

Notes

Introduction

¹ Examples include Russell 1937, Broad 1975, Adams 1994, and Rutherford 1995a.

² Again there are many examples, including Garber 1985, Adams 1994, Hartz 1992, and Rutherford 1995a.

³ My sketch of De Volder's life and work relies on the accounts in Ruestow 1973 and De Pater 1975.

⁴ See Le Clerc 1709, 379–80.

⁵ See Ruestow 1973, 111.

⁶ A different account of De Volder as a secret disciple of Spinoza, or “Crypto-Spinozist” has been offered by Wim Klever (Klever 1988) and further championed by Jonathan Israel in the account of Dutch natural philosophy that appears in his Radical Enlightenment (Israel 2001, 705). I consider Klever's evidence for this reading and offer a defense of the more traditional view presented above in Lodge 2005.

⁷ See G.i.420. Leibniz expresses the same sentiments in a letter to Huet from around the same time (see G.iii.19-20. The critique to which Leibniz refers is his Animadversiones in Partem Generalem Principiorum Cartesianorum (G.iv.354-92/L 383-412). Leibniz had sent the manuscript of this work to Henri Basnage de Beauval (1657-1710) in 1692, asking that he try to secure a publisher. However, Basnage was unable to do so.

⁸ See Lodge 1998a.

⁹ As we shall see below, there is a technical sense in which neither De Volder nor Descartes thought of impenetrability as belonging to the nature of body. Nonetheless, they did think of it as an essential feature of bodies that followed directly from their nature.

¹⁰ See Letters 27 and Letter 52. De Volder does not provide much information about the basis for his dislike of occasionalism. The most that we find is in Letter 52 where he observes that the views of both Leibniz and the occasionalists “leave completely obscure the reason for . . . divine action on created things”. But, given Leibniz’s well-known rejection of occasionalism we should perhaps expect little more. Leibniz’s reasons for rejecting occasionalism are helpfully explained in Woolhouse 1988b and Rutherford 1993.

¹¹ For more on the history of the controversy and its ultimate resolution, see Iltis 1967 and Papineau 1977. For a discussion of Leibniz’s role, see Iltis 1971.

¹² For a useful account of the argument see Garber 1995, 310-13.

¹³ See Iltis 1967 69-145.

¹⁴ See Letter 1, note 2 for more details.

¹⁵ See Papin 1689, 183-88. Essentially the same objection was offered on behalf of the Cartesians by Arnauld in his letter to Leibniz of 28 September 1686 (G.ii.67/LA 81).

¹⁶ As Leibniz himself observes in Letter 9, this was a then fashionable way of understanding the nature of gravity (see Freudenthal 2002, 587-90).

¹⁷ Papin himself couched the objection in terms of time (see Papin 1689, 186).

¹⁸ See Papin 1691, 9-11. For discussion of this objection and Leibniz’s subsequent reply, see Iltis 1967, 137-39, Iltis 1971, 31-32, and Freudenthal 2002, 611-19.

¹⁹ De Volder reveals his familiarity explicitly in Letter 27.

²⁰ Although I do not have the space to explore the issue here, Leibniz adds an important caveat, “Nevertheless, I would not want to claim on these grounds that these mathematical entities are really found in nature, but I only wish to advance them for making careful calculations through mental abstraction” (GM.vi.238/AG 121). At this stage in the correspondence, Leibniz’s language does not suggest that he is construing his key physical notions anything other than realistically.

²¹ See Letter 10, notes 29 and 34.

²² See Huygens 1669 and the discussions in Iltis 1967, 47ff and Westfall 1971, 146-58. De Volder provides Leibniz with his own demonstration of this conservation law in Letter 14.

²³ The role of the law of continuity in the God's choice is complex. However, one of the key reasons that Leibniz thinks a wise God would have chosen a continuous world is that this would allow for the maximum number of creatures, and thus the greatest amount of being. See Rutherford 1995a, 29-31 for further discussion of the relation between the law and God's choice.

²⁴ More precisely, Leibniz omits the terms virtually and formally. De Volder was perplexed by these terms (see the supplement to Letter 14), and Leibniz observes in Letter 12 and Letter 17 that they add nothing to the argument and would have been better left out in the first place. That said, there is an account of their meaning in Letter 17.

²⁵ See A VI.iv: 1558-59/AG 51-52

²⁶ See Lodge 1997.

²⁷ See EA.i.46-93.

²⁸ Also see De Volder 1685, 20 and De Volder 1698, 29. It should be noted that De Volder's reliance on the criterion bears a close affinity to Spinoza's, since he nowhere suggests that clear and distinct perceptions are underwritten by divine benevolence (see Klever 1988). For discussion of Spinoza's view, see Della Rocca 1994.

²⁹ See De Volder 1698, 3ff and 29.

³⁰ See Letters 29, 50, 53, 55, and 61.

³¹ See Rutherford 1995b, 226-40.

³² See Brown 1984, 73-75. Also see Brown 2004, 80-89 and McRae 1995, 196-97.

³³ It should also be noted that there is no suggestion from Leibniz that an a priori demonstration of the natural activity of substances could not be given in principle. In a passage that he deleted from the final copy of the Letter 29, he notes that he hopes that “some point to show that every substance has a force of acting, indeed that they always act”, and that he “would very much prefer to have things explained a priori”. And when Leibniz encourages De Volder to provide his own definition of substance in Letter 35 this is at least promoted as the first step toward this goal.

³⁴ It is also striking that the account given by De Volder is almost exactly the same as the one that we find in the Entretien de Philarete et d'Ariste, suite du Premier Entretien d'Ariste et de Theodore, a dialogue that Leibniz wrote in 1712 and revised in 1715 (G.vi.579-94/AG 257-68). However, in this dialogue the account is presented by Ariste who is a spokesman for Malebranche.

³⁵ We shall return to this objection below when we consider Leibniz’s response to De Volder’s argument in favor of extended substance.

³⁶ See A VI.iv:1765/L 196.

³⁷ Also see Letter 51.

³⁸ For example, in the correspondence with Des Bosses (LDB 319; 371).

³⁹ See Mugnai 1992, 38.

⁴⁰ Also see Letters 18, 36, and 39.

⁴¹ See AT VII.1, 30-31/CSM.i.215.

⁴² See EA.ii.36-52.

⁴³ It is interesting to note that in Letter 59 De Volder ascribes this view to Descartes himself and that Leibniz responds, in Letter 61, by insisting that Descartes was committed to the existence of many extended substances.

⁴⁴ See Woolhouse 1993, 22-23

⁴⁵ See EA.ii.86-87.

⁴⁶ See Letters 50, 61, and 64. Leibniz also uses the term space as equivalent to mathematical extension in Letters 50 and 61.

⁴⁷ Leibniz reached this conclusion by providing reductios of the views that a continuum is composed of elements, whether these be a finite or infinite number of parts. However, as several commentators have pointed out, it is far from clear that the argument against the second option is successful (see Levey 1998, 61-62 note 22).

⁴⁸ See Letters 17, 20, 24, 29, and 46.

⁴⁹ Also see Letters 23, 41, and 63.

⁵⁰ There is evidence that Leibniz drew this distinction between two kinds of extension by the time of the correspondence with Arnauld (see Levey 1998, 58-68). In Letter 24 Leibniz uses the term 'extension' in a third sense, to refer to matter. But this is merely an attempt to accommodate De Volder's terminology and plays no role in Leibniz's own view.

⁵¹ Also see the Supplement to Letter 20 and Letter 40.

⁵² See Lodge 2002, 60-61 for discussion of the argument as it appears in the Arnauld correspondence

⁵³ See Lodge 2001 for a more detailed explanation of Leibniz's notion of an aggregate.

⁵⁴ Also see Letters 14, 18, and 59.

⁵⁵ De Volder also claims that this is possible at EA.ii.72.

⁵⁶ See Garber 1995, 270-88 for a useful summary of Leibniz's earlier anti-Cartesian arguments.

⁵⁷ This is Descartes' view, as can be seen from the letters to Henry More of 5 February 1649 and 15 April 1649 (AT.v.269 and 341-42/CSM.iii.361 and 372)). And, as we have seen above, it was also De Volder's.

⁵⁸ As Leibniz also notes this is a view that he himself had held when he was younger, based on the assumption that the resolution of such collisions would be grounded purely in the composition of the velocities of the colliding bodies (see Leibniz 1671a). Even at this early stage in his career, Leibniz believed that he could explain why this result does not actually obtain. His purely geometrical account of the laws of motion was supplemented in the same year by the publication of his 1671b, in which the addition of a hypothesis concerning the physical structure of the actual world yields predictions that accord with the phenomena (see Garber 1982). It is worth noting, as Daniel Garber does, that it is, therefore, a little surprising that he appeals to the same phenomena in order to establish the inadequacy of his former view (see Garber 1995, 273-77). One might think that the key change in Leibniz's views was his commitment to the view that all the properties of body must be understood as consequences of its nature. However, as we have seen, commitment to this thesis is also found in the late 1660s. It would take us too far afield, however, to explore this issue further here.

⁵⁹ Also see Letter 20 and supplement and Letter 24. This consequence is the one that Leibniz points out more regularly in his accounts of this problem (for example, see Discourse on Metaphysics, section 21 (A VI.iv: 1563/AG 53-54); Leibniz 1691a; Leibniz 1693; Leibniz 1695a (GM.vi.240-41/L 440-41); Leibniz 1698b (G.iv.510-11/L 503-04)).

⁶⁰ Leibniz's appeal here is to his famous principle of the identity of indiscernibles (see Mates 1986, 132-36 for a useful discussion). However, as Leibniz himself acknowledges, the truth of this principle has seemed far from axiomatic to some.

⁶¹ Previous commentators have suggested a number of possibilities. Thus, Daniel Garber suggests that the argument is "intended to show that if the world is . . . full of matter uniform in its nature then change is impossible" (1995, 286 – also see Garber 1992, 180-81). And Robert Adams has claimed that Leibniz intends to show that "there would be no

difference between motion and rest in the [Cartesian] system” (1994b, 5). For other similar readings, see MacDonald Ross 1984, 80 and Hartz 1989, 28-29. I have argued at length elsewhere against these readings in Lodge 1998b. One important concern is highlighted in what Leibniz says to De Volder in the passage above, namely that he is arguing that the problem arises from the fact that “equivalent things would always be substituted for one another,” something hard to square with the suggestion that he concerned to show that there would be no change on the Cartesian view. And although it is true that Leibniz’s own acceptance of the principle of identity of indiscernibles entails that he himself would not accept the kind of non-qualitative difference that this reading turns upon, I present evidence that Leibniz intended the argument to work against people who did not accept the principle.

⁶² See ECHU II.vii.

⁶³ Wilson 1994, 222-28 provides a persuasive case for this claim.

⁶⁴ See Broad 1975, 49-118; Garber 1985, 72; Garber 2009, ch. 8.

⁶⁵ By way of contrast, Daniel Garber sees a significant change taking place in Leibniz’s ontological commitments during the correspondence (see Garber 2009, 310-14) and treats the passage from Letter 64 as limited in temporal scope.

⁶⁶ See Letters 50, 53, 55, 61, and the supplement to Letter 20. See Lodge 2001 for a more detailed defense of this interpretation.

⁶⁷ In Letter 29 Leibniz speaks of bodies (human organs to be precise) as aggregates of corporeal substances, rather than monads. Although I do not have the space to discuss the matter here, this is consistent with the account of corporeal substances that I shall offer later in the introduction, according to which corporeal substances are aggregates of monads. As I have observed above, there is nothing in Leibniz account that precludes the aggregation of aggregates, provided this process is ultimately grounded in the aggregation of true unities.

⁶⁸ See Hartz 1992, 525-26. I provide reasons for rejecting Hartz’s position in Lodge

2001.

⁶⁹ Also see Russell 1937, 105; Rescher 1967, 82-83; Broad 1975, 91-92.

⁷⁰ See Letters 17 and 50.

⁷¹ See Letter 10, the Supplement to Letter 20, Letter 29, and Letter 50.

⁷² See G.iv.395/AG 252.

⁷³ The term ‘form’ is used primarily in the early discussions between Leibniz and Bernoulli, where it is also given the prefix substantial on two occasions (see Letters 4, 5, 7, and 8). In a letter to Bernoulli of 18 November 1698 we find a possible explanation of the absence of this term from most of the De Volder correspondence. Here Leibniz tells Bernoulli “I choose to say what is incomplete is the active without the passive and the passive without the active, rather than matter without form, or vice versa . . . since most moderns are offended less by the word activity than by form” (GM.iii.541/AG 168).

⁷⁴ Also see the draft of the New System (G.iv.472/WF 22), which was probably written in the same year.

⁷⁵ Given this, it is perhaps strange that Leibniz neglects to reiterate this view when De Volder expresses his inability to distinguish between Leibniz's notion of force and the concept of powers formulated by the scholastics, in Letter 18. I take it that, standardly, force and active force are synonymous for Leibniz. However, there are terminological complexities here that I am glossing over. For example, in Letter 61, Leibniz speaks of force as “the principle of action and passion” (italics mine).

⁷⁶ Leibniz does of course allow some outside assistance in the form of divine concurrence, as he makes clear in Letter 55. For a helpful discussion of the notion of concurrence in Leibniz's philosophy see Lee 2004.

⁷⁷ Leibniz also ascribes the power of conception to some of the monads in his ontology and we should probably understand the term ‘perception’ as a catch-all in contexts

where such monads are under discussion.

