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NICHOLAS STENO'S CHALLENGE FOR TRUTH

Reconciling science and faith



Filosofia Storia Scienze sociali

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FRANCOANGELI

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In loving memory of my father

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Table I – Portrait of an about thirty-year old Nicholas Steno

List of Abbreviations^{*}

Libraries and Archives

- FSA = Florentine State Archives
Mar.Lib. = Marucelliana Library of Florence
Nat.Lib. = National Library of Florence
Med.Lar. = Mediceo-Laurenziana Library of Florence
Vat.Lib. = Vatican Apostolic Library

Volumes

- Chaos* = *Chaos. Niels Stensen's Chaos-manuscript, Copenhagen 1959, complete edition*, ed. by A. Ziggelaar, Danish National Library of Science and Medicine, Copenhagen, 1997
EP = *Nicolai Stenonis epistolae et epistolae ad eum datae*, ed. by G. Scherz, 2 vols., NYT Nordisk Forlag, Verlag Herder, 1952

^{*} Concerning the Steno-Sylvius controversy (see chap. 7), I add here the abbreviations of three works written by the latter: *Joannis Sylvii ad primam D. Stenonis responsam* (written on September 25, 1670, and then published in 1677) [JS]; *Latinorum hodiernorum methodici, inter illos fratres de Walenburch, correcti, sive fundamentorum credulitatis Romanae concussio et fundamentorum fidei Catholicae seu reformatae defensio* (Amsterdam, 1676) [METH]; *Nicolai Stenonis quondam philosophi ad ecclesiam Romanam via hoc anno Florentiae publicata, ante quinquennium et quod excurrit examinata per Joannem Sylvium, ecclesiastem Amstelodomensensem* (Amsterdam, 1677) [VIA].

- OBI = *Olai Borrichii itinerarium 1660-1665. The journal of the Danish Polyhistor Ole Borch*, 4 vols., ed. by H. D. Schepeleern, The Danish Society of Language and Literature, C. A. Retzels Forlag Copenhagen, E. J. Brill, London, 1983
- Opere* = F. Redi, *Opere*, 9 vols., Società Tipografica de' Classici Italiani, Milan, 1809-1811
- OPH = *Nicolai Stenonis opera philosophica*, ed. by V. Maar, 2 vols., V. Tryde, Copenhagen, 1910
- OTH = *Nicolai Stenonis opera theologica*, ed. by K. Larsen and G. Scherz, 2 vols., NYT Nordisk Forlag, 1949
- Positio* = *Positio super introductione causae et super virtutibus ex officio concinnata*, ed. by the Holy Congregation for the Causes of Saints, Rome, 1974

Steno's Scientific Works

- Avibus et cuniculis* = *Observationes anatomicae in avibus & cuniculis*, in *Thomae Bartholini Epistolarium medicinalium centuria IV*, 1667, n. XXVI (OPH I, pp. 113-120)
- Canis Carchariae* = *Canis Carchariae dissectum caput*, Florentiae, ex Typografia sub signo Stellae, 1667 (OPH II, pp. 113-146)
- De glandulis* = *Disputatio anatomica de glandulis oris & novis inde prodeuntibus salivae vasis*, Johannes Elsevirium, Leiden, 1661 (OPH I, pp. 9-52)
- De musculis* = *De musculis et glandulis observationum specimen*, Hafniae, Literi Matthiae Godicchenii, 1664 (OPH I, pp. 161-192)
- De solido* = *De solido intra solidum naturaliter contento dissertationes prodromus*, Florentiae, ex Typografia sub signo Stellae, 1669 (OPH II, pp. 181-226)
- De vitelli* = *De vitelli in intestina pulli transitu epistola*, Hafniae, Literi Matthiae Godicchenii, 1664 (OPH I, pp. 209-218)

