords Mathematical Similes. Metaphors. Aristotelianism.

> Qual è 'l geomètra che tutto s'affige
> per misurar lo cerchio, e non ritrova,
> pensando, quel principio ond'elli indige
> (*Par*. XXXIII, 133-135)

Everybody in the trade should be aware of Leibniz's peculiar proclivity for scouting Platonic horizons with Aristotelian spyglasses, that is, with instruments taken from the Aristotelian philosophy. It might seem worthwhile, therefore, to scrutinize his use of the genuine *Aristotelian spyglass*, as the title of Tesauro's treatise on rhetoric goes ([1670] 2000): the object of which is witty eloquence pivoting on the metaphor, the mother of sagacity that teaches the truth under the guise of the false.[1] Max Black observed in a famous essay of his: «To draw attention to a philosopher's metaphors is to belittle him – like praising a logician for his beautiful handwriting» (1954-55, p. 273). Leibniz was a fine logician indeed; but, although nobody conversant with his manuscripts would ever eulogize his scrawls, he posi-

1 Cf. Tesauro [1670] 2000, p. 478: «la gran madre di ogni Argutezza»; p. 495: «sotto imagine di falso t'insegna il vero».

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tively had a liking for metaphors[2] and he was quite proud of the style of his exoteric writings.

«The simile (εἰκὼν) also is a metaphor», Aristotle taught in his *Rhetoric*: «for there is very little difference» (*Rhet.*, III, 4, 1406b 20; [1926] 2000, 367). As our title promises, we are going to inspect the kinds and scopes of some mathematical similes that can be found in Leibniz's *Theodicy* – that is, our analysis will concentrate on explicit metaphors, or similes, in which the relation is declared by the use of 'like', 'similar to', ὡς, *sicut*, and the like; and on such ones where the term of comparison is a mathematical entity, kind, procedure, etc. There are plenty of such tropes in the *Theodicy*, where they play an important role, not only in the economy of the work as an explanatory device, but for a general comprehension of the relation between metaphoric reasoning and more formal argumentations in Leibniz's writings as well.

It is true that Leibniz seems to share the negative view of metaphors, which, according to him, are empty if they are not grounded in a higher truth, just like everlasting fame is no more than a figurative surrogate of eternal life: «Ovidius ait *parte tamen meliore mei super alta perennis astra ferar*: quid nisi metaphoricum est, cum, nisi subsit altius quiddam, inane» (A II, 1, p. 178).[3] He does not allow much leniency: «quand on a de l'indulgence pour les metaphores, il faut se bien garder de ne pas donner dans les illusions» (A VI, 4, p. 1473). Nevertheless Leibniz really has some partiality for 'proportional' or 'analogical' metaphors – the fourth type in Aristotle's *Poetics*[4] – for instance, the famous 'labyrinths', or even better, his 'metaphysical points', which could be considered a sort of 'shield of Dyonisus' on Leibnizian premises. He also seems rather fond of metaphors that cross disciplinary boundaries.[5]

Thus, on the one hand, truth must first of all be contemplated in unerring thought; tropes have but a delayed function and their purpose is to communicate and inculcate: «quand on a une fois pensé juste, les expressions figurées sont utiles pour gagner ceux à qui les méditations abstraites font

2 See Andrea Costa's recent work on Leibnizian stylistics 2010. See also Rutherford 2005; Marras 2010.

3 See Ovid, *Met.*, XV, 875-876. In the *Theodicy*, Leibniz affirms to be confident that the truth «l'emportera toute nue sur tous les ornemens de l'eloquence et de l'erudition» (*Théodicée*, Préface, GP VI, p. 38).

4 Metaphors of analogy or proportion occur in «cases where *b* is to *a* as *d* is to *c*: one will then speak of *d* instead of *b*, or *b* instead of *d*»; sometimes the metaphor is qualified by adding «that to which the replaced term is related. Thus the wine bowl is to Dionysus as the shield to Ares: so one will call the wine bowl *Dionysus' shield* and the shield *Ares' wine bowl*» (Aristotle, *Poet.* 21, 1457a, 16-22; [1927] 1995, pp. 105-107).

5 Not to mention mathematics, Fichant 1998, pp. 247ff., 252, has commented on the use of juridical similes in the field of natural science.

peine» (A VI, 4, p. 1473). Don Rutherford sums up this aspect of Leibniz's relation to metaphors as follows:

> When interlocutors failed to see the truth of Leibniz's conclusions, he could only attempt to convey that truth by appeal to what was more familiar to them. In doing so, he inevitably fell back on the heuristic function of metaphor to convey the purely intelligible in terms of the sensory of imaginable. (Rutherford 2005, p. 284)

On the other hand, metaphors are based on similarity, a concept of indubitable Leibnizian renown, which in his view has a cognitive potential both for description and for invention. In a writing of 1677-1678 titled *Post tot logicas nondum logica qualem desidero scripta est*, we can read that *similitudo*, which is here the relation of similarity, «est locus praedicationis, nam cum rem aliquam expono, inter alia possum similia ejus exhibere»; at the same time, «similitudo est locus ideationis, possum enim formare ideam talem: *Cutis similis lacti*» (A VI, 4, pp. 10-11).

To have a command of metaphor, declared Aristotle, is «a sign of natural gift: because to use metaphor well is to discern similarities» (*Poet.*, 22, 1459a 5-8; [1927] 1995, p. 115). Metaphors «should be drawn from objects which are proper to the object, but not too obvious; just as, for instance, in philosophy it needs sagacity to grasp the similarity in things that are apart» (*Rhet.*, III, 11, 1412a 9-12; [1926] 2000, p. 407). All this reminds one immediately of the traits of combinatory minds so often drawn by Leibniz:

> Ingenia ad inveniendum apta vel Combinatoria vel magis Analytica sunt. Combinatoria sunt quibus oblata quadam re statim alia res licet longe dissita occurrit, quae cum hac utiliter componi possit. Hi ergo datae rei facile inveniunt usum in vita, ac datae regulae exemplum vel instantiam, narrataeque historiolae mox similem aliam in promtu habent. (A VI, 4, p. 323)

Resemblance and comparisons are obviously entwined, and so are, *a fortiori*, similarity and similes. But mind: a real resemblance is required, a similarity *in rebus*, or we shall not have a proper comparison, but a mere fiction.[6] On this condition, although similes are often recommended for

6 See how this dyad is instantiated in the «Eclaircissement des difficultés que M. Bayle a trouvées»: on the one hand, «lorsque j'ay dit que l'ame, quand il n'y auroit que Dieu et Elle au monde, sentiroit tout ce qu'elle sent maintenant, je n'ay fait qu'employer une fiction, en supposant ce qui ne sçauroit arriver naturellement» (GP IV, p. 517); on the other hand, «j'ay expliqué l'accord qui est entre l'ame et le corps par une comparaison qui seroit entre l'accord poetical text in preference to prose,[7] Leibniz has always made use of more or less elaborate similes in philosophical texts, as we can see already in this passage of 1671: «Omne enim sentiens tum repraesentat objectum instar speculi, tum regulariter agit ordinateque ad finem, instar horologii» (A VI, 1, p. 482).

