

Leibniz on the Greatest Number and the Greatest Being¹

Ohad Nachtomy, Bar-Ilan University and Telhai Academic College

Abstract

In notes from 1675-76 Leibniz is using the notion of an infinite number as an illustration of an impossible notion. In the same notes, he is also using this notion in contrast to the possibility of the '*Ens perfectissimum*' (A.6.3 572; Pk 91; A.6.3 325). I suggest that Leibniz's concern about the possibility of the notion of 'the greatest or the most perfect being' is partly motivated by his observation that similar notions, such as 'the greatest number', are impossible. This leads to the question 'how Leibniz convinced himself that the notion of the greatest number is self-contradictory and that of the greatest being is not. I consider two suggestions, one that stress the difference between beings and numbers and one that stress the difference between two notions of infinity, and conclude that neither of them provides a satisfactory solution to this question.

1. Introduction

In his notes from 1675-76, Leibniz writes that, "the number of all numbers is a contradiction" (e.g., A.6.3 463 – all my references to 'A' are, unless otherwise noted, to 6.3–; Pk 7). Leibniz's claim appears in a period in which he is developing his views about infinity and is also engaged, among other projects, in distinguishing possible and impossible notions. In this context, Leibniz is using the notion of the number of all numbers (*numerum omnium numerorum*) and that of the greatest number (*numerus maximus*) as an illustration of an impossible notion, i.e., one whose internal constituents imply a contradiction. At the same time, he is also using the notion of the greatest number in contrast to a notion whose possibility he attempts to prove: 'the greatest or the most perfect being' (A 572; Pk 91; A 325). The analogy between the notion of the greatest number and that of the greatest being has clearly captured Leibniz's attention. Yet the subtle way in which Leibniz compares and contrasts the notions of the greatest number and that of the greatest being has not captured the attention of his scholars.

In this paper I will suggest that Leibniz's concern about the possibility of the notion of a totality, in general, and about the definition of God as the maximal totality, in particular, is related to his observation that similar notions, such as the notion of the greatest number ('the greatest shape' and 'the most rapid motion') are impossible. At the same time, it is not at all easy to see how Leibniz convinced himself that, while the notion of the greatest number is self-contradictory, the notion of the greatest being is not. This is the main question I will formulate in this paper. I believe that it poses a serious challenge for Leibniz's scholars.

2. The Context

In his Paris Notes, Leibniz explicitly states that, "The number of all numbers is a contradiction" (e.g., A 463; Pk 7). In discussing this point, Leibniz uses several closely related terms, such as the greatest number, the last number and an infinite number. For example, he writes that, "the last number will always be greater than the number of all numbers. Whence it follows that the number of all numbers is not infinite. Neither, therefore, is the number of unities. Therefore there is no such a thing as infinite number, that is, it is not <possible>" (A 477; Arthur 53). As Leibniz acknowledges, his reasoning on this point is closely related to Galileo's. He writes:

There comes to mind a similar line of reasoning conspicuous in Galileo's writings. The number of all squares is less than the number of all numbers, since there are some numbers which are non square. On the other hand, the number of all squares is equal to the number of all numbers, which I show as follows: there is no number which does not have its own corresponding square, therefore the number of all numbers is not greater than the number of all squares; on the other hand, every square number has a number as its side: therefore, the number of squares is not greater than the number of all numbers. Therefore, the number of all numbers (square and non-square) will be neither greater than nor less than, but equal to the number of all squares: the whole will be equal to the part, which is absurd (A 550-51; Arthur, 177).

Leibniz's employment of Galileo's reasoning makes its appearance in a very interesting context. In 1675-76, shortly after he develops his calculus and during the period in which he is developing his views on infinity (Arthur 2001, Introduction and Levey 1998), Leibniz is also engaged in distinguishing possible and impossible notions. In fact, he goes as far as attempting to demonstrate that

some notions are possible while others are impossible. It is noteworthy that, at the time, Leibniz is already working with a fairly crystallized set of presuppositions about possibility. He identifies the possible with the conceivable in God's mind and he explicates the conceivable (or the intelligible) in terms of self-consistency among the terms of complex notions.² Thus, for example, in the same set of notes he states that, "every thing possible is thinkable" (A 475; Pk 27-9).³

In addition, he presupposes a universal method for distinguishing possible and impossible notions. His method can be stated roughly as follows: if the terms making up a given notion are consistent *inter se*, then the notion indicates a genuine possibility, that is, something that can exist; if the terms are inconsistent, so that they imply a contradiction, the notion indicates an impossibility or an impossible thing, that is, something that cannot exist. In this case, there is no concept corresponding to it in God's mind but only an inconsistent notion (which he explicates as a concatenation of words or signs) in the minds of human beings. The method requires the analysis of complex notions into their constituents and, in this way, determining whether they involve internal contradictions or not.

