

17. Annotated Excerpts from Spinoza¹
 [Late April 1676?]²

Aiii19

275 Items Communicated in Mr. Schuller's letter

1) He demonstrates that every substance is infinite, indivisible and unique.³

By substance he understands that which is in itself, and is conceived through itself,^{L1} that is, that whose idea or concept does not arise from the idea or concept of another thing.⁴

276 2) He defines God as follows: that which is an absolutely infinite being, i.e. a substance consisting of infinite attributes, each of which expresses an infinite and eternal essence and is thus immense.⁵

N.B. He says absolutely infinite, and not infinite in its own kind, since if something is infinite only in its own kind, infinite attributes can be denied of it, i.e. infinite attributes can be conceived which do not pertain to its nature.⁶

3) [Spinoza's Letter on] The Problem of the Infinite.

To everyone the problem of the infinite has seemed very difficult, if not insoluble, precisely because they have not distinguished between that which is infinite as a consequence of its own nature, or by the force of its definition, and that which has no limits not by the force of its own essence, but by the force of its cause. And also because they have not distinguished between that which is called infinite because it has no limits, and that whose parts cannot be expounded by or equated with any number, even though we know its maximum and minimum, i.e. that it is bounded. Finally, they have not distinguished between that which can only be understood but not imagined, and that which can also be imagined. Had they paid attention to these distinctions, they would never have been overwhelmed by such a huge multitude of difficulties. For then they would have clearly understood what kind of infinity cannot be divided into any parts, i.e. cannot have any parts; and what kind can be so divided without contradiction. Again, they would have understood what kind of infinity can be conceived to be greater than another infinity without implying any contradiction, and what kind cannot be so conceived. This will be made clear by what I am about to say presently.

277 But first of all let me briefly explain these four [terms]: Substance, mode, eternity, and duration. What I should like you to consider about substance are: (1) that existence pertains to its essence,^{L2} i.e. that from its essence and definition alone, it follows that it exists (if I am not mistaken, I have demonstrated this to you before in conversation, without the aid of other propositions); and (2) (which follows from (1)) that substance is not manifold; rather, there exists only one unique substance of the same nature; and finally, (3) that every substance can be understood only as infinite.

The affections of substance I call modes. Their definition, insofar as it is not the definition of substance itself,^{L3} cannot involve existence. So even though they exist, we may conceive them as not existing. Again it follows from this that when we attend only to the essence of modes, but not to the order of the whole of matter, we cannot infer from the fact that they exist now that they will or will not exist later, or that they did or did not exist earlier. From this it is clear that we conceive the existence of a substance to be of a wholly different kind than the existence of modes.^{L4}

This is the source of the difference between eternity and duration. For it is only the existence of modes that we may explain by means of duration; but the existence of substance is explained by means of eternity, i.e., the infinite enjoyment of existing, or, in bad Latin, of being.^{L5}

278 From these considerations it is clear that whenever (as is most often the case) we attend only to the essence of modes and not to the order of nature, we can limit their existence and duration as we please, conceive them as greater or smaller, and divide them into parts, without thereby^{L6} destroying whatever concept we have of them. But eternity and substance, inasmuch as they can only be conceived as infinite,^{L7} cannot be treated by us in any of these ways without at the same time destroying the concept we have of them.

So those who hold extended substance to be made up of parts or bodies really distinct from each other are, in a word, talking nonsense, bordering on insanity.^{L8} For this is the same as if someone should try, simply by adding circles or piling them one on top of another, to make up a square or triangle or anything else whose whole essence is different. So that whole hodgepodge of arguments by which they struggle to show that corporeal substance is finite, falls apart of its own accord. For all these arguments suppose corporeal substance to be made up of parts.^{L9} In the same way there are others who, having persuaded themselves that a line is composed of points, have been able to find many arguments by which they would show that a line is [not]⁹ divisible to infinity.