⁷⁸ Although this letter contains what appears to be the first mention of the term “law of the series”, similar ideas are to be found somewhat earlier. Thus, in his final letter to Arnauld from 1690, Leibniz claims: “[E]ach of these substances contains in its nature the law by which the series of its operations continues, and all that has happened and will happen to it” (G.ii.136/LA 170).

⁷⁹ For example, see the letter to Arnauld from 30 April 1687 (G.ii.91/LA 114), the New Essays (NE 94; 164-5; 173; 403), and the Principles of Nature and Grace (G.vi.598/AG 208).

⁸⁰ See G.vi.620/AG 23

⁸¹ My treatment of monadic aggregation shares some key features with the account advanced by Donald Rutherford (for the most detailed expression of this account, see Rutherford 1994). The most significant difference between the two is the fact that Rutherford grounds the aggregation of monads in a divine perception of relations that hold between them, whereas I ground it in a unifying cognitive activity of finite minds. The need to attribute equivocation regarding the notion of organic body to Leibniz may instead be taken as evidence that there is a defect in my account of aggregation. Readers are again referred to Lodge 2001 for my defense of this account.

⁸² For discussion of Leibniz’s principle of uniformity, see Phemister 2004.

⁸³ See Adams 1994a, 256.

⁸⁴ See A VI.iv: 1500/L 363.

⁸⁵ This passage appears to date from around 15 February 1712 (see LDB 231-33).

⁸⁶ Also see Letters 40 and 42.

⁸⁶ See LDB lvi-lxxix.

⁸⁸ Also see Letter 20, the Supplement to Letter 20, and Letter 21.

Letter 1

1. LBr 57 1, Bl. 238: excerpt from letter as sent; in Bernoulli's hand (my printed text). LJB L Ia 18, Bl. 97: excerpt from draft; in Bernoulli's hand. Letter 1 is answered by Letter 2.

2. Denis Papin (1647-c.1712) was an experimentalist and inventor. He published two papers (Papin 1689; Papin 1691) attacking the arguments that Leibniz had presented against the Cartesian thesis that the force of a body should be measured by its quantity of motion (i.e., the product of its size and speed), in the paper commonly referred to as the Brief Demonstration (Leibniz 1686). Leibniz responded to both (Leibniz 1690; Leibniz 1691b). For a discussion of the public debate between the two men, see Iltis 1967, 129-42; Iltis 1971, 30-32; Freudenthal 2002, 580-619. Papin and Leibniz also debated these issues in private correspondence in 1692, and then again between 1695 and 1700. All the letters can be found in OP, and A.III.v and vi contain a critical edition of those dating from January 1692 to June 1696, with the remaining letters to appear in subsequent volumes of that series. See Ranea 1989; 1991; Freudenthal 2002, 619-25 for discussion of the correspondence.

3. There is no evidence that Bernoulli sent anything to De Volder until early in 1699 (see Letter 10).

Letter 2

1. LJB L Ia 19 1, Bl. 109-10: excerpt from letter as sent; in Leibniz's hand (my printed text). LJB L Ia 20, Bl. 173: excerpt from copy of letter as sent; in Bernoulli's secretary's hand. LBr 57 1, Bl. 250: excerpt from draft; in Leibniz's hand. Letter 2 answers Letter 1 and is answered by Letter 3.

2. See the Theoria Motus Abstracti (Leibniz 1671b). Even at this early stage in his career, Leibniz believed that he could explain why this result does not actually obtain. His purely geometrical account of the laws of motion was supplemented in the same year by the publication of his Hypothesis Physica Nova (Leibniz 1671a), in which the addition of a hypothesis concerning the physical structure of the actual world yields predictions that accord with the phenomena. For an account of Leibniz's views during this period, see Garber 1982.

3. An argument to the conclusion that there is more to the nature of body than extension and impenetrability appears in Leibniz's writings from around 1678 onward (see A VI.iv: 1976-80/AG 245-50) and was presented publicly in Leibniz 1691a and Leibniz 1693. The claim that collision can be explained in terms of an elastic force that is a mechanical phenomenon grounded in the motion of indefinitely divided particles can be found in a number of writings from the mid-1680s onward (see A VI.iv: 1620/LOC 311; GM.vi.228; Leibniz 1695a; Leibniz 1698b).

Letter 3

1. LBr 57 1, Bl. 246: excerpt from letter as sent; in Bernoulli's hand (my printed text).

There is no version of this letter in LJB L Ia. Letter 3 answers Letter 2 and is answered by Letter 4.

Letter 4

1. LJB L Ia 19, Bl. 111-12: excerpt from letter as sent; in Leibniz's secretary's hand (my printed text); LJB L Ia 20, Bl. 175-76: excerpt from copy of letter as sent; in Bernoulli's secretary's hand; LBr 57 1, Bl. 247-48: excerpt from draft; in Leibniz's hand. Letter 4

answers letter 3 and is answered by Letter 5.

2. The term moles was used by Cartesians and other contemporaries of Leibniz to refer to the quantity of body. Generally Leibniz uses moles as a mass term and, in such situations, I translate it as bulk. However, when it is used as a singular term, I translate it as mass, and where it refers to a component in the Cartesian quantity of motion, I translate it as size.

3. In section 36 of Part II of the Principles of Philosophy (AT VIII.1, 61/CSM.i.240), Descartes maintains that God preserves the same quantity of motion in the universe. Here Leibniz appears to interpret Descartes as committed to the occasionalist view, more readily attributable to Malebranche and others (see Letter 27, note 4), that the preservation is by the direction intervention of God's will. Whether this was in fact Descartes' view has been a matter of some controversy (see Schmaltz 2008, 87-128).

4. Conatus was a technical term in Leibniz's philosophy by this stage, and, when he uses it this way I leave it untranslated. In the Specimen Dynamicum (Leibniz 1695a), Leibniz defines conatus as "the speed taken with the direction [of a body]" (GM.vi.237/AG 120).

5. See Letter 2, note 2. The publication from the Journal des Savants could be either Leibniz 1691a or Leibniz 1693.

6. See Letter 3 for all the quotes in this letter.

7. See the Supplement to Letter 11.

Letter 5

1. LBr 57 1, Bl. 252: excerpt from letter as sent; in Bernoulli's hand (my printed text).
LJB L Ia 18, Bl. 98: excerpt from draft; in Bernoulli's hand. Letter 5 answers Letter 4 and is answered by Letter 6.

2. Leibniz did not respond directly to this question. However, Bernoulli raised essentially the same issue in his next letter (see GM.iii.540) and received the following reply, “You fear that matter is composed of that which is not quantitative. I respond, it is no more composed of souls than from points” (GM.iii.542/AG 168). De Volder raised the issue himself late in 1704, in Letter 63, but did not receive a direct answer, and in his final letter to Leibniz from 1706, Letter 66, De Volder remained perplexed.

Letter 6

1. LJB L Ia 19, Bl. 118: excerpt from letter as sent; in Leibniz’s secretary’s hand (my printed text);); LJB L Ia 20, Bl. 186: excerpt from copy of letter as sent; in Bernoulli’s secretary’s hand; LBr 57 1, Bl. 255: excerpt from draft; in Leibniz’s hand. Letter 6 answers Letter 5.

2. The letter is not dated in Gerhardt (see GM.ii538), apparently following LBr 57 and LJB L Ia 19. However the copy in Bernoulli’s secretary’s hand is dated 22 August.

Letter 7

1. LBr 57 1, Bl. 263: copy of the postscript as sent; in Leibniz’s hand (my printed text). LJB L Ia does not contain a version of the postscript.

2. The letter actually sent to Bernoulli ends, “I also enclose a separate postscript, which you can send on to Mr. De Volder if it seems appropriate [Adjeci et P. S. separatim, quod, si ita videbitur, D^{no}. Voldero communicare possis]” (LJB L Ia 19, 1 Bl. 120/GM.iii.543). In his letter to Leibniz of 8 November 1698, Bernoulli reported that he had sent the postscript as requested and encouraged De Volder to write to Leibniz if he had any

comments, noting, “I do not doubt that he will still have his worries about the things that you say about forms” GM.iii.548). Bernoulli’s prompting appears to have precipitated Letter 8 and the start of the Leibniz-De Volder correspondence. However, Letter 8 does not contain a direct response to the content of the postscript.

3. See note 7 below. Although Leibniz talks of a recent article, he seems to be referring to a piece that was by then over a decade old, namely Leibniz 1687b.

4. Leibniz’s letter to Huygens of 20 March 1693 contains a lengthy statement of his concerns about Huygens’ commitment to atomism (see A III.v: 517-21). However, I have found no evidence of Huygen’s concession in the surviving correspondence between the two men.

5. In his 1687b, Leibniz provides a more detailed account of his law of continuity as follows, “When the differences between two instances in a given series or that which is presupposed can be diminished until it becomes smaller than any given quantity whatever, the corresponding difference in what is sought or in their results must of necessity also be diminished or become less than any given quantity whatever. Or to put it more commonly, when two instances or data approach each other continuously, so that one at last passes into the others, it is necessary for their consequences or results (or the unknown) to do so also” (G.iii.52/L 351).

6. Democritus (c.460-c.370 BCE) was a student of Leucippus (c.480-c.420 BCE), who is credited with the invention of atomism. For discussion of Democritus’ views along with the surviving fragments and references to his work in other ancient authorities see McKirahan 1994, 303-43. In chapter V of Le Monde, Descartes describes three elements, fire, air, and earth, which differ only in terms of the size shape and motion of their parts and which he takes to be the only kinds of matter found in the world. The first and second elements are fire and air respectively (see AT X, 23-31/CSM.i.88-90). For an overview of

Descartes' account of the material world in Le Monde, including the theory of the elements, see Gaukroger 1995, 225-68.

7. Leibniz 1687a concludes with a critique of Malebranche's acceptance of a number of the rules of impact set out in sections 46-52 of Part II of Descartes' Principles of Philosophy (AT VIII.1, 68-69) and Malebranche's account of the collision of perfectly hard bodies. The paper precipitated a partial defense from Malebranche (Malebranche 1687) and a further critical paper by Leibniz (Leibniz 1687b). For discussion of the arguments, see Iltis 1967, 121-23; Iltis 1971, 29; Garber 1995, 314-16.

Letter 8

1. LBr 967, Bl. 1-2: letter as sent; in De Volder's hand with marginal additions and underlining by Bernoulli (my printed text). Letter 8 was sent with Letter 9 and is answered by Letter 10. Whilst Letter 8 is addressed to Bernoulli, it was clearly written with Leibniz as its intended audience.

2. Neither of these letters appears to have survived.

3. See Letter 1, note 2.

4. The underlining from LBr 967 is preserved here and below where it was added for emphasis by Bernoulli.

5. Leibniz 1691b, 446/GM.vi.210.

6. Leibniz 1687a, 142. The public debate between Leibniz and Papin followed an earlier one with the Cartesian Abbé Catelan (see Catelan 1686 and 1687; Leibniz 1687a and 1687c). Leibniz also debated Catelan's objections in his correspondence with Antoine Arnauld (see G.ii.80-81/LA 100-101; G.ii.89/LA 111; G.ii.109/LA 137; G.ii.128-29/LA 163-66). For discussion of the issues raised by Catelan and Leibniz's responses, see Iltis 1967,

107-29; Iltis 1971, 28-30.

7. Huygens 1669. As the full title of this article indicates, it appeared in the Journal des Savants as well as the Philosophical Transactions. For an account of Huygens' laws of motion, see Westfall 1971, 146-58.

8. Huygens 1669, 928/OH.vi.433. This is Law 6.

9. Ibid.

10. Here De Volder alludes to Law 7 (see *ibid.*).

11. In B14 Bernoulli is referring to Letter 7.

12. Leibniz 1694. In this short article, Leibniz claims that the concept of substance is illuminated by his concept of active force, which "inheres in all substance", such that "some action always arises from it" (G.iv.470/L 433). Leibniz contrasts his own notion of force with the "mere possibility of acting" (*ibid.*) that he attributes to the scholastic understanding of this term. The key difference between the two, for Leibniz, is that the latter requires some external stimulus in order to be brought to action, whereas the former is "carried into action by itself" (*ibid.*). However, the essay does little other than state Leibniz's position, and it is not surprising that De Volder required a justification for adopting the view in question despite his sympathy with it.

13. See Letters 1, 3, and 5 for Bernoulli's account of his discussions with De Volder concerning elastic force.

14. See Letter 7.

15. Jean Brun (1628-1708) was professor of Theology at Groningen. He had sided with Bernoulli earlier in 1699 in a dispute with another of their colleagues, Paulus Hulsius (1633-1712).

Letter 9

1. LBr 57 1, Bl. 270: excerpt from letter as sent; in Bernoulli's hand (my printed text); LJB L Ia 18, Bl. 106: excerpt from draft; in Bernoulli's hand. Letter 9 was sent with Letter 8. It is answered by Letter 11.

2. See Letter 1, note 2 for references to Papin. The discussion between Leibniz and Bernoulli concerning the proper measure of force began in June 1695 after Bernoulli had read Leibniz's Specimen Dynamicum (Leibniz 1695a) (see A III.vi: 408-10) and continued until 6 October 1696 (see GM.iii.331).

3. Leibniz wrote his Dynamica de Potentia et Legibus Naturae corporae (GM.vi.281-514) during his trip to Italy in 1689-90. This systematic exposition of Leibniz's physics remained unpublished during his lifetime. The published work to which Bernoulli refers is the Specimen Dynamicum (Leibniz 1695a).

