ORESME'S CONCEPTS OF PLACE, SPACE, AND TIME IN HIS COMMENTARY ON ARISTOTLE'S PHYSICS

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The purpose of this paper is to give a survey of the most important features of Oresme's discussion on the nature of place, space, and time.

What makes Oresme's discussion on the nature of place appear so important is that he might have been the first scholar in Western Europe since late antiquity to have rejected Aristotle's definition of place as the innermost surface of the surrounding body. Oresme argued definitely for the non-Aristotelian position that the place of a body is the space filled or occupied by the body. We know of no other Christian mediaeval philosopher who shared Oresme's position. Oresme's discussion on the nature of place and space will be treated in section I of this article.

In stating that the place of a body is the space filled or occupied by it not only does Oresme subscribe to an opinion of Greek antiquity, but he can also be regarded, together with later philosophers like Gianfrancesco Pico della Mirandola, Francesco Patrizi and Giordano Bruno, as a precursor of Newton in the theory of place and absolute space. None the less, in spite of the close resemblance which Oresme's view of place and space bears to Newton's, there are characteristic differences concerning the ontological status of space. These differences will be discussed at the end of section I.

Section II of this paper will be devoted to Oresme's concept of an infinite void space outside the last sphere, beyond the world, and to Oresme's identification of this space with the immensity of God and, ultimately, with
God Himself. There were others in the Latin Middle Ages who assumed the existence of an infinite void space outside the last sphere, but none of these seem to have identified such space with God Himself.

What has just been said about Oresme’s rejection of Aristotelian tenets on the nature of place is also true for his theory of time. Again, Oresme holds a non-Aristotelian point of view. In defining time as *duratio rerum successiva* and thus deducing his concept of time from the duration of things, which duration is prior to and independent of motion, Oresme deviates clearly from Aristotle’s point of view. Oresme’s position again appears similar to that of classical physics, but, as is true of place and space, there are certain differences concerning the ontological status of time.

Oresme states that without any succession the duration of things is eternity, which he defines as *duratio rerum tota simul*. As with the relation between God and extramundane space Oresme identifies eternity with God Himself. Again it will be helpful to compare Oresme’s position with that of Newton to gain a better understanding of their different views of the relation between God and eternity and infinite extramundane space. Oresme’s concept of time and eternity will be discussed in section III.

I- ORESME’S CONCEPT OF PLACE

Oresme treats the definition of place in the first six questions of his commentary on the fourth book of Aristotle’s *Physics*. There are three theories to be discussed: first the Aristotelian definition of the place of a body as the «innermost motionless boundary of what contains it»¹, or, as Oresme puts it, the (innermost) surface of the containing body. Secondly the opinion that place is the whole surrounding body, a position held by William Ockham², and

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² See Edward Grant, «The Medieval Doctrine of Place: Some Fundamental Problems and Solutions», in *Filosofia e scienze nella tarda scolastica: Studi sul XIV secolo in
finally a third opinion that place is the space in between the sides of the surrounding body, that is, the space filled by the body, which space would be a vacuum if the body were removed. The Aristotelian definition of place is discussed in Questions IV.1 to IV.4, the second theory in Question IV.5 and the third in Question IV.6.

With the Aristotelian definition of place, there are cases in which one is confronted with serious problems when one tries to determine the place of certain objects. A house for instance, which obviously is at rest, would continually change its place, since the surrounding air and its innermost surface bordering on the house, which surface is according to Aristotle’s definition the place of the house, moves incessantly. This was a common problem discussed in most of the commentaries on Aristotle’s Physics.


Oresme gives the following account of these three opinions: «Prima est quod locus est superficies corporis continens, que est alid a corpore contingente, et ista est Aristotelis et Commentatoris [cf. Aristoteles, Physics, IV.4. 211b11-14, 212a5-6, 20-21; Averroes, In Phys., IV, Comm. 41, fol. 140A-B]. Secunda est quod locus est corpus continens, quia est superficies, que non est alid quam corpus. Tertia est quod est spatiun, quod <remaneret> vacuum, si corpus tolleretur inde.» (Oresme, Phys. comm., Qu. IV.1, 82-87). Quotations of questions and lines in this and the subsequent footnotes refer to the following edition: Stefan Kirschner, Nicolaus Oresmes Kommentar zur Physik des Aristoteles. Kommentar mit Edition der Quaestiones zu Buch 3 und 4 der aristotelischen Physik sowie von vier Quaestiones zu Buch 5, Stuttgart, Steiner, 1997). A similar description of the third theory occurs in the title of Qu. IV.6: «Consequenter queritur utrum locus sit spatiun interceptum inter latera continens, quod esset vacuum, si non esset ibi locatum;» cf. Aristotle’s formulation of this competing theory in Physics, IV, 211b7-8.

In Oresme’s Physics commentary it appears as an example that Aristotle’s doctrine of place does not meet the essential condition that nothing that is at rest changes place. Oresme introduces this condition in Qu. IV.1 as the tenth item in a total of 12 suppositions about the nature of place which he regards as essential criteria for the soundness of any definition of place. In the following passage cited from Qu. IV.4, Oresme mistakenly refers to the ninth supposition: «Tunc [...] arguitur [...] primo ex nona suppositione sic: nullum quiescens localiter mutat locum; <tamen> tale mutat superficiem continens, ergo talis superficies aut continens non est locus. Maior patet ex nona suppositione et ratione, quia in aliis motibus patet quod nullum quiescens alteratione mutat qualitatem aut <quiescens> quantitatem etc. Minor patet, quia per ventum variatur aer et superficies aeris continens domum; similiter lignum quiescens in aqua mota continue est in alia et in alia superficie, ut arguitur sic: hoc mutat superficiem, ergo mutat locum, ergo est loci mutatio,
Usually it was resolved by distinguishing between «formal place» and «material place». Those who applied this distinction regarded the physical innermost surface of the containing body as the material place, whereas the position (situs) and relation (ordo) of that surface or of the contained body with respect to an immobile entity was thought to constitute the formal place. So long as the formal place remains fixed and constant, the body was considered to be at rest. Oresme proposes a different solution. He holds that the term «place» contains the connotation that the body behaves in a certain way with respect to the world order (ordo mundi, also ordo universi). This behaviour with respect to the world order is an inner condition of the body and cannot be changed by a mere change of the position of other bodies but only when the body itself moves. The house is therefore at rest, as it behaves always in the same way with regard to the world order, irrespective of what happens to the surrounding air. Nearly all major problems arising from the

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5 See Edward Grant, «Medieval Doctrine», p. 63-72. Grant observes that in the fourteenth century it became common to speak of distance rather than *situs* and *ordo*.

6 «Tertio notandum quod locus significat superficiem vel etiam corpus, <et> non est differentia quoad hoc connotando corpus contentum ad omnia alia et ad se et in tali ordine se habere in mundo quantum est ex se, quod dico notanter, quia per mutationem aliorum posset alter se habere ad alia, non tamen ad se, ideo hoc est extrinsece, sicut dictum fuit in questionibus de motu» (Qu. IV.4, 41-45).

7 See Oresme's answer to the above mentioned problem (see ftn. 4): «Tunc respondetur alter ad maiorem. Conceditur: „nullam quiescens localiter sit in alioc loco“—dico quod verum est quod unum [lege unus locus] est quantum ad formam et connotatam, sed bene quantum ad materiale <locus mutatur>. Sed adduc indiget declaracione, et ad minorem dico quod, licet superficies, que est locus, mutetur et varietur, tamen semper vocatur idem locus et potest dici idem, quia semper est idem connotatam, scilicet hoc sic se habere; unde posset dici quod locus non manet idem, sed manet tamen <idem> locus, scilicet idem corpus locans et eodem modo, sicut dickus quod numerus non est una res, tamen est unus numerus, sicut forte multe superficies non sunt una res, sed sunt unus locus, quia, sicut dictum est, ita conseuverunt locum autorem. Et ad confirmationem, cum dicitur quod nullum quiescens alteratione mutat qualitatem, posset dici quod, si esset possibile quod continue in aliquo esset alia et alia albedo, tamen semper equalis, illud non diceretur alterari, quia semper eodem modo esset album; et ita, cum sit possibile in loco quod continue habet diversas superficies et eodem modo se habeat, non dicitur moveri. Per hoc patet ad aliam formam <argumenti>, cum dicitur: „mutat superficiem, ergo locum“: nemo consequentiam, licet superficies sit locus, sicut non sequitur: „mutatur terminus proportionis, ergo variatur proportio“, et causa est, quia non mutat taliter se habere» (Qu. IV.4, 69-87). Before Oresme proposed this solution he rejected the view of those who
Aristotelian concept of place can be resolved by appealing to such connotations, as it is no longer the innermost surface of the surrounding body but the contained body itself, which is to be regarded. The same applies to the second of the above-mentioned theories of place, which is related to the Aristotelian opinion.

Oresme does show how to defend the Aristotelian concept of place against various objections and he shows himself to be familiar with the different strategies of argumentation, but nevertheless he prefers the third theory that the place of a body is the space filled by it. In the sixth and last question on the nature of place Oresme discusses this theory. The title of the question is: «consequently it is asked whether place is the space between the sides of the containing (body) — which space would be a vacuum if there were no body».

As this title indicates, such a theory can only be held if one proves that there could be a vacuum. Hence the question contains also some general remarks on whether the existence of a vacuum is at least theoretically possible.

Oresme begins his discussion with the distinction that the term «vacuum» can be understood in two different ways: 1. as that, where there is no body, but can be. 2. as a distance between bodies, where there is no body, but can be.

Having made this distinction Oresme draws the conclusion that under natural conditions there is no vacuum. However, to suppose the existence of a

draw on the distance between the object and the heavens, its poles or the centre of the world to determine whether something is at rest or in motion: «Solutio: dicunt aliqui quod formale in loco dicitur distantia ad orbem; ideo, si non mutat distantiam illam, non movetur, et si mutat, movetur et e converso. Sed illud non valet, quia possibile est quod aliquid continue maneat in eadem superficie aut in eadem distantia ad orbem vel ad centrum et polos et tamen moveatur, sicut patet de una stella fixa, que dicitur moveri et tamen continue ita se habet, et de rota fabrì vel si aliqua <res> cum suo continentie movetur versus orientem equidistans semper a centro et a polis mundi» (Qu. IV.4, 62-68).