But if you ask why we are so inclined, by a natural impulse, to divide extended substance, I reply that we conceive quantity in two ways: abstractly, i.e. superficially, as we have it in the imagination with the aid of the senses; or as a substance, which occurs by the intellect alone. So if we attend to quantity as it is in the imagination, which is what we do most often and quite easily, we find it to be finite, divisible and composed of parts, and manifold; but if we attend to it as it is in the intellect alone, and perceive the thing as it is in itself, which is very difficult, then, as I demonstrated to you well enough before, we find it to be infinite, indivisible and unique.

279 Time and measure, moreover, arise from the fact that when we conceive quantity abstracted from substance, and separate duration from the way it flows from things eternal, we can limit duration and quantity as we please. Time is for limiting duration,¹⁰ measure for limiting quantity, so that we may as far as possible imagine them easily.

Next, from the fact that we separate the affections of substance from substance itself, and reduce them to classes so that we may as far as possible imagine them easily, there arises number, by which we limit them. From these considerations you can see clearly that measure, time and number are nothing but modes of thinking, or rather, of imagining. So it is no wonder that all those who have endeavoured to understand the process of nature by similar notions, and badly understood ones at that, should have tangled themselves up so marvelously that in the end they have been unable to untangle themselves again except by forcing their way through everything, oblivious to any absurdity, no matter how gross.

For since there are many things which we cannot at all grasp by the imagination, but only by the intellect—such as substance, eternity etc.—anyone who tries to explain such things using similar notions, which are merely aids to the imagination, does nothing more than if he were to engage himself in running wild with his imagination.

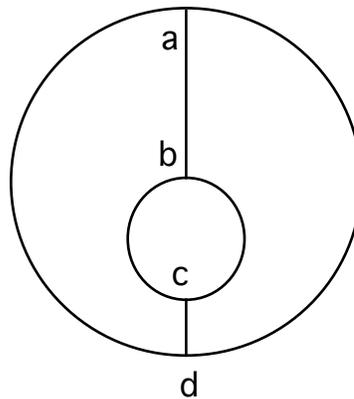
Moreover, the modes of substance themselves can never be correctly understood if they are confused with similar entities of reason or aids for the imagination. For when we do this, we separate them from substance and from the way they flow from eternity, without which they cannot be correctly understood. To see this more clearly still, take this example: Whenever someone conceives duration abstractly^{L10} and by confusing it with time begins to divide it into parts, he will never be able to understand how an hour, for example, can pass. For in order for the hour to pass, it will be necessary for half of it to pass first, and then half of the remainder, and

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then half of what remains of this remainder. And if he goes on in this way subtracting half from the remainder indefinitely, he will never be able to reach the end of the hour.^{L11} Hence many people who are not accustomed to distinguishing entities of reason from real things have ventured to declare that duration is composed of moments, thus running into Scylla in their eagerness to avoid Charybdis. For generating duration from moments is the same as generating number simply by adding noughts.^{L12}

Moreover, from what has just been said it is clear enough that neither number, nor measure, nor time, inasmuch as they are only aids for the imagination,^{L13} can be infinite. For otherwise number would not be number, nor measure measure, nor would time be time. Hence it is easy to see why many people who have confused these three for real things, because they were ignorant of the true nature of things, have denied the actually infinite. But let the mathematicians judge how miserably these people have reasoned; for arguments of such poor quality have never caused them any hesitation about things they perceived distinctly.

Figure 1



For apart from the fact that they have discovered many things which cannot be expounded by any number^{L14}—which reveals well enough the inability of numbers to limit everything—there are also many things which cannot be equated with any number,^{L15} but exceed every number that can be given. Yet they do not conclude that such things exceed every number because of the multiplicity of their parts, but because the nature of the thing cannot admit a number without a manifest contradiction.^{L16} For example, all the inequalities ab and cd of the space lying between two circles, and all the variations which the matter moving in it must undergo, exceed every number. And this is not concluded from the excessive

