THOMISTIC LOGIC IN RENAISSANCE ITALY
GIROLAMO SAVONAROLA, PAOLO BARBÒ, CRISOSTOMO JAVELLI*

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Abstract

This paper is devoted to the formation of a 'Thomist logic' in Renaissance Italy. After having expounded the principles that should inspire any logic *ad mentem Divi Thomae*, the article focuses on three textbooks of 'Thomist logic': Girolamo Savonarola's *Compendium Logicae*, Paolo Barbò's *Expositio in Artem veterem*, and Crisostomo Javelli's *Compendium Logicae*. I show that these textbooks display common features, such as the presentation of logic according to the order of the books traditionally included in the *Organon*. Savonarola maintained that propositions can only be in the present tense and cannot generate *insolubilia*. Barbò's contributions to philosophy of logic are conspicuous and include an original discussion of the *subiectum* of logic and of the doctrine expounded in the *Categories*. Under the possible influence of Renaissance humanism, Javelli's textbook includes a history of logic and historical and philological analyses.

Key Words

Thomism, Girolamo Savonarola, Paolo Barbò, Crisostomo Javelli, Renaissance Thomism, History of Logic.

Was there ever a 'Thomistic logic'? Thomas Aquinas's contributions to logic are limited and one might argue that his system does not really include a logical section. But if 'Thomism' simply refers to the practice of teaching and learning

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philosophy and theology 'according to the mind of saint Thomas' (*ad mentem Divi Thomae*), logic was certainly included in Thomist philosophy.[1] 'Thomistic logic' took shape in the schools where the Dominican fathers taught philosophy *ad mentem Divi Thomae*. In this paper, I describe a moment of the history of Thomism in which logic became one of the disciplines included in the system. Three Italian Renaissance Thomists gave a significant contribution to outline a 'Thomistic logic': Girolamo Savonarola, Paolo Barbò, and Crisostomo Javelli. In what follows, I present their most significant logical doctrines.

I. *A recipe for a Thomistic logic*

Aristotle's theory of deduction is expounded mostly in his *Topics* and in his *Prior Analytics*, but Thomas Aquinas did not write any commentary on either of these works. His contributions to the field are limited to the treatise *De fallaciis*[2] and the short treatise *De propositionibus modalibus.*[3] But as soon as Aquinas's thought became mandatory within the Dominican Order,[4] some logic textbooks were

[1] According to Jacob Schmutz, later authors maintained that they were writing « ad mentem divi Thomae » in order to present themselves as orthodox: see Jacob Schmutz, « *Bellum scholasticum.* Thomisme et antithomisme dans les débats doctrinaux modernes », *Revue thomiste*, 108/1 (2008), p. 131–182.

[2] *Sancti Thomae de Aquino Opera Omnia iussu Leonis XIII P. M. edita*, vol. XLIII, Editori di San Tommaso, Roma 1976, p. 383–418.

[3] Ibid., p. 419–422. Both treatises are of doubtful attribution. The Leonine editors maintain that there is some evidence for claiming that both treatises were written by Aquinas (cf. Ibid., p. 386–387). However, René-Antoine Gauthier, who would later edit Aquinas's commentary on the *De Interpretatione* and on the *Posterior Analytics*, maintained that the treatise *De Fallaciis* is not authentic (cf. René-Antoine Gauthier, « Préface » to Thomas de Aquino. *Expositio libri peryermeneias. Editio altera retractata*, in *Sancti Thomae de Aquino Opera Omnia iussu Leonis XIII P. M.*, vol. I.1*, Commissio Leonina–Vrin, Roma–Paris 1989, p. 56*–58*). Even if the treatise *De propositionibus modalibus* were to be authentic, we should conclude that Aquinas's contribution to logic is limited to a couple of pages.

[4] Several general chapters of the Dominicans proposed the study of Aquinas as mandatory. Especially, the general chapters of 1309, 1313, and 1315 wanted to promote his canonization, and prescribed the study of Aquinas's doctrine; cf. Benedictus Maria Reichert (ed.) *Acta Capitulorum Generalium Ordinis Praedicatorum,* vol. II: *ab anno 1304 usque ad annum 1378*, Institutum Historicum Fratrum Praedicatorum, Rome–Stuttgart 1899 (Monumenta Ordinis Fratrum Praedicatorum Historica, 4). On the formation of the first Thomistic school among the Dominicans see Andrea A. Robiglio, *La sopravvivenza e la gloria. Appunti sulla formazione della prima scuola tomista (sec. XIV)*, Edizioni Studio Domenicano, Bologna 2008 (Sacra doctrina, 53/1); on the model of sainthood which assumed particular connotation after the canonization of Aquinas, see Id., « Se un 'savio omo' diventa santo. Un aspetto della reputazione di Tommaso d'Aquino per gli studenti del Trecento », in Giovanni Grado Merlo, Giuseppina De Sandre Gasparini, Antonio Rigon (eds.), *Studia, studenti, religione*, Cierre, Verona 2009 (Quaderni di storia religiosa, 2009), p. 159–172.

needed for students.[5] The so-called *Summa totius logicae Aristotelis* is an excellent introduction to Aristotle's logic and it is not surprising that this treatise had been attributed to Thomas Aquinas himself.[6]

If we limit our attention to Aquinas's authentic writings, it is certain that any possible Thomistic logic should be grounded on Aristotle's *Organon*. In the *Proemium* to his commentary on Aristotle's *Posterior Analytics*, Aquinas expounds his concept of logic and states that each part of the discipline has been described in the books of Aristotle's *Organon*. Aquinas says that there are three operations of the intellect.[7]

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[5] Aquinas was aware of the *curriculum studiorum* that was practiced in Late Antiquity, as it is clear from his *Proemium* to his commentary on the *Liber de causis:* « [Philosophi] scientiam de primis causis ultimo ordinabant, cuius considerationi ultimum tempus suae vitae deputarent: primo quidem incipientes a logica quae modum scientiarum tradit, secundo procedentes ad mathematicam cuius etiam pueri possunt esse capaces, tertio ad naturalem philosophiam quae propter experientiam tempore indiget, quarto autem ad moralem philosophiam cuius iuvenis esse conveniens auditor non potest, ultimo autem scientiae divinae insistebant quae considerat primas entium causas » (Thomas de Aquino. *In librum de causis expositio*, ed. Ceslao Pera, Marietti, Torino 1955, p. 4, l. 7–8). From passages like this, Thomists might have concluded that logic was an essential part of the philosophical *curriculum* even according to the doctrine of Aquinas.

[6] This work was taken to be a selection of passages from various works of Aquinas, arranged according to the order of Aristotle's *Organon*, by some sixteenth-century editions. See, for example, *S. Thomae Aquinatis Praeclarissima commentaria in libros Aristotelis Peri hermenias et Posteriorum analyticorum; Cum antiqua textus translatione, atque etiam noua Ioannis Argyropyli itemque Thomae Caietani cardinalis Supplementum commentariorum in reliquum secundi libri Peri hermenias. Nuper ex emendatissimis exemplaribus diligentissime recognita. Logicae quoque totius summa nunc addita est, ex eiusdem diui Thomae opusculis excerpta, et in tractatus & capita diuisa, iuxta ordinem librorum ab Aristotelis in logicis obseruatum. His praeterea index nouus adiectus est*, apud Hieronymum Scotum, Venetiis 1562. It is worth noting that the title of this edition is misleading, inasmuch as the unknown author of the *Summa* speaks of syllogisms only after having dealt with dialectics, and the section corresponding to the *Categories* is introduced by some chapters devoted to the *praedicabilia*, which rather corresponds to Porphyry's *Isagoge*. Pierre Mandonnet already denied the authenticity of this work in his *Des écrits authentiques de S. Thomas d'Aquin*, St. Paul, Fribourg 1910, p. 149. There are also other short logical treatises which were wrongly attributed to Aquinas, like the *De inventione medii* and the *De natura syllogismorum.*

[7] Cf. Thomas de Aquino. *Expositio libri Posterioum. Editio altera retractata*, I.1, proem., in *Sancti Thomae de Aquino Opera Omnia iussu Leonis XIII P. M. edita*, vol. I.2*, ed. René-Antoine Gauthier, Commissio Leonina–Vrin, Roma–Paris 1989, p. 4, l. 32–p. 5, l. 50: « Oportet igitur logice partes accipere secundum diuersitatem actuum rationis. Sunt autem rationis tres actus. Quorum primi duo sunt rationis secundum quod et intellectus quidam: una enim actio intellectus est intelligencia indiuisibilium, siue incomplexorum, secundum quam concipit quid est res, et hec operatio a quibusdam dicitur informatio intellectus siue ymaginatio per intellectum; et ad hanc operationem rationis ordinatur doctrina quam tradit Aristotiles in libro Predicamentorum; secunda uero operatio intellectus est compositio uel diuisio intellectuum, in qua est iam uerum et falsum; et huic rationis actui deseruit doctrina quam tradit Aristotiles in libro Peryermeneias. Tercius uero actus rationis est secundum id quod est proprium rationis, scilicet discurrere ab uno in aliud, ut per id quod est notum deueniat in cognitionem ignoti; et huic actui deseruiunt reliqui libri logice ».

According to Aquinas, the first operation of the intellect deals with concept formation (*primae intentiones*).[8] Concepts are classified according to ten categories and the logical doctrine which corresponds to the first operation of the intellect is discussed in Aristotle's *Categories*. The second operation of the intellect is about the connection of concepts in order to form propositions. Aquinas states that Aristotle treated this doctrine in the treatise *De Interpretatione*. The third operation of the intellect consists in producing arguments, so that from known propositions we can infer unknown propositions. Aquinas is clearly referring to syllogistic and states that the *Prior Analytics*, the *Posterior Analytics*, the *Topics* and the *Sophistical Refutations* are designed to expound the doctrine of argumentation. Dialectic is also included in the general doctrine of argumentation, because dialecticians argue by means of syllogisms.[9]

This presentation of the parts of logic could have been questioned by later logicians, because late medieval logicians considered also other topics and did not reduce argumentation to syllogistic. This becomes clear if we take into account the work of Dominican logicians of the Late Middle Ages, like Francis of Prato.[10] Francis

[8] Aquinas distinguishes these three operations of the intellect also in the opening lines of his commentary on Aristote's *De Interpretatione*: « Sicut Philosophus dicit in III De anima, duplex est operatio intellectus: una quidem que dicitur indiuisibilium intelligencia, per quam scilicet intellectus apprehendit essenciam uniuscuiusque rei in se ipsa; alia est autem operatio intellectus componentis et diuidentis; additur autem et tercia operatio ratiocinandi, secundum quod ratio procedit a notis ad inquisitionem ignotorum » (Thomas de Aquino. *Expositio libri peryermeneias*, proem., p. 5, l. 1–8). In the same opening lines, Aquinas states that the treatises included in the *Organon* correspond to the three operations of reason: « Cum autem logica dicatur rationalis scientia, necesse est quod eius consideratio uersetur circa ea que pertinent ad tres predictas operationes rationis: de hiis igitur que pertinent ad primam operationem intellectus, id est de hiis que simplici intellectu concipiuntur, determinat Aristotiles in libro Predicamentorum; de hiis uero que pertinent ad secundam operationem, scilicet de enunciatione affirmatiua et negatiua, determinat Philosophus in libro Peryermeneias; de hiis uero que pertinent ad terciam operationem determinat Aristotiles in libro Priorum et in consequentibus, in quibus agitur de sillogismo simpliciter et de diuersis sillogismorum et argumentationum speciebus, quibus ratio de uno procedit ad aliud; et ideo secundum predictum ordinem trium operationum, liber Predicamentorum ad librum Peryermeneias ordinatur, qui ordinatur ad librum Priorum et consequentes » (Ibid., p. 5, l. 15–32).

