History of Logic from Aristotle to Gödel (www.historyoflogic.com)

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Writings of E. Jennifer Ashworth on the History of Logic. First Part

Contents

This part of the section Historians of logic includes the following pages:

E. J. Ashworth:

1967 - 1972 (Current page)

1973 - 1979

1980 - 1989

1990 - 1995

1996 - 2005

2006 - 2021

E. J. AShworth. Annotated bibliography. Complete PDF Version on the website Academia.edu

L. M. de Rijk:

1950 - 1975

1976 - 1986

1987 - 1994

1995 - 2013

L. M. de Rijk. Annotated bibliography. Complete PDF Version on the website

Academia.edu

Mauro Nasti de Vincentis:

1981 - 2009

Wilhelm Risse:

1960 - 1988

Introduction

Earline Jennifer Ashworth (1939-2024) studied at Cambridge University and at Bryn Mawr College, where she was awarded a Ph.D. in 1964 (*The Logica Hamburgensis of Joachim Jungius*); she was Distinguished Professor Emerita at the University of Waterloo, Ontario (retired July, 1st 2005) and her main interests were Late Mediaeval and Renaissance logic and philosophy of language; she was Renaissance subject Editor for the *Routledge Encyclopedia of Philosophy*.

I dedicate this bibliography to the memory of Professor Ashworth, who helped me complete it.

Books authored

1. Ashworth, Earline Jennifer. 1974. *Language and Logic in the Post-Medieval Period*. Dordrecht: Reidel.
TABLE OF CONTENTS; PREFACE IX; NOTE ABOUT ABBREVIATIONS XIII; ACKNOWLEDGEMENTS XV; CHAPTER I / HISTORICAL INTRODUCTION 1; l. The Publication of Medieval Works 2; 2. Scholasticism in Italy and Germany 4; 3. Scholasticism in France and Spain 5; 4.Humanism 8; 5. Rudolph Agricola and His Influence 10; 6. Petrus Ramus and His Influence 15; 7. Seventeenth Century Logic: Eclecticism 17; 8. Humanism and Late Scholasticism in Spain 19; 9. Other Schools of Logic 20; 10. A Note on Terminology 22; CHAPTER II / MEANING AND REFERENCE 26; I. The Nature of Logic 26; 1. The Contents of Logical Text-books 26; 2. The Definition of Logic 29; 3. The Object of Logic 32; II. Problems of Language 37; 1. Terms: Their Definition and Their Main Divisions 38; 2. The Relationship between Mental, Spoken and Written Terms 42; 3. Other Divisions of Terms 45; 4. Sense and Reference 47; 5. Propositions and their Parts 49; 6. Sentence-Types and Sentence-Tokens 52; 7. Complex Signifiables and Truth 55; 8. Other Approaches to Truth 62; 9. Possibility and Necessity 66; III. SUPPOSITION THEORY 77; 1. Supposition, Acceptance and Verification 78; 2. Proper, Improper, Relative and Absolute Supposition 82; 3. Material Supposition 83; 4. Simple Supposition 84; 5. Natural Personal Supposition 88; 6. Ampliation 89; 7. Appellation 92; IV. SEMANTIC PARADOXES 101; 1. Problems Arising from Self-Reference 101; 2. Solution One: Self-Reference Is Illegitimate 104; 3. Solution Two: All Propositions Imply Their Own Truth 106; 4. Solution Three: Insolubles Assert Their Own Falsity 108; 5. Solution Four: Two Kinds of Meaning 110; 6. Solution Five: Two Truth-Conditions 112; 7. Later Writing on Insolubles 114; CHAPTER III / FORMAL LOGIC. PART ONE: UNANALYZED PROPOSITIONS 118; I. THE THEORY OF CONSEQUENCE 120; 1. The Definition of Consequence 120; 2. The Definition of Valid Consequence 121; 3.Formal and

