

# Science in Theology

Studies in the Interaction Between Late Medieval  
Natural Philosophy, Logic, and Theology

A Summary

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*Abstract*

## **Science in Theology**

Studies in the Interaction Between Late Medieval  
Natural Philosophy, Logic, and Theology

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The thesis consists of four separately published articles and a summary. Three of the articles are research papers and the fourth comprises the critical edition of questions 3, 4 and 5 from Roger Roseth's *Lectura super Sententias*. The aim of the study is to make Roseth's text available for historical study and to trace the close relation between late medieval theology and teaching and research in the faculties of arts.

Historians of medieval intellectual history commonly emphasise that the institutional organisation of the universities contributed to the intellectual unity of medieval science. The basic training medieval scholars received in logic and philosophy established scientific ideals and practises which they applied in the higher faculties of theology, law, and medicine. While medieval logic and natural philosophy have received attention in modern scholarship, their role in late medieval theology still remains a largely unexplored area.

The research articles focus on essential topics in Aristotelian natural philosophy and logic and their relation to theology. The themes of the articles are: the theory of the mathematical infinite and its relation to divine omnipotence; the theory of change, in particular the models for ascribing limits to continuous processes such as the augmentation of charity; and the application of Aristotelian logic to Trinitarian inferences.

## *Acknowledgments*

This book has been long in the making. Over the past several years many people have been involved in this project and made it possible. Now that I leave the first phase of my study of Roger Roseth behind me, I remember with gratitude all those who have eased my way .

My journey with Roger Roseth began in 1984 in the goods lift of a former accumulator factory where the faculty of theology was then situated. While the lift was slowly descending Prof. Simo Knuuttila suggested that I could take Roseth's thought as a theme for my postgraduate studies, because "Roseth is no nincompoo". Prof. Knuuttila also warned me about the hardships in palaeography but as a fresh and rash master of theology I did not take this warning as seriously as I perhaps should have and decided on Roseth. Since then Prof. Knuuttila has been my supervisor and piloted me through the many pitfalls of Roseth's subtle arguments, as well as numerous editorial problems.

Prof. Dr. Albert Zimmermann gave crucial impetus to the project by kindly inviting me to work at the Thomas-Institut (Universität zu Köln). The stay in Cologne not only enabled full-time concentration on post graduate studies but also brought me into the middle of a scholarly community working with medieval philosophical sources. I think with special gratitude of Dr. Hans Gerhard Senger, who took time to guide my first efforts in palaeography. Dr. Heide Riemann and Dr. J. Heinrich Riggert integrated me into their daily fellowship and invited our family to share a social life outside the office as well. The then assistant and present director of the institute, Prof. Dr. Andreas Speer, offered his friendship, helped provide good working conditions, and later on has provided me with material from the Thomas-Institut's library.

During the years the connection with the Copenhagen medievalists has become to be of crucial importance for Roseth studies. Prof. Lauge O. Nielsen from the Department of Church History has read my text from the very early stages on and advised me with his sometimes critical sometimes supportive remarks. We have also shared an interest in electronic editing of medieval texts. Several times Lauge and Camilla Daasnes opened their home to a far-off guest. I feel privileged to have

Prof. Nielsen as one of the two pre-examiners of my dissertation and opponent in the public examination.

The other pre-examiner also comes from Copenhagen. Prof. Sten Ebbesen from the Institute for Greek and Latin read the edition four years ago, when I thought it was finished, and infused me with the courage to consider its publication. The discovery of a new manuscript (Kassel) postponed the printing but also proved that Prof. Ebbesen's suggestions for corrections to a couple of the most problematic passages were the same as those introduced by one of the most reliable manuscripts.

Dr. Russell L. Friedman, a specialist in medieval Trinitarian theology, whom the above-mentioned Copenhagen institutes have now lost to the Thomas-Institut, has been a constant companion. Russ has evaluated my texts and improved my English and it is only fair to say that he has been the most important *socius* I have had in the academic world.