[9] For Aquinas on the status of logic see Bruno Tremblay, « Thomas d'Aquin et la logique comme savoir contemplatif », *Revue Thomiste*, 111 (2011), p. 179–209. Tremblay underlines that Aquinas understood logic as a theoretical discipline, contrary to later authors like Ockham, according to whom logic is a practical discipline.

[10] On Francis of Prato see Francesco Amerini, *La logica di Francesco da Prato con l'edizione critica della Loyca e del 'Tractatus de voce univoca'*, SISMEL–Edizioni del Galluzzo, Firenze 2005; Franciscus de Prato, *Logica*, ed. Christian Rode, Franz Steiner, Stuttgart 2002; Christian Rode, *Franciscus de Prato. Facetten seiner Philosophie im Blick auf Hervaeus Natalis und Wilhelm Ockham*, Franz Steiner, Stuttgart 2004; Francesco Amerini, Christian Rode, « Franciscus de Prato's *Tractatus de ente rationis.* A Critical Edition with a Historico-Philosophical Introduction », *Archives d'histoire doctrinale et littéraire du Moyen Age*, 76 (2009), p. 261–312.

was active after Ockham and reacted against the English Franciscan's logic. Francis's criticisms might be said to be aimed at defending some 'Thomistic' ideas, but his logic goes beyond the Aristotelian 'orthodoxy' that Thomas Aquinas proposed in his *Proemium* to the commentary on the *Posterior Analytics*, because it includes the so-called supposition theory, that Aristotle did not consider in his *Organon*. [11] Renaissance Thomists, on the other hand, were closer to the 'Aristotelian orthodoxy' endorsed by Aquinas, even though their writings show that they were also acquainted with later developments of logic.

If by 'Renaissance logic' we refer to the logic developed in the fifteenth century and at the beginning of the sixteenth century, it is safe to maintain that a radical change took place: logicians started to deal with different topics and abandoned many themes that enjoyed popularity in the Middle Ages.[12] Renaissance logicians kept discussing the status of logic, its subject matter, the transcendentals, the *antepraedicamenta*, etc., but they paid little attention to the theory of argumentation (syllogistic, the theory of *consequentiae*, etc.). Thomist philosophers make no exception to this general claim. The extant works on logic by Dominicans and by other Thomists of this period have as a common trademark the attempt to present logic according to the content matter of Aristotle's *Organon*, and their 'philosophy of logic' echoes Aquinas remarks on the status of logic. If other

[11] On Francis's supposition theory and his criticism of Ockham's logic see Francesco Amerini, « Il trattato *De suppositionibus terminorum* di Francesco da Prato O. P. Una rilettura della dottrina ockhamista del linguaggio », *Medioevo*, 25 (1999/2000), p. 441–550; Id., « La dottrina della significatio di Francesco da Prato O. P. (XIV secolo). Una critica tomista a Guglielmo di Ockham », *Documenti e Studi sulla Tradizione Filosofica Medievale*, 11 (2000), p. 375–408.

[12] For a clear presentation of the traditional logic between 1350 and 1600, see E. Jennifer Ashworth, « Traditional Logic », in Charles B. Schmitt, Quentin Skinner, Eckhard Kessler, Jill Kraye (eds.), *The Cambridge History of Renaissance Philosophy*, Cambridge University Press, Cambridge 1988, p. 143–172. Humanists were more reluctant to accept this way of doing philosophy, and dismissed much of the logical technicalities, which were considered by scholastic authors. See for example the criticisms that Lorenzo Valla (*c.* 1406–1457) raised against Aristotelian logic: « Ipsi potius digni quibus insultetur atque illudatur tum quia magistrum Aristotelem tanquam deum habent, tum quia ne Aristotelici quidem satis scire, Graecarum litterarum imperiti, nec ullam doctrinam plane tenere possint, suae, idest Latinae, liguae parum imperiti. Quos ut ab errore quoad possum revocem et ad vere theologandum posteriores reducam, Aristoteles atque Aristotelicos confutabo » (Lorenzo Valla, *Dialectical Disputations*, I.17–18, ed. and trans. Brian P. Copenhaver, Lodi Nauta, vol. I, Harvard University Press, Cambridge, MA–London 2012 [The I Tatti Renaissance Library, 49], p. 10); on Valla's reform of logic see Lodi Nauta, *In Defense of Common Sense: Lorenzo Valla's Humanist Critique of Scholastic Philosophy*, Harvard University Press, Cambridge, MA 2009 (I Tatti Studies in Italian Renaissance History). For a dismissive assessment of humanist logic see Martha Kneale, William C. Kneale, *The Development of Logic*, Clarendon Press, Oxford 1962, p. 298–300; a balanced presentation of humanist logic may be found in Lisa Jardine, *Humanist Logic*, in Schmitt, Skinner (eds.), *The Cambridge History of Renaissance Philosophy*, p. 173–198.

doctrines are incorporated, these authors pay attention to integrate these doctrines within such a general frame.[13]

Most Thomists were Dominicans, because the Order of Preachers decided to be faithful to the doctrine of Thomas Aquinas. Logical textbooks were needed for the formation of younger friars and if we restrict our attention to the extant textbooks of logic written in the fifteenth and sixteenth centuries by Italian Dominicans, we have the *Compendium logicae* by Girolamo Savonarola, the *Expositio in Artem Veterem* by Paolo Barbò from Soncino, and the *Compendium logicae* by Crisostomo Javelli from Casale Monferrato. Dominic of Flanders wrote a commentary on Aquinas's commentary on the *Posterior Analytics*. Outside the Dominican Order, 'Thomistic' logic was at the centre of the attention of the Franciscan Georgius Benignus Salviati, whose *Dialectica nova* was intended to show the fundamental agreement between the doctrines of John Duns Scotus and of Thomas Aquinas.[14]

The three above mentioned 'Dominican' textbooks were drafted to present a 'Thomistic logic', i.e. a logic that follows the order of presentation of Aristotle's *Organon* and that is understood as section of a philosophical system *ad mentem Divi Thomae.* But Thomist logicians inevitably incorporated doctrines developed by later Medieval authors as well. As we shall see in what follows, the discussions on the subject matter of logic, which is said to be the *ens rationis*, might be traced back to Aquinas's texts. It is nonetheless reasonable to speculate that Herveus Natalis's insistence on the existence of an objective realm of *entia rationis* might have been familiar to later Thomists.

In what follows, I will concentrate on Savonarola, on Barbò, and on Javelli, whose works showcase the formation of 'Thomistic logic' in the Italian Renaissance.

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[13] This shift of attention in the logical textbook of this period has been underlined by E. Jennifer Ashworth in her paper « Developments in the Fifteenth and Sixteenth Centuries », in Dov M. Gabbay, James Woods (eds.), *Handbook of the History of Logic*, vol. II: *Mediaeval and Renaissance Logic*, Elsevier Amsterdam, 2008, p. 609–643. Ashworth underlines that Renaissance logicians wrote handbooks whose structure reflected that of Aristotle's *Organon*. I will show that Thomists make no exception to this general claim. I think, however, that they were faithful to Aristotle's logic, because they found that Aquinas might have implicitly suggested that. Other logicians had other reasons to go back to Aristotle. On the allegiance of medieval logic up until the sixteenth century, see Ead., *Language and Logic in the Post-Medieval Period*, Reidel, Dordrecht–Boston 1974 (Synthese historical library, 12).

[14] Juraj Dragišić (Latin: Georgius Benignus) was born in 1445 in Srebrenica. He taught in Florence, where he entered the cultural circle gathered around the Salviati family. He added the family name 'Salviati' to his own family name. Salviati taught in Rome from 1500, in 1507 he became bishop of Cagli and in 1512 he was moved to the see of Nazareth (the bishop of Nazareth at that time was based in Barletta, Italy). He died in 1520.

II. *Girolamo Savonarola: a précis of Thomistic logic*

Girolamo Savonarola's interest in Aristotle's philosophy is well known.[15] His *Compendium logicae* was first published in Pescia in 1492 and was widely read, as its many sixteenth-century editions attest. The treatise was written in 1484[16] and contained the lecture notes of Savonarola's classes on logic. The famous preacher was teaching logic in the early eighties of the fifteenth century in the priory of San Marco, Florence. As has been noted,[17] Savonarola's treatise aims at reconstructing Aristotle's logic « according to the usual practice of mathematicians » (*more mathematico*).[18] This observation does not imply that Savonarola wanted to employ the mathematical method in developing his logic: he simply wanted to write a clear and short introduction to logic, taking as example the analogous mathematical treatises of his time.[19] Although he cannot be taken as a forerunner of the mathematization of logic, his contributions to logic were highly original.[20]

Savonarola's *Compendium logicae* is divided into eleven books. The very structure of the text shows the originality of Savonarola's doctrine:

I. On the principles of syllogistic (definition of 'term', of 'predicable', the Aristotelian *praedicabilia*, definition of 'proposition', the relations among propositions, the rules of conversions);

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[15] His main philosophical writings have been edited by GIANCARLO GARFAGNINI, EUGENIO GARIN, in GIROLAMO SAVONAROLA, *Scritti filosofici*, Angelo Belardetti Editore, Roma 1982 (Edizione nazionale delle opere di Girolamo Savonarola, 1). Savonarola composed also some notes on Plato's and Aristotle's philosophies. These notes have been edited by LORENZA TROMBONI in her monograph '*Inter omnes Plato et Aristoteles': gli appunti filosofici di Girolamo Savonarola*, Brepols, Turnhout 2012 (Textes et études du Moyen Âge, 66); on Savonarola's philosophical treatises see also DAVID A. LINES, « Pagan and Christian Ethics: Girolamo Savonarola and Ludovico Valenza on Moral Philosophy », *Documenti e studi sulla tradizione filosofica medievale*, 17 (2006), p. 427–444. On the controversial figure of Girolamo Savonarola (1452–1498), see ROBERTO RIDOLFI, *Vita di Girolamo Savonarola*, Le Lettere, Firenze 1997, and DONALD WEINSTEIN, *Savonarola: the Rise and Fall of a Renaissance Prophet*, Yale University Press, New Haven 2011; on Savonarola's philosophy see also EUGENIO GARIN, « Ricerche sugli scritti filosofici di Girolamo Savonarola », in ID., *La cultura filosofica del Rinascimento italiano*, Sansoni, Firenze 1961, p. 201–212.

