

Infinity in Science and Religion: The creative Role of thinking about Infinity

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Abstract

The major claim of this paper is to show the creative role of thinking about infinity in science and religion. This claim is substantiated by a historical survey. Starting with the reluctance of ancient Greek philosophy to think in terms of infinity it is shown, that first steps towards thinking about infinity were made by Anaximander's *απειρον* and Aristotle's potential infinity. However the overall schema of Greek philosophy remained oriented towards finiteness. It was not before the Christian theologian Gregor of Nyssa and not before some remarks of St. Augustine in his *civitate dei* that God was conceived as being infinite – in sharp separation of Aristotle's metaphysical concept of a finite God. This new concept of an infinite God raised the question of how to relate and how to think about this infinity, which was inconceivable in classical Greek metaphysics. One answer was the emergence of apophatic theology. The theology of Dionysios the Areopagite stresses like Gregor's theology the infinity of God. However he holds that this infinity can not be thought of in terms of language. Therefore one can only speak about the infinite God in the form of negations (*υπερ-*, *μετα-*) and can relate to it only in terms of emptying one's rational capability thus in the final analysis ending up in adoring silence. This apophatic answer to the intellectual challenge to think and relate to God's infinity however, as spiritual powerful as it may be, conveys the risk of eroding both human and divine rationality. Thus it could have turned out that the concept of an infinite God and the apophatic theology as a form of pious adoration of this infinity might have resulted in an intellectual dead end. However it is shown that in the subsequent historical development the most important successor of Dionysius the Areopagite and the strongest adherent of his theology, Cusanus, paved the way to intellectual understanding the infinity of God by means of symbolic mathematical illustration. He thus set the stage for the ongoing discussion about infinity and by creating the concept of (i) infinite mathematical approximation (ii) the concept of relativity of motion (iii) infinity of the world, including space, (iv) by linking infinity to mathematics. This combination of infinity with mathematics proved to be very fruitful in the theological and mathematical research of Georg Cantor in the 19th century, especially in the hierarchy of his *κς*. Thus thinking about infinity has been creative and triggered many innovative scientific and religious insights.

Biography

Wolfgang Achtner, studied theology in Mainz, Göttingen and Heidelberg and mathematics by correspondence. His doctoral dissertation was about a reframed natural theology in the work of T.F. Torrance. His recent second thesis (Habilitation) explores the shifts in theology, philosophy, epistemology and anthropology in late medieval time that paved the way to the emergence of modern science. He spent about a year in FEST in Heidelberg, a think tank of the Protestant Church in Germany. He published numerous articles about the science-theology dialogue and founded five working groups on science-

religion. In 1999-2000 he spent a sabbatical at the Princeton Theological Seminary, exploring the history of the concept of "law of nature" and its role in the science theology dialogue. Since 2000 he is campus minister at the University of Giessen and part-time lecturer at this University on science-theology. His awards include "Kleines Lutherstipendium", a translation grant of his book Dimensions of Time (Eerdmans 2002), a grant for founding an LSI group at the campus ministry and a stipendium for the "Templeton Oxford Seminars on Science and Christianity". He is member of the ESSSAT and the Protestant Academy of Arnoldshain and lectured in Germany, France, Switzerland, Greece, UK and USA. He is founder and editor of the "Giessener Hochschulpredigten und Hochschulgespräche der ESG (GHH) and the newsletter "Wissenschaft und Religion" (WUR).

Introduction

PP1: Presentation Slide

As finite human beings in space time and matter our thinking and feeling about infinity has always been associated with experiencing religious awe, whether in terms of wondering, frightening or inspiring. In this sense infinity has a very strong affective-emotional component. At the same time infinity is a scientific concept. In this sense it has a strong intellectual-rational component. In many records the affective-emotional component is stressed. Most famous is the text of Pascal, written during the time when modern Europe with its drive for infinite scientific progress was about to emerge. Quotation.

PP2: Pascal

“If I consider the short period of time of my life, intertwined into the eternity preceeding and following it, if I consider the little space, I am dwelling in, and even the one, which I see, which is annihilated in the infinite space, from which I know nothing, and which know nothing from me, then I am struck and wonder, that I live here and not there”¹.

However the rational structure of infinity still needs to be clarified. Many philosophers and mathematicians struggled with the intellectual endeavor to give a rational account of infinity. The most famous quotation derives from the German mathematician David Hilbert. In an address given in 1925 in Münster he said:

PP3: Hilbert

“The infinite has always stirred the emotions of mankind more deeply than any other question; the infinite has stimulated and fertilized reason as a few other ideas have”².