8 Qu. IV.3 and IV.4 are especially illustrative of such attempts to «save» the Aristotelian concept of place. For Oresme’s text and a commentary on it see S. Kirschner, «Nicolaus Oresmes Kommentar», p. 111-114, 304-312.

9 «Consequenter queritur utrum locus sit spatium interceptum inter latera continentis, quod esset vacuum, si non esset ibi locatum ».

10 The text has « and ».

11 The text has « and ».

12 «[...] premittenda <est> primo distinctio de significatone vacui: unde uno modo potest accipi pro eo, ubi non est corpus et potest esse; secundo pro distantia inter alia corpora, ubi non est corpus et potest esse» (Qu. IV.6, 9-12).
vacuum does not include any logical contradiction. The existence of a vacuum is therefore not something simpliciter impossible, which means that the almighty God could create it. Oresme proves this conclusion by a thought experiment: it can be imagined that God annihilates everything in between the walls of a house or everything below the sphere of the moon and thus leaves a vacuum. From thought experiments of that kind, which were rather common in his time, Oresme deduces later in Qu. IV.8 that a vacuum, if it existed, would be distance. Oresme justifies this conclusion by arguing that it is impossible to imagine that the concave surface of the heavens could remain spherical after the annihilation of all things originally contained by it, without there being such a distance.

It is worth while to consider this passage carefully. Oresme’s assertion that there would remain a vacuum if everything under the sphere of the moon were annihilated by God’s power, and that this vacuum would constitute a distance in the sense of a three-dimensional void space, seems to be reasonable; nevertheless it is not so self-evident as it might appear at first sight. A comparison with Buridan’s treatment of the same subject in his commentary on the Physics reveals the logical difficulties in Oresme’s argumentation. Buridan holds that after the annihilation of all things below the sphere of the moon nothing at all would remain, even no space and no vacuum, for, if one says that a space or a vacuum remains under the moon’s sphere, such an affirmative proposition is only true if the terms «space» and «vacuum» represent

13 «Tertia conclusio <est> quod secundum veritatem possibile est vacuum esse in mundo, licet non naturaliter. Probatur: ex quo non videtur implicare contradictionem non est negandum a potentia divina. Secundo conceditur quod Deus potest annihilare alicquid totaliter, ergo posse annihilare quidquid corporeum est in domo dimittendo domum; ergo domus esset vacua et nihil esset inter eius latera. Tertio. Deus potest totaliter annihilare materiam primam et omne corpus, quod est intra spheram activorum et passivorum, dimittendo celum; ergo tunc in superficie concava oris lune esset vacuum» (Qu. IV.6, 52-59).

14 In order to prove that God could create a vacuum Oresme repeats in Qu. IV.8 the thought-experiment which he had already mentioned in Qu. IV.7: «Tertio, ut dictum fuit, si annihilaret totam massam materie prime seu generabilia et corruptabilia et dimitteretur celum sicut nunc est, tunc infra celum totum esset vacuum, et antecedens esset sibi possibile, ex quo conceditur quod possit annihilare» (Qu. IV.8, 61-64). Then he infers: «Ex quo sequitur corollarie primo quod, si vacuum esset, illud esset distantia. Patet statim ex tertia ratione, quia impossibile est imaginari quod superficies concava celi sit adhuc spherica et evacuada quin ibi sit distantia» (Qu. IV.8, 69-71).
something, and this implies a contradiction of the premise that absolutely everything had been annihilated\textsuperscript{15}. Therefore for Buridan the result of such an annihilation is not a vacuum below the sphere of the moon; but the logically correct proposition must be that the concave surface of the sphere of the moon is void\textsuperscript{16}. But certainly we must not assume that Buridan wanted to deny God the power and possibility to create a void space. As another passage in Buridan’s commentary on the \textit{Physics} shows, it has to be done in another way, namely by directly creating a spatial dimension without any substance or accident. Such a \textit{dimensio simplex} could then receive bodies without giving way to them, because for God the penetration of dimensions is not impossible\textsuperscript{17}.

The second result that Oresme derived from his thought experiment was that the vacuum below the sphere of the moon would be distance. Concerning this point Buridan is again of quite another opinion. He holds that after an

\textsuperscript{15} « Dico ergo quod hoc casu posito nihil esset infra sive intra concavum orbis lune, quia totum ponitur annichilatum, et sic non esset aliquod spaciun et etiam non esset vacuum intra vel infra huisusmodi concavum, quia implicat contradictionem quod nichil sit intra concavum et quod vacuum vel spaciun sit intra concavum, quoniam cum hec propositio "vacuum est intra concavum" vel "spacium es intra concavum" sit affirmativa, oportet, si sit vera, quod ille terminus "vacuum" vel "spacium" pro aliquo supponat; ideo sequitur "vacuum est intra concavum", ergo es et liquid intra concavum", et hec est contradictoria illius prime que dicebat quod nichil est intra concavum et cetera [...]» (\textit{Acutissimi philosophi reverendi Magistri Johannis buridani subtilissime questiones super octo phisicorum libros Aristotelis diligenter recogit et revise A magistro Johannes durlaer de gandano anteae nasquam impressa}, Parisiis 1509, reprinted in facsimile Frankfurt am Main, 1964 [in the subsequent quotations referred to as « Buridan, Phys., ult. lect. »] (Qu. III.15, fol. 57vb).

\textsuperscript{16} « [...] non esset vacuum intra concavum orbis lune, sed illud concavum esset vacuum quod modo est plenum; idem enim est locus et plenum et ille idem locus esset tunc vacuos, ideo vacuum esset una res magna et notabilis quia esset celum » (Buridan, Phys., ult. lect., Qu. III.15, ed. cit., fol. 58rb); « [...] et concavum orbis lune esset vacuum » (Buridan, Phys., ult. lect., Qu. IV.8, ed. cit., fol. 74ra).

\textsuperscript{17} « [...] ego pono quod deus potest facere accidens sine subiecto et potest accidentia separare a subjectis suis et separatim conservare, ideo potest simplicem dimensionem creare absque hoc quod cum ea sit aliqua substantia vel etiam aliquod accidens distinctum ab ea. Secundo videtur mihi quod non est apud deum impossibilis penetratio dimensionum, immo potest plura corpora facere esse simul in eodem subiecto vel in eodem loco absque hoc quod differant ab invicem secundum situm siclicet absque hoc quod unum sit extra alterum secundum situm ergo deus deus potest facere simplicem dimensionem sive spaciun ab omni substantia naturali separatum in quo vel cum quo absque hoc quod cedat recipi possunt corpora naturalia [...]» (Buridan, Phys., ult. lect., Qu. IV.8, ed. cit., fol. 74ra).
annihilation of all things under the moon’s sphere the poles of this sphere would neither touch nor would they be separated in a rectilinear way from each other. The reason is that there would be no medium which could constitute such a rectilinear distance\textsuperscript{18}. For Buridan, the fourteenth century Cartesian (a phrase coined by E. Grant)\textsuperscript{19}, there is no space without body, because space is nothing else than the dimension or magnitude (magnitudo, dimensio) of bodies\textsuperscript{20}, and according to this view distance between bodies is nothing abstract, but the magnitude of the bodies that lie in between.

But let us return to what Oresme said. Having demonstrated that the existence of a vacuum involves no logical contradiction and is thus theoretically possible, Oresme can proceed to demonstrate formally that the place of a body is the space filled by it\textsuperscript{21}. Other arguments for the equation of place with space are derived from thought experiments. Oresme gives the following example: if everything surrounding a stone were annihilated without the stone’s being moved, the stone would have the same place as before. But the only place the stone would occupy after such an annihilation would be the space filled by it\textsuperscript{22}. Moreover terms like «full» and «void» only refer to this

\textsuperscript{18} «[...in predicto] caso annihilationis eorum quae sunt infra orbem lune unus polus non tangeret alterum polum nec distaret ab altero polo secundum rectitudinem, quia non esset spatiuin rectum medium per quod distant. Sed posset concedi distare secundum distantiam circularem vel curvam» (Buridan, Phys., ult. lect., Qu. III.15, ed. cit., fol. 58ra; see a, Qu. IV.7, fol. 73va).


\textsuperscript{20} «Dico enim quod spatiuin non est nisi dimensio corporis et spatiuin tuum dimensio corporis tui [...]]» (Buridan, Phys., ult. lect., Qu. IV.10, ed. cit., fol. 77va; cf. Qu. III.15, ed. cit., fol. 58rb).

\textsuperscript{21} «Sexta conclusio est quod locus est spatiuin inter latera continentis, quod esset vacuum, si nullum corpus esset ibi, ut proponit quetro. Probatur, quia per secundam conclusionem, si possibile est vacuum esse, illud nunc est locus; sed possibile est vacuum esse per tertiam, igitur illud spatiuin est locus, igitur conversive locus est tale spatiuin» (Qu. IV.6, 82-86). In the second conclusion Oresme stated: «Secunda conclusio est quod, si possibile est vacuum esse, illud nunc est locus, quod esset vacuum tunc, scilicet tale spatiuin imaginatum. Probatur sic, quia privativa opposita habent fieri circa idem, si utrumque possit inesse, ergo illud nunc est plenum, quod tunc esset vacuum; sed illud spatiuin tunc esset vacuum, igitur nunc est plenum; sed plenum non dictur proprie nisi de loco, igitur, si vacuum est possibile, illud spatiuin est locus, quod esset vacuum» (Qu. IV.6, 35-40).

\textsuperscript{22} See the second proof for the above (footn. 21) cited second conclusion: «Secundo. Sit hic lapis, et si vacuum est possibile, fiat circumquaque destruendo corpus continens et
«imaginary» space (*spatium imaginatum*) and not to the containing (body), for, if there were some air or something else inside a barrel of wine, nobody would regard the barrel of wine as full, unless the wine occupied the whole space inside the barrel. Therefore the place of the wine is not the inner surface of the barrel, since this surface is fully covered by wine in spite of the other body inside, but the space occupied by the wine. Finally everybody who thinks that the world has been created must state that there was a vacuum where it was created.