The use of mathematical similes amounts to an innovation, if any, not from the point of view of general rhetoric, but rather in the topic. Leibniz is aware that the rhetoric tradition does not favour mathematics as a source of tropes (with a few and quite simplistic exceptions like 'ex diametro', or 'sesquipedalia verba'). Mathematics are a fount of obscurity, a means to obfuscate rather than to clarify. As Erasmus of Rotterdam writes in his comment to the fitting adage *Rudius ac planius*,

> antiquitus illi σοφοί, quos vocant, soleant mysteria sapientiae quibusdam aenigmatum involucris data opera obtegere, videlicet ne prophana turba ac nondum philosophiae sacris initiata posset assequi. [...] Sic Plato numeris suis obscuravit suam philosophiam. Sic Aristoteles multa mathematicis collationibus reddidit obscuriora.[8]

In fact Leibniz himself famously states: «Je n'écris jamais rien en philosophie que je ne le traite par définitions et par axiomes, quoyque je ne lui donne pas tousjours cet air mathematique qui rebute les gens» (GP III, p. 302). If a 'mathematical air' repels ordinary people, then mathematics might offer no suitable ground for the production of metaphors, as far as the latter are for Leibniz a properly heuristic embellishment. Nevertheless, mathematical similes are often used by Leibniz, lightheartedly and explicitly; and by preference – which is even more outré, and yet so typical of him – he looks for similes in the highest regions of state-of-the-art mathematics, as he does in this text of 1686, with the notion that it will shed light on a difficult subject, rather than obscuring it, as anybody else would expect: «Infiniti possunt gradus esse inter animas, idque similitudine petita a nostra Geometria sublimiore videtur illustrari posse» (A VI, 4, p. 1524).

Mathematical language, the repelling effect notwithstanding, is abundant in the *Theodicy*, in a variety of uses. There are many implicit or explicit numbers in the *Theodicy*, that allude to computations of all sorts. Does the number of the damned exceed that of the saved? Moreover, does this supposition, «qui n'est pourtant pas absolument certaine» (*Théodi-*

de ces deux Etres et celuy de deux pendules de differente structure qui se rencontreroient tousjours exactement pour marquer la même heure au même temps» (GP IV, p. 530).

7 E.g. by Aristotle himself (*Rhet.*, III, 4, 1406b, 24-25).

8 Erasmus, *Adag.*, 39, 1993, p. 154.

cée, § 363, GP VI, p. 373),[9] entail that vice and misery exceed virtue and happiness in the world? Note that the second balance is again a matter of calculation, since the world, in Leibniz's view, is apparently saved by the cumulated moral weight of amoebas and platyhelminths:

> Mais pourquoy ne se pourroit il pas que le surplus du bien dans les creatures non intelligentes, qui remplissent le monde, recompensât et surpassât même incomparablement le surplus du mal dans les creatures raisonnables? Il est vray que le prix des dernieres est plus grand, mais en recompense les autres sont en plus grand nombre sans comparaison; et il se peut que la proportion du nombre et de la quantité surpasse celle du prix et de la qualité. (*Théodicée*, Abrégé, II, GP VI, p. 378)

These are but strictly quantitative argumentations that have nothing to do with comparisons and similarities – even the allusion to incomparability refers to real-life mathematical practices of the time. Besides, Leibniz sometimes deals with mathematical entities directly, for instance, when he is discussing whether it can be admitted, «avec quelques Scotistes», that the eternal verities would exist even though there were no understanding, not even that of God, and he concludes in the negative: «Il est vray qu'un Athée peut être Geometre. Mais s'il n'y avoit point de Dieu, il n'y auroit point d'objet de la Geometrie» (*Théodicée*, § 184, GP VI, p. 226). In such cases, mathematical terms appear to speak for and of themselves.

There are reasonings in the *Theodicy* that are based on mathematical comparisons or similes that Leibniz did not originate: for example, the distinction between principal and subsidiary causes illustrated by Chrysippus' cylinder,[10] a simile concerning which Leibniz remarks essentially that he boasts an equivalent, maybe better one. «Cette comparaison de Chrysippe n'est pas fort differente de la nostre, qui étoit prise d'un bateau chargé, que le courant de la riviere fait aller, mais d'autant plus lentement que la charge est plus grande» (*Théodicée*, § 335, GP VI, p. 314). Actually he introduced it at § 30 as the best possible analogy: «comparons, dis-je, l'inertie de la matiere, avec l'imperfection naturelle des creatures, et la lenteur du bateau chargé, avec le defaut qui se trouve dans les qualités et dans l'action de la creature: et nous trouverons qu'il n'y a rien de si juste que cette comparaison» (*Théodicée*, § 30, GP VI, p. 120).[11] That being the case, it would seem that physical metaphors and similes can be, in the eye

9 In paraphrasing the text, I shall tacitly follow Huggard's translation.

10 «Chrysippe [...] se sert de la comparaison d'un cylindre, dont la volubilité et la vistesse ou la facilite dans le mouvement vient principalement de sa figure, au lieu qu'il seroit retardé, s'il etoit raboteux» (*Théodicée*, § 332, GP VI, p. 312).

11 The moving boat, a seventeenth century hit, appears many times in the *Theodicy*.

of our author, not worse and perhaps even better than mathematical ones, and the main reason why mathematical comparisons are much spoken of might be, therefore, the inebriating effect they have on present-time interpreters. Still we must not disregard them.