Letter 10

1. LBr 967, Bl. 3-6: draft; in Leibniz's hand (my printed text). LJB L Ia 702, Bl. 82-89: copy of letter as sent; in Bernoulli's secretary's hand. Letter 10 was sent with Leibniz's letter to Bernoulli of 17 December 1698 (GM.iii.559-61). It answers Letter 8 and is answered by Letter 14.

2. LBr 967 has no date, but the copy ends "Goodbye. From Hanover, 17/27 December 1698 [Vale. Dabam Hanoverae 17/27 Decembr. 1698.]"

3. Leibniz expressed similar sentiments in the accompanying letter to Bernoulli as follows, "Since your letter from Mr. De Volder pertains almost exclusively to me, I have replied to him following your suggestion. However, I fear that I may have gone on too much, but I preferred to sin in this way, and there was not enough time to shorten it. As you are

passing on my response, please do not neglect to strengthen, explain, and even correct it where this seems to be needed” (GM.iii.559).

4. See Letter 8 for all the quotes in this letter.

5. Leibniz is referring to Descartes’ Explication des engins par l’aide desquels on peut avec une petite force lever un fardeau fort pesant, commonly known as the Traité de la mécanique, which was included in a letter from Descartes to Constantijn Huygens (1596-1697) of 5 October 1637 (AT I, 435-36/CSM.iii.66-67).

6. Pascal 1663, 1-15/Pascal 1937, 3-11.

7. Leibniz originally wrote, “Moreover, you seem to accept that when this is allowed the matter is resolved in my favor. [Eo autem admisso, rem pro me confectam esse, agnoscere videris.]”

8. Impetus is a technical term for Leibniz, which is defined in the Specimen Dynamicum (Leibniz 1695a) as, “the product of the bulk of a body and its speed, whose quantity is what the Cartesians usually call quantity of motion, i.e., the momentary quantity of motion” (GM.vi.238/AG 121).

9. The copy does not have “bare [nudam]”.

10. Solicitation is a technical term for Leibniz, which is defined in the Specimen Dynamicum (Leibniz 1695a). It is a “striving [nisus]” that is “elementary or infinitely small” found at the very beginning of motion, whose repetition gives rise to impetus (GM.vi.238/AG 121). Shortly after explaining the notions of impetus and solicitation Leibniz observes that he “would not want to claim . . . that these mathematical entities are really found in nature”. Rather they are advanced “for making careful calculations through mental abstraction” (ibid.).

11. Leibniz is referring to Archimedes’ law of the lever, which is found in

Propositions 6 and 7 of Book I of his On the Equilibrium of Planes (Archimedes 2003, 192-94). For a discussion of Archimedes' law, see Dijksterhuis 1987, 291-304.

12. The copy does not have “i.e., of speeds inversely proportional to the sizes, [seu celeritatum molibus reciprocarum]”.

13. As Gerhardt notes, the word “relative [respectivam]” is unreadable on the LBr 967 (G.ii.155). I follow the copy.

14. The “singular problem” to which Leibniz refers here was the challenge that Papin posed to come up with a method by which all of the power of a larger body could be transferred to a smaller body in collision non-miraculously (Papin 1691, 11). The method proposed by Bernoulli in his letter of 18/28 January 1696 (A III.vi: 632-34) involves oblique collision and is essentially the same as the one that Leibniz discusses later in this letter.

15. Gerhardt mistakenly omits this sentence (see G.ii.157).

16. The copy does not have “obstruction, i.e., [impedimentum seu]”.

17. P. Vergilius Maro, Aeneid Book 6, card 724.

18. Johannes Kepler (1571-1630) introduced the term inertia in his Epitome astronomiae Copernicanae of 1618 as the feature of bodies that accounted for their tendency to come to rest (Kepler 1937-, vol. 7, 295-98). For discussion of the relationship between Leibniz's and Kepler's views, see Bernstein 1981. Also see Letter 17, note 5.

19. In fact, Bernoulli sent excerpts from his letters to Leibniz that included this a priori argument in the letter with which he sent Letter 10 to De Volder (see the Supplement to Letter 11).

20. Joachim Jungius (1587-1657), Logician, mathematician, and natural philosopher, is best known for his Logica Hamburgensis (Jungius 1638) in which he presented late medieval theories and techniques of logic for the pupils at the Gymnasium in Hamburg, where he was rector from 1628-40. A number of his writings on natural philosophy, which

were published posthumously, are collected in Jungius 1982. For discussion of Jungius' views, see Meinel 1984.

21. Johannes Marcus Marci (1595-1667) was a Czech doctor who made significant contributions to medicine and optics as well as writing treatises on mechanics, including a system of dynamics (Marci 1639). For an outline of Marci's views see Westfall 1971, 117-25.

22. Giovanni Alfonso Borelli (1608-79) is most famous for his pioneering work in iatromechanics, De motu animalium (Borelli 1680-81). However, he also wrote a number of important works on mechanics (Borelli 1666; 1667; 1686). For discussion of Borelli's views, see Westfall 1971, 213-30.

23. For Huygens, see Letter 8, note 7.

24. Sir Christopher Wren (1632-1723), as well as being a famous architect, was a noted mathematician and Professor of Astronomy at Gresham College (1657-61), and then Savilian Professor of Astronomy at the University of Oxford (1661-73). He was the author of an important paper on impact, submitted to the Royal Society (Wren 1669), of which he was a founding member. For discussion of Wren's paper, see Westfall 1971, 203-06.

25. John Wallis (1616-1703) was one of the leading figures in English mathematics and science in the late 17th century. He was one of the original members of the Royal Society and Savilian Professor of Geometry at the University of Oxford from 1649 until his death in 1703. His work on mechanics is confined largely to his Mechanica sive de Motu Tractatus Geometricus (Wallis 1670-71), which is, in part, an expansion of a paper that he submitted to the Royal Society on impact (Wallis 1669). For discussion of Wallis' views, see Westfall 1971, 231-243.

26. Edme Mariotte (c.1620-1684) was one of the original members of the Académie Royale des Sciences and published a treatise on mechanics (Mariotte 1673). For discussion of Mariotte's mechanical views, see Westfall 1971, 243-56.

27. Precisely what Leibniz is referring to here is unclear. Wallis upholds quantity of motion as a measure of force in Proposition 1 of Chapter 1 of De Motu, and recognizes that quantity of motion is not conserved in collisions that involve soft bodies in the same work (Wallis 1670-71, 661-62). However, Westfall notes (1971, 236) that Wallis was not consistent in claiming quantity of motion as the correct measure and employed several different conceptions of force in De Motu.

28. See Leibniz 1695a (GM.vi.239/AG 122-23).

29. Leibniz is probably referring to the thought experiment that appears first in his letter to Antoine Arnauld from 8 December 1686 (G.ii.78-80/LA 97-99), which closely resembles the demonstration that he gives here. In the earlier version, Leibniz spells out the thought experiment a little more clearly. In particular, he explicitly includes the assumption that the distance covered by the first sphere (R in the following demonstration) takes one unit of time and is at constant speed. This entails that the length of the diagonal ($\sqrt{2}R$ below) provides a measure of the speed of the sphere on collision and the lengths of the sides (W_2R and V_2R below) provide measures of the two perpendicular components of the speed of the sphere. For discussion of the letter to Arnauld, see Iltis 1967, 111-13.

30. See note 14 above.

31. Papin 1691, 9.

32. P. Vergilius Maro, Aeneid Book 11, card 288.

33. The copy does not have "with his spirit was revived [resumto animo]".

34. Leibniz sent an early version of this thought experiment, involving oblique collision of just two bodies, to Papin in his letter of March 1696 (see A III.vi: 700-01).

Papin's initial response in his letter of 5 April 1696 was non-committal (see A III.vi: 723). It reappeared in the form presented to De Volder in Leibniz's letter to Papin of 26 January 1698 (see OP 7, 360-68). Leibniz's quote from Virgil seems to be reference to Papin's reaction in this second instance. The two men had been writing around one letter per month each in the previous year, but no response was forthcoming until 24 April 1698. It was here that Papin was concessive (see OP 8, 4-5). However, by 28 August he had adopted the more combative stance to which Leibniz alludes (see OP 8, 23-27).

35. The copy has "in the present case [in praesenti casu]".

36. The copy has "reflection [reflexio]".

37. De Volder was among the first Dutch professors to introduce experiments as illustrative devices into the teaching of physics and experiments concerning the vacuum were the mainstay of his extremely popular lectures (see De Pater 1975, 314-17).

38. Descartes provides such an explanation of the elasticity of air in sections 46 of Part IV of the Principles of Philosophy (AT VIII.1, 231) and of the elasticity of glass and rigid bodies in general in section 132 of Part IV (AT VIII.1, 274). A commitment to a variant of Descartes's thesis can be found in Huygens 1690. See Sabra 1981, 208-209 for discussion of the differences between the two.

39. See Letter 7, note 6.

40. Leibniz originally wrote: "indeed I have a demonstration that there are no perfectly smooth spheres in nature [pro demonstrato enim habeo globos perfecte tornatos in natura non dari]".

41. The copy does not have "Parisian and Dutch [Parisinis et Batavis]". Leibniz is almost certainly referring to the work commonly referred to as his New System (Leibniz 1695b) and the clarificatory articles that he published in the Journal des Savants subsequently (Leibniz 1696a; and 1696b). These are collected in WF along with a number of other pieces

and extracts from contemporary correspondences that provide important background. Leibniz speaks of Parisian and Dutch journals because each volume of the Journal des Savants was published both in Paris and in Amsterdam.

42. Here Leibniz is referring to De Ipsa Natura (Leibniz 1698b). Johann Christoph Sturm (1635-1703) was a natural philosopher who was Professor of Mathematics and Physics at the University of Altdorf from 1669 until his death. De Ipsa Natura was written as a response to doctrines that Leibniz found in Sturm's De natura sibi incassum vindicata, which appeared in the second volume of Sturm 1698.

43. Leibniz 1698a. Here Leibniz responds to worries that Pierre Bayle had expressed in Note H to the article Rorarius (Bayle 1697, i.966-67).

44. Leibniz wrote a letter to Henri Basnage de Beauval, editor of the Histoire des Ouvrages des Savans, in late 1695 in which he outlined some of the main ideas from Leibniz 1695b (see G.iii.121-2/WF 64-65). Apparently in response to comments that he received from Basnage, Leibniz wrote again on 3 January 1696 (G.iv.498-500/WF 62-64) and suggested that Basnage might publish some of his explanations in the Histoire if he deemed it appropriate, albeit with the insistence that they be published anonymously. In the February volume, Basnage included an extract (Beauval 1696), which was then republished with some additional material in November as Leibniz 1696b.

Letter 11

1. LBr 57 1, Bl. 273: excerpt from letter as sent; in Bernoulli's hand (my printed text); LJB L Ia 18, Bl. 107: excerpt from draft; in Bernoulli's hand. Letter 11 answers Letter 9 and is answered by Letter 12.

2. See Letter 4.

3. It is impossible to know just what Bernoulli sent. The Supplement to this letter contains the Leibniz's initial presentation of the a priori argument, but the argument was discussed further by Leibniz and Bernoulli for several months after its introduction (see A III.vi: 671-72; 704-707; 732-33; 758; 788; 797-98; GM.iii.297-98; 312; 316; 321-22; 329-30). It appears in Leibniz's writings more generally from around 1690 onward (e.g., see GM.vi.291-92/AG 110-11; G.iii.59-60). For a detailed discussion of the a priori argument see Gueroult 1967, 118-54.

4. See Leibniz's letter to Bernoulli of 30 October 1695 (A III.vi: 523-26). De Volder refers to part of this letter in the material which appears in the Supplement to Letter 14. However, neither De Volder nor Bernoulli discussed this material with Leibniz any further and I do not include the original in this volume.

5. Letter 10.

6. In a letter to De Volder of 3 January 1699, Bernoulli claimed that the number of gravitational impressions is proportional to the distance that a body moves, rather than the time taken (Ms. UB Basel L Ia 675, 163).

7. Excerpt from letter as sent; A III.vi: 648-49.

Letter 12

1. LJB L Ia 19 1, Bl. 125-26: excerpt from letter as sent; in Leibniz's hand (my printed text); LJB L Ia 20, Bl. 196-97: excerpt from copy of letter as sent; in Bernoulli's secretary's hand; LBr 57 1, Bl. 275: excerpt from copy of letter as sent; in Leibniz's secretary's hand. Letter 12 answers Letter 11 and is answered by Letter 13.

2. Despite the request, there is no evidence that Bernoulli ever sent this material to Leibniz.

3. In Letter 11 Bernoulli included the term virtually when referring back to Leibniz's

a priori argument, given that it had appeared in their initial discussion of it (see the Supplement to Letter 11). Bernoulli's response to the initial statement of the argument included this worry about the validity of Leibniz's inference (see A III.vi: 672-73). But, in fact, it seems to have been Leibniz's suggestion that the best way to proceed was to leave the terms out of the formulation of the argument (see A III.vi.706). As we see in the Supplement to Letter 14, De Volder was confused over the more basic question of what Leibniz meant by each of these terms.

4. Leibniz's explanation of the virtual-formal distinction in terms of thalers appears in the earlier discussion of the a priori argument with Bernoulli (see A III.vi.705) and in Letter 17 as a response to De Volder's confusion. In Letter 17 Leibniz again suggests that the terms virtual and formal might be left out of the formulation.