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magnitude of the intervening space,^{L17} for however small a portion of it we take, the inequalities of this small portion will still exceed every number. Neither is it concluded from the fact that, as happens in other cases, we do not know its maximum and minimum. For we know both in this example of ours: ab is the maximum, and cd is the minimum. Instead it is concluded simply from the fact that the nature of the space lying between two non-concentric circles can admit no such thing. So if anyone should wish to determine all those inequalities by some definite number, he

will have to see to it at the same time that a circle not be a circle. In the same way, to return to our purpose, if anyone should wish to determine all the motions of matter there have been up till now by reducing them and their duration to a definite number and time, he will of course only be asking for corporeal substance (which we can conceive only as existing)^{L18} to be deprived of its affections, and made not to have the nature that it does have. I could give a clear demonstration of this, as well as other things which I have touched on in this letter, if I did not regard it as superfluous.

From everything already said it seems clear that some things are infinite by their nature, and cannot in any way be conceived to be finite;^{L19} others are infinite by the force of the cause in which they inhere,^{L20} although when they are conceived abstractly they can be divided into parts and regarded as finite;^{L21} and others, finally, are called infinite, or if you prefer, indefinite, because they cannot be equated with any number, although they can be conceived as being greater or smaller.^{L22} For it does not follow that things which cannot be made equal to any number must necessarily be equal,^{L23} as is evident from the example adduced, and from many others.

282 In sum, I have briefly indicated the causes of the errors and confusions which have arisen concerning the problem of the infinite,^{L24} and unless I am mistaken, I have so disposed of them that I do not think there remains any problem about the infinite which I have not touched upon here, or which cannot be very easily solved from what I have said. So I do not regard it as worthwhile to detain you any longer with these matters.

But I would like to note here in passing that the Peripatetics have, I think, misunderstood the demonstration by which the Ancients tried to show the existence of God. For as I find it according to a certain Jew called Rabbi Jaçdai,¹⁷ the demonstration goes as follows: Supposing there is an infinite progression of causes, then everything that exists has also been caused; however, it does not pertain to anything that has been caused that it should exist necessarily by the force of its own nature; therefore there is nothing in nature to whose essence it pertains to exist necessarily; but this is absurd, therefore the supposition is too. Hence the force of this argument does not lie in the assertion that it is impossible for the infinite to exist actually, but only in the supposition that things which do not exist necessarily by their own nature are not determined to exist^{L25} [unless]¹⁸ by a thing existing necessarily by its own nature.

Leibniz's Notes on his Transcription of Spinoza Above

- 275 L1 It seems that we conceive through themselves those things whose terms or expressions are undefinable, i.e. whose ideas are irresolvable, such as existence, the ego, perception, the same, change; as well as sensible qualities, such as heat, cold, light, etc. But something is understood through itself only if we conceive all its requisites without having conceived another thing, i.e. only if it is the reason for its own existence. For we commonly say that we understand things when we can conceive their generation, i.e. the way in which they were produced. Hence we understand through itself only that which is its own cause, i.e. that which is necessary, i.e. is a being in itself. And so it can be concluded from this that if we understood a necessary being, we would understand it through itself. But it can be doubted whether we do understand a necessary being, or, indeed, whether it could be understood even if it were known or recognized.
- 276 He distinguishes concepts into the merely clear, and the clear and distinct together. Every concept is clear, since a man always discerns one concept from another, for example, heat from cold. But it is not always distinct, that is, such that I know what the cause of the difference is. Idea, concept, cognition, consciousness, perception, etc., come down to the same thing.
Volition, according to Descartes, is the faculty of affirming or denying.
 That is conceived through itself whose concept does not arise from the concept of another thing. Something is conceived distinctly from something else when one of its affections is understood.
 An essential property of a thing is that which is reciprocal.
 Light and heat are conceived, not understood. The properties of light and heat are known by us, but only experienced, and so are not understood or demonstrated by us even though they are perceived. Thus in my opinion it is possible that certain properties concerning existence, concerning us ourselves —the ego itself, and so forth— are also observed or sensed, but cannot be demonstrated.
- Everything that cannot be demonstrated is either an identical property or an empirical fact, or both.
 If several attributes of some thing, or several mutually independent or a priori propositions about it, are expressed, then these propositions are either empirical facts or follow from empirical facts.
- 277 L2 It should be shown that this follows from that which is conceived through itself. A distinct concept is a proposition whose reason can be provided. All simple concepts are clear and distinct. There are concepts which are not pure, but in which images or signs act as intermediaries for concepts, and these are not even clear. And to this extent they might be said to be confused. There are certain concepts such that there is sufficient resolution in them for solving some other problem or for [proving] its impossibility, as is usually the case in geometry. But this is not necessarily the case for all concepts. For if the resolution of those things whose cause is sought ends in sensible qualities, there are concepts whose cause cannot be sought, as when everything is resolved into extension and duration. A cause can be sought for motion and matter: likewise for solidity; and so in these things an ultimate resolution is not sufficient for a solution or [proving] an impossibility. If, however, we should demonstrate certain laws to be sufficient on the basis of some particular hypothesis —e.g. if we assume the nature of matter to be such that one [portion of matter] fills a