In the classic view, a comparison should easily become a simile, while similes should be convertible with regular metaphors. Nonetheless, the distinctions between comparisons, similes, metaphors, and similar tropes, ought not to be completely overlooked. Let us consider a well-known example of a mathematical argument by analogy, which, by the way, does not appear in the *Theodicy*:

> Essentiale est discrimen inter Veritates necessarias sive aeternas, et veritates facti sive contingentes differuntque inter se propemodum ut numeri rationales et surdi. Nam veritates necessariae resolvi possunt in identicas, ut quantitates commensurabiles in communem mensuram, sed in veritatibus contingentibus, ut in numeris surdis, resolutio procedit in infinitum, nec unquam terminatur. (A VI, 4, p. 1616)

This one is not expressed in form of a simile, but it would be easily transformed into one. It is not, nor can it become an acceptable metaphor: it would not seem appropriate for Leibniz to employ directly the relation in order to devise a name, and say e.g. *veritates surdae*, or *numeri contingentes*, or to proclaim that contingent truths are the irrational numbers of epistemology.

It could be ventured, provocatively and not without some proviso, that the *Theodicy* makes sparse or no use of original mathematical metaphors: which is to say that most or all of the instances of mathematical language that Leibniz intentionally put inside it, even if they are transposed from their usual field of application, do not really bring about denominations based on the transferred sense. As a follower of Michel Serres[12] might put it, they are rather models than metaphors. Examples thereof can be the use of 'finite' and 'infinite' at § 118, or the pyramid of the worlds increasing to 'infinity' (*Théodicée*, § 416, GP VI, p. 364); division to infinity and the inexistence of a last half at § 70 of the Preliminary Dissertation; the transformation of geometric figures at § 202; or the argument about poor objections that will not trouble able geometricians (*Théodicée*, Discours, § 26 GP VI, p. 66). When Leibniz introduces some notions of projective geometry to rectify what he considers a clever but erroneous analysis of perception proposed by Bayle («C'est ainsi […] que»: *Théodicée*, Discours, § 64, GP VI, p. 87), rather than a reasoning based on analogy, the reader sights a mathematical argument with a direct explicative function.

12 It is, of course, a reference to Serres 1968.

The numbers on each Sextus' forehead is not a metaphor: on the one hand, it is an instrumental use of numbers as such (as an index that should differentiate similar Sextuses, «des Sextus approchans» (*Théodicée*, § 414, GP VI, p. 363), after some pruning of the tree of possible worlds has been done). On the other hand, if the Sextuses are numbered, it is presumably on account of a conceptual approximation, since the infinite possible Sextuses are not numerable as such.[13] We might consequently suggest that, with that particular, Leibniz is only sweetening the pill for the average reader and the number has at best a symbolic function; it may conceivably symbolize that everything is numbered, i.e. known to God, even, as it is said in the Gospel, to the hairs of our head (cf. *Lc* 12,7, quoted in *Théodicée*, § 174, GP VI, p. 128).

We find ourselves on a more productive ground with certain terms that have both a literal and a metaphorical use. At § 351, Leibniz discusses whether the number of the dimensions of matter depends upon God's choice and, against Bayle's suggestion that it might be so, he declares that the number of the physical dimensions is determined by a 'geometrical' necessity.[14] This particular use is rather literal and self-referential: the matter is in truth geometrical, since it is from geometry that comes the demonstration of which Leibniz is thinking.[15] Other uses of the expression 'geometrical necessity', instead, present us with a barefaced trope,[16] in which the name of a particular kind of 'absolute' necessity is transferred to the genus: this would be indeed a metaphor conforming to Aristotle's second type. Yet it is a feeble and veiled metaphor; in our posterior view it is a synecdoche of the type *species pro genere*. In fact, absolute necessity is called *proprio nomine* logical, metaphysical or geometrical, when it belongs to one or the other specific sphere, whereas it is called 'blind' when Leibniz is metaphorizing more expressively (*Théodicée*, Préface, GP VI, pp. 37; cf. § 349, p. 321). So in this case, on the one hand, we are seemingly confronted with the simple application of that mechanism by which metaphors are considered the motor of linguistic expansion, or of language itself: something similar to calling individual substances 'monads',

13 No infinite set has a number, since according to Leibniz it is not a whole: «l'infini, c'est à dire l'amas d'un nombre infini de substances, à proprement parler, n'est pas un tout non plus que le nombre infini luy même, duquel on ne sauroit dire s'il est pair ou impair» (*Théodicée*, § 195, GP VI, p. 232).

14 «Le nombre ternaire y est determiné, non pas par la raison du meilleur, mais par une necessité Geometrique: c'est parce que les Geometres ont pu demontrer qu'il n'y a que trois lignes droites perpendiculaires entre elles, qui se puissent couper dans un même point» (*Théodicée*, § 351, GP VI, p. 226).

15 It is the same that is presented in the First Day of Galilei's *Dialogue* 1898, pp. 36-38.

16 Cf. *Théodicée*, Préface (GP VI, pp. 43-44); Discours, § 2 (p. 50); § 345, § 347, § 350 (pp. 319-320, 322).

a metaphor, from our point of view, of negligible mathematical content. On the other hand, this trope conveys at least the reciprocity between the various species of absolute necessity. The same characters of 'geometric' necessity can in fact be attributed to 'metaphysical' necessity, which in the *Theodicy* is even explained, when needed, with a geometrical simile:

> Aussi Spinosa cherchoit il une necessité metaphysique dans les evenemens, il ne croyoit pas que Dieu fût determiné par sa bonté et par sa perfection (que cet auteur traitoit de chimeres par rapport à l'univers), mais par la necessité de sa nature: comme le demicercle est obligé de ne comprendre que des angles droits, sans en avoir ny la connoissance ny la volonté. Car Euclide a montré que tous les angles compris par deux lignes droites, tirées des extremités du diametre vers un point du cercle, sont necessairement droits, et que le contraire implique contradiction. (*Théodicée*, § 174, GP VI, p. 218)

The boundaries between similes and regular metaphors are undeniably blurred, and the same also happens, perhaps as a consequence, between the simile and the allegory. For sure Leibniz, in the *Theodicy*, makes also use of mathematical comparisons that take the form of allegories. An experiment can elucidate this. At § 214 of the *Theodicy* there is a well-known passage concerning 'a kind of geometry which Mr. Jungius of Hamburg, one of the most eminent men of his time, called *empiric*', which in the original is formulated so:

> Il y a une espece de Géometrie que M. Jungius de Hambourg, un des plus excellens hommes de son temps, appelloit Empirique. Elle se sert d'experiences demonstratives, et prouve plusieurs propositions d'Euclide, mais particulierement celles qui regardent l'egalité de deux figures, en coupant l'une en pieces, et en rejoignant ces pieces pour en faire l'autre. De cette maniere, en coupant, comme il faut, en parties les quarrés des deux côtés du triangle rectangle, et en arrangeant ces parties comme il faut, on en fait le quarré de l'hypotenuse […]. Or supposé que quelques unes de ces pieces prises des deux moindres quarrés se perdent, il manquera quelque chose au grand quarré, qu'on en doit former; et ce composé defectueux, bien loin de plaire, sera d'une laideur choquante. Et si les pieces qui sont restées, et qui composent le composé fautif, étoient prises detachées sans aucun egard au grand quarré qu'elles doivent contribuer à former, on les rangeroit tout autrement entr'elles pour faire un composé passable. Mais dès que les pieces egarées se retrouveront, et qu'on remplira le vuide du composé fautif, il en proviendra une chose belle et reguliere, qui est le grand quarré entier, et ce composé accompli sera bien plus beau que le composé passable, qui avoit eté fait des seules pieces qu'on n'avoit point egarées. (*Théodicée*, § 214, GP VI, p. 246)

This paragraph can be easily re-written as a more recognizable form of allegory, for instance, in that well-known, scantier kind of allegory that is the parable:

> Verily I say unto you, The universe is like to the squares on the two sides of the right-angled triangle, which a man cut in pieces, and arranged them carefully to make from them the square on the hypotenuse: for he was a geometer in the empiric way of Jungius. And, behold, there were some pieces taken from the two smaller squares, that fell and were lost, and the people said unto that man: 'What manner of figure hath he done? Lo, it is faulty and ugly'. And while he yet sought to make a tolerably good combination with the pieces that remained, they all were much perplexed thereabout. But as soon as the lost pieces were retrieved and the gap in the faulty combination was filled, behold, there ensued a beautiful and regular thing. For all they that saw the complete large square witnessed that this perfect combination was far more beautiful than the tolerably good one which had been made from the pieces that remained. And straightway all the people rejoiced and were exceedingly glad. Do not ye yet understand, that the perfect combination is the universe in its entirety? Wherefore the faulty combination is a part of the universe, where ye find defects which your heavenly Father has allowed, because otherwise the whole would not then have been so beautiful.

This parabolic version of § 214 should be enough faithful to make clear beyond question that Leibniz's ratiocination on the empirical demonstration of the Pythagorean theorem is an allegory – who hath ears to hear, let her hear – and in fact, as an allegory, it mimics in detail, with that kind of explicative coherence that is typical of this trope,[17] the way human beings, according to Leibniz, find defects in particular parts of the created world without being able to see the harmony and the beauty of the whole:

> Le composé accompli repond à l'univers tout entier, et le composé fautif qui est une partie de l'accompli, repond à quelque partie de l'univers, où nous trouvons des defauts que l'auteur des choses y a soufferts, parce qu'autrement, s'il avoit voulu reformer cette partie fautive, et en faire un composé passable, le tout n'auroit pas eté si beau. (*Théodicée*, § 214, GP VI, p. 246)

Similes occupy a sort of middle ground between the useful and pleasant enthymemy of the metaphor and the insistent and didactic openness of

17 And that differentiates it from the 'riddle', that Aristotle (*Poet.*, 22) sees as the typical diction wholly composed of metaphors; instead, according to Quintilian, the extended (*continuus*) use of metaphors 'vero in allegorian et aenigmata exit' (*Inst.*, VIII, 6, 14).

the allegory. Perhaps because of this declaredness, in Leibniz the simile is an argumentative device: that is, it appears mainly inside argumentative rather than literary discourse (whereas, in such texts as his numerous prefaces to unwritten works, plain metaphors, anecdotage, etc. prevail). Argumentation can be either demonstrative or persuasive – mathematical similes in the *Theodicy* have both functions.

Most mathematical metaphors, actually, appear in the *Theodicy* in the form of similes, which have, as we may expect, a primarily explanatory function: a mathematical concept provides a rigorous 'example', by means of analogy, for a concept that has been introduced in a different and less rigorous domain. In relation to the prayers that ask for the abatement of the torments of the damned on account of God's benevolence, Augustine maintained that it would be possible that their pains may be mitigated, and that they nevertheless last eternally, «quia nec Psalmus ait[18] 'ad finiendam iram suam' vel 'post iram suam', sed *in ira sua*» (*Ench.*, § 112). Leibniz writes that if such were the meaning of the biblical text, «la diminution iroit à l'infini quant à la durée; et neantmoins elle auroit un *non plus ultra*, quant à la grandeur de la diminution». A simile explains it: «comme il y a des figures asymptotes dans la Geometrie, où une longueur infinie ne fait qu'un espace fini» (*Théodicée*, § 272, GP VI, p. 279). In the simile a comparison is drawn with asymptote figures, insofar as they are an exact concept: a concept, that is, that does not make the reasoning more emphatic or more vivid, but more precise relative to a different and less rigorous reasoning of another kind. Likewise, Leibniz explains elsewhere in the *Theodicy* that one must think of the creation of the best, and only the best, of all possible universes, as similar to God's hypothetic decree to draw, from a given point, one straight line to another given straight line, «sans qu'il y eût aucune détermination de l'angle, ny dans le decret, ny dans ses circonstances»; it would be determined anyway, «car en ce cas, la détermination viendroit de la nature de la chose, la ligne seroit perpendiculaire, et l'angle seroit droit, puisqu'il n'y a que cela qui soit determiné, et qui se distingue» (*Théodicée*, § 196, GP VI, p. 233).[19]

Among such mathematical similes, incidentally, there is in the *Theodicy* at least one instance on the negative side, at § 49, where Leibniz, discussing indifference of equipoise and the case of Buridan's ass, explains that from his point of view neither the ass nor the universe could be halved by a plane drawn through the middle, so that all be equal and alike on both sides, «comme une Ellipse et toute figure dans le plan, du nombre de celles

18 «Non obliviscetur misereri Deus, aut continebit in ira sua miserationes suas» as quoted by Augustine, *Ench.*, § 112 (*Ps.* 76,10).