In the context of his Paris notes, it is very clear that Leibniz is using the notion of the number of all numbers as a paradigmatic example of such an impossible notion. For example, in A 463; Pk 7, he states that the number of all numbers is a contradiction and immediately goes on to discuss the twofold origin of impossibility. He writes: "The number of all numbers is a contradiction, i.e., there is no idea of it; for otherwise it would follow that the whole is equal to the part, or that there are as many numbers as there are square numbers" (A 463; Pk 7), and then writes: "Impossible is a two-fold concept: that which does not have essence and that which does not have existence..." (A 463; Pk 7).

While 'The number of all numbers' clearly belongs to the first type of impossibility,⁴ the point that I would like to highlight here is that, at the same time, Leibniz is also using the notion of the greatest number as an example of an impossible notion in a more circumscribed context, namely, in contrast to a notion whose possibility he is very keen to prove, viz., the notion of the greatest or the most perfect being (the *Ens Pefectissimum*, A 572; Pk 91; A 325). His immediate objective in this context is to support Anselm's argument, revived by Descartes, according to which it can be proved that God exists, since 'existence' is included in the notion of the most perfect being as one of his perfections. Leibniz, however, argues that, for Anselm's argument to be valid, one has first to show that the very definition of God as the greatest being is consistent. As he writes, "God is a being

from whose possibility (or, from whose essence) his existence follows. If a God defined in this way is possible, it follows that he exists” (A 582; Pk 105).

Leibniz’s main contribution here is to question the antecedent, thus giving the argument an explicit *modus ponens* form (where Leibniz will attempt to prove the antecedent, so that the conclusion, God exists, would follow). Note also that Leibniz replaces here the traditional notion of the essence of God with its possibility — a systematic replacement in Leibniz’s writings. In Leibniz’s eyes, Descartes, as well as the tradition preceding him, simply assumed (without justification) that the definition of the most perfect being is non-problematic. Leibniz points out that this supposition is not self-evident and requires proof.

According to Leibniz – and here he articulates a distinctly modern conception – definitions, as well as concepts, must pass the test of self-consistency or intelligibility (in a modern sense of comprehensibility). Furthermore, in order that truth claims regarding certain notions can be ascertained, their possibility or intelligibility has to be established. It seems to me that the articulation of this point is one of Leibniz’s significant contributions to the history of philosophy but it is not my focus in this paper. Establishing the possibility of a concept requires what Leibniz calls a real definition, which he defines thus:⁵

A real definition is one according to which it is established that the defined thing is possible, and does not imply a contradiction. For if this is not established for a given thing, then no reasoning can be safely taken about it, since if it involves a contradiction, the opposite can perhaps be concluded about the same thing with equal right. And this was the defect in Anselm’s demonstration, revived by Descartes, that the most perfect or the greatest being must exist, since it involves existence. For it is assumed without proof that a most perfect being does not imply a contradiction; and this gave me occasion to recognize what the nature of real definition was. (A Specimen of Discoveries, circa 1686, cited from *The Labyrinth of the Continuum*, ed. R. Arthur, 2001, 305-07).⁶

It is worth noting that Leibniz’s early work on the notions of the greatest being and the greatest number is formative of his view of real definition. While Leibniz’s preoccupation with the notion of the greatest being is well-known, to the best of my knowledge, it has not been recognized that Leibniz was preoccupied by the contrast between the possibility of the greatest being and the impossibility of the greatest number. In the next section, I will show that there is a connection – both

textual and conceptual – between the notion of the greatest being and that of the greatest number.