Oresme’s last argument deserves further consideration for several reasons. First Oresme seems to have forgotten that to state the necessary existence of a vacuum before the world’s creation was condemned by one of the articles announced by Etienne Tempier in 1277. Apart from this, Oresme’s argument is not convincing, as one might hold, like Pseudo-Siger of Brabant (probably Petrus de Alvernia [d. 1304]), Albertus Magnus (ca. 1200-1280) and Roger Bacon (ca. 1214-1294), that God created the world and its place

non movendo lapidem; tunc arguitur: lapis non est alibi quam erat ante; patet ex casu, quia non est mutus <et> semper est idem demonstrativum locale, quia est hic, et nunc non habet locum nisi spatium, quod esset vacuum, si <de>poneretur, ergo ante illud spatium erat locus. Igitur, si possibile est vacuum <esse>, illud spatium nunc est locus» (Qu. IV.6, 41-46).

23 See the second proof for the above (footn. 21) cited sixth conclusion: «Secundo. Illud est locus, cui competit proprie proprietas ipsius loci; sed “plenum” et “vacuum”, licet non sit vacuum, similiter de facto sunt proprietates proprie ipsius loci, sicut “equale” et “inequale” quantitatis; sed ista proprietas competit tali spatio et non continenti, quod declarat(ur) exemplo, quia, si imaginetur in dolio vini quod in medio circa partes centrales sit una concavitas plena aere vel aliquo corpore, tunc non dicimus quod totum dolium sit plenum vino, licet tota superficies sit occupata vino. Et ideo <ad hoc>, quod aliquis locus sit vacuus aliquo corpore vel plenus illo corpore, operet quod totum spatium inter latera continentis sit repletum et occupatum tali corpore vel vacuum; ideo bene signum <est> quod tale spatium est locus, quia sibi competit “plenum” et “vacuum”» (Qu. IV.6, 87-97).

24 This is the third proof for the sixth conclusion: «Tertio. Quicumque ponunt mundum generatum esse necessario habent ponere vacuum esse, ubi factus est mundus; sed secundum veritatem ponendum est quod mundus factus est, ergo et cetera» (Qu. IV.6, 98-100).


simultaneously. Another possible standpoint is represented by Buridan. In Buridan’s opinion God did not need a space to create the world. He states, that, even if such a space, which is nothing but a dimension, existed, it could at any time be annihilated and again created by God. But if God does not need a space to create a space there is no reason to assume that he needed a space to create the world.

It is probable that Oresme conceived the vacuum in which the world was created as of the same kind as the infinite vacuum outside the world. An explicit statement in this sense can be found in his *Livre du ciel et du monde*. In view of the fact that Oresme identifies in Qu. IV.19 the immensity, which exists outside the Heavens, with God Himself (see below), it is justified to assume that Oresme regarded the void in which the world was created as God Himself.

As one might easily imagine, Oresme has to defend his non-Aristotelian concept of place against numerous objections. His arguments are apt to illustrate the properties, nature, and ontological status of this « imaginary » space (spatium imaginatum) as conceived by him.

In order to describe the ontological status of space, Oresme points out that the term « ens » (being) can have various meanings, and for the present discussion he distinguishes between two different significations of « ens »:

1. something which can be signified by nouns or pronouns, and this is called a substance or an accident like an accidental form or a condicio rei or some taliter se habere;
2. secondly – in a very broad sense – « ens » can be said of

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27 See Grant, « Much Ado », p. 327 n. 42.
28 Buridan, Phys., ult. lect., Qu. IV.2, ed. cit., fol. 68ra / b : « Item ex quo magnitudo mundi non est alius quam dimensio et per consequens spacio partium sic et magnitudines partium mundi non sunt nisi spacia et dimensiones non apparent ad quid proficeret alia dimensio vel alius spacio quoniam deus non indigebat spacio presupposito ad creandum mundum et magnitudinem eius quoniam deus etiam si esset tale spacio poterat ipsum annichilare et iterum tale creare et si in creando illud spacio non indigebat alio in quo crearet ita nec in creando magnitudinem mundi indigebat alia magnitudine vel dimensione in qua crearet mundum ».
something which can be signified only *syncategorematic* by adverbs. Thus Oresme introduces a third level of being in addition to substances and accidents.

The «imaginary» space is an example—time is another—of those things that can be signified only by adverbs. According to Oresme the space occupied by a body or the vacuum which would be left if the body were removed, is neither substance nor accident nor something in the proper sense of being, but that which is denominated by the adverbs «here» or «there».

Oresme infers that in a way place is nothing, because space is neither substance nor accident, so that the word «place» is quasi a fictitious name. On the other hand, unlike a chimera place or space is not absolutely non-existent.

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30 «Pro solutione primorum argumentorum notandum <est> quod “ens” dicitur multipliciter, ut patet primo his uis [cf. Aristoteles, *Physics*, I.2. 185a21, 31-32 ; I.3. 186a34-b2 ; I.7. 190a34-b1], et ad propositum dupliciter: uno modo pro eo, quod potest nominaliter significari, sive absolute sive connotative, sive complexe sive incomplexe, sicut “homo”, “album”, “albedo” et cetera, et per pronomem demonstrativum significari dicendo “hoc” vel “illud”, vel per reciprocum, vel per relativum identitatis aut diversitatis dicendo “ipsum”, “allud”, “idem”, “diversum” et cetera, et tale dicitur substantia, sicut materia aut forma aut compositum, vel etiam accident, sicut forma accidentalis vel condicio rei vel taliter se habere vel quocumque <modo> ; sed alio modo dicitur “aliquid” valde large, quod non est significabile per nomen nec demonstrabile <per> pronomem proprice dicendo “hoc” vel “illud”, nec complexe nec incomplexe, sed solum syncategorematic per adverbia, sic <ut> demonstrando “hic” vel “ibi”. Secundo sciemot quod pro veritatis habendis licetum est fingere ista esse entia, sicut patet quarto metaphysice [cf. Aristoteles, *Metaph.*, IV.2. 1003b10], ubi dicitur quod non entia entia dicimus ; similiter dicimus quod ita est, sicut negativa vera significat, ut ista : “chimera non est”, et tamen nulla res est ita, sicut etiam mathematicus fingit lineam ; et ideo talia possunt applicari nominaliter dicendo “locus”, “vacuum” et cetera et minus <im>proprice in obliquo dicendo “in loco” et propriissime adverbia dicendo “hic” vel “ibi”» (Qu. IV.6, 157-175).

31 See section III.

32 «Tunc ad primam, cum queritur “vel substantia et cetera”, dico quod non est substantia nec accidens nec est aliquid propric, sed est illud, quod denotatur “hic” vel “ibi”» (Qu. IV.6, 186-188). What has been just cited, was Oresme’s answer to the following objection: «Contra predictam opinionem sunt dubia: aut tale spatium, quod ponitur locus, est substantia aut accidens ; si substantia, aut corporea aut incorporea. Si incorporea, esset anima intellectiva vel intellegentia. Si corporea, aut esset materia aut forma aut compositum, et tunc esset alia opinio a predicta et duo corpora essent simul, nisi dicetur quod esset corpus locatum, et est contra suppositionem de loco, quia ponitur continens separatum. Si dicitur quod sit accidens, tunc esset in subjecto et per consequens moveretur ad motum subjecti, nec poterit fieri successio corporum in eodem loco, quod est negatum» (Qu. IV.6, 101-108).
Furthermore for the purpose of finding the truth we are allowed to imagine things that can be denoted only by adverbs as existing\textsuperscript{33}, so that it is better to say that place is space than to say that place is nothing\textsuperscript{34}.

The relation between « to be in a place » (esse in loco) and « place » is the following. To be in a place does not mean to be in something, for space is nothing certain, but it means to be somewhere, that is, « here » or « there »\textsuperscript{35}. For Oresme « to be in a place » is a condicio of the corpus locatum. The term « condicio »\textsuperscript{36} means that the accident « to be in a place » is no accidental form, but only a modus essendi of the substance and therefore ranks on a lower ontological status than an accidental form. Nevertheless Oresme regards a condicio as something, an entity of its own, and does not identify it with the substance to which it belongs. As the previous passage showed, a condicio belongs to those things that can be signified by nouns or pronouns, while the ontological status of space is much lower.

Another difference is that the condicio « to be in a place » is in the body, while the space occupied by a body is not in the body and therefore does not move when the body moves\textsuperscript{37}. By stating that space is motionless Oresme can

\textsuperscript{33} See the passage that begins with « secundo scindendum » in the quotation under footn. 30.

\textsuperscript{34} Ex hoc sequitur quod aliquis plus bene dictum est quod locus nihil est, quia nulla res est locus, nec substantia nec accident; sed quia videtur universaliter negari, ideo non bene sonat, quia non est sicut chimera aut hircocervus, immo potest syncategorematico significari et assignari, et etiam esse in loco vel esse aliquid est aliqua condicio, et ad hoc movetur res naturaliter, ut sit hic vel ibi, ideo melius est dicere quod est spatium » (Qu. IV.6, 176-181).

\textsuperscript{35} Quarto notandum quod magis proprie dicitur corpus esse aliquid quam in loco, quia “locus” est nomen quasi fictum, quia non est esse in aliqua re sicut in aliis, “esse in toto” et “esse in subiecto”, quia non significatur <nisi> adverbialiter nec debet vocari <nisi> spatium imaginatum » (Qu. IV.6, 182-185).


\textsuperscript{37} See the continuation of the passage cited above under footn. 35 : « Tunc ad primam, cum queritur “vel substantia et cetera”, dico quod non est substantia nec accident nec est aliquid proprie, sed est illud, quod denotatur “hic” vel “ibi”. Tamen melius posset dici accidentia quam substantia, et forte est illud, quod intellegitur per predicamentum “ubi”. Et cum dicitur “omnia accidentes est in subiecto”, dico quod ista condicio, que est “esse in loco”, bene est in subiecto et est accidentes vel per predicationem vel per inherentiam, quia accidit rei quod sit in tali loco vel hic vel ibi; tamen illud, quod denotatur “hic” vel “ibi”, non est
reject Aristotle’s argument\textsuperscript{38} that the space would be transferred together with
the body and would thus itself need another space for place, and this space
again, and so on, ad infinitum\textsuperscript{39}.