19 Gerhardt's text has «la Creature du meilleur de tous les univers possibles», but it should obviously read «Creation».

que j'appelle amphidextres, peut être mipartie ainsi», because the parts of the universe, just as the entrails of the animal, «ne sont pas semblables, ny également situés de deux côtés de ce plan vertical» (*Théodicée*, § 49, GP VI, p. 130).

It is not surprising that at a certain point Leibniz feels the need to give a theoretical justification of his use in the *Theodicy* of mathematical similes and comparisons in reasoning, that is, to clarify the main function they perform. It happens at the boundary between the second and the third part. At § 211 Leibniz writes:

> Je crois donc que Dieu peut suivre un plan simple, fécond, régulier; mais je ne crois pas que celui qui est le meilleur et le plus régulier soit toujours commode en même temps à toutes les créatures, et je le juge *a posteriori*; car celui que Dieu a choisi ne l'est pas. Je l'ai pourtant encore montré a priori dans des exemples pris des mathématiques, et j'en donnerai un tantôt. (*Théodicée*, § 211, GP VI, pp. 244-245)

Leibniz is asserting that, with examples and similes taken from mathematics, he can provide his readers with the *a priori* reasons of certain general concepts, neither obvious nor trivial, impacting on the best of all possible worlds. It is a general assumption of the *Theodicy*, that «les loix qu'il a plû a Dieu de donner à la nature, [...] nous les apprenons, ou par l'experience, c'est à dire a posteriori, ou par la raison, et a priori, c'est à dire par des considerations de la convenance, qui les ont fait choisir» (*Théodicée*, Discours, § 2, GP VI, p. 49). In this case, from the features of the one and only plan that can be known by experience to have been chosen by God – the existing universe – it is possible for us to judge *a posteriori* that the universe in question is not perfectly comfortable for every creature everywhere; this implies, in turn, that there is no necessity that it be so. But this experiential fact, concerning this single instance of universe, incorporates and at the same time responds to a general law that concerns orders. This law can be shown *a priori* in examples taken from mathematics. He promises one, boasts many, and a couple of them truly arrive at § 212-214 and § 242-243.

It would seem natural to partition these mathematical similes into geometric and arithmetic, if arithmetic ones were not so rare. One reason is that similes with arithmetic content are quite primitive, as for the properties and entities involved, whereas geometric ones are more complex and seemingly more interesting for Leibniz himself. Although he mentions infinite series, if only to correct a mistake in reasoning, he mostly alludes to his methods when they can be referred to geometrical objects that are studied by their means. So his own mathematical discoveries offer examples that pertain more to geometry than to algebra, that is, the object and not the methods seem to be decisive, perhaps because the methods are considered by him too difficult for the reader, while the reference to geometry always offers food for the imagination. Moreover, in the 17th century the idea of the superiority of geometrical analysis and synthetic methods, over symbolic techniques, is still alive and, chiefly because of Huygens' influence, Leibniz shares this view even in contrast to his own algebraic and infinitesimal methods (cf. Panza, Roero 1995). Likely because of this epistemology of mathematics, as we may call it, at § 212-213 the variation calculus is not considered from the point of view of the analytic instrument: «On raisonne ainsi en Geometrie, quand il s'agit *de maximis et minimis*» (*Théodicée*, § 212, GP VI, p. 245), says Leibniz to introduce what is another partly negative simile: while any part of the shortest way between two extreme points is also the shortest way between its own extremes, a part of the best whole is not necessarily the best that can be made of it, nor is the part of a beautiful thing always beautiful.

Nevertheless, while admitting that arithmetic is a secondary source of metaphors and similes, we should not circumvent a very particular arithmetic simile that is so important for Leibniz, and so tricky for Leibniz scholars. It is quoted incidentally at the beginning of the first part of the *Theodicy*, at § 9, but it appeared already in Leibniz's first official philosophical writing, the *Dissertatio de principio individui*, among the supplementary theses that might have been discussed at the request of the committee: it reads «essentiae rerum sunt sicut numeri» (GP IV, p. 26), the essences of things are like numbers. It is considered by many interpreters a Pythagorean-Platonic utterance, and is found more than once in Weigel's works.[20] Curiously it concerns numbers only marginally and, moreover, its origins are all except Pythagorean, and only remotely Platonic. It belongs in fact to the Aristotelian tradition: «dicendum est quod formae substantiales se habent ad invicem sicut numeri, ut dicitur in Octavo Metaphysicae» (Thomas Aquinas, *Quodl.* I, q. 4 art. 1 co.). This originally anti-Pythagorean dictum[21] is disparately interpreted: most often Aquinas and other scholastics have in mind that the nearer a form is to unity, the simpler it is, just as it happens with numbers; that a more perfect form contains a less perfect one, just as higher numbers contain lower numbers, or conversely that, being piled in a Porphyrean tree, general essences can be said to be contained in more specific essences. But in Plato's *Cratylus* (432 b 1) Socrates had stated that there is no true name of things and consequently names are not like numbers, which at once become different numbers if a unit be added or subtracted. And Aristotle declares

20 «Essentiae rerum sicut numeros esse, i.e. eodem modo ut numeros cognosci, supponi, quaeri, tandem inveniri posse, vere dixeris» (Weigel 1673b, p. 34; cf. 1673a, p. 25).

21 See Aristotle, *Met.*, VIII, 3, 1043b 36-1044 a 2; he is criticizing the reduction of things to numbers, while mainly discussing, in a section that is so often echoed by Leibniz, what a true unity is.

in fact that just like numbers mutate by addition or subtraction, even of a single unity, so any definition or essence is changed into another when whichever single predicate is added or removed. This version is equally reproduced by Aquinas, who is liable to extend it to species and forms in general.[22] It is also Leibniz's prevailing notion of the similarity between numbers and essences: «Essentiae rerum sunt ut numeri. Duo numeri non sunt aequales inter se, ita duae essentiae non sunt aeque perfectae» (A VI, 4, p. 1352).[23] It correlates aptly with his mature idea that individual essences *in mente Dei* (e.g. a certain Alexander's, or a certain Sextus' complete notion) compose possible worlds, or possible sequences of the universe, that are weighed one against the other to estimate their suitability for creation. Truly individual essences are the essences of complete beings (in contrast to partial entities as those corresponding to abstracts terms: rationality, animality, or any combination of general essences that does not comprise the individual circumstances of a particular individual history or notion). Alexander is a complete being to whom an individual essence corresponds, and in truth, when God's intellect modifies anything in it, that particular Alexander becomes another individual – like it is for numbers. It is in this case a change in the perfections, or realities, that compose the essence of an individual thing: «Ponamus ergo nunquam duas res aeque caeteris praestantes reperiri, sed semper unam aliis esse perfectiorem: quae Hypothesis certe nihil habet impossibile vel absurdum. Imo valde probabilis est, quia Essentiae rerum sunt ut numeri et non dantur duo Numeri aequales» (A VI, 4, p. 1389).