¹ Blaise Pascal, Le coer et ses raisons. Pensées, Nr. 205

² Hilbert, D., 1925, 371

Religious awe and wonder are just the beginning of a process of deeper religious and rational *transformation*, based both on affective-emotional involvement as well as on intellectual-rational clarification. I want to argue in this presentation *firstly* that religious and scientific – especially mathematical – concepts of infinity are deeply intertwined and *secondly* that one can distinguish at least 3 levels of infinity. Jumping from one level to another is always associated with an act of transformation of the cognitive emotional structure that results creatively in new religious and scientific insights. The presentation will be divided into three parts according to these three levels.

PP4: Levels of Infinity

Level 1: From περας to απειρον

Level 2: From απειρον to potential infinity

Level 3: From potential infinity to actual infinity

Part I. From περς to απειρον: Anaximander

Already in early Greek philosophy in the pre-Socratic area infinity was a matter of philosophical and religious consideration. The first one who mentioned it was Anaximander (). He coined a koan-like saying about infinity:

PP5: Anaximander

Αρχην των οντων το **απειρον** εξ ων δ' η γενεσις εστι τοις ουσι και την φθοραν εις ταυτα γινεσθαι κατα το χρεων διδομαι γαρ αυτα δικην και τισιν αλληλοις της αδικιας κατα την του χρονου ταξις

“The first principle of the things that exist is the apeiron. But where things have their origin, there too their passing away occurs according to necessity; for they pay recompense and penalty to one another for their recklessness, according to firmly established time”.

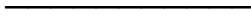

The απειρον is the opposite of περας which means frontier or border, but also the definite and clear. And the απειρον had a negative connotation, something to be afraid of and to be avoided, because only in a confined and rationally ordered area human life was conceived to be possible and healthy. Thus the apeiron in Anaximander’s point of view was not only the vague and indefinite, but also intellectually inconceivable and emotionally frightening.

Part II. From απειρον to potential infinity: Aristotle

The first philosopher of ancient Greece who gave a rational account about infinity was Aristotle.

PP6: Aristoteles' Schema

Aristotle discusses infinity in the framework of his philosophical distinction of *potentiality* and *actuality*. Within this context, the solution which Aristotle found is that the infinite cannot exist as an *actual infinity* but only as a *potential infinity*, which means as a possibility of endless action³. So, the infinite exists in the mode of potentiality⁴, as a mode of endless approximation⁵, which Aristotle associates mainly with mathematical procedures like addition or division⁶. This can be demonstrated in a schema:

	Actuality	Potentiality
Finity	 finite line	non-existent, self contradictory
Infinity	non-existent, self-contradictory	 infinite line

So Aristotle's major claim is that infinity only exists in a potential manner.

PP7: Aristoteles definition of the infinite

„ΛΕΙΠΕΤΑΙ ΟΥΝ ΔΥΝΑΜΕΙ ΕΙΝΑΙ ΤΟ ΑΠΕΙΡΟΝ“, Aristotle, Physics III, 206a18

“It results that the unlimited potentially exists”, Aristotle, Physics III, 206a18

However, thinking is finite.

This finiteness in regarding the process of thinking has an important consequence. Because God can be understood as the thinking of thinking, the νοησις νοησεως⁷, God himself also must be understood as finite.

³ “The unlimited then, is the open possibility of taking more, however much you have already taken”, Aristotle, physics III, 207a6; elsewhere in Metaphysics IX, 6

⁴ “It results that the unlimited potentiality exists”, “λειπεται ουν δυναμει ενει το απειρον”, Aristotle, physics, III, 206a18

⁵ “The illimitable, then, exists only the way just described – as an endless potentiality of approximation by reduction of intervals”, Aristotle, physics III, 206b15; or: “ου γαρ ου μηδεν εξω αλλ’ ου αι τι εξω εστι του το απειρον εστιν”, “Not that is infinite, beyond which nothing exists, but that is infinite, beyond always something is”, Physik III, 207a1

⁶ “it never exists as a *thing*, as a determined quantum does. In this sense, then, there is also illimitable potentiality of addition,...”, Aristotle, physics III, 206b16

⁷ Aristotle, Metaphysics, Λ 1074b33

PP8: Aristotle: God is finite

To sum up one can say, that Aristotle is a thinker who stresses finiteness. He rejects an all encompassing being like Anaximander, the *apeiron*, he rejects the ability of the human mind, the *νοος*, to think the actual infinite, and he contends that God is not infinite. What he holds however is, that the human mind can potentially think in infinite processes, and that time and motion are infinite, but space is finite. What makes Aristotle's account important is his distinction between potential infinity and actual infinity, which proved to be of great influence in the subsequent intellectual struggle about infinity.