[16] Cf. GIANCARLO GARFAGNINI, « Nota critica », in SAVONAROLA, *Scritti filosofici*, p. 373–393, at p. 373–379.

[17] Cf. MASSIMO MUGNAI, « Logic and Mathematics in the Seventeenth Century », *History and Philosophy of Logic*, 31/4 (2010), p. 297–314, at p. 299.

[18] HIERONYMUS SAVONAROLA. *Compendium logicae*, *praefatio,* in ID., *Scritti filosofici*, ed. GARFAGNINI, GARIN, p. 3, l. 18.

[19] Cf. WOLFGANG KÜNNE, « Über Lügner, 'Lügner' und harmlosen Selbstbezug. Bolzano vs. Savonarola und die Geschichte einer Antinomie », in ANNE REBOUL (ed.), *Philosophical Papers Dedicated to Kevin Mulligan*, Université de Genève, Geneva 2011, p. 20–21, fn. 73.

[20] See for example JOSEPH M. BOCHENSKI, *Formale Logik*, Karl Aber, Fribourg–Munich 1956 (Orbis Academicus. Problemgeschichten der Wissenschaft in Dokumenten und Darstellungen, 3/2), p. 190–191.

II. on division (*genera* and *species*; elucidations on how the genus is related to its differences);

III. on definition (principles for a sound definition; the book largely reproduces the doctrine expounded by Aristotle in *Topics* VI);

IV. on categorical syllogistic;

V. on modal syllogistic;

VI. *de potestate faciendi syllogismorum* (Savonarola deals with some metatheoretical properties of syllogistic, with the so-called *inventio medii* and with the theory of *consequentiae*);

VII. on hypothetical syllogistic;

VIII. on demonstrative syllogistic (Savonarola expounds his theory of science);

IX. on dialectical syllogistic;

X. on sophistical syllogisms;

XI. on various logical questions (the status of logic, the utility of logic, etc.).

If we compare the structure of this book with that of other logic textbooks of the late Middle Ages, like Paul of Venice's *Logica Parva*, it is clear that Savonarola's text is in many ways highly innovative. In late medieval logic, syllogistic was no longer the core theory of inference dealt with by logicians, and Paul of Venice deals with it only in a few paragraphs, whereas he devotes entire treatises to the theory of consequences, to the *insolubilia*, to the theory of *suppositio*, and to the *obligationes*, i.e. to the 'new logic' that the Medieval authors had developed.[21] Savonarola, on the contrary, sticks to the structure of Aristotle's *Organon*: book I draws mostly from the material of the treatise *De Interpretatione*,[22] books II and III from the *Topics* (especially from books II, IV, and VI), books IV to VII draw from *Prior Analytics*, book I, whereas the *Compendium*'s book VIII is supposed to expound the doctrine of the *Posterior Analytics*. Book IX draws again from the *Topics* (especially from books I and VIII), whereas book IX deals with fallacies, expounded by Aristotle in his *Sophistical Refutations.* By going back to Aristotle, Savonarola ended up being original. His originality may be better appreciated if one considers the many points in which he departs from Aristotle or from Aquinas.

[21] Cf. Paulus Venetus. *Logica Parva*, ed. Alan R. Perreiah, Brill, Leiden 2002. By following the structure of Aristotle's logic, Savonarola made a choice analogous to that of his fellow Dominican Johannes Versoris (d. *c.* 1485), who wrote commentaries on the whole *logica vetus*, on Aristotle's *Analytics*, *Topics*, and *Sophistical Refutations*, and on Aquinas's *De ente et essentia* (cf. Johannes Versoris. *Quaestiones super totam veterem artem Aristotelis*, Köln 1494 [reprint Minerva, Frankfurt am Main 1967]; Id. *Super omnes libros novae logicae*, Köln 1494 [reprint Minerva, Frankfurt am Main 1967]). In so doing, these Dominicans were attempting to revitalize the tradition of the logic of the thirteenth century.

[22] In *Compendium logicae*, I.8–18, Savonarola summarizes the contents of Porphyry's *Isagoge*, whereas at I.19–42 the Dominican Preacher epitomizes the doctrines expounded by Aristotle in the *Categories* (with the significative addition of the 'Thomistic' doctrine of analogy at I.21).

II.1 *Savonarola on Future Contingents and on the Liar Paradox*

II.1.1. *Tomorrow there will be a sea-battle*

The major point of disagreement between Savonarola and (most commentators of) Aristotle concerns the nature of propositions. We can look into the nature of propositions by considering two well-known puzzles, i.e. the puzzle concerning the truth-value of sentences describing future contingent events and the so-called 'liar paradox'.[23] If we accept the principle of bivalence, according to which every proposition is necessarily either true or false, we have several difficulties in solving the above mentioned puzzles.

If there are only two truth-values for a proposition like:

(i) Tomorrow there will be a sea-battle

determinism seems to be an unavoidable option. Aristotle, however, was not a determinist. Most scholars believe that, according to the Stagirite, a proposition like (i) may have a third truth value ('indeterminate'). Hence, the principle of bivalence does not hold.[24]

Similarly, if there are only two truth-values, a proposition like:

(ii) The proposition (ii) is false

does not seem to be intelligible: if (ii) is true, then it is false (because it would be true that 'the proposition (ii) is false'); if (ii) is false, then it is true (because it would be false that 'the proposition (ii) is false').

In this case too, i.e. in what is commonly referred to as the 'liar paradox', one might be tempted to abandon the principle of bivalence.

Savonarola's solution is radically different: he would rather claim that neither (i) nor (ii) are propositions. This enables him to claim that the principle of bivalence is valid for *all* propositions.

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[23] A 'liar paradox' is an argument that arrives at a contradiction. It is called the 'liar paradox' because it could be formulated thus: (*) 'I am lying'. Suppose that there are two truth-values and that to lie is to utter falsehood. If (*) is true, then I am lying, i.e. I am uttering falsehoods. However, since I am uttering (*), if (*) is true, then it is false. Similarly, if (*) is false, then it is false that I am lying, i.e. it is false that I am uttering falsehoods. If I am not uttering any falsehood, I am uttering a truth, i.e. (*) is true. Hence, if (*) is false, then it is true. On the late medieval history of the liar paradox see Stephen Read, « The Liar Paradox from John Buridan back to Thomas Bradwardine », *Vivarium*, 40/2 (2002), p. 189–218.

[24] Cf. Aristoteles. *De Interpretatione*, 9, 19a23–b4. This passage has been interpreted in many ways. Most scholars maintain today that Aristotle did not accept the principle of bivalence for future tense singular assertions; cf. e.g. Paolo Crivelli, *Aristotle on Truth*, Cambridge University Press, Cambridge 2004, p. 198–233; Russell E. Jones, « Truth and Contradiction in Aristotle's *De Interpretatione* 6–9 », *Phronesis*, 55 (2010), p. 26–67.

In I.47, Savonarola considers the tense of propositions and states that the logician is only interested in present-tensed propositions.[25] A few pages later, he maintains that declarative propositions (*propositiones enuntiativae*) have only two truth-values, i.e. 'true' and 'false' (cf. I.49).

Savonarola's solution to the puzzle of sentences about future contingent events may be summarized as follows:

(a) the bearers of truth and falsity are present-tense 'propositions' (type-sentences) and not 'utterances';[26]

(b) among the many types of propositions,[27] the logician deals only with the *indicativa* or *enuntiativa*, i.e. the « discourse that signifies the true or the false » (« oratio significans verum vel falsum »);[28]

(c) from the above claims, Savonarola may infer the conclusion that « in the singular future contingent <contradictory pairs of sentences>, it is necessary that one of the contradictory <propositions> is true and that the other is false, <and this is necessary> jointly, not in the divided sense » (« in singularibus contingentibus de futuro necesse est alterum contradictorium esse verum et alterum falsum, coniunctim non autem divisim »).[29]

This conclusion is hardly surprising and reproduces Aristotle's own conclusion to the puzzle. Savonarola, however, infers that a singular future-tense sentence cannot be said to be true or false because it is not a proposition, namely it is not a

[25] Savonarola. *Compendium logicae*, I.47, p. 22, l. 22–26: « [u]titur autem logicus verbo indicativi modi praesentis temporis, praesertim hoc verbo substantivo, sum, es, est, in praesenti tempore. Et hoc est maxime verbum apud ipsum in quod reliqua verba resolvuntur ».

[26] According to Crivelli, Aristotle considered *utterances* to be the bearers of truth and falsity (cf. *Aristotle on Truth*, p. 72–76). For a different reading of truth-bearers in Aristotle see David Charles, Michael Peramatzis, « Aristotle on Truth-Bearers », *Oxford Studies in Ancient Philosophy*, 50 (2016), p. 101–141.

[27] Savonarola lists the following kinds of propositions: « est autem quaedam oratio imperfecta, ut homo albus. Quaedam sunt perfectae, et harum quaedam sunt imperativae, quaedam optativae, quaedam deprecativae, quaedam indicativae » (*Compendium logicae*, I.48, p. 23, l. 1–4). In doing so, Savonarola remains faithful to the *littera* of Aristotle (cf. *De Interpretatione*, 4, 16b33–17a7) but detaches himself from those late medieval theories according to which also other kinds of proposition are bearers of truth and falsity. For discussion of this topic, see Gabriel Nuchelmans, *Theories of Propositions. Ancient and Medieval Conceptions of the Bearers of Truth and Falsity*, North Holland, Amsterdam–London 1973 (North-Holland Linguistic Series, 8), p. 266–268. According to Nuchelmans, Paul of Venice, in his *Logica Magna*, allows for other propositions apart from *enuntiationes* to be bearers of truth and falsity; in his *Logica Parva*, however, Paul writes that « sola oratio indicativa est propositio non autem imperativa nec optativa » (cf. Paulus Venetus. *Logica Parva*, I.12, p. 4, l. 10–11). On medieval theories of propositions see also Laurent Cesalli, *Le réalisme propositionnel. Sémantique et ontologie des propositions chez Jean Duns Scot, Gauthier Burley, Richard Brinkley et Jean Wyclif*, Vrin, Paris 2007 (Sic et Non).

[28] Savonarola. *Compendium logicae*, I.49, p. 23, l. 7–8.

[29] Ibid., I.61, p. 26, l. 11–13.

truth-bearer. It is still legitimate to state that it is necessary that either of the events represented by a singular future-tense sentence will be the case. Savonarola's language, however, does not seem to be very precise. If a future-tense sentence does not have a truth-value, it is not entirely correct that in any contradictory pair one sentence is true and the other is false.[30] Savonarola probably intended to say that any future-tense contradictory pair is a case of the law of the excluded middle. Accordingly, in the case of future contingent contradictory pairs of sentences, it is necessary *de sensu composito* that either is the case and the other is not. In fact, even if neither of the sentences has a truth-value, the very fact of their being a contradictory pair makes it impossible to affirm both at the same time. Accordingly, it is necessary (*de sensu composito*) to affirm one of them, and deny the other.