3. The Greatest Number and the Greatest Being

Leibniz defines the notion of the most perfect being as “the subject of all perfections” (A 580; Pk 103) – that is, “one which contains all essence, or which has all qualities, or all affirmative attributes” and he attempts to demonstrate that it “is possible or (*seu*) does not imply a contradiction” (A 572; Pk 91). In these formulations, the notion of God as the greatest being can be naturally read as closely related to a notion of a maximal totality. God is defined as that which contains all essence, all perfections, all qualities or all affirmative attributes. In other words, in the definition of God as ‘the subject of *all* perfections or attributes’, the ‘all’ is naturally read as indicating an infinite number of perfections. This would seem to be a natural explication of the traditional notions of God as ‘that than which a greater cannot be conceived’ and as an infinite being, which is explicit in both Descartes’ and Spinoza’s definitions of God.⁷ This impression is supported by Leibniz’s intended proof that the notion of the *Ens Perfectissimum* is possible. He writes:

I seem to have discovered a demonstration that a most perfect being – or one which contains all essence, or which has all qualities, or all affirmative attributes – is possible, or does not imply a contradiction. This will be evident if I show that all (positive) attributes are compatible with each other. But attributes are either analyzable or unanalyzable; if they are analyzable they will be aggregates of those into which they are analyzed. It will therefore be sufficient to have shown the compatibility of all primary or unanalyzable attributes, or, of those which are conceived through themselves. For if individual attributes are compatible, so are several attributes, and so therefore are composite attributes. It will therefore be sufficient to show only the intelligibility of a being which contains all primary attributes, or, to show that any two primary attributes are compatible with each other.⁸

If Leibniz is working with a traditional and broadly accepted definition of God, why he is worried about the intelligibility of a being that contains all primary attributes. Why should the possibility of the greatest being — a traditionally accepted and apparently innocuous notion — require a proof? Why, in other words, should its possibility be in question?

A general answer to this question can be gathered from what I have already said, namely, that Leibniz was engaged in a project (related to his philosophical language) of distinguishing possible and impossible notions by the analysis of complex concepts. This general reply, however, does not explain Leibniz's particular interest in providing a proof for the possibility of the notion of the greatest being. A more specific reply is needed and I suggest the following: Leibniz is concerned about the possibility of the notion of a totality, in general, and about the definition of God as the maximal totality, in particular, because he clearly sees that notions such as 'the greatest number' and 'the most rapid motion' and 'the greatest shape', which have a similar structure, are impossible.⁹ The similarity between the notion of the greatest number, seen as the totality of all numbers, and that of the greatest being, seen as the totality of perfections, is evident and it is unlikely to have escaped Leibniz's attention. Rather, I suggest that the analogy is likely to have evoked Leibniz's concerns about the traditional notion of God. It is worth stressing that, if it turned out that the notion of the *Ens Perfectissimum* were inconsistent, disastrous consequences would follow, not only for rational theology but also for the very foundations of Leibniz's metaphysics and his very notion of possibility. For, according to him, it is God who conceives of all possibilities in his understanding.¹⁰

As it turns out, the texts are unambiguous in suggesting that the relations between the notions of the greatest being and the greatest number preoccupied Leibniz.¹¹ He juxtaposes and contrasts these definitions in the same papers and notes. In his writings, e.g., A 520; Pk 79, he explicitly draws an analogy between the essence of God and the essence of the number 6, which he argues is composed of six units (A 518; Pk 77). He is exploring an analogy between God, as consisting of all perfections, and the greatest number, as consisting of all units. In a letter to countess Elizabeth from 1678, he considers several examples of impossible notions (such as a square circle and the greatest speed) and writes:

... we think about this greatest speed, something that has no idea since it is impossible. Similarly, the greatest circle of all is an impossible thing, and the number all possible units is no less so; we have a demonstration of this. And nevertheless, we think about all this. That is why there are surely grounds for wondering whether we should be careful about the idea of the greatest of all beings, and whether it might not contain a contradiction (A.2.1, 433-38; AG 238).

Additional evidence that Leibniz is consciously connecting the notions of the greatest being and the greatest number appears in a later text, where he writes:

Mons. Des Cartes in his reply to the second objections, article two, agrees to the analogy between the most perfect Being and the greatest number, denying that this number implies a contradiction.¹² It is, however, easy to prove it. For the greatest number is the same as the number of all units. But the number of all units is the same as the number of all numbers (for any unit added to the previous ones always makes a new number). But the number of all numbers implies a contradiction, which I show thus: To any number, there is a corresponding number equal to its double. Therefore, the number of all numbers is not greater than the number of all evens, i.e., the whole is not greater than its part (G I 338; quoted from Russell's appendix, 244).