In another famous objection Aristotle argued\textsuperscript{40} that, if the place of a body
were the space occupied by it, there would be a penetration of dimensions.
Oresme counters this argument by stating that the space has no real
dimensions, at least no corporeal dimensions\textsuperscript{41}. Unfortunately he does not treat
Aristotle’s strongest argument against such a space\textsuperscript{42}, namely that the
dimensions of the space, which is filled by a body, are not at all distinct from
the dimensions of the body, and that it is therefore superfluous to assume in
addition to the dimensions of a body a separate space filled by it.

After having defended the non-Aristotelian concept of place Oresme makes
the following closing remarks: «Ultimately those opinions could be compared
and perhaps, if that which is the oldest were not unusual, perhaps according to
it the suppositions concerning place would be better met; nor does it contain
the difficulties which were held against those who hold the other views; rather
there is no difficulty to answer what that thing (place) is»\textsuperscript{43}.

in aliquo, sed aliquid est in illo, et ita forte diceretur de tempore quod hoc non est accidens
inherens» (Qu. IV.6, 186-194).

\textsuperscript{38} See Physics, IV.4. 211b23-25; see a. Averroes, In Phys. (Aristotelis opera cum
Averrois commentariis. Quartum Volumen. Aristotelis de physico auditu libri octo cum
Averrois cordubensis variis in eosdem commentariis, Venetiis apud Iunctas, MDLXII.
Reprinted in facsimile Frankfurt am Main 1962), IV, Comm. 37, fol. 137H-K.

\textsuperscript{39} See the following objection: «Quinto. Translato continentem cum contento, sicut
dolum cum vino, transfertur quidquid est inter eius latera, ergo tale spatium transfertur et
per consequens indiget alio spatio tamquam loco, et sic in infinitum» (Qu. IV.6, 149-151).
Oresme replies: «Ad quintam — “translato continentem transfertur quidquid est inter eius
latera” —; verum est quod quocumque substantia vel accidens inherens, sed tale spatium
semper est immobile et semper potest esse ibi aliquid corpus» (Qu. IV.6, 242-244).

\textsuperscript{40} Physics, IV.8. 216a26-b2.

\textsuperscript{41} «Quarto arguit Aristoteles quod tale spatium haberet tres dimensiones et tunc esset
penetratio istorum dimensionum cum dimensionibus corporis locati» (Qu. IV.6, 147-148).
Oresme replies: «Ad quartam — conceditur quod esset penetratio — dico quod illud spatium
non habet proprie dimensiones, quia separatum corpore ibi non esset aliquid nec aliqua
dimension, et si habeat, tamen est alterius rationis, nec sunt corpus, sed sunt ubi est corpus»
(Qu. IV.6, 238-241).

\textsuperscript{42} See Physics, IV.8. 216a26-b16.

\textsuperscript{43} «Ultimo possent compa<ra>ri ille opiniones et forte, nisi ista, que est antiquissima,
esset inobservata, forte secundum eam melius conservarentur suppositiones de loco, nec
Despite his somewhat careful mode of expression Oresme makes clear that he prefers the third opinion that the place of a body is the space occupied by it. He finds this concept to be in better accord with the suppositions that describe the properties of place. This is an allusion to the difficulties which arise in maintaining the Aristotelian concept of place or the second theory which identifies place with the surrounding body. Oresme treats these problems in Questions IV.1 to IV.5, and it would take too long to describe the discussion here in detail. But what must be stressed and what Oresme himself emphasizes is that it is because the third theory is much easier that he prefers it to the Aristotelian and the second theory. This is not the only place where Oresme applies the criterion of simplicity in order to justify his decision between competing theories.

It has already been mentioned that Oresme might have been the first philosopher in Western Europe since late antiquity, that is, since Simplicius (b. ca. 500, d. after 533) and his contemporary John Philoponus, to have approved of the non-Aristotelian definition of place. But this applies only to his Commentary on the Physics. Whenever he speaks about place in his Livre du ciel et du monde and in his Questiones de spera he takes the Aristotelian

continent difficultates, quae tenebamur contra tenentes alias vias, immo nulla est difficultas ibi ad respondendum, quid est illud » (Qu. IV.6, 255-258).

44 Oresme mentions these suppositions in Question IV.1.


concept of place as a basis and does not even mention the third theory. There is only one exception, provided that one accepts the view that the anonymous *Questiones super librum de celo et mundo* in the Munich Codex Clm 4375, ff. 47r-76r, represent a second version of Oresme’s Latin Commentary on Aristotle’s « De celo ». For these questions, which show many coincidences with known works by Oresme, contain an implicit approval of the theory that the place of a body is the space filled by it. Moreover the description of the ontological status of the vacuum is very similar to that found in Oresme’s *Physics Commentary*.

Certainly there were others besides Oresme who knew about the advantages of the non-Aristotelian concept of place, for instance Thomas of Aquinas, Johannes Buridan and Albert of Saxony. Nevertheless all of them followed Aristotle.

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50 Commenting on Aristotle’s statement that the last sphere has no place since there is no other body beyond, which could serve as a container (see Aristoteles, *Physics*, IV.5. 2128b10-14), Thomas remarks that it seems to be impossible for the last sphere to have no place since it moves locally and everything that moves locally is in a place. In this context Thomas stresses that those who hold that the place of a body is the space occupied by it are not confronted with this problem: « Sed hoc [that the last sphere is in no place] videtur impossibile: quia ultima sphaera movetur in loco; nihil autem movetur in loco, quod non sit in loco. Hucusque dubitationis difficilis non accidit iis qui tenet sententiam de spatio. Non est enim eas necessae dicere quod ad hoc quod sphaera ultima sit in loco, quod habeat corpus continens; sed spatium quod intelligitur penetrare totum mundum et omnes partes eius, est locus totius mundi et cuiuslibet partium eius, secundum eos » (Sancti Thomae Aquinatis doctoris angelici opera omnia iussu impensaque Leonis XIII P. M. edita. Tomus secundus. Commentaria in octo libros physicorum Aristotelis ad codices manuscriptos exacta cura et studio Fratrum ordinis praedicatorum, Romae MDCCCLXXXIV, Lib. 4, Lect. 7, n. 3). This opinion is rejected by Thomas at once: « Sed haec positio est impossibilis: quia vel oportet dicere quod locus non sit aliquid praeter locatum, vel quod sint aliquae dimensiones spatii per se existentes, et tamen subintrantes dimensiones corporum sensibilium: quae sunt impossibilia ». Buridan mentions another
Within the Jewish and Moslem tradition the situation was not very much different. Among the Jewish mediaeval thinkers only Ḥasdai Crescas\(^{51}\) (1340-1412) and his disciple Joseph Albo\(^ {52}\) (ca. 1365-1444) can be mentioned as proponents of the view that the place of a body is the empty space filled by it. In the Moslem tradition this view gained support from the Persian physician Abū Bakr Muḥammad ibn Zakariyā al-Rāzī\(^ {53}\) (ca. 865-925/932), al-Rāzī’s follower Abū al-Barakāt al-Bagdādi\(^ {54}\) (b. ca. 1080, d. 1164 or 1165), and Ibn al-Hayṭam\(^ {55}\) (d. 1040). Moreover two groups of the atomist *mutakallímün*, the advantage of the non-Aristotelian concept of place (Phys., ult. lect., Qu. IV.1, ed. cit., fol. 67ra) : « Omne corpus habet locum proprium et vere sibi equalem si locus esset spaciuum separatum de quo post dictur. Sed ex decendis post supponimus non esse ita [...] ». Albert of Saxony wrote: « Breviter de dicta questione [whether place is immobile] non est dubium, si poneteret, quod locus esset dimensionis separata; tunc enim locus esset simpliciter immobilis » (Acuistimae Questiones super libros de physica auscultatione, Qu. IV.3; cited from Jürgen Samowski, Die aristotelisch-scholastische Theorie der Bewegung. Studien zum Kommentar Alberis von Sachsen zur Physik des Aristoteles, «Beiträge zur Geschichte der Philosophie und Theologie des Mittelalters. Neue Folge», Münster, Aschendorffsche Verlagsbuchhandlung, 1989, vol. 32, p. 177.


Basrian Mu'tazilīs and the Ashʿarīs, seem to have, at least implicitly, held the concept of some kind of absolute space in which the bodies are embedded. Nevertheless the Aristotelian concept of place remained prevailing in Moslem mediaeval philosophy.

The concept that the place of a body is the space occupied by it gained strong support in the 16th and 17th century. Gianfrancesco Pico della Mirandola (1469-1533) seems to have been one of the first, if not the first, of the Renaissance philosophers, who argued for this opinion. Others followed, like Bernardino Telesio (1509-1588), Julius Caesar Scaliger (1484-1558), Francesco Patrizi (1529-1597), and Giordano Bruno (1548-1600). As is well known, this tradition culminated in Newton’s assigning to an infinite and absolute space a fundamental role in his new physics and cosmology.

At the end of this section it seems to be useful to compare briefly Newton’s concept of place and its ontological status with Oresme’s because such a comparison provides an additional insight into the characteristic features of the latter’s view.

In his Philosophiae naturalis principia mathematica Newton establishes the following definition of place: «Place is that part of space which a body
occupies, and is either absolute, or relative according to the space. I say, a part of space; not the situation, or the surrounding surface».

Newton emphasizes that place cannot be identified with the location of the body nor is it the surrounding surface. Thus he expressly rejects both Descartes' and Aristotle's position.

Obviously Newton and Oresme agree in rejecting Aristotle's doctrine of place. But none the less there are important differences between Newton and Oresme concerning the nature of space. Newton evidently regards absolute space as a physical reality, which exists independently of any substance. In his unpublished paper De gravitatione et aequipondio fluidorum Newton rejects Descartes' identification of space and body (or matter). Concerning the ontological status of space Newton holds that space is neither substance nor accident, «for it has its own manner of existence which fits neither substances nor accidents».