Letter 13

1. LBr 57 1, Bl. 277: excerpt from letter as sent; in Bernoulli's hand (my printed text); LJB L Ia 18, Bl. 108: excerpt from draft; in Bernoulli's hand. Letter 13 answers Letter 12.
2. See Letter 11, notes 3 and 4.
3. See Letter 12, note 3.

Letter 14

1. LBr 967, Bl. 7 and Bl. 9-10: letter as sent; in De Volder's hand (my printed text). Letter 14 was sent with Letter 15. It answers Letter 10 and is answered by Letter 17.
2. Letter 9.
3. Letter 7.

4. Letter 9, fig. 3.

5. See Huygens 1669.

6. Here, and for the remainder of this discussion, I retain De Volder's earlier convention of using lower case letters to refer to the bodies.

7. Here De Volder refers Hypothesis II of De motum corporum ex percussione (Huygens 1703, 369/OC.xvi.31). This work, from which the laws of motion published in Huygens 1669 were taken, was essentially complete by 1656. However, it did not appear until the publication of Huygens 1703, which was edited by De Volder and the Franeker professor, Bernhard Fullenius (1640-1707) in accordance with Huygens' wishes. For discussion of Huygens 1669, De motum corporum ex percussione and the relation between the two, see Iltis 1967, 47-66 and Westfall 1971, 146-158.

8. See Letter 10, notes 43, 44, and 45. De Volder may also be referring to Leibniz 1694 and Leibniz 1695a.

9. LBr 967, Bl. 8: as sent; in De Volder's hand (my printed text). Here, on a separate sheet included with Letter 14, De Volder considers some of the excerpts from Leibniz and Bernoulli's correspondence mentioned in Letter 11.

10. Supplement to Letter 11.

Letter 15

1. LBr 57 1, Bl. 286: excerpt from letter as sent; in Bernoulli's hand (my printed text).

There is no version of this letter in LJB L Ia. Letter 15 was sent with Letter 14.

2. See Letter 12.

Letter 16

1. LJB L Ia 19 1, Bl. 129: excerpt from letter as sent; in Leibniz's hand (my printed text); LJB L Ia 20, 202-03: excerpt from copy of letter as sent; in Bernoulli's secretary's hand; LBr 57 1, Bl. 284: excerpt from copy of letter as sent; in Leibniz's secretary's hand.

2. LBr has a date of 1 March 1699, which is the date given by Gerhardt (see GM.iii.578). I follow the date of 14 March from LJB L Ia, since Leibniz mentions Letter 14, which Bernoulli sent to Leibniz with Letter 15 on 4 March 1699.

3. In fact, the letter to which Leibniz's refers (Letter 17) was not sent at this time. As Leibniz observes in a postscript, "The copy of the letter of response to De Volder is not yet ready. [Epistolae ad Volderum responsoriae nondum praesto est apographum]"(LJB L Ia 19, Bl. 130). It was finally sent, as the letter itself is dated, on 24 March 1699 (see GM.iii.581).

4. Bernoulli and De Volder clearly had further discussions of their own on these issues, culminating in Bernoulli's provision of a thought experiment that convinced De Volder that Leibniz's account of the measure force was the correct one. A number of Bernoulli's letters are preserved in Basel (LJB L Ia 675, Bl. 161-91). However, other than the material that Bernoulli himself quotes in Letter 35, which includes the aforementioned thought experiment, there is nothing in these letters that significantly augments our understanding of the interaction between Leibniz and De Volder, and so they are not reproduced in this volume.

Letter 17

1. LBr 967, Bl. 11-18: draft; in Leibniz's secretary's hand (my printed text); LJB L Ia 702, Bl. 82-89: copy of letter as sent; in Bernoulli's secretary's hand. Letter 17 was sent with

Leibniz's letter to Bernoulli of 3 April 1699 (see GM.iii.581, which has the Old Style date of 24 March). It answers Letter 14 and is answered by Letter 18.

2. See Letter 14, note 7.

3. For Huygen's book on motion, see Letter 14, note 7. Leibniz is probably referring here to his Dynamica (see Letter 9, note 3).

4. Leibniz may be referring to Huygens 1690, 14/OC.xix.473. Here Huygens claims that a body that collides with a stationary body that is in contact with three more stationary bodies will propagate the motion of the first to those with which it is in contact in such a way that it and the body initially in motion come to rest and the other three move away from the collision.

5. Leibniz probably has in mind the letters to Mersenne of December 1638 (AT II, 466-67/CSM.iii.131) and 25 December 1639 (AT II, 627/CSM.iii.141) and to Debaune of 30 April 1639 (AT II, 543-44/CSM.iii.135). For Kepler's views, see Letter 10, note 20.

6. See Letter 2, note 2.

7. See Letter 2, note 3.

8. Leibniz's secretary originally wrote, "which therefore always exercises a new action [quae proinde novam semper actionem exercet]".

9. See the Supplement to Letter 11.

10. See Letter 12.

11. See the Supplement to Letter 11 and the Supplement to Letter 14. Despite the fact that Leibniz presents the material here and later in the paragraph as if it were quoted, he gives a slightly different version of the argument to the one that De Volder received and from which he quotes in the Supplement to Letter 14.

12. See Letter 16, note 4.

Letter 18

1. LBr 967, Bl. 19-20: letter as sent; in De Volder's hand (my printed text). Letter 18 was sent with Letter 19. It answers Letter 17 and is answered by Letter 20.

2. For Malebranche order is the objective hierarchy of perfections, with God more perfect than creation. It follows that God acts for his own perfection in creating, and this is used to explain various features of creation and, in particular, imperfections, such as sin. For discussion, see Pyle 2003, 118-121.

3. See Letter 17 for all the quotes in this letter.

4. In Letter 17 Leibniz has “does more [plus facit]”, rather than “produces more force”.

Letter 19

1. LBr 57 1, Bl. 293: excerpt from letter as sent; in Bernoulli's hand (my printed text); LJB L Ia 18, Bl. 110: excerpt from draft; in Bernoulli's hand. Letter 19 was sent with Letter 18. It is answered by Letter 21.

2. In his letter to Bernoulli of 16 May 1699, Leibniz expressed his eagerness to receive De Volder's letter, noting that he thought that De Volder seemed “half converted [semi-conversus]” (GM.iii.587).

Letter 20

1. LBr 967, Bl. 21-22: draft; in Leibniz's hand (my printed text); LJB L Ia 702, Bl.

90-92: copy of letter as sent; in Bernoulli's secretary's hand. Letter 20 was sent with Letter 21. It answers Letter 18 and is answered by Letter 22.

2. Whilst LBr is dated "23 June 1699 [23 Junii 1699]", the copy has "26 June/6 July 1699 [26 Junii/6 Julii, 1699]", which coincides with the date of the accompanying Letter 21.

3. Leibniz originally wrote: "confirmed [confirmari]".

4. Given Leibniz's indication in Letter 64, note L1, that the material appearing in square brackets there was not included in the letter as sent, it is reasonable to think that the same applies here.

5. The copy does not have the preceding sentence.

6. The copy does not have: "absolutely [absolute]".

7. See Letter 2, note 2. Although the examples in Letters 2 and 20 are different, they are both consequences of the views adopted in the same work.

8. The copy has: "motions or conatus [motus vel conatus]".

9. The copy does not have the preceding sentence.

10. Letter 18.

11. Despite the fact that Leibniz underlines this question, as is his usual practice when quoting directly, this is only a loose paraphrase of the material that immediately succeeds the first question in Letter 18.

12. LBr 967, Bl. 25-28: longer version; in Leibniz's secretary's hand (my printed text); LBr 967, Bl. 23-24: draft of longer version; in Leibniz's hand. Leibniz indicates at the top of the page that this version of the letter was not sent to De Volder.

13. In the draft Leibniz originally wrote: "We believe that that the opposite of which implies a contradiction is absolutely necessary and that that the opposite of which does not imply a contradiction is possible. [Absolutae necessitatis censemus cujus oppositum implicat contradictionem, possibile cujus oppositum eam non implicat]".

14. St. Thomas More's Utopia (More 1516) and John Barclay's Argenis (Barclay 1621) are both fictions. The former offers one of the most famous models of an ideal society; the latter is a romance that provides insight into political intrigue and its consequence. Leibniz had used Argenis as an example of something merely possible as early as 1672 or 1673 in his Confessio Philosophi (A VI.iii: 128-29/CP 57-59).

15. Leibniz is probably referring to Pierre Gassendi (1592-1655). See, for example, Gassendi 1658, 1.341b. The view and its motivations are discussed in Palmerino 2001.

16. In the draft Leibniz originally wrote: “namely A without B and B without A, or A without B and nevertheless not B without A, or not A without B nor B without A. Thus thought and extension. . . . [nempe A sine B et B sine A, vel A sine B nec tamen B sine A, vel nec A sine B nec B sine A. Sic cogitationem et extensionem. . . .]”.

17. In the draft Leibniz originally wrote: “With the one comprehension we order change or successive existence, with the other coexistence. [Uno intellecto mutationes seu existentias successivas, altero coexistentias ordinamus.]”

18. In the draft Leibniz originally wrote: “in matter [in materia]”.

19. See Leibniz 1691a. In a letter to the French theologian Bishop Jacques Bénigne Bossuet (1627-1704) from 1693, Leibniz indicated that he was responding to “a friend I have in Rome” (Ravier 1937, 58).

20. See note 10 above.

21. In the draft Leibniz originally wrote: “the organic body [corpus organicum]”.

Letter 21

1. LJB L Ia 19 1, Bl. 135: excerpt from letter as sent; in Leibniz's hand (my printed text); LJB L Ia 20, Bl. 210-11: excerpt from copy of letter as sent; in Bernoulli's secretary's

hand; LBr 57, 1 Bl. 295: excerpt from draft; in Leibniz's hand.

2. The date here is based on the assumption that Leibniz gives the old style date on LBr 57 1. This is supported by the date of "26 June/6 July 1699 [26 Junii/6 Julii, 1699]" on the copy of Letter 20.

3. Letter 18. This is not an exact quote.

Letter 22

1. LBr 967, Bl. 29: letter as sent; in De Volder's hand (my printed text). Letter 22 was sent with Letter 21. It answers Letter 20 and is answered by Letter 24.

2. Letter 20.

3. Letter 20.

4. Leibniz 1687a, 137.

5. Descartes makes the claim that all variety in the material world is brought about by motion in section 23 of Part II of the Principles of Philosophy (AT VIII.1, 52-53/CSM.i.232-33). However, Descartes' own writings are unclear when it comes to the question of whether the variety in question is meant to include the distinction between individual bodies or whether the material world consists of an indefinite number of distinct material substances, which can be identified with bodies, independently of motion (see Woolhouse 1993, 22-23). Leibniz attributes the view that the parts of extension are distinct substances to "Descartes and others" in Letter 61, and it is plausible to think that at least one prominent Cartesian, Antoine Arnauld (1612-94), counted among those (see Lodge 2002, 63-64). But one can find the view that bodies are produced by modification of a single corporeal substance in the writings of the Cartesians Robert Desgabets (1610-78) and Pierre-Sylvain Regis (1632-1707) (see Schmaltz 2002, ch. 2), and, most famously, in Spinoza, albeit in a rather complex sense

(see Nadler 2006, 87-104).

Letter 23

1. LBr 57 1, Bl. 302: excerpt from letter as sent; in Bernoulli's hand (my printed text); LJB L Ia 18, Bl. 112: excerpt from copy of letter as sent; in Bernoulli's secretary's hand.

Letter 23 was sent with Letter 22. It is answered by Letter 25.

2. In his letter to Leibniz of 18 July 1699, Bernoulli complained that he had not been able to look at Leibniz's last letter to De Volder (see GM.iii.594). Leibniz indicated in his letter of 25 July 1699 that this was accidental and encouraged Bernoulli to read and comment on the correspondence (see GM.iii.596). By the time Bernoulli wrote Letter 23 Leibniz had in fact already sent a copy, on 28 July (see GM.iii.601).

3. In his letter to Leibniz of 3 June 1699, Bernoulli reported, "I have put your complaints about his excessive obsession before De Volder in writing, and encouraged him to relax some of his rigor" (GM.iii.594).

4. See Letter 21. I follow LJB L Ia. LBr 57 1 has "objections [objectiones]" for "demonstrations [demonstrationes]", though in fact both misquote Leibniz's original "proofs [probationes]".

5. Bernoulli had already alerted Leibniz to this in Letter 9.

Letter 24

1. LBr 967, Bl. 30-31: draft; in Leibniz's secretary's hand with corrections and additions by Leibniz (my printed text); LBr 967, Bl. 32: earlier draft; in Leibniz's hand. LBr. 967, Bl. 33-34: partial copy of LBr 967, Bl. 30-31; in Leibniz's secretary's hand; LJB L Ia

702, Bl. 93-98: copy of letter as sent; in Bernoulli's secretary's hand. Letter 24 was sent with Letter 25. It answers Letter 22 and is answered by Letter 27.

2. Although neither draft is dated, the copy has: "From Hanover, 1/11 September 1699 [Dabam Hanoverae 1/11 Septemb. 1699.]"

3. In the earlier draft Leibniz originally wrote: "since the effect is the same [cum effectus idem est]".

4. As we see here, Leibniz speaks of an action as violent where he is thinking of an action that has an effect on something other than agent. Leibniz uses a number of cognate expressions to express this idea. I translate all of them as violent action.