It seems evident that Leibniz's clarity about the impossibility of the greatest number (as well the most rapid motion and the greatest shape) plays a role in his concerns about the possibility of the greatest being — for his clarity about the former partly explains why the possibility of the latter requires a proof in the first place.

In any event, it is clear that Leibniz is investigating these notions by comparing and contrasting them. Note that the contrast between them is no less significant than their similarity: In Leibniz's eyes, the notion of the greatest being provides a paradigmatic case of a *possible* notion while 'the greatest number' provides a paradigmatic case of an *impossible* notion. It is also clear that each of these notions is of great consequence in Leibniz's philosophy. While these concepts ('all units', 'all perfections') have a striking structural similarity and both seem to imply infinite quantity, the concept of the greatest being serves Leibniz as a paradigm of a possible notion while the notion of the greatest number serves him as a paradigm of an impossible notion.

Since these notions seem to be analogous, Leibniz's position is very puzzling. What makes him regard the notion of the greatest being a paradigm of possibility and that of the greatest number a paradigm of impossibility? I think that this question merits some attention and it is one of the main purposes of this paper to draw attention to it. While I will consider some attempts to answer it, to a large extent, the question will remain unanswered. I am also under the impression that the distinction between these notions plays an important role in other contexts in Leibniz's metaphysics. For example, it is well known that Leibniz's notion of individual substances as well their complete concepts involves infinity. While the complete concept of an individual involves infinitely many predicates, Leibniz's

notion of individual substance involves infinitely many properties as well as reference to infinitely many other individuals. Since he considers individual beings to be possible (as some of them are actual), surely he considers their infinite concepts to be non-contradictory. But, as we noted, he considers infinite number to be impossible. So, to put the question more generally, what is the difference Leibniz sees between the notion of an infinite being – created or not – and that of an infinite number?

To try and see this, let us push the analogy a bit further. As I noted, Leibniz analyzed the notion of the greatest being in terms that seem to indicate maximal totality and number, such as “the subject of all perfections” (A 580; Pk 103), “one which contains all essence, or which has all qualities, or all affirmative attributes”. In a set of definitions from 1676, (A 482-84) and in reference to Euclid’s definition of number, Leibniz writes: “Number, if it is understood simply as integral and rational, is a whole consisting of units” (Pk 37-38). In the same texts he also draws an explicit analogy between God’s essence and whole numbers.¹³ In this analogy, numbers consist of units as God’s essence consists of simple forms or perfections. Since Leibniz defines whole number as consisting of units, the greatest number is seen as consisting of all units. Since he defines God as consisting of all essence or all perfections, the greatest being is seen as consisting of all perfections. Just as there are infinitely many units in the notion of infinite number, so it would seem that there would be infinitely many perfections in the notion of God. In this sense, these notions seem to be analogous. But, if so, Leibniz would have to consider them to be equally problematic (or equally unproblematic). Yet, as we have seen above, he doesn’t. Rather, he considers the one to be possible, the other to be impossible. Furthermore, he believes that he has demonstrated that the one is possible and that the other is impossible. What then is the dissimilarity Leibniz sees between the notion of the greatest being and that of the greatest number – a dissimilarity that convinces him to consider the one to be possible and the other to be impossible?

4. Beings and Non-Beings

Let me attempt to sketch a way in which we might approach this question. At the same time, I would like to stress that my project here is limited to the question of on what grounds Leibniz might have convinced himself that these notions

substantially differ from one another. The question whether his position is justified is surely very interesting but I should not pretend to address it here.

So, here is a way to think about this: One might suggest that the answer to our question is to be found in the question itself – namely, precisely in the difference between ‘the greatest *number*’ and ‘the greatest *being*’. Thus my first attempt to address the difficulty focuses on the difference between a number and a being. In spite of the close similarity between the notions of the greatest number and of the greatest being, there is also a substantial (semantic) difference between them. Put crudely, it is a dissimilarity that stems from the categorical difference between beings and numbers – a distinction that cuts deep in Leibniz’s metaphysics – and may be somehow reflected in their notions. We know that Leibniz considers numbers to be mental abstractions – *entia rationis* — rather than true beings. As he makes explicit in the same set of notes, “Numbers, modes, and relations are not entities” (A 463; Pk 7). Hence, “It is not surprising that the number of all numbers (*numerum omnium numerorum*), all possibilities, all relations or reflections, are not distinctly understood; for they are imaginary and have nothing that corresponds to them in reality” (A 399; Pk 115).¹⁴ In Leibniz’s mind, there seems to be a connection between his observation that the number of all numbers is not distinctly understood to that nothing corresponds to it.

