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BETWEEN THEOLOGY AND MATHEMATICS. NICHOLAS OF CUSA'S PHILOSOPHY OF MATHEMATICS

Abstract. The paper is devoted to the philosophical and theological as well as mathematical ideas of Nicholas of Cusa (1401–1464). He was a mathematician, but first of all a theologian. Connections between theology and philosophy on the one side and mathematics on the other were, for him, bilateral. In this paper we shall concentrate only on one side and try to show how some theological ideas were used by him to answer fundamental questions in the philosophy of mathematics.

The aim of this paper is to indicate the influence of theological and philosophical ideas on the philosophy of mathematics of Nicholas of Cusa (1401–1464). He was a mathematician but first of all a theologian. In fact the connections between theology and philosophy on the one side and mathematics on the other were in his case bilateral. He used mathematical language in explaining theological ideas and *vice versa* – some ideas and concepts coming from theology and philosophy were used by him to express his conceptions concerning philosophical questions and problems of mathematics. In this paper we shall concentrate only on the second issue and try to show how some theological ideas were used by him to answer fundamental questions in the philosophy of mathematics.

Before we consider Nicholas' philosophy of mathematics let us say some words about his life and activity.

He was born as Nicholas Kryffs or Krebs in Kues, now Bernkastel-Kues, about 30 km from Trier, an old town in the Palatinate, founded already by the Romans. Following the usual practice in a Latin speaking church environment, his name often appears as Nikolaus Cusanus, from the Latin name of the town. He was sent to Deventer, in the Netherlands where he probably attended a school of Brothers of Common Life, a Roman Catholic religious community founded in the 14^{th} century. They in-

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fluenced him with a mixture of mysticism and reason. In 1416 Nicholas matriculated at the University of Heidelberg where he studied liberal arts, particularly philosophy. The following year he went to the University of Padua where he studied canon law. In Padua he became a friend of Paolo dal Pozzo Toscanelli, who later became an important mathematician and astronomer. They remained friends throughout Nicholas' life. Thanks to his contacts with Toscanelli, Nicholas learned in Padua about the latest developments in mathematics and astronomy. He graduated with a doctorate in canon law from Padua in 1423. In 1425 he matriculated at the University of Cologne to study philosophy and theology. There he was introduced to the ideas of Pseudo-Dionysius, Albertus Magnus, and Ramon Llull. After finishing his studies he began his legal activity. In 1431–1437 he took part in the Council of Basel. In 1433 he wrote *De concordantia catholica* arguing that the Council's authority took precedence over that of the pope. In 1436 Nicholas changed sides, taking the pope's side. In 1438 pope Eugenius IV sent him as a member of a three-man delegation to Constantinople. Their aim was to set up a process leading to the eastern and western Churches reuniting. His activity led to temporary success. The stay in Constantinople was important for Nicholas also from the point of view of his scientific activity – he discovered there some important Greek manuscripts.

Between 1438 and 1448 Nicholas took part in several missions to Germany as papal envoy. Sometime between 1436 and 1440 he ordained and was named cardinal by pope Eugenius IV in 1446 in recognition of his work as papal envoy. The death of Eugenius IV caused that Nicholas had to wait till 1448 when pope Nicholas V made him a cardinal. He became the bishop of Brixon (now Bressanone) in 1450. Unfortunately he could not take up his duties there for two years (the reason was opposition by the Duke of Austria) and the pope sent him as papal legate to North Germany and the Netherlands. His aim was to prepare the Christians for the Jubilee of 1450.

In Brixen Nicholas began to reform the local Church, which caused him trouble. In 1460 he was imprisoned by the local ruler Sigismund. Set free he left his diocese and settled in Rome. He died in Todi in 1464. According to his wishes his body was buried in Rome and his heart in his home town Kues.

Nicholas' first important published work was *De docta ignorantia* (1440). This is perhaps his best known philosophical work. He argued there the incomplete nature of man's knowledge of the universe, claiming that the search for truth was equal to the task of squaring the circle.