5. See Leibniz 1687a.

6. Leibniz 1687a, 137.

7. See Letters 8 and 14.

8. See Letter 17.

9. See Letter 18.

10. See Letter 20.

11. See Letter 20.

12. Descartes' commitment to the thesis of continual creation can be found in the third of his Meditations (AT VII, 48-49/CSM.ii.33) and section 36 of Part II of the Principles of Philosophy (AT VIII.1, 61/CSM.i.240). However, Leibniz clearly has contemporary Cartesians in mind when he considers the more specific case of locomotion. One obvious example is Johann Christoph Sturm, to whom Leibniz explicitly attributes this view in section 13 of his 1698a (G.iv.512-13/AG 163). For Sturm, see Letter 10, note 44.

13. Leibniz originally wrote: "But I had already intimated this sufficiently well in my last letter, and otherwise you could certainly conclude with equal right that the universe is only one substance. [Atque haec jam satis in praecedenti innueram et sane alioqui pari jure]

concluderet unam tantum universo substantiam esse.]” This sentence also appears in the earlier draft where Leibniz originally included: “you could conclude with Spinoza [cum Spinoza concluderet]”.

14. The copy has: “is inferred necessarily [necessario colligi]”.

15. The copy has: “is admitted [admittatur]”.

Letter 25

1. LJB L Ia 19, Bl. 142-143: excerpt from letter as sent; in Leibniz’s hand (my printed text); LJB L Ia 20, Bl. 218-19: excerpt from copy of letter as sent; in Bernoulli’s secretary’s hand. LBr 57 1, 306-07: excerpt from draft; in Leibniz’s secretary’s hand. Letter 25 was sent with Letter 24. It answers Letter 23 and is answered by Letter 26.

Letter 26

1. LBr 57 1, Bl. 308: excerpt from letter as sent; in Bernoulli’s hand (my printed text). LJB L Ia 18, Bl. 120: excerpt from copy of letter as sent; in Bernoulli’s secretary’s hand. Letter 26 answers Letter 25.

2. In his letter to Bernoulli of 20 October 1699, Leibniz acknowledged Bernoulli’s positive response and added, “Now we will put his judgement, or rather his candor, to the test. I have had a high opinion of them up until now” (GM.iii.617).

3. See Letter 8.

Letter 27

1. LBr 967, Bl. 35-36: letter as sent; in De Volder's hand (my printed text). Letter 27 was sent with Letter 28. It answers Letter 24 and is answered by Letter 29.

2. See Letter 24 for all the quotes in this letter.

3. Descartes' views on the causal relationship between mind and body and the unity of human beings are notoriously complex. A helpful discussion of these complexities can be found in Rozemond 1998.

4. A useful overview of the doctrine of occasionalism in Cartesian philosophy to which De Volder alludes here can be found in Radner 1984. As well as considering the views of the most famous proponent, Nicolas Malebranche, Radner discusses Arnold Geulincx (1624-69), Géraud de Cordemoy (1626-84), and Louis de La Forge (1632-66?).

5. Leibniz 1695a.

6. Although this is not a direct quote, De Volder is referring to Leibniz 1694 (see G.iv.470/L 433).

Letter 28

1. LBr 57 1, Bl. 312: excerpt from letter as sent; in Bernoulli's hand (my printed text); LJB L Ia 18, Bl. 123: excerpt from copy of letter as sent; in Bernoulli's secretary's hand.

Letter 28 was sent with Letter 27. It is answered by Letter 30.

2. Gerhardt has the incorrect date 21 October 1699 (see GM.iii.620).

3. See Letter 18.

Letter 29

1. LBr 967, Bl. 37-38: draft; in Leibniz's hand (my printed text). Letter 29 was sent

with Letter 30. It answers Letter 27 and is answered by Letter 33.

2. See letter 27 for all the quotes in this letter.

3. Leibniz's quote is in error at LBr 967, Bl. 37, with "first [priore]" for De Volder's "second [posterioris]". I follow De Volder's original.

4. Leibniz originally wrote: "Therefore, it is not possible for powers to be calculated from speeds unless the distances are inversely proportional to the times, i.e., when the speeds and the powers as well are equal. [Nec posse adeo potentias esse in ratione velocitatum nisi cum spatia sunt reciproce ut tempora, id est cum velocitates itemque potentiae sunt in ratione aequalitatis.]"

5. Leibniz originally wrote: "can be considered in any way. However, if you understand by the productivity of the action the intension multiplied by the extension in time, I say that it is not possible for there to be a discussion about that here. [quoquo modo spectari potest. Sane si intelligis per praestantiam actionis intelligis id intensionem componendam cum extensione secundum tempus dico de ea non posse esse hic sermonem.]"

6. Leibniz originally wrote: "It will be possible to demonstrate from the things that you admit that an action that covers one mile in one hour and an action that covers one mile in two hours are not equal. For both are calculated from the product of the times and the powers. [Ex iis quae admittis demonstrari etiam poterit, actionem quae unam leucam absolvit una hora, et quae unam leucam absolvit duabus horis, non posse aequales. Nam utique sunt in ratione composita temporum et potentiarum.]"

7. The significance of the quotation marks here is unclear.

8. Gerhardt omits, "and I readily admit that, even in matters relating to Descartes, you conduct yourself with the freedom proper to a philosopher" (see G.ii.205).

9. Leibniz originally wrote: "one indivisible substance [una impartibili substantiali]"

10. Given Leibniz's indication in Letter 64, note L1, that the material appearing in square brackets there was not included in the letter as sent, it is reasonable to think that the same applies here.

11. Gerhardt omits the preceding sentence (see G.ii.206).

12. Leibniz originally wrote: "but not in such a way that they could be naturally separated [sed non ita tamen ut possint per naturam divelli]".

13. Leibniz originally wrote: "Even if it is not the case that everything can be separated from a true mass, i.e., the secondary matter, nonetheless, without a doubt, something can. And, accurately speaking, I will not have said that a mass is moved by the soul but by a mass [A massa vera seu materia secunda etsi non omnii, aliqua tamen divelli haud dubie potest itaque accurate loquendo nec dixero massam ab anima moveri sed a massa]".

14. Leibniz originally wrote: "a true substance, i.e., a monad [substantiam veram seu Monada]".

15. Leibniz originally wrote: " , which the Cartesians and most people also recognize. And so you have something of what you demand from me - although an imperfect attempt – that you may consider carefully in the meantime, until I can think over everything in greater depth. Goodbye from Hanover [, quam et Cartesiani plerique agnovere. Ita habes aliquod ejus quod a me postulas imperfectam licet tentamentum, quod interea boni consules, donec profundius omnia meditari possim. Vale dabam Hanoverae]".

16. The following material appears at the top of LBr 967, Bl. 37, where Leibniz indicates that it was not part of the letter that he sent.

17. At the end of the penultimate paragraph on LBr 967, Bl. 37, the following passage was deleted by Leibniz.

18. Leibniz originally wrote: "to demonstrate it is possible [demonstrare posse]".

Letter 30

1. LJB L Ia 19 1, Bl. 146-47: excerpt from letter as sent; in Leibniz's secretary's hand (my printed text). LJB L Ia 20, Bl. 223-24: excerpt from copy of letter as sent; in Bernoulli's secretary's hand. LBr 57 2, Bl. 1-2: excerpt from draft; in Leibniz's hand. Letter 30 was sent with Letter 29. It answers Letter 28 and is answered by Letter 31.

2. Gerhardt has 12 January, based on LBr 57, 1 (see GM.iii.621). I assume that this is the old style date.

3. Gerhardt mistakenly has "actions [actiones]" (see GM.iii.620).

Letter 31

1. LBr 57 2, Bl. 3: excerpt from letter as sent; in Bernoulli's hand with additions by Leibniz (my printed text). There is no version of this letter in LJB L Ia. Letter 31 answers Letter 30 and is answered by Letter 32.

2. Letter 29.

3. Letter 29. This is not an exact quote.

4. See the Supplement to Letter 34.

Letter 32

1. LJB L Ia 19 1, Bl. 148: excerpt from letter as sent; in Leibniz's hand (my printed text). LJB L Ia 20, Bl. 226: excerpt from copy of letter as sent; in Bernoulli's secretary's hand. LBr 57 2, Bl. 5: excerpt from draft; in Leibniz's hand. Letter 32 answers Letter 31 and

is answered by Letter 34.

2. See the Supplement to Letter 34.

Letter 33

1. LBr 967, Bl. 39-40: letter as sent; in De Volder's hand (my printed text). Letter 33 was sent with Letter 34. It answers Letter 29 and is answered by letter 35.

2. For Borelli, see letter 10, note 22. In fact, Borelli's views on the nature of force are complex and not straightforwardly Cartesian (see Westfall 1971, 541-45).

3. See Letter 27.

4. Letter 27.

5. See the Supplement to Letter 34 for the relevant part of Bernoulli's letter to De Volder of 3 February 1700.

6. Although Leibniz had not referred to his argument in this way in any of his letters to De Volder, Bernoulli uses the expression attempt at a proof [tentamentum probationis] when reporting Leibniz's views in his letter to De Volder of 3 February 1700 (LJB L Ia 675, Bl. 170).

Letter 34

1. LBr 57 2, Bl. 7 and 9: excerpt from letter as sent; in Bernoulli's hand (my printed text). LJB L Ia 18, Bl. 124-25: excerpt from draft; in Bernoulli's hand. Letter 34 was sent with Letter 33. It answers Letter 32.

2. Letter 32.

3. Gerhardt mistakenly has "activity [activitate]" (see GM.iii.627).

4. See Bernoulli's letter to Leibniz of 28 January 1696 (A III.vi: 632-34) for the argument in question. It does not appear in any of the surviving letters from Bernoulli to De Volder.

5. See the Supplement to this letter.

6. LBr 57 2, Bl. 8: excerpt from postscript as sent; in Bernoulli's hand (my printed text). The postscript was copied from Bernoulli's letter to De Volder of 3 February 1700 (LJB L Ia 675, Bl. 170). There is no version of the postscript in LJB L Ia.

7. The term sine as used here has a different meaning from that found in contemporary trigonometry. It refers to the line drawn from one end of an arc perpendicularly to the radius through the other end.

Letter 35

1. LBr 967, Bl. 41-44: draft; in Leibniz's hand (my printed text). Letter 35 answers Letter 33 and is answered by Letter 36.

2. On 19 March 1700, Elector Friedrich III of Brandenburg approved the founding of the Berlin-Brandenburg Society of Sciences, which survives to the present day. Leibniz was named the first president on 12 July, the day after its formal inauguration (see Brather 1990; Antognazza 2009, 386-90).

3. Leibniz originally wrote: “; for help with this it will be necessary to appeal to The Netherlands (seeing that that part of Germany abounds greatly with various arts) and useful things of note should be collected from different regions. [qua in re etiam ad Batavorum opem erit confugiendum (quando ea pars Germaniae variis artibus maxime floret) et ex diversis regionibus utiles notitiae corrogandae.]”

4. Presumably Leibniz is alluding to Francis Bacon's famous work The Advancement of Learning (Bacon 1605).

5. See the Supplement to Letter 34.

6. See section 36 of Part II of Descartes' Principles of Philosophy (AT VIII.1, 61/CSM.i.240).

7. Leibniz originally wrote: "another creature [alia creatura]".

8. Leibniz originally wrote: "nominal definition [nominali definitione]"

9. Leibniz's request for De Volder's account of substance indicates forgetfulness at best. De Volder had provided such an account over a year earlier, in Letter 18, and Leibniz had subjected it to a detailed critique in the longer version of his response to that letter (see the Supplement to Letter 20).

10. See Spinoza's Ethics, Part I, Definition 1 (SO.ii.45/CWS.i.408).

11. Leibniz is remembering the account of the controversy surrounding the Dutch Collegiant Johannes Bredenberg (1643-91) that appears in footnote M to Bayle's article Spinoza in his Dictionnaire historique et critique (Bayle 1697/Popkin 1991, 295-99). Leibniz offers his own version of events in his Theodicy, Part II, section 373 (Leibniz 1710/GM.vi.337-38/Huggard 449-50). See Letter 36 for further discussion.

Letter 36

1. LBr 967, Bl. 45-46: letter as sent; in De Volder's hand (my printed text). Letter 36 was sent with Letter 37. It answers Letter 35 and is answered by Letter 38.

2. It seems that either the date on this letter or that on Letter 37 is incorrect, given that Bernoulli sent the two letters to Leibniz at the same time.

3. Nicolas Fatio de Duillier (1664-1753), a Swiss mathematician, was a friend of Isaac Newton who played a major part in the priority dispute between Leibniz and Newton regarding the invention of the differential calculus. In his Lineae Brevissimi Descensus Investigatio Geometrica Duplex (Fatio de Duillier 1699), he suggested that Leibniz was guilty of plagiarism. Fatio was a member of the Royal Society and the book was published with its imprimatur. After finding out, Leibniz responded in print (Leibniz 1700). For discussion, see Antognazza 2009, 428-29.

4. Here, and in Letter 38, I use variable letters that correspond to the terms as translated into English.

5. De Volder refers to Jacques Bernard's critical discussion (Bernard 1700) of Jean-François Vallade's Discours Philosophique sur la Création et l'Arrangement du Monde (Vallade 1700). Bernard (1658-1718) was a theologian and publicist. As well as taking over the editorship of the Nouvelles de la République des Lettres from Pierre Bayle in 1699, Bernard was De Volder's successor as professor of philosophy and mathematics at Leiden, although, as De Volder informed Leibniz at that time, this was initially subject to a probationary period during which he took over De Volder's teaching duties but was not given the title (see Letter 66 and Bernoulli's letter to Leibniz of 30 January 1706 (GM.iii782)).