Material Consequence 128; 4. 'Ut Nunc' Consequence 130; 5. The Paradoxes of Strict Implication 133; 6. Rules of Valid Consequence 136; II. PROPOSITIONAL CONNECTIVES 147; 1. Compound Propositions in General 147; 2. Conditional Propositions 149; 3A. Rules for Illative Conditionals 154; 3B. Rules for Promissory Conditionals 156; 4. Biconditionals 156; 5. Conjunctions 157; 6. Disjunctions 161; 7. De Morgan's Laws 166; 8. Other Propositional Connectives 177; III. AN ANALYSIS OF THE RULES FOUND IN SOME INDIVIDUAL AUTHORS 171; 1. Paris in the Early Sixteenth Century 171; 2. Oxford in the Early Sixteenth Century 181; 3. Germany in the Early Sixteenth Century 183; 4. Spain in the Third Decade of the Sixteenth Century 184; 5. Spain in the Second Part of the Sixteenth Century 184; 6. Germany in the Early Seventeenth Century 185; CHAPTER IV / FORMAL LOGIC. PART TWO: THE LOGIC OF ANALYZED PROPOSITIONS 187; I. The Relationships Between Propositions 189; 1. The Quality and Quantity of Propositions 189; 2. Opposition 192; 3. Equipollence 194; 4. Simple and Accidental Conversion 195; 5. Conversion by Contraposition 199; II. Supposition Theory and Quantification 207; 1. The Divisions of Personal Supposition 207; 2. Descent and Ascent 213; III. Categorical Syllogisms 223; 1. Figures and Modes 224; 2. How to Test the Validity of a Syllogism 230; 3. Proof by Reduction 239; 4. Syllogisms with Singular Terms 247; APPENDIX / LATIN TEXTS 253; BIBLIOGRAPHY 282; 1. Primary Sources 282; 2. Secondary Sources on the History of Logic 1400-1650 291; INDEX OF NAMES 297-304.

"Keckermann remarked of the sixteenth century, "never from the beginning of the world was there a period so keen on logic, or in which more books on logic were produced and studies of logic flourished more abundantly than the period-in which we live." (1) But despite the great profusion of books to which he refers, and despite the dominant position occupied by logic in the educational system of the fifteenth, sixteenth and seventeenth centuries, very little work has been done on the logic of the postmedieval period. The only complete study is that of Risse [a], whose account, while historically exhaustive, pays little attention to the actual logical doctrines discussed. (2) Otherwise, one can tum to Vasoli [b] for a study of humanism, to Muñoz Delgado [c] for scholastic logic in Spain, and to Gilbert [d] and Randall [e] for scientific method, but this still leaves vast areas untouched. In this book I cannot hope to remedy all the deficiencies of previous studies, for to survey the literature alone would take a life-time.

As a result I have limited myself in various ways. In the first place, I concentrate only on those matters which are of particular interest to me, namely theories of meaning and reference, and formal logic. For discussions of such matters as demonstration, the logic of scientific method, the categories, the topics, informal fallacies, humanist logic, Ramist logic, and the whole range of commentaries on Aristotle, the reader will have to look elsewhere. However, in my first chapter, which I must confess to be based largely on secondary sources, I attempt to give an overall picture of the period, so that the reader can assess the place of the people and the theories I discuss in a wider context.

In the second place, although I make extensive references to one or two medieval logicians, particularly Peter of Ailly, whose work was still widely read and discussed in the post-medieval period, I have made no attempt to fill in the medieval background, or to trace the historical antecedents of every doctrine I mention. There are two reasons for this deficiency. One lies in my original purpose, which was simply to describe just what logic a well-read man of the sixteenth or seventeenth century would have been acquainted with. The other, and most important, reason lies in the monumental nature of such a task. An adequate treatment of the historical antecedents would not only double the size of my book, but would quadruple the number of footnotes, as well as taking many years to accomplish. Fortunately medieval logic has been by no means as thoroughly neglected as post-medieval logic, and a very good idea of its scope and achievements can be obtained from the following works, which themselves contain extensive bibliographies:

Nuchelmans, G., *Theories of the Proposition. Ancient and Medieval Conceptions of the Bearers of Truth and Falsity*, Amsterdam, 1973.

Pinborg, J., *Logik und Semantik im Mittelalter. Ein Uberblick*, Stuttgart-Bad Cannstatt, 1972.
Rijk, L. M. de, *Logica Modernorum, Vol. I, On the Twelfth Century Theories of Fallacy*, Assen, 1962.
Rijk, L. M. de, *Logica Modernorum, Vol. II, The Origin and Early Development of the Theory of Supposition*, Assen, 1967. This volume is in two parts, the second of which contains texts and indices.

In the third place, I have found myself unable to shed very much light on the historical relations between many of the authors whom I discuss.