It is no substance «because it is not absolute in itself, but is as it were an emanent (f(0) of God, or a disposition of all being». It is no accident because we can «clearly conceive extension existing without any subject, as when we may imagine spaces outside the world or places empty of body», and because «we cannot believe that space would perish with the body if God should annihilate a body». Finally Newton emphasizes that space is not nothing, because «there is no idea of nothing nor has nothing any properties, but we have an exceptionally clear idea of extension, abstracting the dispositions and properties of a body so that there remains only the uniform and unlimited stretching out of space in length, breadth and depth.» Moreover space possesses properties as it is eternal, infinite, uniform and motionless. Thus for Newton space possesses a higher ontological status than an accident.


and «approaches more nearly to the nature of substance»⁶⁴. In his decision that space cannot be included within the categories of substance and accident Newton agrees with Pierre Gassendi (1592-1655)⁶⁵ and Giordano Bruno (1548-1600)⁶⁶.

Concerning Oresme’s thoughts on the ontological status of space it has already been said that he is of the opinion that space is neither substance nor accident, nothing that can be signified by a noun or pronoun, but only by adverbs like «here» and «there». That means, space is not absolutely non-existent, but it has by no means the high ontological status accorded to it by

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⁶⁴ Newton, «De gravitatione et aequipondio fluidorum», p. 99 (italics mine): «De extensione jam forte expectatio est ut definiam esse vel substantiam vel accidentem aut omnino nihil. At neutiquam sane, nam habet quendam sibi proprium existendi modum qui neque substantijs neque accidentibus competit. Non est substantia tum quia non absolute per se, sed tanquam Dei effectus emanatibus, et omnis entis affecto quaedam subsistit; tum quia non substrat ejusmodi proprijs affectionibus quae substantiam denominant, hoc est actionibus, quales sunt cogitationes in mente et motus in corpore. [...] Praeterea cum extensionem tanquam sine aliqua subjecto existentem possumus clare concipere, ut cum imaginamur extramundana spatia aut loca quaelibet corporibus vacua; et credimus existere ubicunque imaginamur nulla esse corpora, nec possumus credere periturum esse cum corpore si modo Deus aliquid annihilaret, sequitur eam non per modum accidentis inhaerendo aliqui subjecto existere. Et proinde non est accident. Et multo minus dicitur nihil, quippe quae magis est aliquod quam accidens et ad naturam substantiae magis accedit. Nihil nila datur idea neque ullae sunt proprietates sed extensionis Ideam habemus omnium clarissimam abstrahendo sicelicit affectiones et proprietates corporis ut sola maneant spatij in longum latum et profundum uniformis et non limitata distensio. Et praeterea sunt ejus plures proprietates concomitant quisque Ideam, quas jam enumerabo non tantum ut aliquid esse sed simul ut quid sit ostendam». The English translations are derived from Hall and Hall, «Unpublished Scientific Papers», p. 132. Cf. a. p. 104 (italics mine): «Porro quamvis fortasse possumus imaginari nihil esse in spatio tamen non possumus cogitare non esse spatium; quammodum non possimus cogitare durationem non esse, etsi possibile esset fingere nihil omnino durare. Et hoc per extramundana spatia manifestum est, quae (cum imaginamur mundum esse finitum) non possumus cogitare non esse, quamvis nec a Deo nobis relevata sunt, nec per sensus innotescunt nec a spatij intramundinis quod existentiam dependent. Sed de spatij istic credi solet quod sunt nihil. Imo vero sunt spatia. Spatium etsi sit corpore vacuum tamen non est seipso vacuum. Et est aliquid quod sunt spatia quamvis praeterea nihil». See a. the subsequent passage (p. 111): [... si [... animis nostris adverimus nos posset spatium sine aliquo subjecto existens concipere, dum vacuum cogitamus. Et proinde hujus aliquid substantialis realitatis competit».


Newton. While for Newton space approaches more nearly to the nature of substance than of accident, for Oresme it ranks on a far lower ontological level than an accident.

II- ORESME’S CONCEPT OF AN INFINITE VOID SPACE BEYOND THE WORLD

Another central conclusion that Oresme draws in his discussion of the nature of place is that beyond the world, that is, outside the last sphere, there exists an infinite void space in the first sense of the above mentioned distinction of the word « vacuum », according to which vacuum is something where there is no body but theoretically could be. Oresme’s main argument for the existence of an infinite extracosmic void space in this sense is that the almighty God could at any time create a body beyond the world or even another world without generating a new place there.

Oresme’s other arguments for the existence of an infinite extracosmic void space are the following:

1. The word « extra » implies that it is imaginable that there is a body outside the world. Hence it follows that outside the world there is a place either filled by a body or not, and since the world is not infinite, it follows that outside the world there is a vacuum. However, a closer inspection of this argument shows that from an Aristotelian point of view Oresme uses the term « extra » in an improper way, since in the sense of the Aristotelian doctrine of place according to which place is the innermost surface of the surrounding body there is no place outside the world, since there is no body which could serve as a continens. But by using the differentia loci « extra » in a non-Aristotelian way the whole argument turns into a petitio principii. Elsewhere Oresme is more precise in his distinction between the proper and improper use of the term « extra ». In his Questiones super De celo he also states the existence of

67 « Quarta conclusio <est> quod capiendo vacuum primo modo in infinitum spatiun vacuum est extra mundum. Probatur ex descriptione, quia vacuum primo modo est, ubi non est corpus et potest esse; sed conceditur quod deus, qui est omnipotens, posset ibi facere unum corpus aut unum mundum absque creatione novi loci, ergo ibi est vacuum primo modo » (Qu. IV.6, 60-64).
68 « Extra » est differentia loci; cum igitur sit imaginabile quod extra sit aliquod corpus aut nullum, sequitur quod ibi est locus plenus aut vacuus; et ibi non est plenum, cum mundus non sit infinitus, igitur ibi nunc est vacuum » (Qu. IV.6, 65-67).
an extracosmic void space, but nevertheless he rejects an argument similar to that in his Physics Commentary\(^6\).

Oresme’s next argument in favour of the existence of an extracosmic void space can be traced back to the Stoics and was known to the Middle Ages by Simplicius’ Commentary on Aristotle’s “De caelo” which was translated by William Moerbeke in 1271. Oresme argues that it is much easier to imagine that it is possible that somebody extends his arm into a spatiwm vacuum infinitum than to imagine that there is neither vacuum nor time nor place outside the Heavens\(^7\). As a comparison with Buridan’s treatment of the same argument shows, the force of Oresme’s argument depends wholly on the way in which the nature of space is conceived. Buridan, who, as has been often mentioned, identified space with the dimensions of bodies, held that only when the arm is extended outside the last sphere, there is space there, namely the dimension of the arm\(^7\).

\(^6\) See Oresme, Questiones super De cebo, ed. Claudia Kren, Ph. D. dissertation, University of Wisconsin, 1965 (facsimile by University Microfilms International, Ann Arbor (Michigan) / London, 1982), Qu. XIX (utrum extra ccelum sit aliquod vel possit esse), p. 279-281. One of the arguments in favour of the existence of an extracosmic void space reads: “et videtur quod sic, quia “extra” est differentia loci, igitur ibi est vel potest esse corpus vel locus”. Oresme answers: “dicq quod hoc adverbium “extra”, si capiatur impropri, non significat differentiam loci”. A parallel line of argumentation can be found in Qu. III.11 of Oresme’s Physics commentary (utrum sit aliquod corpus actu infinitum). The first adversary argument, by which it shall be proved that outside the Heavens there must be a body, reads (Qu. III.11, 5-6): “[... tunc, cum “extra” sit differentia loci, si extra non est corpus, sequitur quod ibi sit vacuum]. In his reply Oresme criticizes the use of the term “extra” with the following words: “Et cum dicitur <quod>: “extra” est differentia loci, dicq quod verum est, si capiatur propri, modo hic tenetur impropri et privative, id est “non intra”” (Qu. III.11, 170-171). Here again by “si capiatur propri” the Aristotelian sense of the term “extra” is meant.

\(^7\) Item non videtur imaginabile quin, si homo ibi esset prope superficiem convexam celi, quin per alium virtutem posset extendere brachium extra, immo multo difficilius est imaginari quod ibi non sit nec vacuum nec plenum nec tempus nec locus quam quod ibi sit spatiwm vacuum infinitum” (Qu. IV.6, 68-71). This argument is already discussed by Thomas of Aquinas, who rejects it by arguing that nobody is able to extend his arm outside the Heavens, since it is an essential property of all beings to be surrounded by the last sphere (see Edward Grant, “Medieval and Seventeenth-Century Conceptions of an Infinite Void Space beyond the Cosmos”, Isis, 60, 1969, p. 39-60, on p. 41, footn. 14).

\(^7\) “Dico enim quod spatiwm non est nisi dimensio corporis et spatiwm tuum dimensio corporis tu, et antequam elevares brachium ultra illam speram nichil esset ibi, sed brachio elevato esset ibi spatiwm scilicet dimensio brachii tui” (Phys., ult. lect., Qu. IV.10, ed. cit., fol. 77va).
In his last argument Oresme uses another thought-experiment: if God had created at first a plane world and only later transferred it into a spherical shape, without filling it completely, there would have been a vacuum inside, and also outside, since what is inside would not have been of another nature than what is outside. As the situation we have now is with regard to the outer region in no way different from that described in the thought-experiment, it can be stated that there is a vacuum outside the Heavens. The same argument can be found in the anonymous *Questiones super librum de celo et mundo* in the Munich Codex Clm 4375, which were mentioned above.

In one of the objections against the existence of an extracosmic infinite void space it is argued that, if there were such a vacuum beyond the world, there would be something that God could neither create nor annihilate. Oresme replies by referring to the ontological status of void space: space is not something in the proper sense of being. Moreover, since place or space is that where there can be some body, even God cannot create or annihilate place or space because he cannot deprive himself of the possibility to create or put something in or outside the world.

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72 « Tertio. Si mundus fuisset factus alterius figure quam spherice et postea fuisset plicatus in spheram non replendo totum, quod est intra, tunc illud, quod esset extra, non esset alterius rationis quam illud, quod esset intra, et tamen illud intra esset vacuum, ergo extra esset vacuum, et non est nunc alter extra quam tunc esset, ergo tunc extra esset (lege nunc extra est) vacuum » (Qu. IV.6, 72-76).