But the lack of a truth-value of a future tense sentence entails that any other sentence that includes it has no truth-value either, if the first sentence is not part of a logical law as the law of the excluded middle as in the above example. Consequently, the following sentence has no truth-value and is not a proposition:

(i*) it is necessary that there will be a sea-battle tomorrow

In fact, if (i) does not have a truth-value and is not a proposition, so (i*) cannot have a truth-value either. Even though (i*) is in the present tense, it is syntactically different from a well-formed proposition. In a well-formed proposition, a modal operator ('it is necessary that' and the like) can only be added to a well formed proposition. But (i) is not a proposition. Hence (i*) is not a proposition either.

On the contrary, the following proposition is a logical truth:

(iii) it is necessary that either there will be a sea-battle tomorrow, or there will not be a sea-battle tomorrow

The sentence (iii) is an instance of the principle of excluded middle ('$p \vee \neg p$'). Regardless of the tense of the sentence *p* and, more generally, regardless of *p* being a proposition or not, the whole sentence (iii) displays the syntax of well-formed propositions: we have a contradictory pair and their conjunction is negated. On the basis of the truth-value tables of connectors such as the negation and the conjunction, (iii) is a well-formed proposition. In addition, the proposition is in the present tense, as all truth-bearers should be. Savonarola's insistence on the present tense of the truth-bearers might mean that in his opinion logic has to deal with type-sentences (that are commonly formulated in the present tense) and not with utterances (that are commonly pronounced in past, present and future tenses). This might be the case because logic is meant to be an instrument of scientific inquiry and science is about what is always the case.

[30] This rule is known in the literature as Rule of Contradictory Pairs. According to Jones, Aristotle did not subscribe to an unqualified version of the Rule of Contradictory Pairs either (cf. « Truth and Contradiction in Aristotles's *De Intepretatione* 6-9 », p. 26–67).

Savonarola's solution to the puzzle raised by sentences about future contingent events was probably not available to Aristotle.[31]

II.1.2. *The Liar Paradox*

Savonarola considers the 'liar paradox' in the tenth book of his *Compendium*, which is devoted to sophistical arguments.[32] According to Savonarola, a self-falsifying statement like:

(iv) This proposition is false

belongs to the *insolubilia*, i.e. to that set of semantic paradoxes that lead to contradiction.

For Savonarola, (iv) is neither false nor true. Hence, (iv) is not a proposition, because propositions are bearers of truth and falsity.[33]

In his analysis of the Liar Paradox, Savonarola employs the so-called *consequentia mirabilis.*[34] Suppose that:

(v) Every proposition is false

[31] The Stagirite seems to accept the idea that the bearers of truth and falsity may display tenses different from the present (cf. *De Interpretatione*, 5, 17a9–12: *ἀνάγκη δὲ πάντα λόγον ἀποφαντικὸν ἐκ ῥήματος εἶναι ἢ πτώσεως· καὶ γὰρ ὁ τοῦ ἀνθρώπου λόγος, ἐὰν μὴ τὸ ἔστιν ἢ ἔσται ἢ ἦν ἤ τι τοιοῦτο προστεθῇ, οὔπω λόγος ἀποφαντικός*). Hence, Aristotle implicitly maintains that future tense sentences have a truth-value. If this interpretation is correct, Aristotle is forced to give up the principle of bivalence for future contingent statements, in order to avoid subscribing to determinism. Aristotle's ideas on future contingents have been discussed by many scholars; for a map of this scholarly literature see VINCENZA CELLUPRICA, *Il Capitolo 9 del 'De interpretatione' di Aristotele: Rassegna di studi, 1930–1973*, il Mulino, Bologna 1977 (Pubblicazioni del Centro di studio per la storia della storiografia filosofica, 1); JULES VUILLEMIN, *Nécessité ou contingence. L'aporie de Diodore et les systèmes philosophiques*, Éd. de Minuit, Paris 1984 (Le sens commun); RICHARD GASKIN, *The Sea Battle and the Master Argument. Aristotle and Diodorus Cronus on the Metaphysics of the Future*, de Gruyter, Berlin–New York 1995 (Quellen und Studien zur Philosophie, 40); C. W. A. WHITAKER, *Aristotle's 'De Interpretatione': Contradiction and Dialectic*, Oxford University Press, Oxford 1996.

[32] Bernhard Bolzano (1781–1848) discusses at length Savonarola's solution to the 'liar paradox' in his *Wissenschaftslehre.* On Bolzano's reception of Savonarola see WOLFGANG KÜNNE, *Epimenides und andere Lügner*, Vittorio Klostermann, Frankfurt am Main 2013, p. 71–91. This small book by Künne includes many insights on the the history of the liar paradox, and provides many possible sources for Savonarola's own treatment of the paradox (for example, at p. 140–144 Künne underlines that the liar paradox was clearly stated by saint Jerome in his homily on Psalm 116; Jerome chooses the reading « omnis homo est mendacium », because he finds that the alternative reading « omnis homo est mendax » would have implied the liar paradox, and this was not acceptable for Jerome).

[33] See SAVONAROLA. *Compendium logicae*, X.18, p. 152, l. 1–3: « cum postea queritur an sit vera vel falsa respondetur quod nec est vera nec falsa, nec propositio, sed est propositio insolubilis ».

[34] Savonarola's treatment of the 'liar paradox' has been carefully studied by KÜNNE (« Über Lügner, 'Lügner' und harmlosen Selbstbezug », esp. p. 24–25). As far as Savonarola's argument is concerned, Künne speaks of a « schwache Version » of the *consequentia mirabilis.*

Let us assume that (v) is a proposition, and that in our world *w* there is but one proposition, namely (v).

1. If (v) is true, then at *w* all propositions are false. If all propositions are false, (v) is false as well. Hence, if (v) is true, then (v) is false.
2. If (v) is false, then at *w* there is at least one proposition which is true. But at *w* there are no propositions but (v), therefore (v) is true. Hence, if (v) is false, then (v) is true.

Savonarola's conclusion is that (v) belongs to the *insolubilia*, because we cannot establish whether it is true or false. Therefore, (v) is not a proposition.[35]

II.2. *Savonarola on the 'praedicabilia' and on the theory of argumentation*

In the remaining sections of his logical textbook, Savonarola does not depart from the Aristotelian orthodoxy, but expounds nevertheless an original doctrine.

In II.12 (p. 33, l. 17–23), Savonarola observes that a genus might be divided in several ways. This doctrine is consistent with what Aristotle says in *De partibus animalium* I.2–4, but might also be taken to be reminiscent of Aquinas's claim that we do not know the essential differences of many beings.[36] The combination of the Aristotelian background with Aquinas's doctrine becomes clearer a few pages later, when Savonarola maintains that there is no definition of God.[37] In Savonarola's exposé, the real definition is provided by the true genus and by the true difference, and the genus is predicated of a subject as its what-it-is (*in quid*), whereas the difference is predicated as a quality of the subject (*in quale*).[38] Aristotle's *Topics* presented this doctrine, along with the idea that the difference is genus-like, and thus might be predicated *in quid* as well.[39] Savonarola is clearly

[35] Savonarola's solution resembles the theory of 'cassation', according to which « one who utters an insoluble proposition 'isn't saying anything' » (Paul Vincent Spade, Stephen Read, « Insolubles », in Edward N. Zalta [ed.], *The Stanford Encyclopedia of Philosophy*, [Fall 2018 Edition], <https://plato.stanford.edu/archives/fall2018/entries/insolubles/>, § 2.5).

[36] Cf. Thomas de Aquino. *In duodecim libros Metaphysicorum Aristotelis expositio*, VII, lect. 12, § 1552, ed. Marie-Raymond Cathala, Raimondo M. Spiazzi, Marietti, Torino 1964, p. 374; Id. *De ente et essentia*, ch. 5, in *Opera omnia iussu Leonis XIII P. M. edita*, vol. XLIII, Editori di San Tommaso, Roma, 1976, p. 376, l. 76–78.

[37] Cf. Savonarola. *Compendium logicae*, III.19, p. 51, l. 1–5.

[38] Cf. Ibid., III.2, p. 38, l. 5–6.

[39] Aristotle says that the difference is a quality of the genus in *Topica*, IV.6, 128a27 and VI.6, 144a18–19 (at IV.2, 122b16 Aristotle adds that the difference does not express the *τί ἐστι* of the thing; *sed contra*, in *De generatione et corruptione*, I.3, 318b14–16, Aristotle maintains that the differences refer to the *τόδε τι*). However, he says that the difference is predicated *ἐν τῷ τί ἐστιν* in *Topica*, IV.6, 128a20–29 and in *Topica*, VII.3, 153a16–19; in *Analytica Priora*, I.27, 43b6–7 what is predicated *ἐν τῷ τί ἐστιν* is contrasted with *praedicabilia* like *propria* and accidents (on the basis of *Topica*, I.4, 101b18–19, where the difference is associated to the predicable 'genus', one might be tempted to take *Analytica Priora,* I.27, 43b6–7 as further evidence in favour of the claim that the difference is

interpreting Aristotle's text in order to eliminate any apparent inconsistency and, in so doing, he creates an original system.

The logic of argumentation is the objects of books IV–IX and, despite its Aristotelian flavour, Savonarola's presentation displays again originality. Savonarola's definition of syllogism[40] is identical to Aristotle's one.[41] But unlike Aristotle's, Savonarola's syllogistic deals with singular terms too.[42]

From Savonarola's perspective, the proof by *ἔκθεσις* is a syllogism,[43] even though Aristotle does not seem not to treat the proof by *ἔκθεσις* as a syllogism at all. This 'proof' has puzzled many interpreters, because it does not seem to rely on any formal principle.[44] Savonarola's treatment avoids the difficulty raised by the alleged non-logical status of *ἔκθεσις*,[45] but involves other problems, because if the *ἔκθεσις* is a syllogism, there is circularity in the demonstrations within the syllogistic system.

Aristotle uses the *ἔκθεσις* (or a procedure similar to *ἔκθεσις*), in order to prove the validity of the law of conversion for universal negative propositions (CUN). On the basis of CUN, Aristotle proves all the other laws of conversion (cf. *Prior Analytics*

predicated *ἐν τῷ τί ἐστιν*). Savonarola's solution is an attempt at solve the inconsistencies of Aristotle's treatment of the difference.

40 See Savonarola. *Compendium logicae*, IV.1, p. 44, l. 4–6: « syllogismus est oratio in qua positis quibusdam aliud quiddam ab his quae posita sunt ex necessitate accidit eo quod haec sunt ».

41 Cf. Aristoteles. *Analytica Priora*, I.1, 24b18–20.

42 See the example of syllogism provided shortly after the definition of syllogism, in Savonarola. *Compendium logicae*, IV.1, p. 44, l. 7–13. It is controversial whether Aristotle's syllogistic deals with singular terms, and most interpreters say that it does not (see e.g. Jan Łukasiewicz, *Aristotle's Syllogistic from the Standpoint of Modern Formal Logic*, Clarendon Press, Oxford 1957[2], esp. p. 1–2). All the examples of syllogisms in the section devoted to categorical syllogistic in *Analytica Priora*, I.2, 4–7 include quantified premises and conclusions. It is well known, however, that in the *Prior Analytics* there are also examples of syllogism with singular terms, see e.g. *Analytica Priora*, II.27, 70b15 and ff. See also John Langshaw Austin, « Critical Notice », *Mind*, 61 (1952), p. 395–404, esp. p. 396–397.