<i>Discours</i>	=	<i>Discours de Monsieur Stenon, sur l'anatomie du cerveau...</i> , chez Robert de Ninville, 1669 (OPH II, pp. 1-36)
<i>Elementorum myologiae</i>	=	<i>Elementorum myologiae specimen, seu musculi descriptione geometrica</i> , Florentiae, ex Typografia sub signo Stellae, 1667 (OPH II, pp. 61-112)
<i>Hepati redivivi</i>	=	<i>Responsio ad vindicias hepati redivivi</i> (OPH I, pp. 61-73)
<i>Proemium</i>	=	<i>Proemium demonstrationum anatomicarum in Theatro Hafniensi anni 1673</i> , «Acta Medica et Philosophica Hafniensia», II, CXXXIV, 1675, pp. 359-366 (OPH II, pp. 249-256)

Steno's Theological Works

<i>Ad virum1</i>	=	<i>Ad virum eruditum...epistola exponens methodum convincendi Achatolicum iuxta Chrysostomum</i> , Florentiae, ex Tipographia Nicolai Navesij, 1675 (OTH I, pp. 54-70)
<i>Ad virum2</i>	=	<i>Ad virum eruditum...epistola detegens illorum artes, qui suum de interprete sacrae scripturae errorem Sanctorum Patrum testimonio confirmare nituntur</i> , Florentiae, ex Tipographia Nicolai Navesij, 1675 (OTH I, pp. 76-90)
<i>De conversione</i>	=	<i>De propria conversione epistola</i> , ex Typographia Ioannis Gugliantini, Florentiae, 1677 (OTH I, pp. 126-129, EP I, pp. 257-260)
<i>Defensio conversionis</i>	=	<i>Defensio et plenior elucidatio epistolae de propria conversione</i> , Hannoverae, Typis Wolfgangi Schwendimanni, 1680 (OTH I, pp. 371-437)
<i>Defensio scrutinii</i>	=	<i>Defensio et plenior elucidatio scrutinii reformatorem</i> , Hannoverae, Typis

		Wolffgangi Schwendimanni, 1679 (OTH I, pp. 260-289)
<i>Epistola prima</i>	=	<i>Epistola prima ad Joannem Sylvium</i> (OTH I, pp. 30-31)
<i>Examen objectionis</i>	=	<i>Examen objectionis circa diversas Scripturas & earum interpretationes tanquam divinas a diversis Ecclesiis propositas</i> , Hannoverae, Typis Wolffgangi Schwendimanni, 1678 (OTH I, pp. 39-48)
<i>Examen responsionum</i>	=	<i>Examen responsionum brevium et extemporaneum et Examen responsionis ad examen responsionum brevium et extemporaneum</i> (OTH I, pp. 302-369)
<i>Occasio sermonum</i>	=	<i>Occasio sermonum de religione cum Joanne Sylvius</i> , Hannoverae, Typis Wolffgangi Schwendimanni, 1678 (OTH I, pp. 187-198)
<i>Opuscola</i>	=	<i>Opuscola</i> (OTH II, pp. 377-543)
<i>Parochorum</i>	=	<i>Parochorum hoc age, seu evidens demonstratio quod Parochus teneatur omnes alias occupationes dimittere & suae attendere perfectioni ut commissas sibi Oves ad statum salutis aeternae ipsis a Christo praeparatum perducatur</i> , Florentiae, 1684, apud Hyppolitum Navesium (OTH II, pp. 13-52)
<i>Relatio colloquii</i>	=	<i>Relatio colloquii de communione sub una</i> (OTH I, pp. 452-456)
<i>Scrutinium</i>	=	<i>Scrutinium reformatorum ad demonstrandum Reformatores morum in Ecclesia fuisse a Deo, Reformatores fidei non fuisse a Deo</i> , Florentiae, ex Tipographia Nicolai Navesij, 1677 (OTH I, pp. 112-118)
<i>Sylvii responso</i>	=	<i>De infelici ipsius Sylvii ad geminum ipsi propositum syllogismum responso</i> , Florentiae, ex Typographia Ioannis Gugliantini, 1677 (OTH I, pp. 126-136)

Introductory Remarks

1. Science and Religion in the Early Modernity. A Brief Historiographical Survey

Starting from the analysis of the entire *corpus stenonianum*, namely his correspondence, his scientific and theological work, the aim of the present research is to analyze the interactions between the scientific and religious spheres in Steno's spiritual evolution, trying to show that they are stoutly tied to each other on multiple levels. That means that this connection should not be understood only in biographical terms, as quite usual in the more or less recent, though valuable, Steno-historiography: the assertion that the Dane was «anatomicus, geologiae fundator, servus Dei», without thoroughly analyzing the several contaminations among these phases of his life, results misleading and very reductive of his many-sided personality; still worse, then, when his life is seen as bipartite, his conversion representing a sort of watershed¹.