At the Department of Systematic Theology, my fellow medievalists have read my texts. I especially want to thank Dr. Toivo Holopainen, whose careful reading of the edition helped to correct many of my shortcomings. With Dr. Vesa Hirvonen I have not only shared a workroom for many years but also the glories and defeats in research and life. Part of the research was done in a project led by Prof. Reijo Työrinöja.

Of the many people who have either read my texts or provided me with material unattainable at Helsinki I want to mention Licentiate in Philosophy Anja Inkeri Lehtinen, Prof. Douglas Langston, Dr. David Flood OFM, Dr. Daniel A. Di Liscia, and Nancy Seidel (MA). I owe special thanks to Ms. Liisa Koski from the Inter Library Loans of the University Library.

The edition of Roseth's *Lectura super Sententias* was made using the Critical Edition Typesetter (CET) developed by Bernt Karasch. Besides writing the programme, he also offered accurate user support. I have often wondered at the patience with which he answered my numerous questions.

The completion of this thesis is also due to the peer support group I shared with BA, singer (Diploma) and doctor of music (*in spe*) Ava Numminen. Our project could not have been more successful: despite the fact that our themes had almost nothing in common we both managed to finish our dissertations.

Special thanks are due to the Academy of Finland, Oscar Öflund Stiftelse, Emil Aaltosen Säätiö and the University of Helsinki for their financial support.

For all the goodness in life, I thank my family: Ouna, our Finnish Lapphund, Tuomas, Inkeri and Luukas, and Jaana, my true friend.

Helsinki 20 April 2005

*Olli Hallamaa*

### *List of publications*

The four articles comprising this dissertation are as follows:

- [I] "Continuum, Infinity and Analysis in Theology", in: *Raum und Raumvorstellungen im Mittelalter*, *Miscellanea mediaevalia* Bd. 25, Herausgegeben von Jan A. Aertsen und Andreas Speer, Berlin: Walter de Gruyter (1998), 375-388.
- [II] "On the Borderline Between Logic and Theology: Roger Roseth, "Sophismata", and Augmentation of Charity", in: *Documenti e studi sulla tradizione filosofica medievale* 11 (2000), 351-374.
- [III] "Defending Common Rationality: Roger Roseth on Trinitarian Paralogisms", in: *Vivarium* 41 (2003), 84-119.
- [IV] Roger Roseth, *Lectura super Sententias*. Edited by Olli Hallamaa. Reports from the Department of Systematic Theology, University of Helsinki 18. Helsinki 2005.

## *The Background*

In a number of scholarly articles John E. Murdoch has shown that late medieval academic learning was based on the commonly accepted scientific ideals constituting what he called "the unitary character" of medieval scholarship.<sup>1</sup> According to Murdoch, social and intellectual factors contributed to this unity. The social factor refers to the organisation of academic curriculum: all students striving for a degree in the higher faculties of theology, law, and medicine had to complete a degree in arts or have the equivalent knowledge. Common basic training brought about intellectual unity, which shows in widely accepted scientific ideals, methodology, and practices in research. Among Murdoch's key witnesses for the influence which the arts curriculum exerted on other fields is the Franciscan theologian Roger Roseth.

At the time Roseth was writing his major work, *Lectura super Sententias*, logic and natural philosophy were flourishing in Oxford. In particular, Merton College had recruited several outstanding scholars who cultivated logic, mathematics, and speculative physics. Among the Mertonians were Richard Billingham, Thomas Bradwardine, Thomas Buckingham, Walter Burley, John Dumbleton, William Heytesbury, and Richard Swyneshead. Although the Mertonians outnumbered other arts scholars, other academic institutions also had eminent scholars such as Richard Kilvington or Roger Swyneshead. They all made contributions to logic and philosophy, but many of them continued their studies and published works in theology as well.