certain space, and as a result, when the space is assumed full, this agrees with experiments— this reasoning could suffice for us in the future. Meanwhile the absolute nature of solidity, and other such things, are not yet known. If every solidity were equal and as great as possible [—BREAKS OFF].

- 277** L3 So can the definition of a mode be the definition of substance in some manner?
- L4 This is exactly what is commonly called contingent.
- 277** L5 This agrees well enough with Boethius' definition of eternity.⁷
- L6 “Sans que pour cela [were it not for this]”, although not “thereby”.
- L7 It has not yet been proved here that substance can only be conceived as infinite.
- L8 A bit too harsh, since these [insults] could be hurled at both the ancients and Descartes. [—CROSSED OUT]
- L9 That parts do not exist in wholes was something that Digby and Thomas White endeavoured to prove in great detail.⁸
- 277** L10 That is, I suppose, by conceiving duration as an entity through itself, abstracted from its own subject, in which case it would be, as he says, imaginary or a being of reason. Which considerations strongly agree with Hobbes's. For Hobbes calls place the phantasm of existence and time the phantasm of motion.¹¹
- L11 From this it only follows that nobody can complete the enumeration of parts into which an hour can be divided in continuous proportion. And this is the same thing as saying that no book can be found in which one could write all the numbers of a double geometrical progression.¹² It does not follow from this, however, that an hour cannot pass, but that an hour can only pass in an hour.
- 280** L12 This reason, by means of which other people also endeavour to prove that the continuum can be divided to infinity, does not yet seem to have been deduced carefully enough to be convincing. But the same thing can be strictly demonstrated on other grounds.
- L13 Are then time and measure composed of points? This seems to be given the nod, since it was said a little while ago that those who composed duration of points were in error because they had not distinguished duration, which is real, from time, which is an imaginary entity. But I would scarcely believe that this author is asserting that any continuum is composed of points.
- L14 That is, any finite number. For, if you employ infinite numbers (i.e. more than an assignable quantity of them), even irrationals can be expounded by a ratio of numbers to numbers.