43 An *ἔκθεσις* is an 'exposition'. Aristotle proves the validity of the law of conversion for universal negative propositions by *ἔκθεσις*, i.e. by 'exposing' a particular term. The proof runs as follows: if universal negative propositions do not convert *simpliciter*, it is false that AeB ('No A is B') implies BeA ('No B is A'). Hence, AeB would be compatible with the contradictory of BeA, i.e. BiA ('Some Bs are A'). If some of the Bs are A, then there is a term, say C, such that C is B and is A. The 'exposition' (*ἔκθεσις*) consists in pointing to the existence of this hypothetical C. If there is a C, such that C is B and is A, then some As are B (because C, that is an A, is also a B). On proof by *ἔκθεσις* see Michel Crubellier, Mathieu Marion, Zoe McConaughey, Shahid Rahman, « Dialectic, the *Dictum de omni* and *Ecthesis* », forthcoming in *History and Philosophy of Logic.* Savonarola presents the proof by *ἔκθεσις* in *Compendium logicae*, IV.7, p. 45, l. 23–28.

44 See Günther Patzig, *Die aristotelische Syllogistik. Logisch-philologische Untersuchungen über das Buch A der Ersten Analytiken*, Vandenhoek und Ruprecht, Göttingen 1959 (Abhandlungen der Akademie der Wissenschaften zu Göttingen. Philologisch-historische Klasse. 3. Folge, 42), p. 172.

45 On this difficulty, see especially Łukasiewicz, *Aristotle's Syllogistic*, p. 59–66.

I.2). In Savonarola's presentation, the *ἔκθεσις* is replaced by the *syllogismus expositorius*. The proof runs as follows:

Thesis:

(a) (1) 'No A is B' converts into (2) 'No B is A'

If (a) is not the case, then (1) 'No A is B' is compatible with the contradictory of (2), namely

(3) 'Some Bs are A'

Let us assume that the Bs, which are A, are referred to by C. As a consequence, all Cs are A, and all Cs are B. We have a *syllogismus expositorius* which infers that

(4) 'Some A are B'

This, however, contradicts our premise (vi). Therefore, CUN is a valid law.

Savonarola's proof would be sound, if only this *syllogismus expositorius* were not a *Darapti.*[46] However, as Savonarola knows,[47] *Darapti* is proved to be valid in virtue of the conversion of the minor premise. Thanks to this conversion, *Darapti* is 'reduced' to the first figure mood *Darii.* The conversion of a universal affirmative into a particular affirmative relies on the validity of CUN, as Savonarola admits with Aristotle.[48] In other words, Savonarola's account of the validity of CUN and of the validity of *Darapti* appears to be circular.[49]

Apart from this inconsistency, Savonarola's presentation of categorical syllogistic is faithful to Aristotle's *littera.*[50]

The modal syllogistic is the less original part of the treatise. Savonarola maintains that LLL-syllogistic (both premises and conclusion are necessary) is shown to be valid thanks to the conversions for modal premises, and to the demonstration *per impossibile* of the validity of *Baroco* LLL and *Bocardo* LLL.[51] This is certainly true, but, since logic requires that all assumptions are made explicit, one should add to what Savonarola says that also LLL-*Barbara*, LLL-*Celarent*, LLL-*Darii*, and LLL-*Ferio* should be taken to be valid syllogisms.[52]

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[46] Cf. Savonarola. *Compendium logicae*, IV.9, p. 46, l. 15–26. *Darapti* is the name of a type of syllogism and has the following structure: 1) all M are P; 2) all M are S; therefore 3) some S are P.

[47] Ibid., IV.14, p. 51, l. 20–21.

[48] Ibid., IV.3, p. 45, l. 9–13.

[49] The only way out is not to consider the *syllogismus expositorius* to be a standard syllogism. This treatment of the *syllogismus expositorius*, as a self-standing logical rule, was common in the Middle Ages and may also be found in the *Summa totius logicae Aristotelis* of pseudo-Aquinas. On the *syllogismus expositorius* in the Middle Ages see Simo Knuuttila, « Generality and Identity in late Medieval Discussion of the Prior Analytics », *Vivarium*, 48 (2010), p. 215–227.

[50] For example, in Savonarola. *Compendium logicae*, IV.25, the Dominican Preacher stresses that there are only three figures; this doctrine is a trademark for 'orthodox' Aristotelian syllogistic.

[51] Ibid., V.5.

[52] If *Barbara* is a valid syllogism, is it the case that LLL-*Barbara* is valid as well? One might argue that *Barbara*'s validity relies on the *dici de omni*; analogously, LLL-*Barbara*'s validity relies on a L-*dici de*

In books VI and VII, Savonarola makes a bold claim about the non-monotonicity of syllogistic. He states that the middle term cannot be too general, otherwise it would be difficult to infer any interesting conclusion from it; furthermore, it cannot be a singular term, because we do not quantify over singular terms.[53] Book VII aims at reducing (part of) propositional logic to syllogistic. The definition of hypothetical propositions captures sentences that display the following structures: (h*) '$p \rightarrow q$' or (h**) '$p \vee q$'.[54] But even if he makes room to hypothetical propositions in his logic, Savonarola is faithful to the Aristotelian tradition in maintaining that some rules of propositional logic, like the *modus ponendo ponens*, should not be employed in a deductive system, because they are not able to yield any new information.[55] In Savonarola's view, the information in the conclusion of a *modus ponendo ponens* is not 'new' inasmuch as it appears already in the premises.[56] The information included in the conclusion of a *Barbara* syllogism, on the other hand, does not appear in the premises, because these display different predicative relations.

The remaining books of the *Compendium* do not show an equal degree of originality.[57]

omni (if A is said of necessity of all B, then A is said of necessity of all of which B is said of necessity; Aristotle seems to adopt this argument in *Analytica Priora*, I.8, 30a2–3). Now, it is possible to argue that if the *dici de omni* is a true formula, then the L-*dici de omni* is also a true formula. This entails, however, the adoption of the necessitation rule, and of the K axiom. Such a move might be problematic for a student of Thomas Aquinas (there is evidence to maintain that Thomas would have rejected the K axiom, see Lorenz Demey, Luca Gili, « Thomas van Aquino, niet-normale modale logica's en het problem van toekomstige contingenties », *Tijdschrift voor Filosofie*, 79/2 [2017], p. 259–276). Savonarola, however, needs to argue in a similar way, in order to maintain his modal claims.

53 Cf. Savonarola. *Compendium logicae*, VI.5, p. 73, l. 26–p. 74, l. 8.

54 Cf. Ibid., VII.1, p. 85, l. 3–13.

55 Cf. Ibid., VII.20, p. 95, l. 6–29.

56 Alexander of Aphrodisias is probably the first Aristotelian philosopher who tried to downplay propositional arguments because they were not producing 'new' information; see Luca Gili, *La sillogistica di Alessandro di Afrodisia*, Olms, Hildesheim 2011 (Spudasmata: Studien zur klassischen Philologie und ihren Grenzgebieten, 138), p. 101–102.

57 In book XI of the *Compendium*, Savonarola dwells on some issues pertaining to what we would rather call today 'philosophy of logic' and his claims are fairly conventional (*pace* Garin, « Ricerche sugli scritti filosofici di Girolamo Savonarola », p. 208). See for example Savonarola's solution to the *vexata quaestio* of the position of the *Categories* within Aristotle's *Organon:* according to the Dominican Preacher, the logician considers the ten categories, inasmuch as they are second intentions; one might infer that the metaphysician studies the categories inasmuch as they are first intentions (cf. *Compendium logicae*, XI.30, p. 175, l. 11–17). Analogously, Savonarola relies on Thomas Aquinas's writings when dealing with topics like the *materia signata quantitate* (which he takes to be the principle of individuation) and the analogy of being.

III. *Paolo Barbò from Soncino (Soncinas)*

The date of birth of Paolo Barbò is unknown.[58] He joined the Order of Preachers and was a pupil of Peter Maldura of Bergamo (d. 1482). Peter of Bergamo was *regens studiorum* in Bologna from 1471 to 1477, while Paolo Barbò was a student friar in the same convent. Peter is the author of the *Tabula Aurea*, an index to philosophical and theological topics from Aquinas's works[59]. Jindráček, author of several meticulous studies on Paolo Barbò, claims that Barbò was influenced by Peter of Bergamo's Thomism.[60] Barbò became a doctor in theology in 1494 and died in 1495. His works include editions of texts by other authors and three original works: a commentary on Aristotle's *Metaphysics*, a commentary on Porphyry's *Isagoge* and on Aristotle's *Categories*, and a summary of Capreolus's *Defensiones*. Among his editions, it is worth mentioning a collection of short works by Thomas Aquinas. The book, published in Milan in 1488 (« per magistros Benignum et Johannem Antonium fratres de Honate »),[61] does not include logical treatises like the *Summa totius logicae Aristototelis* – evidence that Barbò was probably uncertain about their authenticity. The collection includes however other inauthentic logical writings, i.e. the treatises *De modalibus, De natura accidentis, De natura generis, De natura syllogismorum, De sensu respectu singularium et intellectu respectu universalium, De inuentione medii*.[62] Future research on Barbò's logic will have to draw attention to the presence of the doctrine outlined in these pseudonymous works in Barbò's own writings.

As I anticipated, the Dominican Master from Soncino wrote three major works: a commentary *per quaestiones* on Aristotle's *Metaphysics*,[63] a summary of Capreolus's *Defensiones theologiae*,[64] and a running commentary on Porphyry's *Isagoge* and on

[58] Efrem Jindráček suggests that Paolo might be born around the year 1458. On Barbò's life and works see Efrem Jindráček, « Paolo Barbò da Soncino: La vita ed il pensiero di un tomista rinascimentale », *Archivum Fratrum Praedicatorum*, 78 (2008), p. 79–148. Jindráček's contribution is supported by a vast research in the archives and corrects many incorrect information included in the entry « Paolo Barbo » written by Cesare Vasoli for the *Dizionario biografico degli italiani*, vol. VI, Treccani, Roma 1964.

[59] On Peter of Bergamo's *Tabula aurea* see Bertrand-Georges Guyot, Tiziano Sterli, « La *Tabula aurea* di Fra Pietro Maldura da Bergamo O.P. entro la storia del Tomismo », *Angelicum*, 80 (2003), p. 597–660.

[60] Cf. Jindráček, « Paolo Barbò da Soncino », p. 91.

[61] The colophon is quoted in Ibid., p. 113, fn. 9.

[62] Cf. Ibid., p. 115–116.

[63] A partial edition of Barbò's commentary has been published in Efrem Jindráček, *Paolo Barbò da Soncino: Questioni di metafisica. Introduzione alla vita ed al pensiero di un tomista rinascimentale,* Angelicum, Roma 2017.

[64] The treatise was published with the title *Diuinum epitoma questionum in quattuor libros Sententiarum a principe thomistarum Ioanne Capreolo tholosano disputatarum* in Lyon (Lugduni), « per Joannem Crespinum », in 1528.