All this to say that the same concept is applied to possible universes in the *Theodicy*: «De sorte que rien ne peut être changé dans l'univers (non plus que dans un nombre) sauf son essence, ou si vous voulés, sauf son individualité numerique» (*Théodicée*, § 9, GP VI, p. 108). Nothing can be changed in the universe without the loss of its essence or individuality – not any more than (i.e. just like) in a number. The simile rests on a very basic property of numbers; it might be considered, in the end, only apparently or superficially mathematical, but, as we said, this is a characteristic of most arithmetical comparisons. It is also a very essential and unadorned simile, and this raises a point that might deserve pondering.

22 «Unde philosophus dicit, in VIII Metaphys., quod species rerum sunt sicut numeri, in quibus additio vel diminutio variat speciem», *Summa*, I Sec., q. 52 art. 1 co. See it also discussed by Francisco Suárez, *Index locupletissimus in Metaphysicam Aristotelis* (*Opera Omnia*, ed. Vivès, vol. XXV), VIII, 3, q. 9.

23 There is a most peculiar reading in Leibniz's «Von der Wahren Theologia Mystica: Alle Geschöpfe sind von Gott und Nichts; ihr Selbstwesen von Gott, ihr Unwesen von Nichts (Solches weisen auch die Zahlen auf eine wunderbare Weise, und die Wesen der Dinge sind gleich den Zahlen). Kein Geschöpf kann ohne Unwesen sein; sonst wäre es Gott. Die Engel und Heiligen müssens haben» (Guhrauer I, p. 411).

At the beginning of the third part, at § 241, Leibniz admits that it would be better to admit sufferings, defects and monstrosities than to violate general laws, «comme raisonne quelques fois le R. Pp. Malebranche». But it is also well to bear in mind «que ces monstres mêmes sont dans les regles, et se trouvent conformes à des volontés generales, quoique nous ne soyons point capables de demêler cette conformité». Then comes a mathematical explanatory integrant:

> C'est comme il y a quelques fois des apparences d'irregularité dans les mathématiques, qui se terminent enfin dans un grand ordre, quand on a achevé de les approfondir; c'est pourquoy j'ai déja remarqué cy dessus, que dans mes principes tous les evenement individuels, sans exception, sont des suites des volontés generales. (*Théodicée*, § 241, GP VI, p. 261)

This is, somewhat belated, the 'example' derived from mathematics that Leibniz had promised at § 211, except that it is not introduced as an example: rather it comes out as a simile, given that *c'est comme*, 'just as', is the usual formula for the enunciation of the trope. Yet this might not be enough for a good simile. Consider how Dante Alighieri, that professional of similes, seldom contents himself with the enunciation: as a rule, he does not tell solely that Virgil acted suddenly, «just as a mother who is wakened by a roar»; he patiently describes how she, catching sight of the blaze next to her, takes her son, and flies, having more care of him than of herself, so that she does not even pause to throw on a robe[24] – an elongation from which we grasp not only the swiftness of the action, but its being done for the protection of the poet as well. So we might say that Leibniz's simile lacks only a modicum of development, since, in the first place, a simile is in itself an amplification, and secondly, as we have seen, some further specification may be convenient to clarify the meaning of the simile itself. Anyway, the concept at issue is often explained by Leibniz with much more precision, whenever he says that any collection of points randomly drawn on a page, or the contours of anyone's face, can be described by a continuous geometric line, or a regular movement of some sort, ruled by a mathematical function. And, as we shall see, in the *Theodicy* a similar reasoning is exhibited in the ensuing paragraph. On this basis, will not another practical corroboration that such examples are utterly equivalent to canonical similes – some rough Dantean imitation, based on Leibniz's «Just as sometimes there are appearances of irregularity in mathematics» – be easily confected? Like this:

24 «Come la madre ch'al romore è desta | e vede presso a sé le fiamme accese, | che prende il figlio e fugge e non s'arresta, | avendo più di lui che di sé cura, | tanto che solo una camiscia vesta» (*Inf.* 23, 38-42).

> Come tal volta al geomètra appare
> Che la regola si perda, e tuttavia
> Maggior si puote un ordine trovare,
> Né pur viso pintor dipigneria,
> O casual punto e punto sovra'l foglio,
> Che una linea descritto non avria.

It seems to work, somehow. And so we shall feel free to treat these comparisons as similes without further justification. But, literary jests and experiments apart, even for Leibniz it is not beyond question that such complicated philosophical matters be explained with complicated mathematical similes, as a new sort of *obscurum per obscurius*. Accordingly, the following paragraph begins so: «On ne doit point s'étonner que je tâche d'éclaircir ces choses par des comparaisons prises des mathématiques pures, où tout va dans l'ordre, et où il y a moyen de les démêler par une méditation exacte, qui nous fait jouir, pour ainsi dire, de la vue des idées de Dieu» (*Théodicée*, § 242, GP VI, pp. 261-262). How much this mention of the vision of God's ideas might be a scorning allusion to Malebranche, who appeared as the polemic object of the preceding paragraph, is difficult to say. It could be just a little malice of Leibniz's, or it could be something spontaneous he came out with, because he is deeply convinced that mathematical similes and examples are a reason, or an indication and a side-effect of the reasons, for his superiority over Malebranche. And then, as we already mentioned, he completes the simile:

> On peut proposer une suite ou série de nombres tout à fait irrégulière en apparence, où les nombres croissent et diminuent variablement sans qu'il y paraisse aucun ordre; et cependant celui qui saura la clef du chiffre, et qui entendra l'origine et la construction de cette suite de nombres, pourra donner une règle, laquelle étant bien entendue, fera voir que la série est tout à fait régulière, et qu'elle a même de belles propriétés. (*Théodicée*, § 242, GP VI, p. 262)

In the same way, a curve can apparently develop without rhyme or reason, «et cependant il se peut qu'on en puisse donner l'équation et la construction, dans laquelle un géomètre trouverait la raison et la convenance de toutes ces prétendues irrégularités» (*Théodicée*, § 242, GP VI, p. 262). That is, he concludes, how we must look upon irregularities, monstrosities, and other alleged defects in the universe – pace Malebranche.