On this suggestion, the main difference Leibniz sees between these notions derives from the fact that the one is a notion of a being and the other is a notion of a non-being, which, if true, may also teach us something about the way Leibniz understands the difference between beings and non-beings in other cases. While numbers are universal, divisible, and may be composed by a conjunction of units; beings, for Leibniz, are individual (that is, unique), active and indivisible units. While beings for Leibniz must be active agents, numbers are not. Rather, numbers are understood as abstractions in the minds of agents.¹⁵

On the other hand, the notion of God or the greatest being serves as the paradigm of Being. It is the primary being as well as the source of all created beings. It also serves as the model for Leibniz’s notion of created beings – i.e., individuals that have power and internal source of activity as well as an infinite structure.¹⁶ Even so, the question stands: “Why does the notion of the greatest being, seen as consisting of infinitely many perfections, avoid the contradiction facing the greatest number?” Let us not forget that Leibniz’s strategy to prove that the greatest being is possible is to show that all simple positive perfections or attributes are compatible *inter se* and therefore may be included in one subject. Since a conjunction of all

unities or ones would surely pass that test, how is it that, according to Leibniz, the notion the greatest being is deemed possible if the notion of infinite number, seen as the conjunction of all simple unities, is deemed impossible?

Unlike the notion of a number, the notion of God (and, if fact, of any true being, of which God is the most perfect) is, according to Leibniz, a notion of something that is not produced by composition of parts, that is, it is not something that is made up (per impossible) by composing or conjoining an infinite number of units or perfections. God (or any Leibnizian being) is not a sum of perfections. In fact, a being for Leibniz is not a sum at all; rather, it is an active and indivisible agent, or better, a mind that is said to include all perfections not by being composed of them as its parts. Such a primitive unity cannot be fully defined in terms of its constituents and in this sense admits no parts.

While this adequately captures Leibniz distinction between beings and non-beings, it is not at all clear that it helps clarifying our question. My original project was to compare the *concept* of the greatest being with that of greatest number. And so, even if God himself “is not a sum of perfections,” how does that help showing that the *concept of God* does not involve a sum of perfections in such a way as to make the concept of the greatest being just as problematic as the notion of the greatest number?¹⁷

5. Infinite Magnitude and Infinite Perfection

As this objection makes clear, something is either missing or wrong in the response given above. Indeed, the definition of God as the “subject of all perfections” is not all there is to Leibniz’s notion of God. For Leibniz, God is also “necessarily a thinking being;”¹⁸ an active mind whose activity consists in thinking.¹⁹ Unlike numbers, ideas and other incomplete notions, Leibnizian substances are intrinsically active units, whose activity (and primitive force) cannot be fully understood as a sum of their attributes.

While one may rightly want to protest at this juncture that activity and unity have nothing to do with the *concept* of God, this may indicate that, unlike the notion of number, the notion of God or that of the primary being is not understood by Leibniz in purely quantitative terms. Rather, if the source of being, according to Leibniz, is intrinsic activity and unity, which is a qualitative feature, then God’s intrinsic activity and unity may indicate that the sense in which infinity is ascribed to his notion may not pertain to a quantitative aspect, as I supposed above. In

other words, it may serve to indicate that the notion of infinity Leibniz ascribed to the greatest or most perfect being does not primarily pertain to magnitude or to number. There is a usage of 'infinite' which has to do with being complete and perfect and which is not, strictly speaking, quantifiable. This traditional notion of infinity, that which is not limited, need not be cashed out in quantitative terms, let alone in numerical ones. On this reading, the notion of the *Ens Perfectissimum* could be understood in this context in a sense that its highest perfection is not primarily expressed through the quantitative aspect of infinite sum or number of perfections but rather through a qualitative aspect of completeness and being unlimited.