Along with Merton College, the mendicant convents at Oxford were centres of excellence in research, housing scholars like William Ockham, Adam Wodeham, Robert Halifax, Roger Roseth, Robert

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<sup>1</sup> E.g. John E. Murdoch, "From Social to Intellectual Factors: An Aspect of the Unitary Character of Late Medieval Learning", in: *The Cultural Context of Medieval Learning*, ed. by J. E. Murdoch and E. D. Sylla. Boston Studies in the Philosophy of Science 26. Dordrecht: D. Reidel Publishing Company 1975, 271–348 and John E. Murdoch, "Mathesis in philosophiam scholasticam introducta: The Rise and Development of the Application of Mathematics in Fourteenth-Century Philosophy and Theology," in: *Arts libéraux et philosophie au moyen âge: actes du quatrième congrès international de philosophie médiévale*, Montréal: Institut d'études médiévales – Paris: Librairie philosophique J. Vrin 1969, 215–254.



Holcot, and William Crathorn. Like their secular colleagues in the arts faculty, Greyfriars and Blackfriars had to study logic and philosophy before entering the university for a higher theological education. Some mendicants even published works on arts subjects. Well trained mendicants and former arts masters employed the scientific ideas they had learned while studying the arts in their theological works, and thus established an unconventional new approach that has been characterized as the mathematization of theology.

The studies that constitute this dissertation address the English theology of the 1330s. Since most of the sources elucidating this unique period in the history of theology still remain unedited, and are thus accessible only to scholars familiar with medieval paleography, the present study includes a critical edition from Roger Roseth's *Lectura super Sententias* [IV], which is good example of *Theologia Anglicana*, fourteenth century mathematical English theology. The research articles shed light on the use of logic and physics in Roseth's text.

Though Roseth's *Lectura* is an important witness for the *Theologia Anglicana*, hitherto it has awakened only exiguous scholarly interest. With the exception of the above mentioned articles by John E. Murdoch, modern historians of medieval thought have rarely used Roseth as a source. Roseth's name probably appears for the first time in a modern study in 1925 when K. Michalski identified the author of *Lectura super Sententias* in the MS. Oxford, Oriel College 15 as Roger Rosseti, but presumed that the name was a variant of the name Swyneshead.<sup>2</sup> In 1941 Marshall Clagett corrected Michalski's assumption and announced that the author was an English Franciscan "Roger Royseth". Clagett also identified two more manuscripts in which Roseth's *Lectura* was preserved.<sup>3</sup> Twelve years later Victorin P. Doucet extended the list with nine new manuscripts.<sup>4</sup> Studies on Roseth's thought include Simo Knu-

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<sup>2</sup> Published in: "Le Criticisme et le Scepticisme dans la Philosophie du XIV<sup>e</sup> siecle," in: *Bulletin International de l'Academie Polonaise des Sciences et des Lettres*, Classe de philologie. Classe d'histoire et de philosophie, L'Année 1925, Part I, pp. 47, 79; quoted through Marshall Clagett, *Giovanni Marliani and Late Medieval Physics*. Studies in History, Economics, and Public Law, no. 483, New York: Columbia University Press 1941, 172–173.

<sup>3</sup> Clagett 1941, 172–173. See also Marshall Clagett, *The Science of Mechanics in the Middle Ages*. University of Wisconsin Publications in Medieval Science 4. Madison: The University of Wisconsin Press, 1959, 204.

utila's research on the rise of deontic logic,<sup>5</sup> Katherine H. Tachau's work on the history of epistemology at Oxford in the second quarter of the fourteenth century,<sup>6</sup> and Angel d'Ors's article on deontic semantical paradoxes.<sup>7</sup> The current state of research still leaves many unexplored areas in Roseth's thought.

### *The Articles*

[I] Infinity is the topic in medieval natural philosophy that has an inherent counterpart in theology, because of God's omnipotence. But whereas in physics infinity is brought about by an unending series of addition or division, in theology infinity originates from God's perfections and is thus metaphysical. In Aristotelian terms the mathematical infinity created by the unending series is potential, while theological infinity is actual by nature.