74 « Septimo arguitur contra quartam conclusionem quod extra celum non sit tale vacuum, quia tunc esset aliquid, quod deus non possit annihilare aut creare » (Qu. IV.6, 128-130).

75 « Ad septimam - conceditur quod esset aliquid, quod deus non possit annihilare et cetera - : solvitur per hoc, quia non ponitur quod sit aliqua res. Tamen deus non possit facere quin ibi aliquid corpus possit ponere; verbi gratia, dicimus quod illud est locus, ubi potest ponere corpus; ergo, si deus posset locum destruere, tunc non posset ponere corpus ibi nec posset facere corpus extra celum, quod est inconveniens » (Qu. IV.6, 212-217). The question whether space might be something independent of God becomes irrelevant, if one holds, like Buridan, that space is nothing but the dimensions of a body, since it is certain that God could at any time create or annihilate dimensions separate from any subject or any other accident (cf. Buridan's statement that God did not need a space in which to create the world, cited above under footn. 28).
Another objection draws on Aristotle's statement in «De caelo»\(^{76}\) that there is neither place nor time nor vacuum outside the Heavens\(^{77}\). Oresme’s answer to this argument is quite brief, so that a further explanation is needed. Although Aristotle defines vacuum in «De caelo» much as Oresme does as that where there is no body, but could be, the two philosophers arrive at completely different results\(^{78}\). Aristotle first demonstrates that there cannot be any body outside the last sphere nor can a body get there, neither naturally nor violently. From that he deduces that beyond the world there is neither place nor time nor vacuum. There is no place, because at each place it must be possible for a body to be there, but Aristotle has just shown that there cannot be any body outside the last sphere. For the same reason Aristotle states that there cannot be a vacuum because vacuum is something where there is no body but can be. And there is no time, because time is defined as number of motion with respect to before and after, but motion is not possible without a body that is moved. In the framework of Aristotle’s natural philosophy this proof is complete. But for Oresme as a Christian philosopher the omnipotent God comes into play who is able to create a body or even a whole world beyond the last sphere. This is quite obvious and stated several times by Oresme, so that he can without further explanation reply to the above mentioned objection «posset negari» or that this auctoritas applies to the second meaning of the word «vacuum», that is, a distance between already existing bodies, where there is no body, but can be\(^{79}\).

Oresme’s conception of an extracosmic infinite void space is well known from other works by him\(^{80}\). Besides Oresme there were few mediaeval philosophers who assumed the existence of an infinite void space beyond the world. The Jewish philosopher Hasdai Crescas, Thomas Bradwardine and

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\(^{76}\) Aristoteles, De caelo, I.9. 279a11-12, 17-18.

\(^{77}\) «Ultimo auctoritate Aristotelis primo celi, ubi dicit quod extra celum non est locus nec vacuum nec tempus» (Qu. IV.6, 133-134).

\(^{78}\) See for the following description of Aristotle’s argumentation «De caelo», I.9. 278b21-279a18.

\(^{79}\) «Ad auctoritatem Aristotelis quod extra celum non est vacuum : posset negari vel solvi per distinctionem prius postiam quod ibi non est vacuum, id est spatium inter corpora» (Qu. IV.6, 223-225).

Robert Holkot may be mentioned among them. Later in his questions on the nature of time Oresme speaks of the immensity which is outside the Heavens and identifies this immensity, by which he means without any doubt the extracosmic void space, with God Himself. This identification of the infinite void space with God Himself is a characteristic feature of Oresme’s natural philosophy or theology. According to Wolfson Crescas did not identify the infinite void outside the world with God’s immensity nor does Bradwardine seem to have held such a view. The same applies to Robert Holkot.
Oresme’s identification of the extracosmic void space with the immensity of God and with God Himself offers new perspectives on the properties of this space. Since God was commonly regarded as a nondimensional being, we have to assume that Oresme conceived the extracosmic void space as nondimensional. This specific status of the extracosmic void space is for the first time implied in Question IV.6 when Oresme incidentally observes that what is outside the world perhaps is of another nature than the place inside the world. Obviously Oresme’s extracosmic space does not correspond to Newton’s concept of an absolute space beyond the world and in which the world is located. For irrespective of how Newton thought of the relation between God and space, a problem that has not yet been convincingly resolved, it is clear, that he conceived the infinite extracosmic void space as

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86 The context in which Oresme’s remark occurs is the following: One of the arguments against the existence of an extracosmic void space emphasizes that such a view implies the existence of something else besides God before the creation of the world, namely the space in which it was created: «Octavo sequitur quod aliquid aliud a deo fisset ante mundum, scilicet tale vacuum, ubi fecit mundum» (Qu. IV.6, 131-132). Oresme replies by referring to the specific ontological status of space (see above) according to which space is no real thing. Having stated that nevertheless God could create the world in some place Oresme continues with his remark on the different natures of that, which is outside the world, and the kind of place we find inside the world: «Ad aliarn [the just mentioned counter-argument] – conceditur quod ante mundum fisset aliqua res alia ab ipso deo –: negatur illa, quia non ponitur quod sit aliqua res. Verumtamen ante mundum deus potest aliqui facere mundum; unde illud, quod est extra mundum, forte est alterius rationis a loco, qui est in mundo, sicut etiam est de duratione» (Qu. IV.6, 218-222).

three-dimensional (and extended). Furthermore it is beyond any doubt that for Newton the infinite space differs from God and is not identical with God as for Oresme.

spatium. Deque Duratione similla possunt affirmari: scilicet ambae sunt entis affectiones sive attributa secundum quae quantitas existentiae cujuslibet individui quoad amplitudinem praesentiae et perseverationem in suo esse denominatur. Sic quantitas existentiae Dei secundum durationem aeterna fuit, et secundum spatium cui adest, infinita; et quantitas existentiae rei creatae secundum durationem tanta fuit quanta duratio ab inita existentia, et secundum amplitudinem praesentiae tanta ac spatium cui adest. In another unpublished tract which can be dated to the years 1692-93 (cf. McGuire, «Newton on Place, Time and God», p. 114) Newton again calls time and place «space omnium rerum affectiones communes» (ibid., p. 116). In «De gravitatione et aequipondio fluidorum» Newton continues (p. 104, italics mine): «Denique spatium est aeternae durationis et immutabilis naturae, idque quod sit aeterni [the Edition has «aeternis»] et immutabilis entis effectus emanativus». In the «Scholium generale» which Newton added to the second and third edition of his «Philosophiae naturalis principia mathematica» he says of God (ed. cit., vol. 2, p. 761, italics mine): «Non est aeternitas et infinitas, sed aeternus et infinitus; non est duratio et spatium, sed durat et adest. Durat semper, et adest ubique; et existendo semper et ubique, durationem et spatium constituit». Furthermore in one of his drafts for the preface to Des Maizeaux’s 1720 edition of the Leibniz-Clarke correspondence Newton writes (cited from Alexandre Koyré and I. Bernard Cohen, «Newton & the Leibniz-Clarke Correspondence with Notes on Newton, Conti & Des Maizeaux», Archives internationales d'histoire des sciences, 15, 1962, p. 63-126, on p. 96-97): «The Reader is desired to observe, that wherever in the following papers through unavoidable narrowness of language, infinite space or Immensity & endless duration or Eternity, are spoken of as Qualities or Properties of the substance w^67 is Immense or Eternal, the terms Quality & Property are not taken in that sense wherein they are vulgarly, by the writers of Logick & Metaphysics applied to matter; but in such a sense as only implies them to be modes of existence in all beings, & unbounded modes & consequences of the existence of a substance which is really necessarily & substantially Omnipresent & Eternal: Which existence is neither a substance nor a quality, but the existence of a substance with all its attributes, properties & qualities, & yet is so modified by place & duration that those modes cannot be rejected without rejecting the existence». The exact meaning of Newton’s description of space as «effectus emanativus» of God or «mode» and «consequence» of the highest being is still under discussion (see the literature cited at the beginning of this footnote).

III- ORESME'S CONCEPT OF TIME

Aristotle defines time as the number, that is measure, of motion with respect to before and after. Thus he deduces the existence of time from the existence of motion, which means that time is nothing independent of motion. In contrast to Aristotle Oresme conceives time as the successive duration of things (duratio rerum successiva, also duratio successiva rerum or rerum duratio successiva), that is, the duration of the actual existence of things. For Oresme this is time in the proper sense of the word. In an improper meaning of the equivocal word «time» it is that by which we measure the duration of things or that with the help of which we apprehend the duration. In this sense, that is improperly

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89 Aristotle, *Physics*, IV.11. 219b1-2 ; for the deduction of this definition see IV.10. 218b9ff.

90 «De secoundo, quid est tempus, sciendum quod hoc nomen “tempus” uno modo capitur in significacione propria, et sic sibi competunt significaciones prius dicte suppositiones, et sic intellegant<ur> conclusiones prius poste, et ideo illud denotatur per adverbia temporis, et eius differentie sunt “prius” et “posterior” et “ante” et cetera, et non est significabile nominaliter categoriealic, sed adverbialiter aut nominibus derivatis inde vel equivalentibus, ut vocatur tempus in generali aut duratio rerum successiva. Alio modo capitur equo pro eo, quo mensuramus talem duratiorem vel per quod fit nobis nota in relatione et comparatione rei ad rem, sicut dicimus quod Sor <currid> per spatium vie trium leucarum vel trium leum le... dico revolutionum, et sic dicitur quod fabbe sunt numeros hominum, per quas numerabimus quot sunt homines. Secundo sciendum quod proportionaliter <dicendum est> de tempore sicut de loco quodammodo, quia uno modo accipitur pro eo, ubi est res, sicut “hic” vel “ibi”, ali pro quo equo pro corpore locante sicut pro vases; unde, dum vinum portatur in delio, semper est in eodem loco secundo modo et non primo modo, et eodem modo tempus est equocum. Tunc est prima conclusio secunde partis quod proprius tempus est duratio successiva rerum. Patet tripliciter: primo quia non est res nec accidentes inherens rebus, ut probatum est; relinquit ergo quod sit huius<mod> duratio. Secundo quia illud est tempus, quod communiter omnes intendunt nomine temporis; modo sic est, ergo et cetera. Tertio quia tali competunt communiter concessa de tempore, sicut diurnitas temporis, brevitas et suppositiones, que dicte sunt de tempore» (Qu. IV.17, 84-106). See a. Qu. IV.18, 24-38: «Quantum ad primum distinguendum est de tempore ut prius; unde, si capiatur proprie, aliquid potest sic describi: tempus est rerum duratio successiva. Dico “successiva” ad differentiam etatematis, quia omnes philosophi in hoc conveniunt quod eometas est rerum duratio tuta simul. Ex quo sequitur quod, si non sit aliqua successio nisi per motum, quod tunc duratio non esset temporis nisi motus esset. Tunc sit conclusio quod, licet tempus illo modo sit numerus motus, quia per hoc possimus numerare motum quantum ad duratiorem, tamen cum hoc est mensura eque bene ait argum rerum et duratio, et etiam magis numeramus tempus illo modo per motum quam e converso, et naturaliter secundum imaginationem videtur esse prius motu, et ideo secundum hoc descriptio est bona. Licet hic propositio
(impropriè) understood, time is motion, primarily the motion of the Heavens, although in principle every movement that can be apprehended is appropriate for measuring duration\(^91\).