Among his writings on mathematics one should mention: *De geometricis transmutationibus* (1445), *De arithmeticis complementis* (1445), *De circuli quadratura* (1450), *Quadratura circuli* (1450), *De mathematicis complementis* (1453), *Dialogus de circuli quadratura* (1457), *De caesarea circuli quadratura* (1457), *De mathematica perfectione* (1458), *Aurea propositio in mathematicis* (1459). He also wrote *Declaratio rectilineationis curvae* and *De una recti curvique mensura* but their dates are unknown. He was interested in geometry and logic and had clearly made a study of at least parts of Euclid's *Elements* and the works of Thomas Bradwardine and Campanus of Novara. He contributed to the study of infinity, studying the infinitely large and the infinitely small. He looked at the circle as the limit of regular polygons and used it in his religious teaching to show how one can approach truth but never reach it completely. His main mathematical work is considered to be *De mathematicis complementi*. In many of his papers he considered the problem of squaring the circle and of measuring the circumference of a circle.

He was also interested in astronomy. It led him to certain theories. Giordano Bruno is said to have written: "If [Nicholas of Cusa] had not been hindered by his priest's vestment, he would have even been greater than Pythagoras!".

In his philosophical works Nicholas was particularly interested in the theory of knowledge. He wrote on this topic in works such as *De conjecturis* (1440–44) and *Compendium* (1464). According to him, knowledge is derived through the senses, but understanding is an abstraction of diverse sensory images. All human knowledge must be mere conjecture, and wisdom is attained only through understanding the extent of one's ignorance.

After those general biographical remarks let us come to the proper subject, i.e., to Nicholas' philosophical views on mathematics. Note at the beginning that his writings on mathematics are those of a good amateur and they do not attain top level in rigour.

Nicholas of Cusa, being convinced that human knowledge is only an approximation of the truth (*coniectura*), attributed to mathematical knowledge the highest degree of precision and clarity. Following the tradition of Boethius he claimed that mathematics in the best way prepares the human mind for theological considerations. In *De docta ignorantia* (On Learned Ignorance) he wrote:

> Thus, Boethius, the most learned of the Romans, affirmed that anyone who altogether lacked skill in mathematics could not attain a knowledge of divine matters.[1] (I, 11)

And he added (*ibidem*):

> [...] since the pathway for approaching divine matters is opened to us only through symbols, we can make quite suitable use of mathematical signs because of their incorruptible certainty.[2]

Mathematics played an important, even fundamental, role in Nicholas' thought. In fact it was for him an example and model of all veritable human knowledge. Mathematics gives the best possible certain and reliable knowledge. This is so because in mathematics the mind uses numbers and figures that are constructed by it without any reference to the knowledge of a changeable physical reality. In fact numbers and figures are within the power only of the mind and emulate the activity of God – "And so, God, who created all things in number, weight, and measure[3], arranged the elements in an admirable order. (Number pertains to arithmetic, weight to music, measure to geometry.)[4]" (*De docta ignorantia* II, 13). And similarly at another place (*ibidem*):

> In creating the world, God used arithmetic, geometry, music, and likewise astronomy. (We ourselves also use these arts when we investigate the comparative relationships of objects, of elements, and of motions.) For through arithmetic God united things. Through geometry He shaped them, in order that they would thereby attain firmness, stability, and mobility in accordance with their conditions.[5]

Any intellectual process presupposes the usage of numbers – in fact thinking means to count, to measure, and to compare. Any human knowledge is expressed by numbers. Hence number is an indispensable stamp of human rationality.

According to the tradition of the Platonic Academy, Cusanus took up the classical tripartition of theoretical science: physics, mathematics, and theology. Mathematical objects are intermediate between physical, material, and changing realities and the reality that theology treats. Objects of mathematics – though more abstract than objects of sensual perception – are not free of any change. Still they are fixed and certain because they are in the power of the mind alone. He wrote:

> In our considering of objects, we see that those which are more abstract than perceptible things, viz., mathematicals, (not that they are altogether free of material associations, without which they cannot be imagined, and not that they are at all subject to the possibility of changing) are very fixed and are very certain to us.[6] (*De docta ignorantia* I, 11)

The mind is internally bounded only by the principle of consistency.