At issue here, though limited to a single scientist of the late 17th century, is the question of the relationship between religion (faith, theological thought) and philosophy of nature (biology, embryology, geology) in the early development of modern science. The importance of the interrela-

1. Even in the most recent articles, Steno's life, because of his «abandonment» of science for the sake of the religious activity, is defined «dramatic»; see for instance V.I. Onoprienko, *Scientific Discoveries Live for Centuries. Notes on the Dramatic Fate of Nicolaus Steno*, «Herald of the Russian Academy of Sciences», Vol. 77, No. 6 (2007), pp. 619–623: 620: «The fact that Steno accepted Catholicism in 1667 played a fatal role in his scientific destiny. Upon returning to Amsterdam in 1670, he became an object of reproach of his colleagues in science, convinced Protestants». As for a brief account of the most recent publications about Steno see below in this paragraph the *Bibliographia stenoriana*.

tions between science (physics for the most part) and religion in the 17th century scientific revolution has often been underlined over the last century, with changeable exactitude and effectiveness². Several research lines can therefore be pointed out. On one hand there are those who, developing Pierre Duhem's old thesis about the consistency of science and theology begun during the Middle Ages³, put forth the opinion whereby some theological developments backed up by Medieval authors exerted an active influence upon some tenets of the early modern science. Above all John E. Murdoch, William J. Courtenay, Alain de Libera, Eugenio Randi and Luca Bianchi several years ago underlined the relevance of the *potentia Dei absoluta-potentia Dei ordinata* distinction for the advancements of modern science⁴. In particular, as Amos Funkenstein had extensively showed⁵, the reasoning based upon God's absolute power permitted many philosophers to carry out «mental experiences» often divergent from the accepted Aristotelian world view⁶.

2. As for a brief survey of these researches see L. Bianchi, *Cristianesimo e scienza moderna. Vecchie polemiche e nuove prospettive di ricerca storica*, «La nuova civiltà delle macchine», 15, Nos. 1-4 (1997), pp. 208-217.

3. This thesis was uttered mainly in his *Le système du monde. Histoire des doctrines cosmologiques de Platon à Copernic*, 10 vols., Hermann, Paris, 1913-1959.

4. J. E. Murdoch, *From Social into Intellectual Factors: an aspect of the Unitary Character of late Medieval Learning*, in J. E. Murdoch, E. D. Sylla (eds.), *The Cultural Context of Medieval Learning*, Kluwer, Dordrecht-Boston, pp. 271-348; W. J. Courtenay, *Capacity and Volition. A History of the Distinction of Absolute and Ordained Power*, Lubrina, Bergamo, 1990; A. de Libera, *Le développement de nouveaux instruments conceptuels et leur utilisation dans la philosophie de la nature du XIV^e siècle*, in Various Authors, *Knowledge and the Sciences in Medieval Philosophy. Proceedings of the Eighth International Congress of Medieval Philosophy*, Helsinki, 1990, vol. 1, pp. 158-197; E. Randi, *Plurality of Words: Fourteenth Century Theological Debates*, in *ibid.*, vol. 2, pp. 322-330 and Id., *Il sovrano e l'orologio. Due immagini di Dio nel dibattito sulla «potentia absoluta» tra XIII e XIV secolo*, La Nuova Italia, Florence, 1987. Luca Bianchi, in his *Potentia Dei absoluta: logique de la decouverte ou rhétorique de l'argumentation scientifique?*, in Various Authors (eds.), *Knowledge and the Sciences in Medieval Philosophy*, op. cit., vol. 2, pp. 138-145, attempts to clarify what role was really played by this important theological distinction within the early modern science. As for more recent researches, see G. Canziani, M. A. Granada, Y. C. Zarka (eds.), *Potentia Dei. L'onnipotenza divina nel pensiero dei secoli XVI e XVII*, Angeli, Milan, 2000, where several authors (Galileo, Gassendi, Descartes etc.) are analyzed in detail with reference to their theological convictions and epistemological perspectives.