Aristotle's *Categories*, that was first published in Venice in 1499 with the title *Expositio magistri Pauli Soncinatis super Artem Veterem*.[65] This book was published again in 1587,[66] with the title *In universalia, seu Isagogen Porphyrii, et Aristotelis Praedicamenta subtilis et lucida expositio*, and in 1600,[67] together with Dominic of Flanders's *Quaestiones perutiles* on Aquinas's commentary on the *Posterior Analytics.*[68]

Barbò's commentary deals only with the first operation of the intellect in Aquinas's scheme, namely with concept formation. In the *Prooemium*, Barbò expounds the subject of logic and displays a certain degree of originality, by contrasting Albert's and Scotus's opinions with Aquinas's and Aristotle's conclusions, that Barbò defends and endorses:[69]

> Scotus maintains that the syllogism is the subject of logic, Albert the Great <maintains that> argumentation <is the subject>, whereas saint Thomas and the Philosopher <maintain that> the being of reason (*ens rationis*) <is the subject>. Hence, in order to present the truth of this doubt, first, the opinion of saint Thomas will be expounded by means of some conclusions, second, it will be expounded what is true in the opinions of Scotus and Albert.[70]

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[65] Cf. THOMAS KAEPPELI, *Scriptores Ordinis Praedicatoris Medii Aevi*, vol. III: *I–S*, ad Sanctam Sabinam, Roma 1980, p. 203.

[66] In Venice, « apud Michaelem Berniam bibliopolam Bononiensem ».

[67] Again in Venice, « aput Haeredem Hieronymi Scoti ».

[68] The complete title of this edition is *Dominici de Flandria Ordinis Praedicatorum Theologi ac Philosophi celeberrimi In D. Thomae Aquinatis Commentaria super Libros Posteriorum Aristotelis, necnon in eiusdem Fallaciarum opus Quaestiones Perutiles, Pauli quoque Soncinatis eiusdem ordinis, lucida et subtilis expositio in Porphyrii Isagogen et Aristotelis Praedicamenta, cum suis quaestionibus in unaquaque expositione utiliter disputatis*. Dominic of Flanders is one of the most prominent figures of Renaissance Thomism in the fifteenth century. Born Balduinus Lottin de Mervis, he was master of arts in Paris in the 1450s. He became a Dominican friar in 1461, and he taught in Bologna, in Florence, and in Pisa. He died in the priory of Santa Maria Novella (Florence) in 1479. He is well known for his commentary on Aristotle's *Metaphysics*, but he also commented on the *Posterior Analytics*, on the *Categories*, and exposed the different opinions of many scholars on Aristotle's *Posterior Analytics*. These two last works are preserved in a manuscript in the former Dominican Priory of Taggia; cf. KAEPPELI, *Scriptores Ordinis Praedicatoris,* vol. I: *A–F*, ad Sanctam Sabinam, Roma 1970, p. 316–317. The first text has this title: *Super libros Analyticorum Posteriorum. I: Declaratio eorum que inveniuntur in scripto Thomae de Aq.; II: Problemata que sunt inter doctorem sanctum et alios doctores circa libros Posteriorum*, and is preserved in MS Taggia, Biblioteca del Convento Domenicano, 4, fol. 45–58 (15th cent.), The commentary *Super Praedicamenta* is preserved in the same manuscript at fol. 39–45.

[69] Barbò's exposition of analogy, which is also original and interesting, has been discussed by MICHAEL TAVUZZI, « Some Renaissance Thomist Divisions of Analogy », *Angelicum*, 70 (1993), p. 93–121, esp. p. 98–102. Tavuzzi speculates that Barbò « might well have been one of Cajetan's teachers » (p. 99), and suggests that Cajetan's famous doctrine of analogy might well have been reliant on some of Barbò's speculations.

[70] *Expositio magistri Pauli Soncinatis super Artem Veterem*, Venetiis 1499, p. 1a: « Scotus arbitratur subiectum logice esse syllogismum, Albertus Magnus argumentationem, Divus vero Thomas et philosophus ens rationis. Ut ergo pateat huius dubii veritas, primo declarabitur quibusdam conclusionibus opinio sancti Thome, secundo quid veritatis habeat opinio Scoti et Alberti » (my

To present Aquinas's position on the subject of logic, Barbò distinguishes three senses of the expression *ens rationis*:

> I state that something can be said to be a 'being of reason' (*ens rationis*) in three ways. (1) Something is said <to be> a 'being of reason' when 'of reason' is understood in an intransitive way, and in this way the 'being of reason' is nothing but reason itself. (2) Something is said <to be> a 'being of reason' because it exists in reason itself; in this sense, the intelligible species and the acts of the intelligence and the concepts created by means of these acts are said <to be> 'beings of reason'. Logic is not about the 'being of reason' understood in these two ways, because such beings – in relation to their constitutive being (*quantum ad eorum entitates*) – are the object of the third book <of Aristotle's> *On the Soul.* (3) 'Being of reason' is taken as distinguished from 'real being'.[71]

According to Paolo Barbò,

(a) *ens rationis* can be referred to the *ratio*, i.e. to the mind;

(b) *ens rationis* may refer to the mental representation of a concept, i.e. to the entity existing in the mind;

(c) *ens rationis* is something that is *not* a real being nor a representation of a real being: this third type of *ens rationis* includes privations and negations, which do not exist *in ipsa rerum natura*.

Barbò states that Aristotle studies the *ens rationis* according to the first two senses in his *De anima*, book III. The *entia rationis* of the third kind are the subject of logic. According to Barbò, this is Aquinas's position, whereas Albert the Great maintained that 'arguments' are the subject of logic,[72] and Scotus suggested that 'syllogisms' are the proper subject of this discipline.

translation; I number the pages according to their succession, and I number as p. 1 the first page of text; the copy of the first edition of Barbò's work at the Biblioteca Nazionale di Firenze, which I have consulted, does not have page numbers).

71 Ibid.: « Dico quod tripliciter potest aliquid dici ens rationis. Uno modo dicitur aliquid ens rationis secundum quod ly rationis construitur intransitive et hoc modo nihil est aliud ens rationis nisi ens quod est ipsa ratio. Alio modo dicitur aliquid ens rationis quia est in ipsa ratione existens quo modo species intelligibilis et actus intelligendi et conceptus per tales actus formati dicuntur entia rationis. De ente rationis his duobus modis accepto non est logica: cum talia entia pertineant ad tertium librum de anima quantum ad eorum entitates. Tertio accipitur ens rationis ut distinguitur contra ens reale » (my translation).

72 Albert's ideas on the subject of logic have been studied by Bruno Tremblay in his paper « Albert le Grand et le problème de la science logique », *Documenti e studi sulla tradizione filosofica medievale*, 22 (2011), p. 301–345.

The *entia rationis* of the third type include privations, negations, and relations.[73] Barbò maintains that only relations of reason (*relationes rationis*) are the proper subject of logic. To defend this claim, Barbò refers to a passage of Aquinas (*De veritate*, q. 21, art. 1) where the relation of the knowable (*scibile*) to science is taken to be a relation of reason. According to Thomas, if X depends on Y, the relation of X to Y is real, but the relation of Y to X is a relation of reason. Science depends on the knowable (*scibile*), but the reverse is not the case, hence the relation of the knowable to science is a mere relation of reason, i.e. a relation that finds no correspondence in reality.

Barbò thinks that the relations such as $R_{x,y}$ ('X is the genus of Y'), or $R_{z,w}$ ('Z is the species of W') are relations of reason. Barbò's argument is not explicit, but it is reasonable to suppose that he should have argued along the lines of Aquinas's argument: the genus X does not depend on its species Y for being the genus of Y, nor the species Z depend on the individual W for being its species. As a consequence, *genera, species*, etc. are *respectus rationis*, i.e. relations of reason.

> Logic is not about privations and negations [...], because such things do not belong per se to a scientific habit, as is said in the first <book> of <Aristotle's> *Posterior <Analytics>*. Hence, <logic> can only be about relations of reason. [...] As a real relation consists in an order of things, a relation of reason consists in an order that the intellect discovers and attributes to what is said in a relative way. Such are the relations that the intellect attributes to things that are grasped, *qua* grasped <by the intellect>, as in the case of the relation of the genus, of the species, of the universal, of the predicable, and of other such things.[74]

This discussion of the subject of logic is one of the most original contributions that Barbò brought to the discipline. In the rest of his work, he expounds the categories and the *praedicabilia*.

Barbò goes back to the status of logic in his opening lines of his commentary on Aristotle's *Categories.* The debate on the status of 'categories' (*predicamenta*) has been heated already in antiquity: are they classes of words or of things? Is the treatise about real beings or about our language?

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[73] Barbò maintains that this further distinction has to be found in *De veritate*, q. 21, art. 1. Aquinas is asking himself whether the notion of the good adds something to being, and in his answer he makes some remarks on relations, and distinguishes real relations from relations of reason.

[74] *Expositio magistri Pauli Soncinatis super Artem Veterem*, Venetiis 1499, p. 1b: « De priuationibus et negationibus [...] non est logica, cum talia non cadant per se sub habitu scientifico, ut dicitur in primo Posteriorum, ex quo relinquitur quod sit de relationibus rationis. [...] [S]icut relatio realis consistit in ordine rerum, sic relatio rationis consistit in ordine, qui est per intellectum inuentus et attributus ei, quod relative dicitur, et huiusmodi sunt relationes, que attribuuntur ab intellectu rebus intellectis ut intellectae sunt, sicut est relatio generis, et speciei, et universalis, et praedicabilis, et aliorum huiusmodi » (my translation).

Barbò does not shy away from the controversy. He upheld the traditional response, according to which the *Categories* are about 'words signifying things', but he presents this solution according to Aquinas's distinction between a 'material object' and a 'formal object' of a science.

Barbò begins by stating that the word 'category' has several meanings.