At various places in his works Nicholas mentioned the (not quite clear) idea of intellectual mathematics and physical mathematics – in particular he did so in connection with his considerations of the problem of squaring the circle. Physical mathematics is the inverted reflection of intellectual mathematics. The latter deals with the infinitely great and the infinitely small. It is the light of the mind – thanks to it one can do ordinary mathematics. Using Kant's terms one can say that intellectual mathematics is the condition that makes possible ordinary mathematics. Intellectual mathematics contains all the figures and forms that are distinct for reason. According to Nicholas, if the squaring of a circle is impossible on the level of ordinary mathematics, it exists on the level of the light of the intellect and of the superior mathematics. The latter can only be studied indirectly, on the basis of physical mathematics.

Where and how do mathematical objects exist? In his work *Idiota de mente* (The Layman on the Mind) he considered the concept of number. He distinguished numbers being the object of mathematics and numbers coming from God. The former come from man; the latter have their origin in God's mind. In *Idiota de mente* he wrote in Chapter 9:

> Mind makes a *point* to be the termination of a *line*, makes a line to be the termination of a surface, and makes a surface to be the termination of a material object. Mind makes number; hence, multitude and magnitude derive from mind. And, hence, mind measures all things.[7]

And in Chapter 6 one finds the following words:

> I deem the Pythagoreans – who, as you state, philosophize about all things by means of number – to be serious and keen [philosophers]. It is not the case that I think they meant to be speaking of number qua mathematical number and qua number proceeding from our mind. (For it is self-evident that that [sort of number] is not the beginning of anything.) Rather, they were speaking symbolically and plausibly about the number that proceeds from the Divine Mind – of which number a mathematical number is an image. For just as our mind is to the Infinite, Eternal Mind, so number [that proceeds] from our mind is to number [that proceeds from the Divine Mind]. And we give our name "number" to number from the Divine Mind, even as to the Divine Mind itself we give the name for our mind. And we take very great pleasure in occupying ourselves with numbers, as being an instance of our occupying ourselves with our own work.[8]

Hence the numbers being objects of mathematics are the image (*ymago*) of the numbers existing in God.

We see that Cusanus dissociates from Plato. For the latter, mathematical numbers belonged to a realm between the realm of ideas and the realm of objects sensually recognizable. They exist eternally. For Nicholas there exist only numbers that come from God's mind and find their reality in the variety of sensually intelligible objects and the mathematical numbers that are creations of the human mind in accordance with God's numbers. He wrote in *Idiota de mente* (Chapter 6):

> You see, too, how it is that number is not anything other than the things enumerated. Here from you know that between the Divine Mind and things there is no actually existing intervening number. Instead, the number of things are the things.[9]

The role of numbers is seen by Cusanus in the following way (*Idiota de mente*, Chapter 6):

> In like manner, I say that number is the exemplar of our mind's conceptions. For without number mind can do nothing. If number did not exist, then there would be no assimilating, no conceptualizing, no discriminating, no measuring. For, without number, things could not be understood to be different from one another and to be discrete. For without number we [could] not understand that substance is one thing, quantity another thing, and so on regarding the other [categories]. Therefore, since number is a mode of understanding, nothing can be understood without it. For since our mind's number is an image of the divine number – which is the Exemplar-of-things – it is the exemplar of concepts.[10]

Add that according to Nicholas mathematical objects are good symbols of the essences of things. Hence, different kinds of reality can be symbolised by different kinds of numbers and unities. The divine unity should be symbolised by the first arithmetical unit – the one – which is the principle of all numbers. The unit of ten and its first multiples represent the order of pure intellects or intelligences, the unit of one hundred and its multiples – the order of souls, and the unit of one thousand can be linked to the world of bodies and materials.