Part III: From potential infinity to actual infinity: Gregory of Nyssa, Dionysius the Areopagite, Cusanus, Cantor

III.1 Gregory of Nyssa

It was not before Gregory of Nyssa that Christian theologians started to think about God in terms of infinity as actual infinity. It was within the Christological debates that Gregory claimed the infinity of God, substantiating it with biblical quotations.

PP9: God is infinite

αοριστος αρα και απερατωτος η θεια φυσικ καταλαμβάνεται⁸

Gregory goes a step further and asks the question, in what way infinity can be conceived:

“τινι γαρ ονοματι διαλαβω το απεριληπτον”⁹

and comes to the conclusion that the human mind (*νοος*) is not able to comprehend the infinity of God.

“οτι ουκ εστιν το αοριστον κατα την φυσικ επινοια τινι ρηματων
διαληφθηναι”¹⁰

To sum up Gregory opened a number of new theological, spiritual, ethical and intellectual horizons in his theology of infinity. The most important is:

⁸ p. 4,9sq, Muehlenberg 160

⁹ § 103, 39, 2sq; Muehlenberg 103

¹⁰ §103, 38, 17-21, Muehlenberg 102

PP10:God is infinite

He firmly conceived God as infinite, thus destroying the finite God of classic Greek metaphysics

III. 2 Actual infinity and apophatic theology: Dionysios the Areopagite

There is no notion, there is no intellectual concept that can cover all features of God's infinity. Thus he created apophatic theology in which all attempts to reach God's infinity are in vain. God is always ontologically (*υπερουσιος*) and epistemologically beyond the way humans think about him.

The locus classicus for the indiscernibility of God is in his *Mystica Theologia* V:

PP11: Apophatic Theology: God is indeiscernible

“Far more ascending we proclaim now that he, the first principle (*παντωναιτια*) is neither soul and not spirit. He has no power of imagination (*φαντασια*), nor opinion (*δοξα*), nor reason, nor recognition (*νοησις*). God can not be expressed in words nor can he be understood by thinking. He is neither number, nor order (*ταξις*), neither magnitude nor minimum, neither equality (*ισοτης*) nor non-equality (*ανισοτης*), neither similarity (*ομοιοτης*) nor non-similarity (*ανομοιοτης*). ... He is not being (*ουσια*), not eternity, not time. He can not be understood by thinking, he is not knowledge (*επιτημη*), not *wahrheit*, not dominion, not wisdom, not one (*εν*), not unity (*ενοτης*), not god-likeness (*θεοτης*), not mercy, not spirit (*πνευμα*) as we understand it. ... There is no word (*λογος*), no name (*ονομα*), no knowledge (*γνωσις*) about him”¹¹.

It seems that this approach of the Areopagite ends up in an intellectual dead end. God's actual infinity can not be discerned by the intellect.

The next decisive step towards an intellectual clarification of actual infinity was made by a German adherent and admirer of the Areopagite. It is Nicolaus Cusanus. We are going now to examine his contribution.

III.3 Actual infinity and the watershed to its rational understanding: Cusanus

Cusanus was deeply influenced by Dionysius. He is the most often quoted author in Cusanus' writings¹². And Cusanus is especially influenced by the Areopagite's apophatic approach. This means firstly that Cusanus agrees with the Areopagite that God is infinite¹³.

¹¹ Dionysius Areopagita, *Mystica Theologia* V, 1045D-1048B)

¹² For example in “docta ignorantia” Book I, 18,19, 24, 26

¹³ He even attributes to God *absolute* infinity. “Et quando haec subtilissime consideras, bene vides, quomodo Deo, qui est maius quam cogitari potest, scilicet ipsum *absolute infinitum* penitus nullum nomen

PP12: Cusanus: God is infinite

“Et non reperitur in Deo secundum theologiam negationis aliud quam infinitas”¹⁴.

Cusanus goes beyond the apophatic tradition insofar as he attempts by means of symbolic expressions to get an intellectual understanding of God’s infinity.