To summarize, these all are arguments by analogy, that have been made more or less explicit. Having pure mathematics as the object of comparison, they are mathematical similes, the use of which has been openly rationalized at the beginning of the Third Part of the *Theodicy*, on the ground that mathematical disciplines are an image of order. As such, they offer *a* *priori* reasons, that have a divine sort of validity – which is of no little value.

The theme of maxima and minima has a pivotal role in this strategy of similes, by reason of a central feature of Leibniz's thought that he himself calls 'anagogy' in his eponym writing, the *Tentamen anagogicum* (GP VI, 270-279). It concerns the nexus between the Creator's wisdom, the rationality of the universe and the finalism that is detectable in the laws of nature and in the organization of the world. To convey with *a priori* arguments, or *a priori* schemes of arguments, one or the other part of this constellation of concepts, is the most salient function that mathematical similes perform in the *Theodicy*. Leibniz derives from this a sort of general simile at the beginning of the First Part:

> comme dans les Mathematiques, quand il n'y a point de maximum ni de minimum, rien enfin de distingué, tout se fait egalement; ou quand cela ne se peut, il ne se fait rien du tout: on peut dire de même en matiere de parfaite sagesse, qui n'est pas moins reglée que les Mathematiques, que s'il n'y avoit pas le meilleur (*optimum*) parmy tous les mondes possibles, Dieu n'en auroit produit aucun. (*Théodicée*, § 8, GP VI, p. 107)

In this role, mathematical similes do not perform a foundational task: it is rather heuristic, since the knowledge of geometry is a human need, of which things do not partake. As Leibniz writes at § 403: «Faut il qu'une goutte d'huile ou de graisse entende la Geometrie, pour s'arrondir sur la surface de l'eau?» (*Théodicée*, § 403, GP VI, p. 356). Obviously not: geometry is part of the meta-properties of the universe and is commingled, so to speak, with natural processes; humans, on the contrary, need to take the way of geometry to get at a certain kind of knowledge of the relationship of general order and particular phenomena – it also means that we do not get there by illumination or by merely intellectual contemplation. There are more evident cases, as the properties of certain geometric figures, that illuminate less evident ones, as the monsters, whose rules of order are more difficult to get than those of the circle; and it is around the rules that such similes revolve.

The question of what is the exact fulcrum of a simile can be a delicate matter and is sometimes addressed by Leibniz himself, as he does in 1698 to counter an objection raised by Bayle: «Je n'ay comparé l'ame avec une pendule qu'à l'egard de l'exactitude reglée des changemens» (GP IV, p. 522). That brings us to yet another Leibnizian simile, this one quite famous, concerning geometric loci and possible worlds, which will conclude this assay of mathematical similes in the *Theodicy*. It turns up at § 414, within Leibniz's continuation of Valla's fable, that is, inside the allegory of Theodorus and Pallas, about which Leibniz writes: «je me flatte que le petit Dialogue qui finit les Essais opposés à M. Bayle, donnera quelque contentement à ceux qui sont bien aises de voir des verités difficiles, mais importantes, exposées d'une maniere aisée et familiere» (*Théodicée*, Préface, GP VI, p. 48). Thus the text has a really elaborate fabric: we have an allegory concerning «la science de simple intelligence» (*Théodicée*, § 417, GP VI, p. 365), which contains the simile; and all around the simile, of course, metaphors abound (the palace of the fates, the source of happiness, etc.) to enrich the allegory. Quintilian pronounced this the best of styles: «Illud vero longe speciosissimum genus orationis in quo trium permixta est gratia, similitudinis allegoriae tralationis» (*Inst*. VIII, 6, 49).

As we know, Theodorus journeys to Athens and is asked to sleep over in the temple of Pallas Athena. He dreams of being transported into an unknown country, where the goddess shows him a most splendid palace: «Vous voyés ici le palais des destinées, dont j'ai la garde. Il y a des representations, non seulement de ce qui arrive, mais encor de tout ce qui est possible». Her father Jupiter, she says, arranged them into worlds and chose the best one of them; he even comes sometimes back to visit the place and takes pleasure in recapitulating things and renewing his choice – *obiter dictum*, her father seems not in his right mind. She adds that all those possible worlds can be retrieved and inspected:

> Je n'ai qu'à parler, et nous allons voir tout un monde, que mon Pere pouvoit produire, où se trouvera representé tout ce qu'on en peut demander; et par ce moyen on peut savoir encore ce qui arriveroit, si telle ou telle possibilité devait exister. Et quand les conditions ne seront pas assés determinées, il y aura autant qu'on voudra de tels mondes differens entre eux, qui repondront differemment à la même question, en autant de manieres qu'il est possible. (*Théodicée*, § 414, GP VI, p. 362)

Here the simile begins. These worlds are all there before him, in ideas. The goddess reminds Theodorus that he learnt geometry in his youth:

> Vous savés donc que lorsque les conditions d'un point qu'on demande, ne le determinent pas assés, et qu'il y en a une infinité, ils tombent tous dans ce que les Geometres appellent un lieu, et ce lieu au moins (qui est souvent une Ligne) sera determiné. Ainsi vous pouvés vous figurer une suite reglée de Mondes, qui contiendront tous et seuls le cas dont il s'agit, et en varieront les circonstances et les consequences. Mais si vous posés un cas qui ne differe du monde actuel que dans une seule chose definie et dans ses suites, un certain monde determiné vous repondra. (*Théodicée*, § 414, GP VI, pp. 362-363)

It remains somewhat undecided what it means to be «une seule chose definie», or, which level of definition is required to have one single definite thing in a Leibnizian universe. Millions of little animated beings compose, on Leibnizian terms, every microscopic portion of Sextus' liver, that might some morning be a little bigger, or a little smaller, with minimal influence on his placing the right foot before the left, or on his violating or not the wife of his friend. But it does involve a lot of individuals – strictly speaking, an infinity. Anyway, according to Leibniz the choice of the order of the universe, that depends upon the distinct knowledge of an infinity of things at once, is a truth above reason,[25] a mystery, and we certainly shall not and need not solve it here. Moreover, in the end, any understanding of mysteries is in itself, as Leibniz argues at § 54-55 of the Preliminary Dissertation, based on analogy and comparison.[26]