> I answer that, in order to make clear this question, I anticipate that this name 'category' (*predicamentum*) is a term of second imposition and refers to (*significat*) a certain relation of reason discovered by reason and attributed to things *qua* existing in the intellect. Second, I anticipate that such relation is a certain order of priority and posteriority, or of superiority and inferiority. For outside of the intellect, 'animal' is not prior to 'man' or 'horse' or the other species of animal, because it does not have existence (*esse*) outside of its species. I say the same about 'substance' relative to 'body' and about anything superior relative to <its> inferior, but it is the intellect that found this order and that attributed such order to things *qua* existing in the intellect and named <such order> with this name 'category'. Hence, the category is a certain order among superior and inferior <items>. And something is said to be in a category because it is <placed> in such an order. Third, I anticipate that a category can be taken (*potest accipi*) in three ways: (1) as the things themselves to which the intellect attributes the abovementioned order; (2) as the order itself; (3) as the concept by means of which the intellect attributes this order to things. We can add a fourth way of taking a category, <i.e.> (4) as the things not in an absolute way, but *qua* ordered by the abovementioned order by means of the concept of the intellect.[75]

According to Barbò, the word 'category' refers to an order between elements that are prior and elements that are posterior in a hierarchy. This 'order' is a *respectus rationis*, i.e. a relation of reason. This is consistent with Barbò's opinion about the object of logic. If logic is about relations of reason, its parts should be consequently dealing with particular types of relations of reason. Hence, the word

[75] Ibid., p. 41a–b: « Respondeo pro notitia huius questionis premitto quod hoc nomen predicamentum est terminus secunde impositionis et significat quondam respectus rationis adinventum a ratione et attributum rebus secundum quod sunt in intellectu. Premitto secundo quod talis respectus est quidam ordo prioritatis et posterioritatis sive superioritatis et inferioritatis. Nam extra intellectum animal non est prius homine et equo et aliis speciebus animalis cum non habeat esse praeter species suas. Idem dico de substantia respectu corporis et de quolibet superiori respectu inferioris, sed intellectus est qui hunc ordinem excogitavit et talem ordinem rebus attribuit ut sunt in intellectu et nominavit hoc nomine predicamentum. Est ergo predicamentum quedam ordinatio superiorum et inferiorum. Et dicitur aliquod esse in predicamento eo quod est in tali ordine. Premitto tertio quod predicamentum potest accipi tribus modis. Uno modo pro ipsis rebus quibus intellectus attribuit predictum ordinem. Alio modo pro ipso ordine. Tertio pro conceptu quo mediante intellectus hunc ordinem rebus attribuit. Potest addi quartus modus ut accipiatur predicamentum. Quarto modo pro rebus non quidem absolute, sed ut stant sub predicto ordine mediante conceptu intellectus » (my translation).

'*predicamentum*' can refer either to the *things* that are ordered according to the above-mentioned relation of reason, or to the order itself, or to the psychological state of a mind that is actually categorizing extra-mental realities. The word '*predicamentum*' can also refer to things considered not in themselves, but inasmuch as they are in an order of priority and posteriority.

According to Barbò, the material object of the science expounded in the *Categories* is the real world as it is divided into ten genera of beings. The formal object is the *ordo*, i.e. the *respectus rationis*, in virtue of which this order is attributed to things. It is worth stressing that this *ordo* is not mind-dependent in Barbò's view – this probably explains why he distinguished the *ordo* itself from the psychological concept in virtue of which a mind attributes categories to the world. I suggest that the distinction between the third and fourth senses of the '*ordo*' is meant to distinguish between a merely psychological activity of ordering things within the mind (third sense of '*ordo*') and the very extra-mental things qua suitable of being ordered by a mind whatsoever (fourth sense of '*ordo*'). For this reason, Barbò is able to state that the object of logic is mind-independent, even though it is related to the activity of a possible mind.

IV. *Crisostomo Javelli*

Crisostomo Javelli was born in 1470 *c.*, presumably in Piedmont, joined the Dominicans, and died in 1538.[76] He is the author of a *Compendium Logicae*, which includes eleven treatises. The structure of Javelli's work mirrors Ockham's *Summa logicae* in many respects, but also Paul of Venice's *Logica Parva* (unlike Paul of Venice, however, Javelli does not deal with obligations and insolubles).

The eleven treatises deal with the following topics:

I. Introductory remarks, which include a short history of logic;
II. terms (this part corresponds to the doctrine dealt with by Aristotle in *De Interpretatione* 2–5);
III. propositions;
IV. the five *praedicabilia* (this section corresponds to Porphyry's *Isagoge*);
V. the *antepraedicamenta*, the doctrine of the categories (*praedicamenta*), and the *postpraedicamenta* (this treatise, as is clear, corresponds to Aristotle's *Categories*);

[76] On Javelli see Étienne Gilson, « Autour de Pomponazzi: problématique de l'immortalité de l'âme en Italie au début du XVI[e] siècle », *Archives d'histoire doctrinale et littéraire du Moyen Age*, 28 (1961), p. 163–279 (esp. p. 259–277); Michael Tavuzzi, « Chrysostomus Iavelli OP (*c.* 1470–1538). A Biobibliographical Essay: Part I, Biography », *Angelicum*, 67 (1990), p. 457–482; Id., « Chrysostomus Iavelli OP (*c.* 1470–1538). A Biobibliographical Essay: Part II, Bibliography », *Angelicum*, 68 (1991), p. 109–121.

VI. syllogism;
VII. supposition theory;
VIII. *ampliatio* and *appellatio*, i.e. changes in the supposition of a term and changes in the tenses of verbs;
IX. theory of *consequentiae*;
X. *de probatione terminorum* (this treatise deals with the ways in which it is possible to show the truth, or the probability of a proposition);
XI. demonstrative syllogism (this part aims at expounding what Aristotle says in his *Posterior Analytics*).

The treatise was first published in 1540 in Venice. The *Compendium* was rather successful, and went « through some thirty editions between 1540 and 1629 ».[77] Javelli had many teaching positions within the Dominican Order and, most probably, he wrote his *Compendium logicae* for didactic purposes. The tendency to systematize the 'new' logic of the late medieval authors and to present it as consistent with Aristotle's logic is even more evident than in Savonarola's *Compendium*. Javelli was also influenced by the humanists, inasmuch as his treatises draw attention to the linguistic, and historical context in which ancient logic arose. If Lorenzo Valla criticized Paul of Venice for the latter's unfamiliarity with the Greek language, Javelli dwells on the etymology of many key terms of logic, and shows a certain familiarity with both Greek and Latin. In his historical section, Javelli maintains that Socrates and Plato « were not strong in answering and solving <puzzles> because they did not have logic, even though they were strong in asking questions or in raising doubts » (« licet potentes essent ad interrogandum sive dubitandum, non tamen ad respondendum et solvendum propter logice carentiam »[78]). Logic was founded on its proper grounds by Aristotle, for whom Javelli has words of deep admiration:

> Hence, the Author of nature gave us Aristotle, who first discovered true logic with his almost divine mind and organized and brought it to completion in all its parts, so that we could discover the true rule of knowing that guides the human mind in arts and sciences.[79]

[77] TAVUZZI, « Chrysostomus Iavelli OP ... Part I», p. 461, fn. 15.

[78] *Logicae Compendium Peripateticae, ordinatum per Reuerendum Magistrum Chrisostomum Iauellum Canapicium ordinis praedicatorum*, ex officina Ioannis Blauij de Colonia, Olyssipponae 1556 (henceforth, IAVELLUS. *Compendium logicae*), fol. 4v.

[79] IAVELLUS. *Compendium logicae*, fol. 4v: « Ut igitur vera sciendi regula directiva humani intellectus in artibus et scientiis inveniretur, datus est nobis ab authore naturae Aristoteles, qui suo pene divino ingenio primus logicam veram invenit, et secundum omnes partes ordinavit ac perfecit » (my translation).

These words implicitly show the ideological background of the *Compendium logicae*, that is designed to expound Peripatetic logic. Javelli was aware that many topics of his treatise had not been discussed by Aristotle, but he nevertheless thinks that these doctrines are at least Aristotelian in spirit. When Javelli introduces the theory of *suppositio*, in the seventh treatise of his textbook, he states that doctrines like the *suppositio*

> are consistent with Aristotelian philosophy, even though Aristotle did not propose them <explicitly>, and this will be clear to you once you progress in logic, philosophy of nature and in metaphysics under the guidance of Aristotle.[80]

Javelli's attitude in finding an agreement between the doctrines of Aristotle (and of Aquinas) and those of later thinkers has been already underlined by Michael Tavuzzi,[81] and may be said to be a trademark of his *Compendium*.

After his sketchy history of logic, Javelli defines logic as a *rational science*[82] and states that its generic subject is mental being.[83] The subject of logic, as a distinct discipline, is the « ens rationis ratiocinativum, quod est idem quod argumentatio ».[84] This remark echoes Barbò's claim that the object of logic is the *ens rationis*, but Javelli seems to harmonize the 'Thomist' solution with the position of Albert the Great, because the *ens rationis* is qualified as *ratiocinativum* and this is said to be identical to *argumentatio*. According to Barbò, Albert the Great taught that the object of logic is 'arguments': Barbò noticed the similarity with what he took to be Aquinas's position, but stressed nevertheless the difference between the two medieval Dominicans. Javelli implicitly unifies their positions.

According to Javelli, logic is a science and not empirical knowledge, because it has proper subject and proper principles: the presence of these two elements is enough to hold that it falls under the rational sciences,[85] and is divided into sub-disciplines according to the scheme that Aquinas introduces in the *Proemium* to his

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[80] Ibid., fol. 183v–184r: « etsi non habeantur ab Aristotele, tamen doctrinae peripateticae consonant, ut tibi constabit postquam in Aristotelis disciplina tam in logicalibus quam in physicis atque metaphysicis eruditus fueris » (my translation).

[81] Cf. Michael Tavuzzi, « Herveus Natalis and the Philosophical Logic of the Thomism of the Renaissance », *Doctor Communis*, 45 (1992), p. 132–152, esp. p. 148–150.

[82] Iavellus. *Compendium logicae*, fol. 5v: « [l]ogica est scientia rationalis discretiva veri a falso ». Javelli adds that « [l]ogica est ars artium et scientia scientiarum, qua aperta omnes aperiuntur, et qua clausa omnes alie clauduntur » (fol. 6r); this statement echoes Peter of Spain's claim that « dialectica est ars artium, scientia scientiarum, ad omnium methodorum principia viam habens' » (*Petri Hispani Summulae Logicales cum Versorii Parisiensis clarissima expositione*, apud F. Sansovinum, Venetiis 1572, tr. 1, fol. 2v).

[83] Ibid., vol. 8r: « [s]ubiectum in illa universalissime sumptum est ens rationis, id est ens fabricatum ab intellectu et non habet esse extra intellectum ».

[84] Ibid., fol. 8v.

[85] Ibid., fol. 11r.

commentary on the *Posterior Analytics.*[86] In his treatise on terms, Javelli stresses that terms signify *ad placitum*,[87] and that verbs are always tensed.[88] Javelli has something interesting to say about propositions. According to him, a proposition is defined as « discourse that signifies the true or the false by pointing out [something] » (« oratio verum vel falsum significans indicando »);[89] the clause '*indicando*' is meant to exclude prayers, utterances of wish, etc. from the set of propositions. Javelli adds that only present tensed propositions are propositions in the fullest sense, because past-tensed and future-tensed utterances do not signify anything that *is* the case or that *is* not the case, and thus cannot be true or false:

> The phrases (*orationes*) in the past and future indicative tenses do not signify primarily and per se 'true' and 'false', unless they are transformed into a phrase in the indicative present tense.[90]

This is not sufficient evidence to suggest that Javelli's understanding of propositions was analogous to Savonarola's and, regrettably, Javelli does not add many details to his definition. In the same third treatise, Javelli deals with modal propositions as well, and in this case the didactic aim of his exposition could not be more evident. He deliberately avoids all technicalities and limits himself to stating some basic principles of modal logic: modal propositions are defined as categorical propositions to which a modal operator has been attached as a prefix. There are four modal operators for Javelli: necessary, contingent, possible, and impossible.[91] Javelli maintains that also 'true' and 'false' are modes, and by doing so he refers to a traditional doctrine, which has been endorsed also by Aquinas in his *De propositionibus modalibus*. Javelli adds that also '*per se*' and '*per accidens*' are modes, and they correspond to 'necessary' and 'contingent' respectively:

> Nam licet prima [i.e. 'per se'] aequipolleat modali de necesse, et secunda [i.e. 'per accidens'] modali de contingenti, tamen <non> sunt formaliter modales.[92]

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86 Ibid., fol. 12r–13r.