III.3.1 Cusanus’ new approach to infinity

He introduces a new and very innovative thought about this infinity, which is not found in the writings of both Gregory and Dionysius. Cusanus himself calls this thought as “never heard before” (*prius inaudita*)¹⁵. He qualifies the infinity of God as the “coincidentia oppositorum”, the falling together of contradictions or opposites¹⁶.

PP13: Cincidentia oppositorum

“Maximum itaque absolutum unum est, quo de omnia; in quo omnia, quia maximum. Et quoniam nihil sibi opponitur, secum simul coincidit minimum”¹⁷.

Furthermore he is considering the relation of infinity to logic, especially to the principle of contradiction, claiming that the infinite unity defies any logical treatment because the logical procedure requires at least a duality of entities which is not the case in a unity.

PP14: Infinity and Logic

“Infinitas est ipsa simplicitas omnium, quae dicuntur, contradiction sine alteratione non est. Alteritas autem in simplicitate sine alteratione est, quia ipsa simplicitas”¹⁸.

“Hoc autem omnem nostrum intellectum transcendit, qui nequit contradictoria in suo principio combinare via rationis, quoniam per ea, quae nobis a natura manifesta fiunt,

competere potest...”, *Complementium theologicum*, 696; “Et ideo video te immensurabilem omnium mensuram, sicut infinitum omnium finem. Es igitur Domine, quia infinitus sine principio et fine, es principium sine principio et finis sine fine, es principium sine fine et finis sine principio et ita principium, quod finis et ita finis quod principium et necque principium necque finis, sed supra principium et finem ipsa *absoluta infinitas* semper benedicta”, *De visione dei*, 152; also *De visione dei* 148. For an exhaustive summary of all ways to characterize God’s infinity (infinite angle, infinite number, infinite circumference, infinite power, infinite unity, infinite mind) compare Knobloch, E, 2002, 223

¹⁴ Cusanus, *docta ignorantia* I, 26; also “Et ita theologia negationis adeonecessaria est quoad aliam affirmationis, ut sine illa Deus non coleretur ut Deus infinitus, sed potius ut creatura”, Cusanus, *docta ignorantia* I, 26

¹⁵ Cusanus, *docta ignorantia*, II, 11; quoted according Kurt Flasch, *Nikolaus von Kues, Geschichte einer Entwicklung*, Vittorio Klostermann, Frankfurt 1998, S. 47

¹⁶ “debet autem in his profundis omnis nostril humani ingenii conatus esse, ut ad illam se eleuet simplicitatem, ubi contradictoria coincidunt”, Flasch, K., 1998, 46

¹⁷ Cusanus, *dogta ignorantia*, I, 2

¹⁸ Cusanus, *De visione dei*, 148

ambulamus; quae longe ab hac infinita virtute cadens ipsa contradictoria per infinitum distantia connectere simul nequit”¹⁹.

However though human reason could not attain the “coincidentia oppositorum” in the infinity of God, there are other means to get intellectual access to this realm. It is the way of symbolic illustration.

III.3.5 “Coincidentia oppositorum” and the relativity of motion

Cusanus’ concept of the “coincidentia oppositorum” in infinity had not only an impact on mathematics but also on the physical sciences. This impact of Cusanus’ teaching of the “coincidentia oppositorum” in infinity on the physical universe is due to a major shift in Cusanus’ teaching. Cusanus no longer holds that only God is infinite, but because the world is the mirror of God²⁰, also the world must be conceived as infinite, especially with respect to space and motion. Cusanus argues that the world cannot have a center, because in an infinite world the center coincides with the circumference.

PP15: Cusanus: Kein Zentrum der Welt

“Centrum igitur mundi coincidit cum circumferentia”, Cusanus, *docta ignorantia* II, 11

This means that the world with respect to space must be regarded as infinite. This of course means that also the earth can no longer be the center of the world - as taught by Aristotle – and she must have also some kind of motion²¹. Thus in the final analysis Cusanus’ concept of infinity led to the concept of relativity of motion, because a central point of reference in the world is denied.

PP16: Relativitätsprinzip

The principle of relativity of motion was thus invented by purely philosophical considerations about infinity 800 years before it was formulated by Einstein as a principle of physical sciences.