6. See Letter 35, note 11. A detailed account of The Bredenberg Disputes, from which I derive the information in the remaining footnotes to this letter, is found in Israel 2001, 342-58. Also see Van Bunge 1990.

7. De Volder is referring to Bredenberg's Wiskunstige demonstratie dat alle verstandelijke werking noodzaakelijk (Bredenberg 1684a). It was written in 1675 or 1676 and published later without Bredenberg's consent as De Volder relates below.

8. Jan Hartigveld (1616-78) was another key figure in the Rijnsburg group.

9. Frans Kuyper (1629-91) was Bredenberg's main opponent. He and Abraham Lemmerman (d.1694) published the Wiskunstige demonstratie, with critical remarks by Kuyper, without Bredenberg's consent in 1684.

10. Bredenberg 1684b.

11. Despite his interest in Spinoza's arguments and inability to see how they could be resisted, Bredenberg ultimately defended a doctrine of double truth, according to which irrational theological beliefs could be maintained (see Israel 2001, 255-57).

12. Philip van Limborch (1633-1712) was a distinguished Arminian theologian and pastor of the Remonstrants' church in Amsterdam. In the winter of 1683-84, he met and became a life-long friend of John Locke, who had just begun his period of exile in The Netherlands.

13. This famous disagreement of 1685-86 came to be known as the Disputatio Limburgico-Bredenburgica. Van Limborch argued for the reasonableness of faith and the impossibility of the contradiction between revealed and natural theology (see Israel 2001, 355).

Letter 37

1. LBr 57 2, Bl. 20: excerpt from letter as sent; in Bernoulli's hand (my printed text).

No version of this letter is found in LJB L Ia. Letter 37 was sent with Letter 36.

2. It seems that either the date on this letter or that on Letter 36 is incorrect, given that Bernoulli sent the two letters to Leibniz at the same time.

3. See Letter 35 for Leibniz's account of the foundation of the Berlin-Brandenburg Society.

Letter 38

1. LBr 967, Bl. 23-24: draft; in Leibniz's hand (my printed text). Letter 38 answers Letter 36 and is answered by Letter 39. Letter 38 was sent with a letter to Bernoulli of the same date (see GM.iii.644). In a postscript to this letter to Bernoulli, Leibniz added: "I ask you to urge Mr. De Volder . . . but as if it came from you, to propagate the doctrine concerning the true measure of motive force and action by teaching, whether in lectures or through theses and disputations" (GM.iii.644). In his reply of 25 January 1701, Bernoulli confirmed that he had done this and that he expected De Volder to comply (see GM.iii.647).

2. For details of Leibniz's complicated movements at this time, see Antognazza 2009, 389-90.

3. In a letter to Johann Theodore Jablonski (1654-1731), who became Leibniz's secretary on the founding of the society on 26 March 1700, Leibniz justifies calling the institution a society on the grounds that, in Germany, the term academy tended to be used to refer to teaching institutions (see A.I.xviii: 480).

4. Leibniz originally wrote: "my a priori metaphysical arguments [ratocinationes meas μεταφυσικωτέρους a priori]".

5. I have been unable to find a reference to this in the published correspondence from this time period.

6. Here and in Letter 36 I use the variable letters that correspond to the terms as translated into English.

7. Gregorius a Sancto Vincentio (1584-1667) did pioneering work on the quadrature of the circle in the 1620s, which was finally published in his Opus geometricum quadraturae circuli et sectionum conii (Sancto Vincentio 1647). It contained, among other things, the first presentation of the summation of infinite geometric series and a method of trisecting angles

using infinite series.

8. Letter 35.

9. Given Leibniz's indication in Letter 64, note L1, that the material appearing in square brackets there was not included in the letter as sent, it is reasonable to think that the same applies here.

Letter 39

1. LBr 967, Bl. 47-48: letter as sent; in De Volder's hand (my printed text). Letter 39 was sent to Leibniz by Bernoulli with his letter to Leibniz of 26 February 1701, in which he told Leibniz: "[De Volder] is persisting as you will see and urging that you provide him with your notion of substance" (GM.iii.653). It answers Letter 38 and is answered by Letter 40.

2. De Volder could be referring to any of a number of Leibniz's articles from this period.

3. See Letter 36 for De Volder's account of substance.

4. See Letter 38 for all the quotes in this letter.

Letter 40

1. LBr 967, Bl. 49-50: draft; in Leibniz's hand (my printed text). Letter 40 was sent with Leibniz's letter to Bernoulli of 14 July 1701 (see GM.iii.677). It answers Letter 39 and is answered by Letter 41. In his letter to Bernoulli of 13 September Leibniz expressed anxiety over whether the Letter 40 had arrived (see GM.iii.683). However, Bernoulli replied in a letter of 8 October that he had sent it to De Volder as soon as he had received it (see GM.iii.684).

2. Given that De Volder does not refer to the marginal definition in subsequent letters, and that he complained that Leibniz had still not given his definition of substance almost a year later (see Letter 45), it seems likely that the text of L1 did not appear in the letter as sent.

3. For Democritus, see Letter 7, note 6.

4. Leibniz originally wrote: “And if someone thinks, along with Locke and others besides, that the perfection of thought can be added to bodies of a certain kind [Et si quis cum Lockio et aliis praeterea concipiat corpori cuidam addi posse perfectionem cogitationis]”.

5. As note 4 above indicates, Leibniz is thinking primarily of John Locke who famously spoke of the possibility of God’s superadding a faculty of thinking to matter in his Essay Concerning Human Understanding (see ECHU.4.3.6.). Leibniz criticizes Locke’s views explicitly in his New Essays on Human Understanding (NE 378-79).

5. See Letter 36.

6. See Letter 38.

7. See Letter 39.

8. Leibniz originally wrote: “Whence it is also understood (at least with many substances supposed besides the first) that that which needs the concept of another in order to be conceived of is not immediately a mode. [Unde etiam intelligitur, (saltem positis pluribus substantiis praeter primam) non <unreadable> statim modum esse, quod alterius conceptu indiget ut concipiatur.]”

9. Leibniz originally wrote: “cannot be [dari posse]”.

10. Leibniz originally wrote: “they could not have common modes [non possint habere modos communes]”. This was deleted and replaced by: “there cannot be a mode which needs both [non posse dari modum qui indigeat utraque]”, which was in turn deleted.

11. See section 13 of Leibniz 1698b (G.iv.512-14/AG 163-65). For discussion of this argument, see Lodge 1998b.

12. Leibniz originally wrote: “rather than be proposed in haste [quam ex abrupto propositum]”.

13. Letter 36.

14. Leibniz originally wrote: “I do not think it is possible to give [dare posse non puto]”.

15. Leibniz originally wrote: “These things add action and passion to extension. And so extension in my sense is not a mode, but a property of that which results from substances [Hae extensioni addent actionem passionemque. Itaque extensio meo sensu non est modus, sed proprietas eius quod ex substantiis resultat]”.

16. Leibniz originally wrote: “and designates the position of things [rerumque positionem designat]”.

17. Leibniz originally wrote: “primitive notions [notiones primitivas]”.

18. Leibniz alludes to the famous Gordian knot. According to Greek legend, an oracle foretold that whoever untied the knot with which Gordius had tied his cart in an offering to Zeus would rule all of Asia. The knot defied everyone until Alexander the Great untied it with a stroke of his sword.

19. Here Leibniz returns to material from Letter 39.

20. Leibniz does not provide the details of his views on contingency in the correspondence with De Volder. For a helpful discussion, see Adams 1994a, 9-52.

21. Huygens’ Descriptionem Automati Planetarii appeared in Huygens 1703, the posthumous edition of his writings edited by De Volder and Bernhard Fullen (1640-1707).

22. The Danish astronomer Ole Rømer (1644-1710) designed a planetarium that was made in Paris 1678-1679 by Isaac Thuret, the royal clockmaker and demonstrated to the Académie des Sciences and to Louis XIV. Christian V of Denmark acquired a copy in 1682, which is preserved in the Royal Danish Collections at Rosenborg Castle in Copenhagen.

23. Like others at this time, Hartsoeker endeavored to produce increasingly large object lenses for telescopes in order to increase their magnifying power (see King 1955, 58-60).

Letter 41

1. LBr 967, Bl. 51-52: letter as sent; in De Volder's hand (my printed text). Sent to Leibniz with Bernoulli's letter of 15 October 1701 (see GM.iii.687). Letter 41 answers Letter 40 and is answered by Letter 42.

2. Letter 40.

3. The works in question are: Dioptrica, Dissertationem de Corona & Parheliis, and Descriptionem Automati Planetarii, which all appeared in Huygens 1703, along with the Tractatum de Motu and Tractatum de Vi Centrifuga.

4. The letter is lost. However, De Volder refers here to Hartsoeker 1694. Leibniz corresponded with Nicholas Hartsoeker (1656-1725) about issues in natural philosophy and metaphysics from 1706-1712 (see G.iii.483-536).

5. Casimir Oudin to Leibniz, 29 September 1701 (A I.xx: 504-06) and Pierre Bayle to Leibniz, 5 October 1701 (G.iii.61-62). Oudin (1638-1717) was a church historian and, from 1694, a librarian at Leiden. He corresponded with Leibniz from 1700-1712, primarily on historical matters. Both letters are short and contain nothing that pertains to the correspondence between Leibniz and De Volder.

Letter 43

1. LBr 967, Bl. 53-54: draft; in Leibniz's secretary's hand with corrections by Leibniz

(my printed text). Letter 42 was sent with Letter 43. It answers Letter 41 and is answered by Letter 44.

2. It is likely that Leibniz is referring to a piece that he composed on reading reviews of De la Connoissance de soi-même by the French Benedictine François Lamy (1636-1711) (Lamy 1694-98), which appeared in the Journal des Savants of 8 and 15 September 1698. As Woolhouse and Francks note (WF 135), Leibniz seems to have sent his piece to the Journal des Savants for publication. However, it never appeared. For Leibniz's discussion of the issue he mentions here, see G.iv.574-77/WF 140-42.

3. Ehrenfried Walther von Tschirnhaus (1651-1708), the German mathematician, philosopher, and physician was a long-time friend of Leibniz. They corresponded on many topics from 1677-1713. From the 1680s onward he was involved in the production of glass and porcelain and his laboratory developed a number of new techniques that were utilized in the manufacture of optical instruments.

4. See Letter 41, note 3.

Letter 43

1. LJB L Ia 19 2, Bl. 186: excerpt from letter as sent; in Leibniz's hand (my printed text). LJB L Ia 20, Bl. 251: excerpt from copy of letter as sent; in Bernoulli's secretary's hand. LBr 57 2, Bl. 67: excerpt from draft; in Leibniz's secretary's hand. Letter 43 was sent with Letter 42. It is answered by Letter 44.

2. Leibniz mentions this in Letters 17 and 24, which both date from 1699.

Letter 44

1. LBr 57 2, Bl. 69: excerpt from letter as sent; in Bernoulli's hand (my printed text); LJB L Ia 18, 148: excerpt from draft of letter as sent; in Bernoulli's hand. Gerhardt mistakenly attributes Letter 44 to Leibniz (see GM.iii.689). It answers Letter 43.

2. Letter 42.

3. Leibniz to Pierre Bayle 27 December 1701 (G.iii.62-63), which is short and contains nothing that pertains to the correspondence between Leibniz and De Volder. The letter to Oudin appears to be lost. For Oudin, see Letter 41, note 5.

4. Leibniz appears to promise this in Letter 35.

Letter 45

1. LBr 967, Bl. 55-56: letter as sent; in De Volder's hand (my printed text). Sent to Leibniz with Bernoulli's letter of 11 April 1702 (see GM.iii.693). Letter 45 answers Letter 42 and is answered by Letter 46.

2. See Publius Terentius Afer, Andria 1.2. Davus (a standard name for a slave in Roman comedy) accuses his master Simo of talking in riddles. Oedipus is famous for having solved the riddle of the Sphinx.

3. Letter 42.

Letter 46

1. LBr 967, Bl. 57-58: in Leibniz's secretary's hand with corrections by Leibniz (my printed text). Letter 46 was apparently sent with the letter to Bernoulli of 20 April 1702. Leibniz indicates that it had already been sent in his letter to Bernoulli of 29 May 1702 (see

GM.iii.696), and the letter preceding this one has the April 20 date (see GM.iii.696). Letter 46 answers Letter 45 and is answered by Letter 47.

2. See Letters 42 and 45.

3. Letter 42.

4. See Letters 40 and 41.

Letter 47

1. LBr 967, Bl. 59-60: letter as sent; in De Volder's hand (my printed text). Letter 47 was sent to Leibniz with Bernoulli's letter of 12 August 1702 (see GM.iii.708). It answers Letter 46 and is answered by Letter 50.

2. For Descartes' commitment to this thesis, see section 39 of Part II of the Principles of Philosophy (AT VIII.1, 63-64/CSM.i.241-42).

3. See Letter 22, note 5.

Letter 48

1. LBr 967, Bl. 61-62: letter as sent; in De Volder's hand (my printed text). Letter 48 was sent with Letter 49. It is answered by Letter 50.