While Leibniz may not be clear about this in his Paris notes, some later texts do suggest something along this line. In referring to his previous demonstrations, Leibniz articulates this point in terms of the difference in unity (or oneness) between infinite magnitude and infinite perfection. He writes: "...it has previously been demonstrated that the infinite in number and magnitude is neither one nor whole; but that only the infinite in perfection is one and whole" (*Deum non esse mundi animam* A.6.4 1492, quoted from Brown 2005, 450). In addition, in the context of discussing God, Leibniz notes: "An infinite whole is one" (A 474; Arthur 49). Thus, it is evident that *Leibniz* sees infinite in magnitude as contradictory but not so infinite in perfection, which indicates that he might be using 'infinite' here in two different senses. He clearly thinks that the *Ens Perfectissimum* is both one and infinite. Thus it would seem that, in this case, the notion of infinity does not apply to magnitude and to number but rather to perfection and completeness in the sense of being one and unlimited. Intuitively, God's perfection surely has to do with being complete in the sense that it includes all perfections so that there is no attribute that he lacks. Yet, from a historical perspective, it is ironic that Leibniz's attempt to support the proof of God's existence leads to the worry that the notion of God, which he claims to be required for the ontological argument to be valid, may not even be possible.

Perhaps what helped to convince Leibniz is that the notion of *all* perfections need not be spelled out in numerical terms. This is clearly the thrust of a letter from Spinoza, a letter that Leibniz not only read but also preserved and annotated in 1676. Spinoza writes:

To everyone, the problem of the infinite 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; and what kind cannot be so divided without contradiction. Again, they would have understood what kind of infinity can be conceived to be greater than another kind of infinity without implying a contradiction, and what kind cannot be so conceived (in Arthur 2001,103-05).²⁰

Spinoza spells out the distinctions concerning types of infinity as deriving from and applicable to the various distinctions of his metaphysics (Substance, mode, eternity, duration). He goes on to discuss the notion of substance as that in which ‘existence pertains to its essence’ and writes that, “every Substance can be understood only as infinite” (ibid 105). His main point seems to be that ascribing number (as well as measure and time) to Substance or Nature is misguided for these notions can only apply to its modes. While, for Spinoza, Substance is unique and indivisible, it also consists of infinitely many attributes. Thus, while Spinoza’s definition of a substance (as well as his explicit definition of God (in Ethics I definition 6) refers to infinity and infinite attributes, it is meant in the sense of infinity, which “cannot be expounded by or equated with any number”.

Spinoza’s point can be paraphrased (even if a bit crudely) as follows: When we read ‘infinite’ as unlimited we realize that (a) a number cannot be infinite since any number is clearly limited, and (b) that God’s infinity as unlimited cannot be quantified, measured, or numbered since that would imply limiting it. But, of course, that means that ‘infinity’ is used differently when it is applied to number (or more generally to quantity) and when it is applied to the definition of Substance and God as possessing the highest being and perfection. While Spinoza is very explicit about this distinction, Leibniz is not. Again, it is clear that Leibniz read carefully Spinoza’s letter, so that these distinctions were at the very least suggested to him. Interestingly, in his comments, Leibniz formulates the difference between types of infinity in terms of three degrees of infinity. He writes: “The third degree

of infinity, and this is the highest degree, is *everything*, and this kind of infinite is God, since he is all one; for in him are contained the requisites for existing of all other things” (Arthur 2001, 43). We also know that, in their meeting, Leibniz presented to Spinoza his proof of the possibility of God but we know very little about Spinoza’s reaction.

In any event, it is arguable that Leibniz equivocates on the notion of infinity in the way that Spinoza’s letter helps to clarify. That is, the notion of ‘infinite’ that he is using in ‘infinite number’ is not used in the same way as the one in ‘infinite being’. While the first use (in ‘infinite number’) pertains to magnitude, the second does not.²¹ It pertains rather to being unlimited, complete and perfect in a way that cannot be quantified and enumerated.

Thus one may suppose that Leibniz is reading “infinite” in this context as meaning only “complete” and thus denying that the notion of God includes the concepts of an infinity of perfections—that is, Leibniz is maintaining that the notion of God contains only the concept of *all* the perfections, where “all perfections” does not imply “an infinite number of perfections”.²²

Neither Leibniz nor Spinoza was shy about defining God as having infinitely many attributes. In this respect, the problem facing Leibniz seems to face Spinoza as well. However, Spinoza’s refusal to ascribe infinite number to God seems more convincing. For him, questions of possibility are merely epistemic and betray deficiency of knowledge. But this approach seems less convincing for Leibniz, for whom, consistent concepts indicate pure possibilities. After all, Leibniz’s possibility proof of ‘a most perfect being’ turns on the observation that a subject that includes all positive perfections forms a consistent concept.²³ But it is just such a concept that seems to suggest an infinite number of perfections. Thus we are led back to our starting point. Leibniz proves that a being whose notion consists of infinitely many attributes is consistent but a number whose notion consists of infinitely many units is not.