To sum up one can argue that Cusanus has overcome the intellectual dead end of apophatic theology by trying to illustrate infinity by means of mathematical symbols and by applying the new thought of “coincidentia oppositorum” to God’s infinity. However this is only half of the truth. By applying this new concept of “coincidentia oppositorum” also to scientific problems he paved the way to a kind of secularisation of infinity. Thus it became in different ways a scientific concept. The examples are the

¹⁹ Cusanus, *docta ignorantia*, I, 4

²⁰ “Consensere omnes sapientissime nostril divinissimi doctores visibilia veraciter invisibilium imagines esse atque creatorem ita cognoscibiliter a creaturis videri posse quasi in speculo et in aenigmate”, Cusanus, *docta ignorantia*, I, 11; Cassirer, E., *Das Erkenntnisproblem*, reprint 1991, 24; “Quis melius sensum Pauli quam Paulus exprimeret? Invisibilia alibi ait aeterna esse. Temporalia imagines sunt aeternorum. Ideo si ea, quae facta sunt, intelliguntur invisibilia Dei conspiciuntur uti sunt sempiternitas virtus eius et divinitas. Ita a creatura mundi fit Dei manifestatio”, Cusanus, *Triologus de posset*; Cohen, Jonas., 88

²¹ “Terra igitur, quae centrum esse nequit, motu omni carere non potest”, Cusanus, *docta ignorantia*, II 11

PP17: Cusanus' accomplishments

- (i) infinity of space,
- (ii) the relativity of motion,
- (iii) the approximative processes in mathematics and in epistemology.
- (iv) The conceptual difficulties of dealing with infinity in terms of quantity

Thus he paved the way by thinking about infinity in many ways to modern sciences.

III.4: The mathematics of actual infinity: Georg Cantor

PP18: Georg Cantor

Cantor revived the tradition of Cusanus, to whom he even alluded in the endnotes of his *Grundlagen*. He is actually the first one who claimed – despite the then prevailing Kantian philosophy – that actual infinity could be an object of mathematical research and that the human ratio could create conceptual tools in order to discern its internal structure. And this is what Cantor actually did. I want to give just a few but important examples how Cantor made infinity a subject of rational research. These examples fall into three different categories.

- (i) rational discernment of infinity,
- (ii) real antinomies (logical contradictions),
- (iii) resolving the antinomies

(i) *Rational discernment of infinity* Cantor created a new kind of numbers. He defined the infinite number of the integers \mathbf{N} as a new number which he called \aleph_0 or the first transfinite set or the first cardinal number. This new number $\aleph_0 = \mathbf{N} = \{1, 2, 3, \dots, n\}$ serves as a kind of mathematical measurement device for the internal structure of infinity.

By relating $\aleph_0 = \mathbf{N} = \{1, 2, 3, \dots, n\}$ to the rational numbers \mathbf{Q} and the real numbers \mathbf{R} he could show that these sets \mathbf{N} and \mathbf{Q} at the one hand and \mathbf{R} at the other hand had a different “Mächtigkeit” (power). \mathbf{N} and \mathbf{Q} are countable infinities, \mathbf{R} is a non-countable infinity.

PP20: Alefs

Another logical discernment of infinity was Cantors discovery that the set of all subsets of a cardinal number always had a higher “Mächtigkeit” (power) than the set itself.

$$\text{Card}(P(A)) > \text{Card}(A)$$

PP21: Antinomies

(ii) *Antinomies* Cantor discovered two different antinomies in his system, but he was not very concerned about it because he thought he could resolve them. One of them was related to the idea of the totality of all cardinal numbers. How can the set of all transfinite sets be conceived of? He called this set \aleph or absolute infinity, which means $\aleph = \aleph_1, \aleph_2, \aleph_3, \dots, \aleph_n$. He could show that the set of all cardinal numbers results in a contradiction, which violates the logical consistency of all his mathematics with disastrous effects on the logical foundation of mathematics.

Be \aleph the set of all sets

According to Cantors law about the cardinality of subsets [$\text{Card} (P(A)) > \text{Card} (A)$] it follows

$$\text{Card} (P (\aleph)) > \text{Card} (\aleph)$$

At the other hand \aleph includes as the set of all sets also the set of also the set of all subsets (Potenzmenge) $P (\aleph)$. This means for the cardinality:

$$\text{Card} (\aleph) > \text{Card} (P (\aleph))$$

Obviously we have now created an antinomy in the very heart of Cantor's notation of infinity. Two contradicting assertions about infinity occurred by applying the Cantorian theorem about the cardinality of sets and subsets to infinity, which are:

$$\begin{aligned} \text{Card} (\aleph) > \text{Card} (P (\aleph)) \\ \text{and} \\ \text{Card} (P (\aleph)) > \text{Card} (\aleph) \end{aligned}$$

Such a logical contradiction in the heart of the theory must have been a disaster. However though Cantor knew about this contradiction already as early as 1895, he did not care about it very much. The reason why he did not sheds light on his understanding of infinity and about his way he resolved this contradiction.