In Qu. IV.18, where it is asked whether time is the number of motion with respect to before and after\(^92\) Oresme applies the Aristotelian definition of time primarily to the «improper» time, because time in the proper sense is conceived as prior to motion\(^93\). Furthermore he states that improper time is both a number by which we count (numerus quo numeramus), since all other motions are measured by the motion of the Heavens, and a counted number (numerus numeratus), since improper time itself is divided in days, hours etc.\(^94\)

\(^91\) See the end of the second passage cited in the previous footnote and the following conclusions (Qu. IV.17, 107-128) : « Secunda conclusio <est> quod nulla alia re quam motu potest a nobis talis duratio cognoscere servatur iure mensurari. Probatur, quia non percepitur nisi cognoscendo prius <et posterius> ; modo, nisi isset aliqua transmutatio in re extra vel saltum <in> imaginatione, non percepemus aliquem esse prius et posterius <et> <diutius> durare, et ideo dicit Commentator [Averroës, In Phys., IV, Comm. 97, fol. 203K/L]. »

\(^92\) See the second passage cited in footnote 90.

\(^93\) « Consequentem queritur utrum tempus sit numerus motus secundum prius et posterius ».

\(^94\) « Tunc prima conclusio <est> quod tempus est numeros – dico numeros, quo numeramus omnem motum numeratum et mensuratum a nobis. Hoc probatur, quia in alia questione patuit quod tempus illo modo acceptum est motus celi ; sed motum celi sicut una
As this passage shows, even Oresme's improper time cannot be fully identified with Aristotle's definition of time, for the term «number of motion» obviously changed its meaning. With Aristotle the term «number of motion» indicates that the reality of time is deduced from the reality of motion. With Oresme «number of motion» means that the improper time is identified with a certain motion, primarily the motion of the Heavens, and then this motion is used to measure by comparison other motions, whose number, that is, measure, it thus becomes. Such an interpretation of Aristotle's definition of time is also found with Buridan.

Among the other differences between proper and improper time Oresme mentions that the former seems to exist independently of the thinking soul whilst the latter exists as time only when a measure is actually carried out.

die, que dicitur tempus, mensuramus totum motum unius anni, mensuramus etiam motus nostros et locales, alterationes, infirmitates <et cetera>. Patet ergo, quo tempore mensuramus motum, et illud est tempus <improprie acceptum>. Secunda conclusio <est> quod tempus est numerus numerus. Patet, quia tempus est motus celi, sicut annus numeratus et mensuratus per aliquam sui partem sicut per diem vel horam mediante actione anime. Est igitur tempus numerus primo modo, sicelicit numeratus, et secundo modo, <sicelicit> quo numerosus, et non tertio modo, sicelicit quo numerosus tamquam actione <anime>, quia non est actio anime, immo est motus, licet hoc nomen “tempus” sicut etiam “numerus” connotat actionem istam» (Qu. IV.18, 58-71).

56 See Phys., ult. lect., Qu. IV.12, 13 and 14. For instance, in Qu. IV.12 Buridan says (ed. cit., fol. 78vb) : «Secunda conclusio infertur quod tempus est motus ... Tertia conclusio est quod tempus propriissime acceptum est motus primus [that is, the diurnal rotation of the Heavens], quia de ratione temporis est quod sit mensura motum, ideo magis proprius tempus debet dici ille motus qui magis propririe dicitur mensura aliorum et ille est primus motus ». Furthermore he states in Qu. IV.13 (fol. 79rb) : « ... iste terminus “tempus” ultra significacionem motus connotat quod sit mensura, sicelicit aliorum motum ... Secunda conclusio est quod rationabile est dicere quod tempus est numerus quia est mensura sicut dictum est ».

56 «Tunc est prima conclusio quod tempus proprius loquendo non est ab anima, ut videtur. Probatur, primo quia nulla anima cogitante et cunctis <dormientibus> item etiam res movere<n>etur et alterare<n>etur, quodam velocius et quodam tardius; item etiam quodam durarent brevius et quodam diutius et corrupere<n>etur uno tempore antequam alio. Secundo et simpliciter contra dictum Commentatoris, qui dicit [Averroes, In Phys., IV, Comm. 109, fol. 187C; Comm. 131, fol. 202F, G] quod est ab anima intellectiva, quia bruta peripicient tempus et prius et posterius et motum et recolunt preteritum, licet alio modo quam homines, et attediantur, et ita de aliis, que continue <consequentur> ex tempore; modo non peripierent aliquid, quod fieret per actionem anime. Tertio. Nulli existenti per imaginationem aut actionem anime competunt suppositiones prius posite, que communitur conceduntur de tempore. Patet inductive, sicut quod sit idem ubique, quod non
The duration of things as conceived by Oresme precedes motion and is independent of it. Oresme states that without any motion – provided there is no succession without motion – the duration of things is eternity, which he defines as *duratio rerum tota simul*98. Eternity has neither beginning nor end. Being all at once (*tota simul*), eternity contains no succession of earlier and later, so that there is neither past nor future99. As his own citations show, Oresme’s concept of eternity is clearly influenced by Plato and Boethius.

97 See the forth corollary in the following passage from Qu. IV.17 which immediately follows the passage cited under footnote 91 (by « tempus primo modo » Oresme means time proper, by « tempus secundo modo » time improper): « Tunc sequuntur corollaria. Primum est quod tempus primo modo idem est ubique et non sunt muta simul, non tamen secundo modo; et differentie eius non sunt simul, sunt prius et posterius primo et proprie et non capiendo secundo modo; et est incorruptibile adhuc secundum imaginationem et secundo modo est corruptibile. Secundum est quod tempus primo modo a nobis mensuratur muto, sed secundo modo tempus mensuratur tempore sicut motus mensuratur ad motum comparando eos in duratione. Tertium est quod motus solis aut etiam lune magis est tempus quam primus motus, quia, licet non sit regularis, tamen est magis notus, ut patet secundum hoc, quia annus dividitur <illo> tempore, et ideo dicitur <ur> quod sol et luna sunt signa et tempora, et quidam mensurant per annos solares, alii per annos lunares. Quartum est quod tempus secundo modo est ab anima comparante unum ad alium, et non solum intellectiva, sed etiam imaginativa; unde, sicut ulna non dicitur actus mensura panni, nisi quando applicamus eam ad computandum, ita motus non dicitur tempus actu, nisi quando ipso mensuramus durationem rerum et tempus primo modo faciendo comparationem, et solum est ab intellectiva, si fiat multiplex replicatio numeralis, ut dicendo “due hore”, “tres” et cetera, quia bruta non numerant, et illa significacione loquitur Aristoteles multum de tempore» (Qu. IV.17, 129-146).

98 «Quantum ad primum distinguendum est de tempore ut prius; unde, si capiatur proprie, aliquando potest sic describi: tempus est rerum duratio successiva. Dico “successiva” ad differentiam eternitatis, quia omnes philosophi in hoc conveniunt: quod eternitas est rerum duratio tota simul. Ex quo sequitur quod, si non sit aliqua successio nisi per motum, quod tunc duratio non esset tempus nisi motus esset » (Qu. IV.18, 24-29); see a. Qu. IV.17, 82-83: « [...] quia huius<modi> duratio, quando est cum motu, dicitur tempus, quando est sine motu, dicitur eternitas ».

99 For the properties of eternity see Qu. IV.19, 26-46: « Quantum ad primum prima propositio est descripito ipsius eternitatis, quam ponit Boetius quinto de consolatione prosa sexta [Boethius, De consolatione philosophiae, ed. L. Bieler, Turnhout, « Corpus Christianorum, Series Latina », 1957 vol. 94, V, 6.4] dicens quod eternitas est eternalis [lege interminabilis] vise tota simul et perfecta possessio. Ex quo sequitur quasi corollarie primo quod in eternitate non est primum principium nec finis nec in partibus eius, quia est indivisibilis non habens partes sicut est de partibus temporis, cuius quelibet finitas habet principium atque finem. Secundo sequitur quod ipsa est duratio indivisibilis sine
If there is motion and consequently succession, the duration of things becomes time as successive duration of things. About the question, whether, if everything were at rest, there would still be succession and hence successive duration of things, that is, time, Oresme is undecided\textsuperscript{100}. In his \textit{Tractatus de configurationibus qualitatum et motuum} (composed probably after 1351)\textsuperscript{101} Oresme is more distinct: even if everything were at rest, there would still be time\textsuperscript{102}.