Roseth's principal concern appears to be how God's infinity relates to mathematical infinity. He shared the traditional Aristotelian postulate that only potential infinity is acceptable in the created order; in the natural world no creature, not even the angels, are able to perform infinite operations or possess infinite attributes. Therefore the computing of an unending series of proportional parts in a continuum or suffering infinite pain in damnation is not possible for creatures. God, due to His omnipotence, is able to perceive infinitesimal proportional parts of a

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<sup>4</sup> Victorin P. Doucet, "Le studium franciscain de Norwich en 1337 d'après le ms Chigi B. V. 66 de la bibliothèque Vaticane", *AFH* 46 (1953), 85–98.

<sup>5</sup> Simo Knuutila, "The Emergence of Deontic Logic in the Fourteenth Century", in: R. Hilpinen (ed.), *New Studies in Deontic Logic: Norms, Actions, and the Foundations of Ethics*, Synthese Library, Vol. 152, Dordrecht: Reidel, 1981, 225–248; Simo Knuutila, *Modalities in Medieval Philosophy*. London: Routledge 1993, 190–196.

<sup>6</sup> Katherine H. Tachau, "The Problem of the *Species in Medio* at Oxford in the Generation After Ockham", in: *Medieval Studies* 44 (1982), 394–443.

<sup>7</sup> Angel d'Ors, "Insolubles deónticos (Robert Holcot y Roger Roseth)", in: *Acta philosophica* 4 (1991), 173–188.

continuum or deal with any other mathematical object produced by an infinite series. However, Roseth noted that God's omnipotence is restricted by the laws of mathematics. Thus mathematics is a true counterpart of logic in defining logical possibilities: just as God's absolute power is restricted by his inability to bring about a contradiction, God cannot violate the laws of mathematics either. According to Roseth God's omnipotence does not dissolve general rationality even though it makes God a supreme calculator to whom infinite series are accessible. To creatures, infinite series are unattainable, and for them the mathematical infinite does not bring an understanding of God's actual infinity.

[II] The second article presents a case study of a logical puzzle (*sophisma*) that appears in Roseth's discussion on the augmentation of charity. Charity as a quality is susceptible to change, as are the entities falling under the categories of quantity, place (local motion), and substance. In the category of substance, change denotes generation or corruption of creatures and implicates an instantaneous change. By contrast, change in the other three categories involves a process, and therefore increment or reduction of quality, quantity or motion must be continuous.

In Aristotelian natural philosophy, continuity was understood in terms of infinite divisibility, i.e. every continuous magnitude was considered to be a continuum with arbitrarily many cut-off points. These points or instants of time are extensionless; no continua were composed of these cutting points. For this reason, between any two chosen two points or instants, there must always be an infinite number of points or instants. Thus, the Aristotelian prerequisite for a continuous magnitude was that it is not composed of contiguous extensive parts, i.e. atoms.

This concept of continuity raised several theoretical issues. Among them was the question of determining the first and last instants of change. This "limit decision problem" originated from the fact that contradictory or contrary states of affairs cannot prevail simultaneously and there are no contiguous instants of time. Therefore the first instant of change must be defined either as the last instant of rest (extrinsic limit) or as the first instant of change (intrinsic limit). Respectively the terminating instant is either the last instant of change (intrinsic limit) or the first instant of rest (extrinsic limit).

The "limit decision problem" originated with Aristotle, but the medieval schoolmen systematized the theory further by defining rules for determining the types of limit for various types of changes. These rules were then applied to increasingly complicated imaginary examples in which several variables could contribute to the choice of limit. Roseth made use of one of these logical puzzles when he discussed the augmentation of charity.

Roseth used the sophisma to prove the principle that unanimated entities increase only in the improper sense of the word. The principle states that, unlike living creatures, unanimated entities, such as charity, increase by gaining new units of the same species. Accepting this principle entails, Roseth claimed, the truth of the problematic thesis that Socrates will have twice the charity which Plato will have at instant A, when they now begin to have charity for one hour, and Socrates' charity increases two times faster than Plato's, and suppose that Socrates is dead at instant A, which terminates the hour, and Plato is alive at A. The subsequent discussion shows that the logical puzzle, when properly analysed, does not contradict the original principle.