- L15 That is, any finite number. For concerning the rest, if their multiplicity is so great that they exceed any number, that is, any number assignable by us, this multiplicity itself could be called a number, to wit, one that is greater than any assignable number whatever.
- L16 Why they do not exceed every number because of this multiplicity of parts is yet to be shown; why shouldn't they, if indeed it is obvious that they are more numerous than can bear an assignable number?
- 280** L17 He had undertaken to prove that this is not concluded from the multiplicity of the parts; but here he has shown only that it cannot be concluded from the magnitude of the whole, which is far different.¹³ Now it is evident that what is really to be concluded from this is that matter, which is divisible to infinity, is in fact so divided into all the parts into which it can be divided. The same consideration applies in every case of a solid moving in a perfect liquid
- 281** plenum. Indeed, there emerge difficulties whose resolution occasions certain splendid theorems, and if Descartes had happened to discover them, he would have corrected certain of his opinions.
- L18 —for the very reason that, in the phraseology of our author, it is substance.
- L19 —such as substance and eternity, according to the author's opinion.
- L20 —such as duration and extension.
- L21 —such as measure and time.
- L22 —such as the variations of motions.
- L23 This is acknowledged by most mathematicians, expressly by Cardan, but above all, as I see it, observed and carefully elaborated by our author.¹⁴
- 281** L24 I have always distinguished the Immensum from the Unbounded, i.e. that which has no bound. And that to which nothing can be added from
- 282** that which exceeds an assignable number. Briefly, I set in order of degree: Everything, Maximum, Infinity.¹⁵ Whatever contains everything is maximum in entity; just as a space unbounded in every dimension is maximum in extension. Likewise, that which contains everything is the most infinite, as I am accustomed to call it, or the absolutely infinite. The maximum is everything of its kind, i.e. that to which nothing can be added, for instance a line unbounded on both sides, which is obviously also infinite; for it contains every length.¹⁶ Finally those things are infinite in the lowest degree whose magnitude is greater than we can expound by an assignable ratio to sensible things, even though there exists something greater than these things. In just this way, there is the infinite space comprised between Apollonius's Hyperbola and its asymptote, which is one of the most moderate of infinities, to which there somehow corresponds in numbers the sum of this space: $\frac{1}{1} + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \dots$, which is $\frac{1}{0}$. Only let us understand this 0, or nought, or rather instead a quantity infinitely or inassignably small, to be greater or smaller according as we have

assumed the last denominator of this infinite series of fractions, which is itself also infinite, smaller or greater. For a maximum does not apply in the case of numbers.

- 282 L25 This is rightly observed, and agrees with what I am accustomed to saying, that nothing exists but that for whose existence a sufficient reason can be provided. It is easily demonstrated that this sufficient reason cannot be in the series of causes. For we cannot discover where it might subsist in the individual causes, however far we regress; and if we understand the whole series taken back to infinity to be a sufficient reason for the existence of every single succeeding cause—which remains the one escape for those dissenting—it is
- 283 ^{easy to prove} the contrary of this. For any single cause whatever could be rescinded from this series, seeing as what remains must still be a reason for those following it. Hence it follows that in the end the whole series, i.e. the sum of all the rescindible causes, could be subtracted from itself, while leaving intact the reason for existence we assumed in it, which is absurd. Or rather, the contrary of what was supposed is proved directly: namely that the reason for its existence lies outside the series. You could also express this argument as follows: it cannot be said where that reverse series to infinity—which has to be the reason for the succeeding causes, and which is unbounded at one end—is bounded at the other end. It would have to begin bounded at its own end; whence any individuals whatsoever can be subtracted from it, and so, as I said, it can be subtracted from itself. It is likewise evident from this that, since by this argument a series which contains the reason for those following does not have a determinate and definite magnitude, there will be no such series. But these considerations are rather too subtle, even though certain. Yet there is another much more obvious argument at hand why the whole series does not contain a sufficient reason for existing. This is that since the whole series can be imagined or understood by other means, a reason must be provided from outside it why this should be so. From these considerations a truly memorable thing also follows, that what is earlier in the series of causes is not nearer to the Reason for the universe, i.e. to the First Being, than what is later, nor is the First Being the reason for the later ones as a result of the mediation of the earlier ones; rather it is the reason for all of them equally immediately.

Endnotes

1. This document is the 17th piece in a volume of translations I have done of Leibniz's writings, published by Yale University Press. This piece is Leibniz's transcription of excerpts from Spinoza's writings on the infinite, together with his own annotations (numbered L1, L2, etc.), which his are almost as long as the original excerpts. As his title for this piece ("Items Communicated in Mr. Schuller's Letter") indicates, the excerpts from Spinoza's writings were taken from a letter by G. H. Schuller, who had presumably communicated them to him with Spinoza's permission through the mediation of Walther von Tschirnhaus. Schuller was an Amsterdam doctor of Spinoza's acquaintance, and Leibniz was already indebted to Tschirnhaus for information on the Ethics (see Aiii334). The fragments in the first two sections are drawn from a draft of Spinoza's Ethics, Propositions 8, 13 and 14, and Definitions 3 and 6. The third section reproduces the philosophical part of Spinoza's famous "Letter on the Infinite" (Letter 12 in his edited Correspondence), written by him on April 20, 1663 to his longtime friend Lodewijk Meyer. Leibniz's version of the main text of this letter is published by Gebhardt on the bottom halves of pages 53-62