In a similar way to numbers, Nicholas treats geometrical objects. They are creations of the human mind. In Chapter 9 of *Idiota de mente* he wrote:

> Mind makes a *point* to be the termination of a *line*, makes a line to be the termination of a surface, and makes a surface to be the termination of a material object [...].[11]

Also other geometrical figures like the circle, triangle etc. are created by the mind:

> You know, O Orator, how it is that we produce mathematical figures by the power of our mind. Hence, when I wish to make triangularity visible, I construct a figure in which I make three angles, so that, thereupon, triangularity shines forth in the figure thus arranged and proportioned. To triangularity is united a name, which, by imposition, is "trigon". Accordingly, I say: if "trigon" were the precise name of the triangular figure, then I would know the precise names of all polygons. For, in that case, I would know that the name of a quadrangular figure ought to be "tetragon" and that the name of a fiveangled figure ought to be "pentagon," and so on. And from a knowledge of the one name I would know (1) the figure named, (2) all nameable polygons, (3) their differences and agreements, and (4) whatever else could be known in regard to this matter.[12] (*Idiota de mente*, Chapter 3)

How does a human mind create a geometrical object? Cusanus explains this in Chapter 9 of *Idiota de mente* writing:

> *Philosopher*: How does the mind make a line?
> *Layman*: By considering length without width. And [mind makes] a surface by going on to consider width without solidity. (However, neither a point nor a line nor a surface can *actually* exist in this way, for outside the mind only solidity actually exists.) Thus, the measure or end-point of each thing is due to mind. Stones and pieces of wood have a certain measurement – and have endpoints – outside our mind; but these [measurements and end-points] are due to the Uncreated Mind, from which all the end-points of things derive.[13]

In *De docta ignorantia* (II, 5) he adds:

> In order that you may see more clearly: A line cannot exist actually except in a material object, as will be shown elsewhere.[14]

What does it mean to exist actually? Nicholas explains it in the following way (*De docta ignorantia* II, 5):

> But everything which exists actually, exists in God, since He is the actuality of all things. Now, actuality is the perfection and the end of possibility.[15]

Mathematical objects created by the human mind are a picture (*ymago*) of that which comes from God's mind and is realized in things. Those mathematical objects can be made by the mind thanks to its ability of assimilation – see the subtitle of Chapter 7 of *Idiota de mente* that says:

> CHAPTER SEVEN: Mind produces from itself, by means of assimilation, the forms of things; and it attains unto absolute possibility, or matter.[16]

At other places Nicholas uses instead of "assimilation" the word "abstraction" (cf. *De docta ignorantia* II, 1 and 4). One can see here a form of empiricism. In fact in *Idiota de mente* (Chapter 2) he writes[17]:

> So whoever thinks that in the intellect there can be nothing that is not present in reason also thinks that in the intellect there can be nothing that was not first in the senses.[18]

Let us turn now to Cusanus' views concerning infinity. It appears by him both in mathematical considerations as well as in his philosophico-theological considerations. He claims that infinity can be grasped in mathematics by mind with the help of concepts, but it cannot be grasped with the help of senses. It should be stressed that the reason and the aim for considering infinity in mathematics was for Nicholas an attempt to approach the infinity of God.

Considering the problem of the applicability of the Aristotelian category of quantity, Nicholas argued that infinity cannot be characterized in terms of this category; it cannot be quantified. Such notions as "bigger" or "smaller", "equal" or "unequal" cannot be related to infinity. Human rationality operates epistemologically within the category of quantity; all mathematical operations are based on it. Hence there are some constraints put on mathematics in its reach for infinity. In fact there is no way from quantity to infinity. Such notions as infinity, maximum, or minimum, are all transcendent terms. Cusanus objected to Aristotle's idea of potential infinity because it is based on an infinite progression of finite quantities. Infinity cannot be measured. On the other hand, it is the measure of everything else and it is unique. Infinity defies also any logical treatment. The infinite has no proportion to the finite, hence it will never be known from the finite.