In the simile in question here, points have the same explanatory function that we have seen ascribed to asymptote figures: a mathematical comparison provides a rigorous concept, by means of which another concept can be explained. But they do something more: not only they explain the possibility of a proximity query on the database of possible worlds, but they suggest as well how to imagine («vous figurer») the result. Max Black, to demonstrate that every metaphor «organizes our view», introduced a very Leibnizian analogy:

> Suppose I look at the night sky through a piece of heavily smoked glass on which certain lines have been left clear.[27] Then I shall see only the stars that can be made to lie on the lines previously prepared upon the screen, and the stars I do see will be seen as organised by the screen's structure. We can think of a metaphor as such a screen, and […] say that the principal subject is 'seen through' the metaphorical expression. (Black 1954-55, p. 288)

25 «Une verité est au dessus de la raison, quand nostre esprit (ou même tout esprit creé) ne la sauroit comprendre: et telle est, à mon avis, la Sainte Trinité; tels sont les miracles reservés à Dieu seul, comme par exemple, la Création; tel est le choix de l'ordre de l'Univers, qui depend de l'Harmonie Universelle, et de la connoissance distincte d'une infinité de choses à la fois» (*Théodicée*, Discours, § 23, GP VI, p. 64).

26 Thus it is from the union of the soul with the body that a simile for the Incarnation would be fashioned, although Leibniz limits himself to writing that, when we speak of the union of the divine Logos with human nature, «nous devons nous contenter d'une connoissance analogique, telle que la comparaison de l'union de l'Ame avec le corps est capable de nous donner» (*Théodicée*, Discours, § 55, GP VI, p. 81).

27 Compare this screen with Leibniz's creased canvas in the *Nouveaux essais*: «il faudroit supposer que dans la chambre obscure [de l'entendement] il y eut une toile pour recevoir les especes, qui ne fut pas unie, mais diversifiée par des plis representant les connoissances innées; que de plus cette toile ou membrane étant tendue, eût une maniere de ressort ou force d'agir, et même une action ou reaction accommodée tant aux plis passés qu'aux nouveaux venus des impressions des especes. […] Car non seulement nous recevons des images ou traces dans le cerveau, mais nous en formons encore de nouvelles, quand nous envisageons des idées complexes» (NE II, 12, § 1; A VI, 6, pp. 144-145).

Of course the screen can also blur, or confuse, our vision. Thus it is of some importance to remark that Leibniz, in the simile we are investigating, is not weaving directly worlds and points together: he does not assert that possible worlds are like the points in the line. If it were so, and if Quintilian had been right in defining metaphor as a *similitudo brevior*,[28] then this simile could be synthesized in a suggestive denomination, speaking boldly of something like the geometric locus of possible worlds. But this would certainly be too bold for Leibniz, not to say of little help for his readers. Yet this very boldness, in its insufferable excessiveness, provides a hint: «When a metaphor seems bold, convert it into a simile (εἰκασία) for greater safety. A simile is an expanded metaphor […] a less risky form of expression» – this very pertinent suggestion is offered by Demetrius' *De elocutione*, a compact handbook that exerted not a little influence on early modern rhetoric.[29] In more recent times, Leezenberg has conjectured that in similes «the explicit term of comparison ὡς ('like') merely functions as a hedge, i.e., as a particle that weakens the assertive power of a sentence. Thus, the speaker can avoid a commitment to the assertion that Achilles *actually* is member of the class of lions» (Leezenberg 2001, p. 42).

In this case, Leibniz definitely does not claim that worlds are like points, in fact he does not even suggest that they resemble in the least: worlds do not belong to a continuum, while points do not exist side by side. Nevertheless that seems – from experience – to be an easy misinterpretation, basing on which many readers will in fact conclude from that passage that possible worlds are points in a line just as Achilles is a lion, some of them even taking it, not only metaphorically, but literally.[30] But in spite of

28 «In totum autem metaphora brevior est similitudo, eoque distat quod illa comparatur rei quam volumus exprimere, haec pro ipsa re dicitur» (Quintilian, *Inst.*, VIII, 6, 8-9).

29 Demetrius, *De elocutione*, § 80 (in Aristotle [1927] 1995, p. 401). In Vettori's widespread Latin translation, it reads: «Postquam igitur periculosa translatio visa fuerit, convertatur in imaginem: sic enim tutior erit: imago autem est translatio exuperans […] et tutior est oratio» (Vettori 1594, pp. 77). For a long time *imago*, as a more literal translation from the Greek, coexisted with *similis* and *similitudo*, as *tralatio* and *metaphora* did; for a systematization of *imago* and *parabola* as species of *similitudo* in post-Erasmian rhetoric and in the German school of Melanchthon and his followers, see Margolin's *Préface* to Erasmus' *Parabolae sive similia* (Margolin 1975).

30 And the difference between adjacent worlds will obviously have to be the differential, given that Leibniz invented the differential calculus. A more sophisticated comparison between God's vision of infinitely small *minutiae* inside the general order in which they are arranged by Him, and the way infinitely small or unassignable quantities are used in the new analysis to determine assignable quantities, is found in the 'Causa Dei', introduced anyway by a prudent *quodammodo*: «121. Et licet prae ipso Deo infinito nos nihili videamur, hoc ipsum tamen infinitae ejus sapientiae Privilegium est, infinite minora perfectissime curare posse: quae etsi nulla assignabili ipsum proportione respiciant, servant tamen inter se proportionalitatem exiguntque ordinem, quem Deus ipsis indit. 122. Eaque in re quodam modo Deum imitantur Geometrae per novam infinitesimorum analysin ex infinite parvorum

this perhaps well-intentioned reading, the simile revolves around *conditions* for the determination of worlds, that are similar to the conditions for the determination of points, while also the result of the one (a subset, an extraction from the total set of the worlds) and of the other (a locus) are similar, since the respective relations between determination and result are similar: that is, there exists an analogy that can be set, as we can see, in a very precise way. And it is this combination of uncommitment and precision that, in conclusion, we might take as a plausible explanation of Leibniz's favour to explicit comparisons and similes.

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atque inassignabilium comparatione inter se, majora atque utiliora quam quis crederet in ipsis magnitudinibus assignabilibus inferentes» (GP VI, p. 457).

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