(iii) *Resolving the antinomy* Cantor resolved this contradiction by claiming that \aleph , the absolute infinity, can not be object of *quantitative discursive rational* operation. It can not be understood by logical discernment but only by intuitive insight²², and even more, it can not be recognized but only be accepted without any further discursive rational activity and logical discernment²³.

²² Cantor made an allusion to this kind of *intuitive insight* in a letter to Ph. Jourdain from 1903. " I have 20 years ago *intuitively* realized (when I discovered the Alefs themselves) the undoubtedly correct theorem, that except the Alefs there are no transfinite cardinal numbers", Bandmann, H., 1992, 282

²³ "The absolute infinity can only be accepted, but not be recognized, not even nearly recognized", Bandmann, H., 1992, 285

Logical discernment in this context meant that he did not conceive of $\aleph = \{\aleph_0, \aleph_1, \dots, \aleph_n, \dots\}$ as a set, rather he called it an “*inconsistent plurality*”, to which his theorem of the cardinality of sets of sets could not be applied without creating logical inconsistencies²⁴. So he avoided the logical contradictions of \aleph by excluding it from being part of sets. Instead he created another type of sets, which he called the “*inconsistent plurality*”. But this logical differentiation between *sets* and *inconsistent pluralities* was more than just a formal logical operation.

This \aleph , Cantor claimed, is God, the creative source of all quantities existing in the world, to whom a intuitive insight is possible. It was the transformative experience of this \aleph , that helped him according to his own witness, to find the transfinite numbers with all its strange mathematical properties.

²⁴ More explicit Cantor worked with two theorems to avoid the contradiction. First theorem A: The system \aleph of all \aleph s is in its extension similar to Ω and is for this reason also an inconsistent plurality. Theorem B: The system \aleph of all Alefs is nothing else as the system of all transfinite cardinal numbers, Bandmann, H., 1992, 281. In a letter from 1897 to David Hilbert (Bandmann, H., 1992, 287) Cantor introduced this distinction between normal sets and inconsistent pluralities. He wrote :”The totality of all Alefs is a totality which can not be conceived as a distinct well defined set. If this were the case, this would entail another distinct Alef following this totality, which would at the same time belong to this totality and not. This would be a contradiction. Totalities, which can not be conceived from our perspective as sets (....) I called already years ago absolute infinite totalities and have distinguished them very clearly from the transfinite sets.”

PP22: Conclusion

Let me conclude and sum up with a schema that includes all epistemological, ontological and mathematical levels of infinity and the way they are related to each other.

Levels of Infinity	Epistemology	Ontology
Absolute Infinity (Actual Infinity) Cantor: \aleph Cusanus: "coincidentia oppositorum" The Areopagite, G.o.Nyssa: apophatic theology	Intuition (νοησις)	Being
The Transfinite (Actual Infinity: $\aleph_0, \dots, \aleph_1, \dots, \aleph_\omega$): Cantor	Discursive quantitative rationality (διανοια)	Becoming
Potential Infinity: Aristotle	Discursive quantitative rationality (διανοια)	Becoming
Finiteness (περας), To be avoided due to lack of form: αιριον	Sensual experience (αισθησις, δοξα)	Phenomenal world of senses

This schema reveals us that thinking and experiencing infinity is also a story of liberation. Whereas the step from finiteness (περας) to potential infinity and transfinite is associated with the liberation from purely sensual encounter of the world in favor of a rational relation, the step from the transfinite to the absolute infinity is the liberation from purely rational quantitative thinking to the intuitive insight to the unity and infinity the all encompassing infinity of God. One can get a vague intuitive glance of him, but not a rational account. In this sense I want to finish with a quotation of a remark from the Russian mathematician Sonia Kowalewskaja, which she said to Cantor on the occasion of a congress in 1903 in Heidelberg: Alluding to a verse in the Bible (1. King 8, 27), relating the story of the inauguration of the temple by Salomo she said:

“But will God indeed dwell on the Earth? Behold, heaven and the highest heaven cannot contain thee”. “Heaven and the highest heaven” – does that not remind to the sets of all sets? What Salomo said, means, translated into mathematics: God, the highest infinity, can not be grasped at all, neither by a set nor by the set of sets”²⁵.

²⁵ Meschkowski, H., 1967, 155

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