Mathematics can help us to understand infinity, in particular God's infinity. This can be done by symbolic illustration. In *De docta ignorantia* he wrote:

> For since all mathematicals are finite and otherwise could not even be imagined: if we want to use finite things as a way for ascending to the unqualifiedly Maximum, we must first consider finite mathematical figures together with their characteristics and relations. Next, [we must] apply these relations, in a transformed way, to corresponding infinite mathematical figures. Thirdly, [we must] thereafter in a still more highly transformed way, apply the relations of these infinite figures to the simple Infinite, which is altogether independent even of all figure. At this point our ignorance will be taught incomprehensibly how we are to think more correctly and truly about the Most High as we grope by means of a symbolism.[19] (I, 12)

Among things and processes that can be known by the senses there is nothing that could not be increased and expanded. Hence infinity cannot be realized in any process. On the other hand in mathematics there are examples showing that the limit of a process can be grasped by a concept. As such an example Nicholas gives a sequence of regular polygons of n sides. If n grows unboundedly, then the polygons approximate better and better a circle. Among objects cognizable by the senses there exists no circle. A circle exists only as a concept in our mind. In *Idiota de mente* (Chapter 7) he wrote:

> [...] as, for example, when it conceives a circle to be a figure from whose center all lines that are extended to the circumference are equal. In this way of existing no circle can exist extra-mentally, in matter.[20]

Such different objects as a circle and a regular polygon of n sides coincide in infinity. More similar examples can be found by Nicholas. In Chapter 13 of *De docta ignorantia* he writes about a sequence of circles that are tangent to a given line at one fixed point and whose radius grows to infinity. The limit of such a sequence can be grasped as a concept – namely by the concept of a line. According to Cusanus different geometrical figures (circles, spheres, lines, triangles) can be identified with one another when they are increased to the infinite. In particular the infinite circle and the infinite line can be identified.

In a similar way the concept of a line cannot be realized in a world of objects known by the senses. He comes to the conclusion:

> I maintain, therefore, that if there were an infinite line, it would be a straight line, a triangle, a circle, and a sphere. And likewise if there were an infinite sphere, it would be a circle, a triangle, and a line. And the same thing must be said about an infinite triangle and an infinite circle.[21] (*De docta ignorantia* I, 13)

In all these cases Cusanus talks about *coincidencia oppositorum*. He treats it as a principle and applies it not only in mathematics but also in non-mathematical domains where an unlimited object is never given but can be grasped only by finite approximations.

The completion of a process (and simultaneously its limit) have for Cusanus the highest form of being and is eternal because the process itself seeks its own completion.

Considering a line he writes in connection with this in *De venatione sapientia* (The Hunt for Wisdom) (Chapter 34):

To this end, I draw a line *a b*, and I say that the line *a b* is great, because it is greater than one half of itself, and that it can be made greater by extending, or augmenting, it. But it will not become a greatness which, since [it cannot be made greater], would be what it can be. If a line were made so great that it could not be greater, it would be that which it could be; and, [in that case], it would not be *made* but would be eternal and would precede the possibility-of being-made and would not be a line but would be Eternal Greatness.

In the foregoing way I see that since whatever can be made greater is subsequent to the possibility-of-being-made, it is never made to be [all] that which it can be. But because Greatness is [all] that which it can be, it cannot be either greater or lesser [than it is]. And so, Greatness is neither greater nor lesser than anything great or than anything small but is the efficient Cause of all things great or small, and is their formal Cause and final Cause and their most adequate Measure. In all great things and all small things Greatness is all [these] things; and, at the same time, it is none of all [these] things, since all great things and all small things are subsequent to the possibility-of-being-made, which Greatness precedes.