2. De Volder is referring to Leibniz's Réponse aux Reflexions Contenues dans la Seconde Edition du Dictionnaire Critique de M. Bayle, Article Rorarius, sur le Systeme de l'Harmonie Préétablie (G.ii.554-71/WF 107-26), which was eventually published as Leibniz 1716. Leibniz had announced his intention to write the Réponse in a very brief letter to De Volder of 29 May 1702, a copy of which can be found in Halle University library (Hschr. Yg 23/8° B. Bl. 43-46). He sent the essay itself to De Volder, along with another brief letter from

Berlin on 19 August 1702, in which he asked for De Volder's comments and requested that he forward it to Bayle (see G.ii.244). De Volder replied only after he had received Bayle's comments. Perhaps because he was in Berlin rather than Hanover, Leibniz was particularly concerned to know that the piece had been sent to Bayle. He wrote a letter to Bernoulli on 2 September to check whether his letter of 19 August had arrived and reiterated this request, as well as further encouraging feedback from Bernoulli and De Volder (see GM.iii.712-13). Bernoulli responded as soon as he could on 16 September to allay Leibniz's fears (see GM.iii.713) and included his own comments on Leibniz's Réponse (see GM.iii.713-15).

3. Bayle had nothing of substance to say in response to Leibniz's comments, noting that he would simply reiterate his previous objections if he did respond (see G.iii.64-65/WF 70 n.14). However, he did express the hope that it be published.

4. For discussion of Malebranche's views, see Detlefsen 2003.

5. Gerhardt mistakenly has "organic [organica]" (see G.ii.245)

6. G.iv.568/WF 122

7. See G.iv.562/WF 116. Woolhouse and Francks (WF 116, note 94) suggest that Leibniz himself may have been referring to a single letter from the correspondence, namely the letter of 9 October 1687 (see G.ii.111-15/LA 143-48; G.ii.126/LA 161).

Letter 49

1. LBr 57 2, Bl. 84: excerpt from letter as sent; in Bernoulli's hand. There is no version of this letter in LJB L Ia. Letter 49 was sent with Letter 48.

2. Bernoulli does not seem to be referring to any particular warning that he gave Leibniz in the letters that he wrote around this time.

Letter 50

1. LBr 967, Bl 67-70: draft in Leibniz's hand (my printed text); LBr 967, Bl. 65-66: earlier draft; in Leibniz's hand; LBr 967, Bl. 65-66: partial copy of the earlier draft; in Leibniz's secretary's hand. Letter 50 was sent with Letter 51. It answers both Letter 47 and Letter 48.

2. As both the postscript to Letter 50 and Letter 51 indicate, Leibniz originally sent a copy of Letter 50 to De Volder from Hanover sometime during the previous Winter, presumably early 1703, given the date that precedes the postscript. However, since this did not reach Bernoulli, he sent another copy from Berlin on 20 June 1703. See Letter 51, note 2 for more detail.

3. Letters 47 and 48.

4. Leibniz appears somewhat disingenuous here. See Letter 48, note 3.

5. In the earlier draft Leibniz originally wrote: "since I judge that it is necessary. And Bayle did not have, it appears, so much beyond the previous things that he had objected, as he himself intimated. And certainly I think there was nothing in the previous claims of his that was left without a response. Your difficulties are different from his. And so I am not surprised that he thought no response is now needed. [cum eum necessarium esse iudicem. Nec habuit quantum, apparet, quod magnopere ultra priora objiceret Bailius, ut ipse innuit; in prioribus certe nullam objectionum ejus sine responsione relictam puto. Tuae difficultates ab ipsius sunt diversae. Itaque non miror quod nunc quidem nihil reponendum putavit.]"

6. In the earlier draft Leibniz originally wrote: "Besides everyone recognizes that there is often a spontaneous progression of thoughts in the soul, so why could that not happen in the other cases as well? [Praeterquam omnes agnoscunt saepe esse in anima spontaneos cogitanti progressus, quidni ergo et in caeteris casibus id fieri possit?]"

7. In the earlier draft Leibniz originally wrote: “, and indeed you rightly ask this, and not, as it seems, in vain. For in every creature the active must be joined with the passive, and there is no passivity without resistance, from which the connection is clear. [et recte quidem hoc petis, neque ut videtur vane. In omni enim creatura activum cum passivo conjunctum esse oportet; neque passio sine resistantia est, unde nexus patet..]”

8. Leibniz originally wrote: “which is really nothing except a notion, i.e., by abstracting from the differences that we do not consider. [quod revera non sit nisi notio aliter seu abstrahendo a diversitatibus quas non consideramus..]”

9. See Letter 7, note 6.

10. See Letter 40, note 12.

11. Letter 48.

12. In the earlier draft Leibniz originally wrote: “it is the one machine [esse unam machinam]”.

13. In the earlier draft Leibniz originally wrote: “it would not be one [non una foret]”.

14. In the earlier draft Leibniz originally wrote: “whose unity is from us [cujus unitas a nostra est]”.

15. In the earlier draft Leibniz originally wrote: “It cannot be said properly that an entelechy impels its matter. For the active and passive force constitute one substance. But one entelechy does not influence another entelechy [Proprie, dici non potest, entelechiam suam impellere materiam. Nam vis activa & passiva unam substantiam constituunt. Sed una Entelechia non influit in aliam Entelechiam]”

16. In the earlier draft Leibniz originally wrote: “but the entelechies of which the derivative forces are nothing but modifications and echoes in the phenomena. [sed entelechias quarum non nisi modificationes & resultationes in phaenominis sunt vires derivativae..]”

17. Letter 48.

18. Leibniz originally wrote: “of entelechies [Entelechiarum]”.

19. Leibniz originally wrote: “in the phenomena of aggregates [in phaenominis aggregatorum]”.

20. Leibniz originally wrote: “in bodies [in corporibus]”.

21. Leibniz originally wrote: “as bring out the force enclosed in them [quam excitent inclusam]”.

22. Leibniz originally wrote: “the entelechies [Entelechias]”.

23. Gerhardt mistakenly has: “If you assume a mass in place of an aggregate containing many substances, you can nonetheless conceive of one substance that is preeminent in it, i.e., animated by the primary entelechy [Si massam sumas pro aggregato plures continente substantias, potes tamen in ea concipere unam substantiam praeeminentem, seu entelechia primaria animatum]” (G.ii.252). This misreading encourages the idea that Leibniz is thinking of the preeminent substance as one among many simple substances. The actual text suggests that the preeminent substance has an organic body and, thus, that it is a corporeal substance.

24. Leibniz originally wrote: “except the primitive passive force of the whole mass [nisi vim passivam primitivam totius massae]”.

25. Leibniz originally wrote: “dominating in the mass [dominans in Massam]”.

26. Diels and Kranz 1951-52, vol. 2, 68B9. Democritus (c.460-c.370 BCE) was a student of Leucippus (c.480-c.420 BCE), who is credited with the invention of atomism. He drew a contrast between atoms and their properties, which exist in reality, and perceptible qualities, which result from the interaction of compounds of atoms and the sense organs. The precise interpretation of this doctrine and its consequences for Democritus’ metaphysical and epistemological views are debatable (see McKirahan 1994, 333-38). However, it is clear that

he did not regard perceptible qualities as features of a perceiver-independent reality and that this was grounds for thinking of their attribution as conventional in some sense.

27. Gerhardt mistakenly has “construction [constructio]” (G.ii.252).

28. Leibniz originally wrote: “through the mass [per Massam]”.

29. Leibniz originally wrote: “, since simple things reveal themselves in a mass through efficacy not through contact [cum sese res simplices in massa per efficaciam non per contactum ostendant]”.

30. I.e., Huygens 1703.

Letter 51

1. LJB L Ia 19 2, Bl. 203: excerpt from letter as sent; in Leibniz’s hand (my printed text). LJB L Ia 20, Bl. 263: excerpt from copy of letter as sent; in Bernoulli’s secretary’s hand. There is no version of this letter in LBr 57. Letter 51 was sent with Letter 50.

2. In the second half of 1702 and first half of 1703 there was a breakdown of communication between Bernoulli and Leibniz. In his letter of 18 November 1702 (see GM.iii.718), Bernoulli observed that he had received a letter from Leibniz dated 24 August (see GM.iii.716), but wondered whether it had really been written on 24 September. This crossed with a very brief letter from Leibniz of 14 November (see GM.iii.717), in which he said that there had been no time to respond as fully as he wanted to the comments that he had received from Bernoulli or De Volder on his Réponse to Bayle’s Dictionnaire. There are no further letters in existence before Bernoulli’s letter of 5 May 1703. Here Bernoulli informed Leibniz that De Volder and Fullen’s edition of Huygen’s posthumous writings (Huygens 1703) had appeared (see GM.iii.719), as well as reminding Leibniz that he owed De Volder a reply to his letter of 7 October 1702 (see GM.iii.720). In the interim, De Volder had written a

very brief letter to Leibniz - apparently without Bernoulli's mediation - to inform him that he had sent Leibniz a copy of the edition of Huygen's via Leipzig (see G.ii.248). As Letter 50 and Letter 51 make clear, Leibniz had in fact sent a version of Letter 50 sometime during the Winter, presumably early 1703, given the date that precedes the postscript to Letter 50.

Leibniz continued to worry about the transmission of his letters. Having heard nothing from Bernoulli, he wrote on 8 September (see GM.iii.722) and expressed relief when he finally learned that all was well from Bernoulli's letter of 29 September (see GM.iii.725).

3. The additional difficulties are those found in the comments that Bernoulli made on Leibniz's Réponse in his letter of 16 September 1702 (see GM.iii.713-15).

Letter 52

1. LBr 967, Bl. 73-74: letter as sent; in De Volder's hand (my printed text). Letter 52 answers Letter 50 and is answered by Letter 53.

2. For Malebranche's occasionalism, see Letter 27, note 4.

3. See Letter 50 for all the quotes in this letter.

4. De Volder originally wrote: "September 14 [XIV Septembris]".

Letter 53

1. LBr 967, Bl. 75-76: draft; in Leibniz's hand (my printed text). Letter 53 was sent with Leibniz's letter to Bernoulli of 22 November 1703 (see GM.iii.730). It answers Letter 52 and is answered by Letter 54.

2. Leibniz originally wrote: "only monads [Monades tantum]".

3. Given Leibniz's indication in Letter 64, note L1, that the material appearing in

square brackets there was not included in the letter as sent, it is reasonable to think that the same applies here.

4. Leibniz originally wrote: “the continuum (in appearance) [continuum (in speciem)]”.

5. Leibniz originally wrote: “; for its bulk resists the force of the impressed speed [moles enim ejus vim celeritati impressae resistit]”.

6. Leibniz originally wrote: “I had added an a priori demonstrationem [demonstrationem addideram a priori]”.

7. See Letter 40, note 12.

8. See Part 1, Propositions 14-15 of Spinoza’s Ethics (SO.ii.56-57/CWS.i.420).

9. Letter 52.

10. Leibniz originally wrote: “Furthermore, I do not see why you have almost nothing to say about the fact that my hypothesis solves all the difficulties. Can the same be said of the others, I ask? Unless you again call back the system of occasional causes against me, which you demolished some time ago. [Caeterum non video cur pene pro nihil dicas quod omnibus difficultatibus satisfacit Hypothesis mea. Quaeso enim an idem de alia dici potest? Nisi systema causarum occasionalium quod dudum explosisti postliminio contra me revocas.]”

11. Martianus Capella was a fifth century Latin author, born in North Africa, who produced the influential work De Nuptiis Philologiae et Mercurii et de septem Artibus liberalibus libri novem sometime between 410 and 429 CE.

12. Leibniz originally wrote: “most wise [sapientissimus]”.

13. Leibniz originally wrote: “in which reason and order appear [in quo ratio atque ordo apparet]”.

14. See Letter 14, note 7.

15. Leibniz mentions Bernoulli’s comments in his letter to Bernoulli of 22 November

1703 (see GM.iii.728). However, neither they nor Leibniz's reply appear to have survived.

Letter 54

1. LBr 967, Bl. 77-78: letter as sent; in De Volder's hand (my printed text). Letter 54 was sent with Bernoulli's letter to Leibniz of 15 January 1704 (see GM.iii.737). It answers Letter 53 and is answered by Letter 55.

2. See Letter 50.

3. See Letter 52 for all the quotes in this letter.

4. See Letter 53, note 15.

Letter 55

1. LBr 967, Bl. 79-80: in Leibniz's hand (my printed text). Reprinted with some minor differences (source unclear) in König 1752, appendix, 63-68. Letter 55 was sent with Letter 56. It answers Letter 54 and is answered by Letter 58.

2. Leibniz originally wrote: “, I understand by this that which is not an aggregate of many things. For it follows from this, of course, that it cannot be divided into many things. Furthermore, I say that that which is an aggregate of many does not have a unity other than from the intellect, any more than a flock of sheep. Surely you do not oppose this, for you concede that many things do not in fact constitute one thing because they are contiguous or because they are impelled against one another. I have already shown that any things that can be divided into parts are only aggregates [, ego quod non est aggregatum plurimum; inde enim sequitur sane nec dividi posse in plura. Porro quod aggregatum est plurimum id unitatem dico non habere nisi ab intellectu non magis quam ovium grex. Nec sane repugnas,

concedis enim plura non <unreadable> revera constituere unum quia contigua sunt, aut quia ad se impelluntur. Jam ostensum a me est quaecumque in partes dividi possunt, non nisi aggregata esse]".

3. Letter 54.

4. Leibniz originally wrote: "since motion is something protracted, i.e., not instantaneous. Whence it follows that it is not in fact a being, but a phenomenon, for it does not have simultaneous parts and so never really exists, i.e., it is never present, i.e., it never exists. [cum motus sit aliquid tractum habens seu non detur in instanti; unde revera ens non est, sed phaenomenon, partes enim simul non habet, adeoque revera nunquam existit seu nunquam est praesens seu nunquam existit.]"