87 Cf. ARISTOTELES. *De Interpretatione*, 2, 16a19–20.

88 This claim, although consistent with Aristotle's *littera* (cf. *De Interpretatione*, 3, 16b6-7), is at odds with Savonarola's exposition. This suggests that 'Thomist logic' was not a monolith and there were several debated issues.

89 IAVELLUS. *Compendium logicae*, fol. 26v.

90 Ibid. fol. 28v: « Orationes etiam modi indicativi temporis praeteriti et futuri non significant primo et per se verum et falsum, nisi reducantur ad unam temporis praesentis indicativi » (my translation).

91 Ibid., fol. 58v.

92 Ibid., fol. 59r. I suggest to add a 'non' to the sentence to make it intelligible.

This observation seems to suggest that modal syllogistic is grounded on Aristotle's theory of predication.[93] Javelli, however, does not expand this interesting intuition. Furthermore, even though he is aware of the distinction *de sensu composito/de sensu diviso*, he does not consider the problems that such a distinction may create within modal syllogistic.[94] His exposition of modal logic is intentionally simplified for didactic reasons; after having expanded modal conversions, Javelli adds: « that would be enough for now, lest you get confused, young man » (« haec pro nunc sufficiant ne tu iuvenis confundaris »).[95]

The tendency to simplify the core notions of medieval logic brings sometimes Javelli to modify significantly these doctrines, as is the case in his supposition theory. Medieval authors did not understand the theory of *suppositio* as a mere theory of reference, but as a theory of meaning, namely as a theory for interpreting sentences.[96] Javelli, on the contrary, seems to consistently maintain that the supposition theory is what we would nowadays call a theory of reference.[97] According to him,

> the supposition is said to be the positing of a term instead of another, i.e. instead of one of its meanings. In this sense, we say that in this utterance 'God is good', the

[93] It is perhaps worth mentioning that such an interpretation has gained an increasing consensus among contemporary scholars: cf. Paul Thom, *The Logic of Essentialism: An Interpretation of Aristotle's Modal Syllogistic*, Kluwer, Dordrecht 1996 (The New Synthese Historical Library: Texts and Studies in the History of Philosophy, 43); Marko Malink, *Aristotle's Modal Syllogistic,* Harvard University Press, Cambridge, MA 2013.

[94] The laws of conversions for necessity propositions are valid *de sensu composito*; mixed necessity syllogisms (like *Barbara* LXL) are valid only if the modal operator is read *de sensu diviso*. This seems to suggest that Aristotle's modal logic is inconsistent. Javelli, however, seems not to be aware of this philosophical problem. His exposition of the distinction between *de sensu composito* and *de sensu diviso* is as follows: « in modali de sensu composito modus aut praeponitur aut postponitur toti dicto [...], in modali autem de sensu diviso modus nec praeponitur nec postponitur dicto, sed mediat inter partes dicti » (Iavellus. *Compendium logicae*, fol. 61r).

[95] Iavellus. *Compendium logicae*, fol. 62r.

[96] According to Catarina Dutilh Novaes, *suppositio* provides mechanic rules, by means of which we can list all possible interpretations of an ambiguous sentence. The theory of the *suppositio* may also serve the purpose of finding the references of the elements of a sentence in certain context; writing about Ockham, Novaes observes that « supposition theory is better seen as a theory of propositional meaning in the sense that one of its main purposes is to provide an analytical procedure for determining what can be asserted by means of a given proposition – a procedure including, but by no means limited to, the determination of the entities that the proposition may be about, i.e., its possible *supposita*, as it would be the case if it were a theory of reference » (« An Intensional Interpretation of Ockham's Theory of Supposition », *Journal of the History of Philosophy*, 46 [2008], p. 365–393, here p. 367).

[97] Peter T. Geach presented supposition theory as a theory of reference in his classical monograph *Reference and Generality. An Examination of Some Medieval and Modern Theories,* Cornell University Press, Ithaca, NY 1962 (Contemporary Philosophy).

> term 'God' stands for its meaning, so that the sense is: what is signified by 'God' is good.[98]

Javelli relies on the definitions of *suppositio* provided by Peter of Spain and by Peter of Mantua,[99] but in his view the supposition theory is a theory of reference:

> A substantive term in or outside a proposition, taken in itself, has a meaning, but it has a reference (*non supponit*) only in a proposition. To make this clear, note that 'to signify' precedes 'to have a reference' [...]. For 'to signify' is to introduce a term or a sound to represent a given something. [...] As a consequence, it is up to the first authors who give names to things to make it possible to signify. 'To have a reference' is to take an already given meaningful term so that it can refer to any of its meanings or references in a proposition.[100]

According to Javelli, '*supponit*' may be translated with 'refers to a *suppositum*'. Javelli was faced with two alternative interpretations of the *suppositio.* But surprisingly, he endorses the one that is more at odds with his understanding of *suppositio* as a theory of reference. Javelli writes that Thomists were debating among them as to whether a term can suppose (*supponere*) only in a proposition or also in itself. Javelli maintains that a term *supponit* only in a proposition – a conclusion that is certainly more consistent with an understanding of supposition theory as a theory of meaning.[101] Javelli points out that this debate originated from the interpretation of Thomas Aquinas, *Summa Theologiae* I^{a}, q. 39, art. 4, ad 3. Javelli summarizes Aquinas's position as it follows:

> In his answer to the third <objection>, <he> says that 'man' per se refers to (*supponit*) a person (*persona*), whereas 'God' per se refers to nature. [...]. After having said that God per se refers to nature, saint Thomas clarifies such supposition and forms this supposition where it is said 'God creates'. [...] For <'God'> never refers to a Person, unless <the word> is determined by its corresponding predicate, such as in 'God

98 IAVELLUS. *Compendium logicae*, fol. 184v: « dicitur suppositio positio termini pro alio, id est, pro aliquo suo significato. In quo sensu dicimus quod in hac oratione 'Deus est bonus', ly 'Deus' ponitur pro suo significato, ut sit sensus, id quod significatur per ly 'Deus' est bonum ».

99 Cf. Ibid., fol. 184v.

100 Ibid., fol. 185v: « terminus substantivus in propositione et extra [propositionem] per se sumptus significat, sed non supponit nisi in propositione. Pro cuius notitia adverte quod significare praecedit supponere [...]. Nam significare est imponere terminum sive vocem ad aliquid certi repraesentandum. [...] Unde facere significare spectat ad primos authores qui rebus nomina imponunt. [...] Supponere autem est accipere terminum iam impositum ad significandum ut stet in propositione pro aliquo suo significato vel supposito ».

101 Cf. Ibid., fol. 186r.

> generates', 'God is Father', 'God is Son'. Hence <the word> 'God' refers to a Person not by itself, but in virtue of such predicate.[102]

It is not clear who are the Thomists who endorsed the view, according to which Aquinas maintained that a term *supponit* both in a proposition and independently. Cajetan's commentary on *Summa Theologiae* I[a], q. 39, art. 4, ad 3 is not very helpful in this regard. Capreolus seems to endorse a view similar to that rejected by Javelli. According to Capreolus, '*significare*' and '*supponere*' are distinct, as much as they are for Javelli. However, from such a premise Capreolus concludes that a name has a meaning that is different from its corresponding *suppositum*:

> even though <a name> means (*significet*) a substance with a quality, a name properly means (*significat*) a quality, i.e. the form on the basis of which the name is attributed <to the thing>; <a name> however refers to (*supponit*) a substance, i.e. to the thing to which such name is attributed[103].

This leads Capreolus to maintain that « this <proposition> is false: 'God does not generate God' » (« ista est falsa 'Deus non generat Deum' »).[104]

If we were to follow Javelli's view, it is possible, I think, to maintain that a proposition like '*Deus non generat Deum*' may also be true, inasmuch as the term '*Deus*' in this context may be taken to refer not to a Person. Consequently, it would be true to say that God, *qua* Trinity, does not generate God, *qua* Trinity.[105]

This example shows that Javelli had original ideas, even though he never wanted to explicitly detach himself to the core tenets of that 'Thomistic school', to which he belonged.[106]

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[102] Ibid., fol. 186r–v: « in responsione ad tertium dicit quod homo per se supponit pro persona, Deus autem per se supponit pro natura. [...] [P]ostquam beatus Thomas dixerat quod Deus supponit per se pro natura, statim declarans huiusmodi suppositionem format hanc suppositionem, ut cum dicitur 'Deus creat'. [...] Numquam autem supponit pro persona, nisi determinetur per praedicatum relativum, ut 'Deus generat', 'Deus est pater', 'Deus est filius', ergo Deus non ex se, sed respectu talis praedicati supponit pro persona ».

[103] *Johannis Capreoli Tholosani OP Thomistarum Principis Defensiones Theologiae Divi Thomae Aquinatis*, vol. I, ed. Ceslas Paban, Thomas Pègues, Alfred Cattier, Touronibus 1900, p. 222: « nomen, licet significet substantiam cum qualitate, proprie tamen significat qualitatem, hoc est formam a qua nomen imponitur; supponit vero pro substantia, hoc est pro re cui imponitur tale nomen ».

[104] Ibid., p. 224.

[105] According to the Catholic dogma, it is God the Father who generates God the Son. In other words, if we assume that the term '*Deus*' *supponit pro persona* independently (and, hence, in every context), it follows that a proposition like 'God does not generate God' should be false.

[106] The sections on syllogistic are the less original parts of Javelli's treatise.

V. *Conclusion*

Savonarola, Barbò, and Javelli wrote textbooks and not original logical treatises. But their works are scattered with original ideas. The common feature of these treatises is that they go back to Aristotle's logical works and bypass the rich logical tradition of the late Middle Ages. This might be a consequence of the Thomists's reading of Thomas Aquinas's passages, in which the Doctor Angelicus refers to the *Organon*, when he is distinguishing the parts of logic. By going back to Aristotle, the Italian Thomists imitated the humanist logicians. Unlike them, they were not horrified by late medieval logical theories: they saw their value (that did not consist in the elegance of the Latin language, but in their logical content) and they tried to integrate these doctrines within an Aristotelian framework. Savonarola appears to have had many original ideas also in purely logical domains, Barbò had an original 'philosophy of logic', Javelli was mostly concerned with the clarity of exposition and with the desire to harmonize late medieval logic and the *Organon.* These three works bear witness to the importance that logic had within Thomistic circles in Renaissance Italy and show that the didactic practice, that prompted the creation of a 'Thomistic logic', transmitted original ideas. The very activity of synthesizing a heterogeneous body of doctrines and of expounding it *ad mentem Divi Thomae* was a fruitful endeavour, that generated new logical insights.

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