The infinite does not borrow its existence from finite objects. The finite cannot guarantee the existence of the infinite because the latter will never be reached in a process of approximation by finite elements. Just the opposite – the infinite is first, and remains in the order of existence ahead of all that is finite. Cusanus reverses here the order of thinking. According to him the finite can be understood and grasped only with the help of the infinite. In *Idiota de mente* he wrote (Chapter 2):

Consequently, everything finite is originated from the Infinite Beginning.[22]

A finite segment is imperfect in comparison with an infinite line. In *De venatione sapientiae* he wrote:

But since there is no line that is without a length, a line that is not as long as its length [could be] is imperfect in comparison with a line that cannot be longer. (Chapter 26)

In a similar way he wrote in *De docta ignorantia*:

Now, every finite line has its being from the infinite line, which is all that which the finite line is. Therefore, in the finite line all that which the infinite line is – viz., line, triangle, and the others – is that which the finite line is.[23] (II, 5)

One can see that the idea of *coincidentia oppositiorum* that Cusanus used in his attempts to explain how our (mathematical) knowledge can approach God's knowledge is now applied by him as a principle of the ontology of mathematics. And he is doing so quite consciously. Indeed, in *De mathematica perfectione* he writes: "My aim is to improve mathematics by *concidentia oppositorum*"[24]. In this work Cusanus used this concept as a tool for creating the new mathematical procedure of infinite approximation. He tried namely to calculate the circumference of a circle – in this way infinity had become by him a methodological tool. It was also the reflection of his understanding of epistemology as an approximate process towards the truth. One can see in it the creation of the epistemological prerequisites of modern natural science.

NOTES

[1] [...] ita ut Boethius, ille Romanorum litteratissimus, assereret neminem divinorum scientiam, qui penitus in mathematicis exercitio careret, attingere posse.

[2] ad divina non nisi per symbola accedendi nobis via pateat, quod tunc mathematicalibus signis propter ipsorum incorruptibilem certitudinem convenientius uti poterimus.

[3] Wisd. 11, 21.

[4] Admirabili itaque ordine elementa constituta sunt per Deum, qui omnia in numero, pondere et mensura creavit. Numerus pertinet ad arithmeticam, pondus ad musicam, mensura ad geometriam.

[5] Est autem Deus arithmetica, geometria atque musica simul et astronomia usus in mundi creatione, quibus artibus etiam et nos utimur, dum proportiones rerum et elementorum atque motuum investigamus. Per arithmeticam enim ipsa coadunavit; per geometriam figuravit, ut ex hoc consequerentur firmitatem et stabilitatem atque mobilitatem secundum condiciones suas [...]

[6] Abstractiora autem istis, ubi de rebus consideratio habetur, – non ut appendiciis materialibus, sine quibus imaginari nequeunt, penitus careant neque penitus possibilitati fluctuanti subsint – firmissima videmus atque nobis certissima, ut sunt ipsa mathematicalia.

[7] Mens facit punctum terminum esse lineae et lineam terminum superficiei et superficiem corporis, facit numerum, unde multitudo et magnitudo a mente sunt, et hinc omnia mensurat.

[8] Arbitror autem viros Pythagoricos, qui ut ais per numerum de omnibus philosophantur, graves et acutos. Non quod credam eos voluisse de numero loqui, prout est mathematicus et ex nostra mente procedit – nam illum non esse alicuius rei principium de se constat –, sed symbolice ac rationabiliter locuti sunt de numero, qui ex divina mente procedit, cuius mathematicus est imago. Sicut enim mens nostra se habet ad infinitam aeternam mentem, ita numerus nostrae mentis ad numerum illum. Et damus illi numero nomen nostrum sicut menti illi nomen mentis nostrae, et delectabiliter multum versamur in numero quasi in nostro proprio opere.

[9] Conspicis etiam, quomodo non est aliud numerus quam res numeratae. Ex quo habes inter mentem divinam et res non mediare numerum, qui habeat actuale esse, sed numerus rerum res sunt.