5. Leibniz struggled with the precise formulation of the second half of this clause. There appear to be three earlier versions: (1) "the present state taken with the cause of the change into the following [status praesens sumtus cum causa mutationem in sequentem]" ; (2) "the present state containing the cause of the change into the following [status praesens continens causam mutationem in sequentem]" ; and (3) "the present state involving the cause of the change into the following [status praesens causam mutationem in sequentem involvens]" .

6. Leibniz originally wrote: "; which is to change the received sense of the words [quod est mutare receptos sensus verborum:]"

7. See Letter 54. This is not an exact quote.

8. Here Leibniz is quoting his own claim from Letter 53.

9. See Letter 54 for this and all subsequent quotes in this Letter.

10. The following two passages were initially written and then deleted by Leibniz. However, the order of composition is unclear: (1) "If you mean a successive thing that persists in changes, you fall back into my view. If you mean a vanishing successive thing, the

opposite of what the ancients used to say follows. For them everything changes, nothing perishes. For you nothing changes, everything perishes. [Si successivam rem intelligis quae in mutationibus perstat, in meam sententiam incidis. Sin rem successivam intelligis evanidam, sequitur contrarium ejus quod veteres dicebant. Illis enim omnia mutantur, nil interit. Tibi nihil mutatur, omnia intereunt.]; (2) “Two things are not clear; first, why there would be some vanishing thing at all, i.e., first, how it could arise from a nature that something vanishes; next how it could happen that something succeeded this vanishing thing. For what would the succeeding things have in common? Therefore, concerning this matter, it seems that we are inquiring whether you think that some subject changes, that is, something persists in changes, or whether everything vanishes with other things succeeding. [Duo non apparent, primum cur aliqua res sit evanida, seu primum qui natura posset fieri, ut aliquid evanescat, deinde qui fiat ut hoc evanescenti succedat. Quid enim succentibus commune? Id ergo inter nos circa hoc negotium quaeri videtur an putes aliquod subjectum mutari, seu perstare aliquid in mutationibus, an omnia evanescere, aliis succedentibus.]

11. Given Leibniz’s indication in Letter 64, note L1, that the material appearing in square brackets there was not included in the letter as sent, it is reasonable to think that the same applies here.

12. Letter 53.

Letter 56

1. LJB L Ia 19 2, Bl. 220: excerpt from letter as sent; in Leibniz’s hand (my printed text). LJB L Ia 20, 276-77: excerpt of copy of letter as sent; in Bernoulli’s secretary’s hand. LBr 57 2, Bl. 101: excerpt from draft; in Leibniz’s hand (includes the material in the first paragraph only). Letter 56 was sent with Letter 55.

Letter 57

1. LJB L Ia 19 2, 224: excerpt from letter as sent; in Leibniz's hand (my printed text).

LJB L Ia 20, Bl. 280: excerpt from copy of letter as sent; in Bernoulli's secretary's hand.

There is no version of this letter in LBr 57. Letter 57 is answered by Letter 58.

2. At this point De Volder had not yet responded to Letter 55, but Leibniz knew from Bernoulli's letter of 9 February that Letter 55 had been forwarded to De Volder (see GM.iii.743).

Letter 58

1. LBr 57 2, Bl.120: excerpt from letter as sent; in Bernoulli's hand (my printed text).

There is no version of this letter in LJB L Ia. Letter 58 answers Letter 57.

2. Letter 55.

Letter 59

1. LBr 967, Bl. 81: letter as sent; in De Volder's hand (my printed text). Letter 59 was sent with Letter 60. It answers Letter 55 and is answered by Letter 61.

2. Here De Volder refers to the French typographical measure of length known as the Truchet point, which was invented by the clergyman Sébastien Truchet (1657-1729). His typographical point measured $1/1728$ Pied du Roi, which in turn measured $9000/27706$ meters.

3. Gerhardt mistakenly omits "to infinity [in infinitum]" (see G.ii.265).

4. Letter 54.

Letter 60

1. LBr 57 2, Bl. 122: excerpt from letter as sent; in Bernoulli's hand (my printed text).

There is no version of this letter in LJB L Ia. Letter 60 was sent with Letter 59. It is answered by Letter 62.

Letter 61

1. LBr 967, Bl. 82-83: draft; in Leibniz's hand (my printed text). Letter 61 was sent with Letter 62. It answers Letter 58 and is answered by Letter 63.

2. Quintus Horatius Flaccus, Ars Poetica, line 11.

3. See Letter 58 for all the quotes in this letter.

4. Leibniz originally wrote: "does not have a reality proper to it distinct from the reality of the things from which it is aggregated, and does not have a principle of reality intrinsically but from these things [non habet propriam realitatem diversam a realitate rerum a quibus aggregatur, nec in se sed ab illis habet principium realita<ti>]"

5. The rationale for the different translations of the term moles in this sentence and the preceding one are explained in Letter 4, note 2.

6. Leibniz originally wrote: "I say that no one conceives of mathematical body, i.e., bare extended substance [Corpus Mathematicum, seu substantiam nude extensam ajo a nemine concipi]"

7. Leibniz originally wrote: "the actual phenomena [actualibus phaenominis]"

8. Leibniz originally wrote: "derivative forces, i.e., actions [vires derivativas seu"

actiones]”.

9. Leibniz originally wrote: “otherwise true and real unities are never reached [aliter nunquam veniri ad verus et reales unitates.]”

10. Leibniz originally wrote: “i.e., the tendency for changing perceptions [seu tendentium mutandi perceptiones]”.

11. See Letter 22, note 5.

12. Leibniz originally wrote: “The unity of such things is only mental, namely when [Qualium unitas non est nisi mentalis, dum nempe]”.

13. See Letter 27, note 4.

Letter 62

1. LJB L Ia 19 2, Bl. 227: excerpt from letter as sent; in Leibniz’s hand (my printed text). LJB L Ia 20, Bl. 282-83: excerpt from copy of letter as sent; in Bernoulli’s secretary’s hand. LBr 57 2, Bl. 124: excerpt from draft; in Leibniz’s hand. Letter 62 was sent with Letter 61.

2. This is the last letter between Leibniz and Bernoulli that contains any commentary on the Leibniz-De Volder correspondence. However, Bernoulli’s letters of 10 October and 25 November 1705 recount De Volder’s retirement as Professor at Leiden and his intention that Bernoulli be his successor. This came to nothing as Bernoulli had already accepted a position in Basel (see Letter 65; GM.iii.773 and 776) and the chair passed to Jacques Bernard (see Letter 36, note 5) instead. The final mention of De Volder is in Leibniz’s letter of 6 September 1709, where Leibniz laments De Volder’s death (see GM.iii.845).

3. See Letter 50 and Letter 51.

4. See Letter 17 and Letter 42.

5. See Letter 17 and Letter 53.
6. See Letter 58.
7. Leibniz is probably referring to Letter 54 and Letter 59.

Letter 63

1. LBr 967, Bl. 84-85: letter as sent; in De Volder's hand (my printed text). Letter 63 was sent with Bernoulli's letter to Leibniz of 6 December 1704 (see GM.iii.758). It answers Letter 61 and is answered by Letter 64.

2. See Letter 61 for all the quotes in this letter.

3. Letter 58.

4. See Letter 22, note 5.

5. Bernoulli had raised this issue on De Volder's behalf before the correspondence proper even began in Letter 5, but received a rather evasive response from Leibniz (see Letter 5, note 2)

6. In fact, Leibniz's reasons are found in Letter 17 and more explicitly in Letter 53. Indeed, De Volder quotes Leibniz's the explanation from Letter 17 in Letter 18.

Letter 64

1. LBr 967, Bl. 86: draft; in Leibniz's hand (my printed text). Letter 64 was sent with Leibniz's letter to Bernoulli of 25 January 1705 (see GM.iii.761). It answers Letter 63 and is answered, along with Letter 65, by Letter 66.

2. The letter is undated but it seems likely it was written shortly before it was sent to Bernoulli.

3. See Letter 63 for all the quotes in this letter.

4. Leibniz originally wrote: “sensation to sensation [sensione in sensionem]”.

5. Leibniz is referring the school of Academic skeptics associated with Arcesilaus (c.315 BCE-c.240 BCE) and Carneades (c.213-c.128 BCE). For an overview of Academic Skepticism, see Hankinson 1994.

6. Following note L1, we may assume throughout that the material that is surrounded by square brackets was not in the letter as sent.

7. Leibniz originally wrote: “undivided [indivisa]”.

8. See Letter 22, note 5.

9. See Letter 40, note 11.

10. The claim that the followers of Pythagoras identified bodies with numbers was advanced by Aristotle in his Metaphysics (see 1.5 986a1-2; 13.6 1080b16-21; 13.8 1083b8-19; 14.3 1090a20-25; 14.3 1090a32-35). For an overview of the Pythagoreans, see McKirahan 1994, 79-115.

11. The public version appears in section 11 of Leibniz 1698a (G.iv.511/AG 162). Leibniz had in fact given De Volder the reason more than once already (see Letter 63, note 6).

12. I follow Gerhardt here (G.ii.278). LBr 967 has the singular “producatur”.

Letter 65

1. LBr 967, Bl. 87: partial copy of draft of letter as sent with possible later additions; in Leibniz’s hand (my printed text). Letter 65 is answered, along with Letter 64, by Letter 66.

2. Although there is no indication in the copy of where Leibniz was when he wrote this letter, he wrote to Bernoulli from Hanover on 30 October 1705 (see GM.iii.775).

3. See Bernard 1705, 356-57. Leibniz refers to a discussion by editor of the Nouvelles de la République des Lettres, Jacques Bernard (1658-1718), of a book entitled Elémens de géometrie de Monseigneur le Duc de Bourgogne (Malézieu 1705). Written and published by the French mathematician Nicolas de Malézieu (1650-1727), this was the textbook that Malézieu used when private tutor to Louis de France, duc de Bourgogne (1682-1712), the grandson of Louis XIV and father of Louis XV. As Leibniz reports, Bernard tells his readers that the author believes that, whilst metaphysical considerations show that it is composed of indivisible substances, geometry shows that matter is infinitely divisible (for more on Bernard, see Letter 36, note 5).

4. Given Leibniz's indication in Letter 64, note L1, that the material appearing in square brackets there was not included in the letter as sent, it is reasonable to think that the same applies here. The remainder of the text appears to have been written at the same time as the bracketed material. Since all of this text has a different appearance to that which precedes it and contains some crossing out, it is possible that it was not copied from the letter that Leibniz sent on 11 October 1705, but represents later thoughts concerning these issues.

5. Leibniz originally wrote: "When two extremities of a space touch they are one. [Dua extremitates spatii cum se tangent Unum sunt.]"

Letter 66

1. LBr 967, Bl. 88: letter as sent; in De Volder's hand (my printed text). Letter 66 was probably sent with Bernoulli's letter to Leibniz of 30 January 1706 (GM.iii.781-83). It answers Letter 64 and Letter 65 and is answered by Letter 67.

2. See Letter 62, note 2.

3. Presumably this is a reference to material that Leibniz did not copy into the excerpt from his letter to De Volder of 11 October 1705 (see Letter 65). Johann van Waveren Hudde (1628-1704) was a mathematician who spent most of his adult life working for the Amsterdam City Council. All of Hudde's mathematical work was completed before 1663.

4. At this point De Volder and Fullen had already published their collection of Huygens' posthumous writings (Huygens 1703). See Letter 14, note 7.

5. See Letter 62, note 2.

6. Jakob Hermann (1678-1733) was a mathematician who studied under Johan Bernoulli's brother Jakob (1654-1705) at Basel. He was a favorite of Leibniz and held the chair of mathematics at the university of Padua from 1707-13 on Leibniz's recommendation.

Letter 67

1. LBr 967, Bl. 90-91: draft; in Leibniz's hand (my printed text). Letter 67 was probably sent with Leibniz's letter to Bernoulli of 11 February 1706 (GM.iii.785-87). It answers letter 66.

2. See Tournemine 1703.

3. See Leibniz 1708, to which the final word was added in Tournemine 1708. Leibniz 1708 closely resembles what we find in Letter 67, though it is written in a slightly more conciliatory tone. It was composed around the same time. The relevant sections of Leibniz's and Tournemine's papers are translated at WF 247-51. Also see Leibniz's letter to his Jesuit friend Bartholomew des Bosses (1668-1738) of 2 February 1706 (LDB 17) and the discussion by Look and Rutherford in the introduction to their edition of the Leibniz-Des Bosses correspondence (LDB xlv-xlix).

4. See Huygens 1693, 480.

5. LBr 967, Bl 93: apparent alternative to the fourth paragraph of the draft; in Leibniz's hand (my printed text).
6. Leibniz originally wrote: "time, space, i.e., extension [Tempore, spatio seu Exte<nsione>]".
7. Leibniz originally wrote: "and every continuous actual thing [et omni continua actuali]".
8. Leibniz originally wrote: "the perceiving substance and its perceptions [ultra substantiam percipientem ejusque perceptiones.]".
9. LBr 967, Bl. 92-93: earlier draft; in Leibniz's hand (my printed text).
10. See note 2 above.
11. See note 3 above.
12. Leibniz originally wrote: "The real things are monads [Realia sunt monades]".
13. Leibniz originally wrote: "the active in distinct perception, the passive in confused [activa in distincta perceptione, passiva in confusa;]".
14. See Letter 50, note 26.
15. Leibniz originally wrote: "perfect unities [unitatibus perfectis]".