\textit{successione priorum et posteriorum, quod patet ex hoc, quod dicitur \textit{“tota simul”}, sicut primum patet ex hoc, quod dicitur \textit{“interminabilis”}, et dicebatur ratione, quia omnis successio priorum et posteriorum est propter aliquam mutationem. Si \textit{cetera}, que sunt extra mundum, sunt immutabilia, ut dicit Aristoteles primo celli [Aristoteles, \textit{De caelo}, I.9, 279a1-22], et ideo ibi non est tempus. Hoc idem patet quarto huius capitULO quintro [Aristoteles, \textit{Physic}, IV.12. 221b3-7], similiter Boetius ibidem [Boethius, \textit{De consolatione philosophiae}, ed. cit., V, 6.8: \textit{“Quod igitur interminabilis vitae plenitudinem totam pariter comprehendit ac possidet, cui neque futuri quicquam abit nec praeteritie fluxicit, id aeternum esse iure perhibetur iisque necessae est et sui composit praesens sibi semper assistere et infinitatem mobilis temporis habere praeestem”}: \textit{“cui neque futuri quidquid abit nec praeteriti fluxit, illud vere eternum est; necessae est illud infinitatem mobilis temporis habere presentem”}. Tertio sequitur quod in eternitate vera non est preteritum aut futurum, sed totum est presens, ex quo tota est simul, et hoc patet a Boetio ibidem, qui per hoc solvitur questionem de presentia futurorum [Boethius, \textit{De consolatione philosophiae}, ed. cit., V, 6], et probatur adhuc auctoritate Platonis, qui vocat eternitatem \textit{“eum”} dicens sic [Plato, \textit{Timaeus}, ed. J. Herbrand Watazink, 2nd ed., London, Warburg Institute, 1975, p. 30, 1, 7ff.: \textit{“non recte assignamus evo preteritum vel futurum, dicimus enim \textit{‘fuit’}, est, \textit{‘erit’} de evo, tamen illi esse solum competit iuxta veram sinceramque rationem, fuisset vero et fore deinceps non continga”}].}

\textsuperscript{100} Compare the following passages (italics mine): \textit{“Ex quo sequitur quod, si non sit aliqua successio nisi per motum, quod tunc duratio non esset tempus nisi motus esset”} (Qu. IV.18, 27-29). \textit{“Et ideo \textit{forte}, si non esset aliquis motus, non esset tempus […]”} (Qu. IV.18, 125-126). \textit{“Ad quintam quod \textit{“si omnia quiescere esset tempus”} dicitur quod non, caiendo tempus secundo modo [by \textit{tempus secundo modo} Oresme means time improper, that is motion; in case that everything is at rest there naturally can be no such time]; nec \textit{forte} esset duratio successiva, et hec successio fit ex motu. Et si \textit{successio} esset, tunc non esset tempus nisi primo modo […]”} (Qu. IV.18, 147-150). By \textit{tempus primo modo} in the last citation Oresme means time in the proper sense, which could exist even if everything is at rest provided that there can be succession without motion (what is uncertain).


\textsuperscript{102} See Nicolaus Oresme, \textit{Tractatus de configurationibus qualitatum et motuum}, in Marshall Clagett, \textit{Nicole Oresme and the Medieval Geometry of Qualities and Motions},
In deducing his concept of time from the duration of things Oresme deviates from the conventional manner in which this topic was discussed among mediaeval scholastics. For nearly all of them drew on the Aristotelian definition of time as number of motion and thus assumed that time is in its existence in principle dependent of motion, though this dependence was defined in different ways by the various authors. Among the few who opposed Aristotle’s doctrine of time was Petrus Johannis Olivi (b. ca. 1248, d. 1298) who criticized Aristotle for regarding motion instead of the actual existence of things as the subject of time\textsuperscript{103}. Furthermore there can be mentioned the Franciscan Gerardus Odonis (ca. 1290-1349) as proponent of the independence of time from motion\textsuperscript{104}.

Oresme’s theory of time foreshadows that of classical physics to a certain degree. There is still no complete survey of the fortunes of Aristotle’s theory of time and of the propounding of alternative theories based on the concept of duration between the fifteenth and seventeenth centuries. As a résumé of her studies on some Renaissance critics of Aristotle’s theory of time, especially Bernardino Telesio, Giordano Bruno and Francesco Patrizi, Sarah Hutton states that “by the end of the sixteenth century, the term *duratio* has entered the terminology of the definition of time, among both Aristotelians and


\textsuperscript{104} For Odonis’ view see Maier, *Metaphysische Hintergründe*, p. 134-137. Proponents of non-Aristotelian concepts of time within the Jewish tradition were Crescas (see *Or Adonai*, p. 287-291 and the comments by Wolfson, *Crescas’ Critique of Aristotle*, p. 96-98, 654-658; Pines, *Nouvelles Études*, p. 73-83) and Albo (see his *Sefer Ha¬İlkharim*, ed. cit., book 2, ch. 18; Wolfson, *Crescas’ Critique of Aristotle*, p. 656-658) and within the Moslem tradition, among others, Abū Bakr Muhammad ibn Zakarīyā al-Rāzī (see Pines, *Beiträge*, p. 49-56; Brion, *Le temps, l’espace*) and Abū al-Barakāt al-Bagdādī (see Pines, *Nouvelles Études*, p. 21-43). These philosophers have already been mentioned for their exceptional views on the nature of place (see above). Concerning their views on the nature of time one has to bear in mind that by stating that time is independent of motion there is only one problem solved, while other questions arise, e. g., to what degree time is also independent of the existence of things or of the human soul, whether time existed prior to the creation and so on. For an account of the different answers to these questions by the above named authors see especially Pines, *Nouvelles Études*.
others». This new line of thinking, inspired probably to a large degree by Neoplatonism, finally culminated in Newton’s definition of absolute time in his *Philosophiae naturalis principia mathematica*: «Absolute, true and mathematical time, of itself, and from its own nature, flows equably without any relation to any thing external and by another name is called duration».

In both Newton’s definition of absolute time and Oresme’s definition of time proper the term «duration» is central, but nevertheless there is an essential difference concerning the ontological status of time. In Newton’s view time is – like space – a physical reality, which is independent of things. In «De gravitatione et aequipondio fluidorum» Newton compares the independence of space from external things with the similar status of time and argues as follows: «Next, although we can possibly imagine that there is nothing in space, yet we cannot think that space does not exist, just as we cannot think that there is no duration, even though it would be possible to suppose that nothing whatever endures». For Oresme on the contrary time is – like space – nothing definite that could be denoted by a noun, but only by adverbs like «earlier» (*prius*), «later» (posterus) etc. Moreover in Oresme’s opinion time is the duration of things. Hence one might expect that time is to a certain degree dependent on the existence of things. Unfortunately Oresme is not very clear in this point. In Qu. IV.17 he uses a thought...

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107 See the above cited definition of absolute time.


109 See the passage cited above under footn. 90 (Qu. IV.17, 84-106) and Oresme’s presentation in Qu. IV.16 of three possible opinions about the nature of time to the third of which he himself subscribes: «Prima est quod *<tempus>* non est res successiva, sed permanens vel permanentis. Secunda *<est>* quod est res successiva non permanens, scilicet motus sive passio sive duratio consequens. Tertia est quod non est substantia nec aliquid accidens inherens, sed est duratio rerum, que non est proprie significabilis nec potens competenter exprimi per nomina categoriatica, immo per adverbia aut nomina syncategorematica ab eis derivata, licet improprie capiatur aliis modis et equivoco» (Qu. IV.16, 59-66).
experiment to demonstrate that time cannot be something of this world\textsuperscript{110}, but in Qu. IV.21 he thinks of the possibility of there being no time if there is nothing but God\textsuperscript{111}.

Another difference between Newton and Oresme concerns the way in which they conceived the relation between God and time or between God and eternity. In Newton’s opinion the «endless duration or Eternity» is a consequence of the eternal existence of God, God constitutes duration by his everlasting existence\textsuperscript{112}. The question of how Newton exactly imagined the interrelationship between God and eternity has not yet been satisfactorily resolved. But what is sure is that Newton did not identify eternity with God\textsuperscript{113}. Moreover Newton conceives God as a sempiternal being, with past and future\textsuperscript{114}. In contrast to this Oresme identifies God's eternity with God

\textsuperscript{110} « [...] Ponatur, sicut in veritate est possibile, quod deus destruat mundum et iterum reparet; queritur utrum potest inter hoc duo expe<=>tare. Si dicas quod non, sequitur tunc quod semper mundus erat et sic non destruxit, et pari ratione dicetur quod in quolibet instanti destruit et reparat ipsum; si potuit expe<=>tare, ergo tempus fuit inter hoc duo, ergo etiam non alius tempus, quod nunc est, aut alterius rationis, ergo tempus non est aliqua res, quae sit in hoc mundo » (Qu. IV.17, 66-72).

\textsuperscript{111} Oresme's relevant statement forms part of his answer to an objection against his view that eternity is all at once (tota simul). The adversary's argument reads (Qu. IV.21, 138-140): « Tertio. Si <deus> destrue<=>t omnia alia a se et non remaneret nisi eternitas <et> deinde iterum faceret aliquid, <tunc> non simul faceret et destrueret, ergo ibi esset prius et posterius ». Oresme replies (Qu. IV.21, 149-151): « Ad tertium forte dice<=>tur quod, si omnia alia anihilarentur a deo <et> deinde crearet iterum, quod non posset ibi <esse> distanti media, quia ibi non esset tempus ».

\textsuperscript{112} See the above cited passages (footn. 87) from the « Scholium generale » to the second and third edition of Newton's Philosophiae naturalis principia mathematica and from one of his drafts for the preface to Des Maizeaux's edition of the Leibniz-Clarke correspondence.

\textsuperscript{113} See the following passage from the Scholium generale to the « Philosophiae naturalis principia mathematica », where Newton says of God (ed. cit., vol. II, p. 761, italics mine): « Aeternus est et Infinitus, Omnipotens et Omnisciens; id est, durat ab aeterno in aeternum, et adest ab infinito in infinitum: omnia regit; et omnia cognoscit, quae fiunt aut fieri possunt. Non est aeternitas et infinitas, sed aeternus et infinitus; non est duratio et spatium, sed durum et adest ». 

Himself\textsuperscript{115}, a notion that is well known from some of his other works\textsuperscript{116}. Furthermore Oresme's traditional concept of eternity as being all at once does not include succession, as we have seen above. Thus, when Newton and Oresme speak of an eternal God and of eternity, they do not mean the same.

\textsuperscript{115} See the passage cited above (footn. 82).