[10] Pariformiter dico exemplar conceptionum nostrae mentis numerum esse. Sine numero enim nihil facere potest; neque assimilatio neque notio neque discretio neque mensuratio fieret numero non exsistente. Res enim non possunt aliae et aliae et discretae sine numero

intelligi. Nam quod alia res est substantia et alia quantitas et ita de aliis, sine numero non intelligitur. Unde cum numerus sit modus intelligendi, nihil sine eo intelligi potest. Numerus enim nostrae mentis cum sit imago numeri divini, qui est rerum exemplar, est exemplar notionum.

[11] Mens facit punctum terminum esse lineae et lineam terminum superficiei et superficiem corporis [...]

[12] Tu nosti, orator, quomodo nos exserimus ex vi mentis mathematicales figuras. Unde dum triangularitatem visibilem facere voluero, figuram facio, in qua tres angulos constituo, ut tunc in figura sic habituata et proportionata triangularitas reluceat, cum qua unitum est vocabulum, quod ponatur esse «trigonus». Dico igitur: Si «trigonus» est praecisum vocabulum figurae triangularis, tunc scio praecisa vocabulo omnium polygoniarum. Scio enim tunc, quod figurae quadrangularis vocabulum esse debet «tetragonus» et quinquangularis «pentagonus» et ita deinceps. Et ex notitia nominis unius cognosco figuram nominatam et omnes nominabiles polygonias et differentias et concordantias earundem et quidquid circa hoc sciri potest.

[13] PHILOSOPHUS: Quomodo facit lineam? IDIOTA: Considerando longitudinem sine latitudine, et superficiem considerando latitudinem sine soliditate, licet sic actu nec punctus nec linea nec superficies esse possit, cum sola soliditas extra mentem actu exsistat. Sic omnis rei mensura vel terminus ex mente est. Et ligna et lapides certam mensuram et terminos habent praeter mentem nostram, sed ex mente increata, a qua rerum omnis terminus descendit.

[14] Et ut clarius videas: Linea actu esse nequit nisi in corpore, ut ostendetur alibi.

[15] Omne autem actu existens in Deo est, quia ipse est actus omnium. Actus autem est perfectio et finis potentiae.

[16] Quomodo mens a se exserit rerum formas via assimilationis et possibilitatem absolutam seu materiam attingit.

[17] Add that intelect was by Nicolas the higher mental faculty.

[18] Quicumque igitur putat nihil in intellectu cadere posse, quod non cadat in ratione, ille etiam putat nihil posse esse in intellectu, quod prius non fuit in sensu.

[19] Nam cum omnia mathematicalia sint finita et aliter etiam imaginari nequeant: si finitis uti pro exemplo voluerimus ad maximum simpliciter ascendendi, primo necesse est figuras mathematicas finitas considerare cum suis passionibus et rationibus, et ipsas rationes correspondenter ad infinitas tales figuras transferre, post haec tertio adhuc altius ipsas rationes infinitarum figurarum transumere ad infinitum simplex absolutissimum etiam ab omni figura. Et tunc nostra ignorantia incomprehensibiliter docebitur, quomodo de altissimo rectius et verius sit nobis in aenigmate laborantibus sentiendum.

[20] [...] dum concipit circulum esse figuram, a cuius centro omnes lineae ad circumferentiam ductae sunt aequales, quo modo essendi circulus extra mentem in materia esse nequit.

[21] Dico igitur, quod, si esset linea infinita, illa esset recta, illa esset triangulus, illa esset circulus et esset sphaera; et pariformiter, si esset sphaera infinita, illa esset circulus, triangulus et linea; et ita de triangulo infinito atque circulo infinito idem dicendum est.

[22] Quare omne finitum principiatum ab infinito principio.

[23] Omnis autem linea finita habet esse suum ab infinita, quae est omne id, quod est. Quare in linea finita omne id, quod est linea infinita (ut est linea, triangulus, et cetera), est id, quod est linea finita.

[24] Intentio est ex oppositorum coincidentia mathematicam venari perfectionem.

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