of SO.iv, and the edited version of it from the Opera posthuma on p. 52 and the top halves of pp. 53-62. Gebhardt says that Leibniz's copy “perhaps gives the original of the letter, at any rate a version again deviating from the edition of the Op. Posth.” (SO.iv.390). Curley translates the latter version in his SC 200-205, as does Shirley in his translation (Baruch Spinoza, The Ethics and Selected Letters, trans. Samuel Shirley & ed. Seymour Feldman, Hackett, Cambridge: 1982), pp. 231-235.

2. The watermark of the paper used by Leibniz is registered for February 1676. But the Akademie editors note that Leibniz's extracts “were presumably written not long before 2 May 1676,” since Tschirnhaus himself —perhaps prompted by Leibniz— raised a question concerning the “Letter on the Infinite” (from which he quotes) in a letter to Spinoza of this date (see fn. 13 below), in which he also mentions “mijn Heer Leibnits” (SO.iv.331). In support of this late April dating, it appears that Schuller must have communicated these extracts some time after March 18, for on that date Leibniz describes the contents of a (presumably different) letter from Schuller shown him by Tschirnhaus, without mentioning Spinoza (in Aiii36₁: 390). Lastly, certain phrasings in Leibniz's “On Magnitude” (Aiii64; DSR 36-43) show signs of possible influence from his reading of Spinoza here (see fn. 10 below). It is not known when “On Magnitude” was written, but it seems to have been written not long after “Infinite Numbers” (Aiii69), which was finished after April 10.
3. This refers to Spinoza's Proposition 8: “Every substance is necessarily infinite”; Prop. 13: “An absolutely infinite substance is indivisible”; and Prop. 14: “No substance can be or be conceived besides God”; and their accompanying demonstrations, from Book I of the Ethics (SO.ii.49, 55-56; SC 412, 420).
4. This differs slightly from Definition 3 of the official version in the Ethics: “By substance I understand that which is in itself and is conceived through itself, that is, that whose concept does not require the concept of another thing, from which it must be formed.” (SO.ii.45, SC 408).
5. This is identical with Definition 6 from Spinoza's Ethics, except that the last phrase of the definition in Leibniz's copy, “and is thus immense”, is missing from the published version.
6. This is identical with the gloss on Definition 6 appearing in the Ethics, except that the last qualification given in the latter is missing from Leibniz's excerpt: “but if something is absolutely infinite, whatever expresses essence and involves no negation pertains to its essence.” (SO.ii.45-6, SC 408).
7. Boethius (480-525/6) denied that it was proper to ascribe duration to eternity: see Sorabji's discussion in Time, Creation and the Continuum, pp. 115 ff. In his Consolation of Philosophy, 5.6, Boethius wrote: “What is subject to the condition of time is not yet such as to be judged eternal, even if, as Aristotle believed of the world, it never began to exist, and does not cease, but has its life stretched out with the infinity of time” (quoted from Sorabji, *ibid.*, pp. 119-120). Perhaps even more pertinent is the view of Philoponus: “Eternity ... should not be cut, like time, into discrete segments... . Rather, [Plato] thinks

eternity is some single, uniform extension (paratasis), not cut by any differentiation, but staying always (aei) the same, and remaining without change in itself.” (ibid., p. 118).

