Raw Infinity Research - Basic Sources To Consider

Post by “Cassius” of July 15, 2024 at 2:09 PM

Notes on directions to research to look for proper ways to reconstruct basic Epicurean reasoning on infinity:

1. Wikipedia: Infinity
    1. Philosophical nature of infinity.
        1. Anaximander - first Greek to propose the universe to be infinite. Mostly right?
        2. Anaxagorus - first Greek to propose infinite division - Mostly wrong?
        3. Aristotle - rejected actual inflnity but allowed potential infinity?
            1. In Book 3 of the work entitled *Physics*, written by Aristotle, Aristotle deals with the concept of infinity in terms of his notion of actuality and of potentiality. Physics 207b8 It is always possible to think of a larger number: for the number of times a magnitude can be bisected is infinite. Hence the infinite is potential, never actual; the number of parts that can be taken always surpasses any assigned number.
        4. John Locke - in common with most of the empiricist philosophers, also believed that we can have no proper idea of the infinite. They believed all our ideas were derived from sense data or "impressions," and since all sensory impressions are inherently finite, so too are our thoughts and ideas. Our idea of infinity is merely negative or privative. "Whatever positive ideas we have in our minds of any space, duration, or number, let them be never so great, they are still finite; but when we suppose an inexhaustible remainder, from which we remove all bounds, and wherein we allow the mind an endless progression of thought, without ever completing the idea, there we have our idea of infinity... yet when we would frame in our minds the idea of an infinite space or duration, that idea is very obscure and confused, because it is made up of two parts very different, if not inconsistent. For let a man frame in his mind an idea of any space or number, as great as he will, it is plain the mind rests and terminates in that idea; which is contrary to the idea of infinity, which consists in a supposed endless progression." Essay, II. xvii. 7., author's emphasis --- Mostly wrong (?)
2. Especially Likely to lead to something fruitful?
    1. Georg Cantor
        1. The concept of the existence of an actual infinity was an important shared concern within the realms of mathematics, philosophy and religion. Preserving the orthodoxy of the relationship between God and mathematics, although not in the same form as held by his critics, was long a concern of Cantor's.[71] He directly addressed this intersection between these disciplines in the introduction to his *Grundlagen einer allgemeinen Mannigfaltigkeitslehre*

, where he stressed the connection between his view of the infinite and the philosophical one.[72] To Cantor, his mathematical views were intrinsically linked to their philosophical and theological implications – he identified the absolute infinite with God,[73] and he considered his work on transfinite numbers to have been directly communicated to him by God, who had chosen Cantor to reveal them to the world.[5] He was a devout Lutheran whose explicit Christian beliefs shaped his philosophy of science.[74] Joseph Dauben has traced the effect Cantor's Christian convictions had on the development of transfinite set theory.[75][76]

2. Debate among mathematicians grew out of opposing views in the philosophy of mathematics regarding the nature of actual infinity. Some held to the view that infinity was an abstraction which was not mathematically legitimate, and denied its existence.[77] Mathematicians from three major schools of thought (constructivism and its two offshoots, intuitionism and finitism) opposed Cantor's theories in this matter. For constructivists such as Kronecker, this rejection of actual infinity stems from fundamental disagreement with the idea that nonconstructive proofs such as Cantor's diagonal argument are sufficient proof that something exists, holding instead that constructive proofs are required. Intuitionism also rejects the idea that actual infinity is an expression of any sort of reality, but arrive at the decision via a different route than constructivism. Firstly, Cantor's argument rests on logic to prove the existence of transfinite numbers as an actual mathematical entity, whereas intuitionists hold that mathematical entities cannot be reduced to logical propositions, originating instead in the intuitions of the mind.[78] Secondly, the notion of infinity as an expression of reality is itself disallowed in intuitionism, since the human mind cannot intuitively construct an infinite set.[79] Mathematicians such as L. E. J. Brouwer and especially Henri Poincaré adopted an intuitionist stance against Cantor's work. Finally, Wittgenstein's attacks were finitist: he believed that Cantor's diagonal argument conflated the intension of a set of cardinal or real numbers with its extension, thus conflating the concept of rules for generating a set with an actual set.[10]
3. Some Christian theologians saw Cantor's work as a challenge to the uniqueness of the absolute infinity in the nature of God.[6] In particular, neo-Thomist thinkers saw the existence of an actual infinity that consisted of something other than God as jeopardizing "God's exclusive claim to supreme infinity".[80] Cantor strongly believed that this view was a misinterpretation of infinity, and was convinced that set theory could help correct this mistake:[81] "... the transfinite species are just as much at the disposal of the intentions of the Creator and His absolute boundless will as are the finite numbers.".[82] Prominent neo-scholastic German philosopher Constantin Gutberlet was in favor of such theory, holding that it didn't oppose the nature of God.[8]
4. Cantor also believed that his theory of transfinite numbers ran counter to both materialism and determinism – and was shocked when he realized that

he was the only faculty member at Halle who did *not* hold to deterministic philosophical beliefs.[83]

5. It was important to Cantor that his philosophy provided an "organic explanation" of nature, and in his 1883 *Grundlagen*, he said that such an explanation could only come about by drawing on the resources of the philosophy of Spinoza and Leibniz.[84] In making these claims, Cantor may have been influenced by F. A. Trendelenburg, whose lecture courses he attended at Berlin, and in turn Cantor produced a Latin commentary on Book 1 of Spinoza's *Ethica*. Trendelenburg was also the examiner of Cantor's *Habilitationsschrift*.[85][86]
6. In 1888, Cantor published his correspondence with several philosophers on the philosophical implications of his set theory. In an extensive attempt to persuade other Christian thinkers and authorities to adopt his views, Cantor had corresponded with Christian philosophers such as Tilman Pesch and Joseph Hontheim,[87] as well as theologians such as Cardinal Johann Baptist Franzelin, who once replied by equating the theory of transfinite numbers with pantheism.[7] Although later this Cardinal accepted the theory as valid, due to some clarifications from Cantor's.[8] Cantor even sent one letter directly to Pope Leo XIII himself, and addressed several pamphlets to him.[81]
7. Cantor's philosophy on the nature of numbers led him to affirm a belief in the freedom of mathematics to posit and prove concepts apart from the realm of physical phenomena, as expressions within an internal reality. The only restrictions on this metaphysical system are that all mathematical concepts must be devoid of internal contradiction, and that they follow from existing definitions, axioms, and theorems. This belief is summarized in his assertion that "the essence of mathematics is its freedom."[88] These ideas parallel those of Edmund Husserl, whom Cantor had met in Halle.[89]
8. Meanwhile, Cantor himself was fiercely opposed to infinitesimals, describing them as both an "abomination" and "the cholera bacillus of mathematics".[41]
9. Cantor's 1883 paper reveals that he was well aware of the opposition his ideas were encountering: "... I realize that in this undertaking I place myself in a certain opposition to views widely held concerning the mathematical infinite and to opinions frequently defended on the nature of numbers."[90]
10. Hence he devotes much space to justifying his earlier work, asserting that mathematical concepts may be freely introduced as long as they are free of contradiction and defined in terms of previously accepted concepts. He also cites Aristotle, René Descartes, George Berkeley, Gottfried Leibniz, and Bernard Bolzano on infinity. Instead, he always strongly rejected Immanuel Kant's philosophy, in the realms of both the philosophy of mathematics and metaphysics. He shared B. Russell's motto "Kant or Cantor", and defined Kant "yonder sophistical Philistine who knew so little mathematics."[91]

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