The sophisma Roseth made use of is virtually the same as the tenth sophisma of Richard Kilvington's collection of logical riddles. Even though Roseth shared with Kilvington the traditional Aristotelian postulates concerning limit decisions, he also widened his analysis to areas, such as infinite series, which Kilvington did not discuss. The genre of the sophisma, then, was thus one of the analytical tools Roseth applied to the theoretical question at hand, and consequently the thought experiment from physics became part of the methodology in theology.

[III] The employment of logic in a theological context generated difficulties, which seemed to jeopardize the rationality of theology. The problems arising in certain Trinitarian syllogisms, in which the premises were true according to faith but the conclusion manifestly unorthodox, gave the impression that either logic was not, as it was considered to be, universally valid, or that the Christian faith was not rational; both alternatives were horrifying to medieval schoolmen.

Several authors addressed the problem of Trinitarian paralogisms at Oxford. William Ockham made constant use of Trinitarian examples in his *Summa logicae*, showing that problematic Trinitarian inferences

are either fallacies or invalid syllogisms. The anonymous author of *Centiloquium theologicum*<sup>8</sup> looked for the solution in a non-Aristotelian logic of faith, whereas Adam Wodeham defended Aristotelian logic and the rationality of the Christian faith along Ockham's line of thought. Roger Roseth was influenced by these two fellow Franciscans and presented a set of rules with which Trinitarian paralogisms could be separated from valid inferences.

Roseth employs two principles to analyse the validity of syllogisms. First, every good syllogism must comply with the predication rule *dictum de omni vel nullo*. This rule expresses a kind of class inclusion that prevails between the premises: all the entities denoted by the minor premise must fall under the scope of the major premise. The rule applies to all syllogisms, not only to first figure syllogisms but also to third figure syllogisms with premises having singular terms as subject terms: expository syllogisms. Whether or not a syllogism is regulated by the predication rule can be revealed by a simple procedure: the premises are transformed into universal propositions with a circumscription by adding the prefix *omne quod est* to the beginning of the sentence. Paraphrased premises reveal the syllogistic structure and make it easier to detect whether the syllogism is regulated by the *dictum de omni vel nullo*.

The second method is to analyse the supposition of the terms in the premises. In Roseth's parlance the Trinitarian terms have either an essential or a personal supposition. A term having a personal supposition stands for one of the persons within the Trinity, while a term with an essential supposition refers to divine essence. In a valid syllogism the supposition must remain the same throughout the inference: if the supposition varies, the syllogism is invalid and the untrue conclusion is not a threat to the syllogistics or to the rationality of faith.

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<sup>8</sup> Edited by Ph. Böhner and G. I. Etkorn and published among the dubious works of William Ockham in his *Opera philosophica et theologica*, Opera philosophica 8, St. Bonaventure, N. Y.: St. Bonaventure University 1988. The author of the *Centiloquium* was probably the Dominican Arnold of Strelley, who read the *Sentences* at Oxford between 1323 and 1330 and was a regent master in theology in the early 1330s. See Hester Goodenough Gelber, *It Could Have Been Otherwise. Contingency and Necessity in Dominican Theology At Oxford 1300–1350*. Studien und Texte zur Geistesgeschichte des Mittelalters, Bd 81. Leiden, Boston: Brill, 2004, 79–83.

Roseth's solution to the Trinitarian paralogisms seems to to a certain extent be designed for theological purposes, and it could therefore appear to represent a nonstandard logic of faith. Roseth is, however, aware of this unwelcome interpretation and rejects it, emphasizing that the same analysis used for Trinitarian paralogisms is to be used in philosophy as well. This is because similar problems also arise in Platonic metaphysics. In Plato's philosophy the relation of the forms to individuals resembles the relation of the divine essence to the persons in the Trinity and creates similar logical problems. These can be resolved with the rules and techniques Roseth applies to the Trinitarian paralogisms. Therefore, Roseth maintained that none of his rules were merely theological.

[IV] The last article in this thesis includes a critical edition of questions three, four and five of Roger Roseth's *Lectura super Sententias*. The edition is based on all extant manuscripts. The edition involves an introductory article which describes the manuscripts, text history, and Roseth's intellectual milieu.