8. Thomas White argued this in detail in his Quaestio praevia: Utrum in continuo sunt partes actu (“A Leading Question: Whether there are actually parts in the continuum”), §§ 1 and 2; Sir Kenelm Digby in his Two Treatises (Paris: Gilles Blaizot, 1644), “A Treatise of Bodies”, chapter 2, especially § 4 (“If partes were actually in their whole, Quantity would be composed of indivisibles”) and § 5 (“Quantity cannot be composed of indivisibles”). Leibniz had criticized the doctrine (as set forth by White in his first preface to Digby's On the Immortality of the Soul) some years previously, in his Demonstration of the Possibility of the Mysteries of the Eucharist (1668?; A VI.i n.15), where he declared White's opinion “that the parts of a thing are not in it actually” to be “in heresy” and “absurd” (504).
9. Leibniz added then crossed out the ‘non’ (“not”); but it is necessary for the sense, and is there in the canonical edition of Spinoza (cf. SC 202).
10. There are perhaps echoes of this in Leibniz's “On Magnitude”, where he writes: “Time is not duration, any more than space is collocation... . Time is a certain continuum with respect to which something is understood to endure... .” (Aiii64: 484).
11. See Hobbes, De Corpore, II, ch. VII, § 2: “space is the phantasm of an existing thing, insofar as it is existing, that is, with no other accident of the thing considered beyond the fact that it appears outside the person imagining”; § 3: “time is the phantasm of motion, insofar as we imagine in motion an earlier and a later, i.e. succession.”
12. Here “divided in continuous proportion” means that each two successive terms are in the same ratio, here 1:2; and a “double geometrical progression” means a geometrical series in which each term is twice its successor. The “no book can be found” argument is reminiscent of Aiii52 above.
13. In his letter to Spinoza of May 2, 1676, Tschirnhaus raises precisely this objection: “I was desirous to learn from you how one is to understand what you remind us of in the Letter on the Infinite with these words: ‘Yet they do not conclude that such things exceed every number because of the multiplicity of their parts.’ For it seems to me that, concerning such infinities, all mathematicians always demonstrate that the number of parts is so great that they exceed every assignable number, and with respect to the same matter in the example employed concerning the two circles, you do not seem to prove exactly what you had undertaken to. For there you show merely that they do not draw the conclusion in question from the excessive magnitude of the intervening space, ‘and the fact that we do not know its maximum and minimum’; but you do not demonstrate, as you wanted to, that ‘they do not conclude it from the multiplicity of the parts.’” (Tschirnhaus to Spinoza, Letter 80, SO 331). Spinoza replied that if the infinity of the parts were concluded from their multiplicity, the latter “would have to be greater than any given, which is false. For in the whole space between the two non-concentric circles we conceive the multiplicity of parts to be twice as great as in half the space, and yet the number of parts in both the half-space

and the whole is greater than any assignable number.” (Spinoza to Tschirnhaus, May 5, 1676: Letter 81, SO 332). I do not believe that Leibniz would have been persuaded by this reply, if he saw it. For it is hard to see how one multiplicity can be twice the other if no number is assignable to either of them.

14. Cardan maintained the doctrine that one infinity is greater than another in “Arithm. Pract. c. 66. n. 165 and 260”, according to Leibniz in his dissertation *De Arte Combinatoria* of 1666 (A VI.i 229). As for Leibniz’s own view, see “Infinite Numbers” (Aiii69: 497) above, where he concluded that “there can be two infinite commensurable numbers which are not as two finite numbers, if their greatest common measure is a finite number—for example, if both are prime.” That is, for Leibniz two infinite numbers are not only not necessarily equal: they may not even have a finite ratio.
15. Leibniz had articulated this distinction concerning the three degrees of infinity in much the same terms in his notes on Spinoza (Aiii334) above.
16. See Leibniz's discussions of the unbounded above, especially in Aiii66, 65 and 69.
17. Chasdaj (or Hasdai) Crescas (c. 1340-1410), a Spanish-Jewish critic of Aristotle and Maimonides, published this argument in his *Or Adonaj*, 1555, book I, proposition 3. See H. A. Wolfson, *Crescas' Critique of Aristotle*, Cambridge, Mass.: Harvard University Press, 1929.
18. The ‘*nisi*’ (‘unless’) is Leibniz's addition, and is not found in Gebhart or Curley (SC 205). Yet it seems necessary to give the correct sense.

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