5. A. Funkenstein, *Theology and the scientific imagination from the Middle Ages to the seventeenth century*, Princeton, New Jersey, 1989.

6. As L. Bianchi rightly notes, however, the *potentia Dei absoluta* performed both a heuristic and a rhetoric role; see L. Bianchi, *Potentia Dei absoluta*, op. cit., pp. 138-145:142. Besides, Bianchi stresses that, as an argumentation, the *potentia Dei* is totally uncaring of a single philosophical system, and therefore could be employed both against and pro Aristote-

On the other hand, authors like Micheal B. Foster, Arthur F. Smethurst and, more recently, Reijer Hooykaas and Francis Oakley claim to demonstrate the direct dependence of modern science from some tenets of the Christian belief upon very general and abstract analysis, which in the end results ineffectual⁷. What they usually stress is that there would be some «theological presuppositions» which can be proven to have been mandatory for the development of modern science and its rationality, namely the concept of nature as a creation of the divine *logos*, capable of extolling the physical world on one hand from the magical context where it was inserted since the heathen antiquity, on the other from the platonic charge of being a mere appearance of the true «ideas». This concept of creation,

lianism (see *ibid.*, pp. 143-144). On this polyfunctionality of the *de potentia Dei argumentum* see also P. Redondi, *Teologia ed epistemologia nella rivoluzione scientifica*, «Belfagor», 45 No. 6 (1990), pp. 613-636: 628.

7. M. B. Foster, *The Christian Doctrine of Creation and the Rise of Modern Natural Science*, «Mind», vol. 43 No. 172 (1934), pp. 446-468; A. F. Smethurst, *Modern Science and Christian Beliefs*, J. Nisbet, London, 1955; R. Hooykaas, *Religion and the Rise of Modern Science*, Regent College Publishing, Vancouver, 2000 (or. ed. 1972); E. M. Klaaren, *Religious Origin of Modern Science*, Eerdmans, Grand Rapids (Michigan), 1977; F. Oakley, *Onnipotence, Covenant and Order. An Excursion in the History of Ideas from Abelard to Leibniz*, Cornell University Press, Ithaca and London, 1984. Actually, the literature on these issues is huge; it is not the task of this book to furnish an exhaustive list of the works hitherto published. An accurate and annotate bibliography can be found in J. H. Brooke, *Science and Religion. Some Historical Perspectives*, Cambridge University Press, Cambridge, 1991. Part of this historiography, at least as far as Reformation is concerned, takes a hint from Max Weber's sociological analysis, beginning with Merton's famous work *Science, technology and society in seventeenth century England*, published for the first time «Osiris» Vol. 4 (1938), pp. 360-632, though Merton's thesis are sometimes criticized and revised in several points by the most recent studies. The state of debate on Merton's thesis since it appeared in the year it was republished (1970) can be found in C. Webster, *The intellectual revolution of the seventeenth century*, Routledge and Kegan Paul, London-Boston, 1974, where the author, in his turn, tries to disprove the many criticisms advanced to Merton. As a general rule, all these scholars tend to formulate quite generic assertions on the connections between some relevant theological propositions of the Christian theology (such as the meaning of creation, the divine free will, the omnipotence of God) and relevant aspects of modern science (experimentalism, mathematization, mechanism), then employing single figures (mainly drawn out from the English context) as *exempla magistralia* of their thesis. The real problem of these researches, which often turn out to be oversimplifications, is their lack of precise analysis both on scientific and theological level. For a quite updated survey of the topic see M. J. Osler (ed.), *Rethinking the Scientific Revolution*, Cambridge University Press, Cambridge, 2000. For a partially different statement of the question see R. H. Popkin, *Third Force in Seventeenth-Century Thought*, Brill, Aylesbury, 1992, and L. Châtellier, *Les espaces infinis et le silence de Dieu. Science et religion, XVI^e-XIX^e siècle*, Aubier-Flammarion, Paris, 2003.