6. Conclusion

Having showed that Leibniz was preoccupied with the relations between the notion of the greatest being and that of the greatest number, I considered two ways in which he might have convinced himself of the difference between these notions – one that stressed the difference between being and number and one that stressed the difference between two notions of infinity, namely, an infinity that pertains to

magnitude and to number, on the one hand, and an infinity that pertains to perfection and completeness, on the other. As I made clear, both attempts are less than satisfactory. Yet, I don't presently see a better way to defend Leibniz on this score. I leave it here therefore as a challenge for Leibniz's scholars.²⁴

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Ohad Nachtomy
Department of Philosophy
Bar-Ilan University
52900 Israel
ohadnachtomy@mac.com

Abbreviation

- Pk = Parkinson G. H. R. (trans. and ed.) *G. W. Leibniz: De Summa Rerum: Metaphysical Papers 1675-1676* (New Haven and London: Yale University Press, 1992).
- S = Sleight, R. C., Jr. (trans. and ed.) *G. W. Leibniz: Confessio Philosophi: Papers Concerning the Problem of Evil*; additional contributions from B. Look and J. Stam (New Haven and London: Yale University Press, 2005).

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Notes

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² "I have defined the necessary as that the contrary of which cannot be understood; therefore, necessity and impossibility of things are to be sought in the ideas of things themselves, and not outside those things, by examining whether they can be thought or whether they imply a contradiction" (*Confessio*, A 128;S 57)

³ "I call that necessary, the opposite of which implies a contradiction, that is, that which cannot be clearly understood. ...Those things are contingent that are not necessary; those are possible whose non-existence is not necessary. Those are impossible that are not possible, or more briefly: the possible is *what* can be conceived, that is (in order that the word "can" does not occur in the definition of possible) *what is understood clearly by an attentive mind*; the impossible — what is not possible." (*Confessio*, A 126-27; S 53, 55).

⁴ I do not discuss here the other (very interesting) type of impossibility.

⁵ Later on (1684), Leibniz will make explicit the connection between a real definition and a causal one. A real definition establishes the possibility of a concept; a causal one reproduces the way it is produced in God's mind and hence provides a much more thorough knowledge about it.

⁶ This point is also supported in Leibniz's 1684 Meditation on Knowledge, Truth and Ideas, (A.6.4 588-89; AG 25-26)

⁷ Leibniz writes of Spinoza: "He defines God as an absolutely infinite being, likewise as a being that contains all perfections, i.e., affirmations, or realities or things that can be conceived" (A.3 384; Arthur, 43). However, in his letter 12, Spinoza makes clear that his characterization of the Substance as infinite does not

pertain to the number of perfections. Like Leibniz, he argues that, while an infinite number is contradictory, any being must be infinite.

⁸ “Demonstrationem reperisse videor, quod Ens perfectissimum, seu quod omnem Essentiam contineat, seu quod omnes habeat Qualitates, seu omnia attributa affirmativa, sit possibile, seu non implicet contradictionem. Hoc patebit si ostendero omnia attributa (positiva) esse inter se compatibilia. Sunt autem attributa aut resolubilia, aut irresolubilia, si resolubilia sunt erunt aggregatum eorum in quae resolvuntur; suffecerit ergo ostendisse compatibilitatem omnium primorum, sive irresolubilium attributorum, sive quae per se concipiuntur, ita enim si singula compatibilia erunt, etiam plura erunt, adeoque et composita. Tantum ergo suffecerit ostendere Ens intelligi posse, quod omnia attributa prima contineat, seu duo quaelibet attributa prima esse inter se compatibilia” (A 572; Pk, p. 91-93).

⁹ “There cannot be a most rapid motion or a greatest number. For number is something discrete, where the whole is not prior to its parts, but conversely. There cannot be a most rapid motion, because motion is a modification, and is the transference of a certain thing in a certain time. (Just as there cannot be a greatest shape.) There cannot be one motion of the whole, but there can be a kind of thinking of all things. Whenever the whole is prior to its parts, then it is a maximum, as in space and in a continuum. If matter is like a shape, namely that which makes a modification, then it seems that there is no totality of matter” (A 520; Pk 79, my italics).

¹⁰ “The very possibility of things, when they do not actually exist, has a reality grounded in the divine existence: for if God should not exist, there would be no possibility, and possible things are from eternity in the ideas of the divine intellect” (G VI 440). In 1678, Leibniz writes to Elizabeth: “Mais à présent, il me suffit de remarquer, que ce qui est le fondement de ma caractéristique l’est aussi de la démonstration de l’existence de Dieu” (A.2.1 437).

¹¹ In a letter to Conring (1677) Leibniz writes: “*At qui subtiliores sunt adversarii ajunt Ens perfectissimum tam implicare contradictionem quam numerum maximum*” (A.6.3 325).

¹² In his second objection to Descartes’s Meditations, Caterus argued that humans may invent or think out the concept of the greatest being from their own resources, just as they may think the concept of the greatest number though it is impossible.

¹³ “It seems to me that the origin of things from God is of the same kind as the origin of properties from an essence; just as $6 = 1 + 1 + 1 + 1 + 1 + 1$, therefore $6 = 3 + 3, = 3 \times 2, = 4 + 2$, etc. [...] So just as these properties differ from each other

and from essence, so do things differ from each other and from God” (A 518-519: Pk, p. 77. See also A 523; Pk, p. 83; A 512; Pk, p. 67 for similar analogies and A 521; Pk, p. 81).

¹⁴ [F]rom 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, can be infinite” (A 3 280; cited from Arthur, 2001, 111). Compare this with Spinoza’s letter on the infinite (12) in Shirley S. (trans.), Hackett, especially p. 404.

¹⁵ Spinoza says more or less the same thing in Letter L, for example.

¹⁶ See GP 3 340 and Fichant’s “Machines de la nature”, forthcoming in *Studia Leibnitiana*, 14.

¹⁷ The formulation of this objection is due to a referee for this journal.

¹⁸ God is not a Metaphysical something, imaginary, incapable of thought, will, action, as some make out, so that it would be the same as if you said that God is nature, fate, fortune, necessity, the World; but God is a Substance, Person, Mind. [...] It should be shown that God is a person or intelligent substance”.

¹⁹ “Deus non est quiddam Metaphysicum, imaginarium, incapax cogitationis, voluntatis, actionis, qualem nonnulli faciunt, ut idem futurum sit ac si diceret Deum esse naturam, fatum, fortunam, necessitatem, Mundum, sed Deus est Substantia quaedam, Persona, Mens. [...] Ostendendum est Deum esse personam seu substantiam intelligentem”; A 474-75; Pk 29. See also Loemker, p. 158; Pk, p. 27 and A 520; Pk, p. 70.

²⁰ In his comments, Leibniz formulates the different types of infinity in terms of degrees of infinity. “The third degree of infinity, and this is the highest degree, is *everything*, and this kind of infinite is God, since he is all one; for in him are contained the requisites for existing of all other things” (Arthur 2001, 43).

²¹ In his letter 12 (on the infinite), Spinoza expresses a similar point with remarkable clarity. He writes: “...Measure, Time and Number are nothing other than modes of thinking, or rather, modes of imagining. It is therefore not surprising that all who have attempted to understand the workings of nature by such concepts, and furthermore without really understanding these concepts, have tied themselves into such extraordinary knots. ... many who are not used to distinguishing mental constructs from real things have ventured to assert that Duration is composed of moments, thus falling into the clutches of Scylla in their eagerness to avoid Charybdis” (*Spinoza The Letters*, (trans, Shirley S), Hackett, 104).

²² This formulation is due to a referee for this journal.

²³ The proof itself does not appear in texts later than 1678 (in the letter to Elisabeth). While he continues to hold that one must prove the possibility of God and that Anselm and Descartes's version are incomplete for that very reason, he does not repeat the proof after 1678.

²⁴ A third way to approach this question (suggested to me by Y. Melamed) is to stress a difference between the units of infinite number, which are homogeneous, and God's perfections, which are not. If God's attributes are primitive to the extent that they are incommensurable, then Galileo's paradox may not arise. If God's perfections are such that they cannot be compared and related to one another as parts and whole, then it would seem that the paradox could not be generated. Indeed, in one text Leibniz says explicitly that this is the difference between units and forms. He writes: "I cannot explain how things result from forms other than by analogy with the way in which numbers result from units – with this difference, that all units are homogeneous, but forms are different" (A 523; Pk 85). While this suggestion is promising, it is hard to see why the attributes, even if entirely heterogeneous and primitive, may not be enumerated.