So far as those from whom I most frequently quote are concerned, there is little problem. The bulk of my references are to Caubraith, Celaya, Clichtoveus, Enzinas, Pardo, de Soto and Tartaretus, all of whom studied and/or taught at the University of Paris in the first years of the sixteenth century, or earlier in the case of Tartaretus. Needless to say, these men were acquainted with each other's works. Many other references are to Hieronymus of St. Mark of whom I know only that he studied at Oxford and that he frequently quotes from the work of Pardo; and to the Germans, Trutvetter, Gebwiler and Eckius, who are of the same period and who obviously knew the works of the Parisian logicians as well as the works of Ockham, Buridan, Marsilius of Inghen and Albert of Saxony.

The only later sixteenth century author of whom I make much use is Fonseca, and the only seventeenth century author of whom I make much use is John of St. Thomas. The influences on these men have been comprehensively described in the works of Munoz Delgado, and they stem back to early sixteenth century Paris.

However, once one strays outside Spain and the Paris of the early sixteenth century, a number of obstacles to historical understanding immediately appear. Despite Risse's efforts, we still do not know exactly how many logic texts were published, where they were written, or when their first edition appeared. The books themselves usually contain neither biographical nor bibliographical information. Authors not only used each other's work without acknowledgement, but they also criticized each other's work without giving more specific references than "a certain doctor said". Little is known about the curricula of most sixteenth and seventeenth century universities.

Moreover, there is a tremendous amount of sameness about the contents of logical textbooks, particularly in the later period. They can be roughly categorized as Philippist, Ramist, Philippo-Ramist, Aristotelian, or eclectic, but finer distinctions are hard to draw. Even when an author cites his sources, this may be of little help. For instance, we know that Joachim Jungius told Rhenius that he based his logic text upon the works of Dietericus and Johann Kirchmann, (3) but his work bears little obvious relation to that of Dietericus, and I have been unable to see a copy of Kirchmann. In any case, the first edition of Kirchmann listed by Risse appeared in 1638, the very year of the *Logica Hamburgensis*.

On the whole, I think that I will be content to leave the task of unraveling all the relationships between logicians of the later period to the intellectual historian. It is true that a number of medieval doctrines were preserved into the seventeenth century, much later than such authors as Boehner had supposed, and it is true that some new work was done, particularly with respect to the fourth figure of the syllogism, but generally speaking, nothing of interest to the logician was said after 1550 at the very latest. Indeed, now that I have written this book, I have compiled a large list of logic texts from the period 1550-1650 which I shall be happy never to open again. On the other hand, an enormous amount of interesting work remains to be done for the period 1450-1550, and I very much hope that my own research will provide a useful starting point for research by others." (*Preface*, X-XI)

(1) Keckermann, P*raecognitorum Logicorum Tractatus III*, Hanoviae 1606, 109f.
(2) For titles, see the bibliography.
(3) Jungius, *Logica Hamburgensis*, edited and translated into German by R. W. Meyer, Hamburg 1957, editor's introduction, xx.

Notes added:

[a] *Die Logik der Neuzeit. Band l. 1500-1640*, Stuttgart-Bad Cannstatt 1964.

[b] *La dialettica e la retorica dell'umanesimo: 'Invenzione' e 'Metodo' nella cultura del XVe XVI seeolo*, Milano 1968.
[c] *Logica Hispano-Portuguesa hasta 1600*, Salamanca 1972.
[d] *Renaissance Concepts of Method*, New York 1960.
[e] *The School of Padua and the Emergence of Modern Science,* Padua 1961

2. ———. 1978. *The Tradition of Medieval Logic and Speculative Grammar from Anselm to the End of the Seventeenth Century: A Bibliography from 1836 Onwards*. Toronto: Pontifical Institute of Mediaeval Studies.
Contents: Preface VII; Part One. Anselm to Paul of Venice (items 1-632) 1; Part Two. After Paul of Venice (items 633-879) 73; Index of Names 101; Index of Texts 105; Index of Translations 107; Index of Subjects 109.
"My main interest in drawing up this bibliography was to list all the books and articles which have to do with formal logic and semantics from the time of Anselm to the end of the seventeenth century. I see this area as including such topics as consequences, syllogistic, supposition theory, and speculative grammar, but as excluding such topics as the categories, the struggle between nominalism and realism, and pure grammar. It is not, of course, always easy to draw a line between works which are concerned with formal logic and semantics and works which are not so concerned, and inevitably my choice of borderline cases will seem too restrictive to some and too liberal to others. However, my hope is that I have not excluded any book or article which obviously falls into the area I have delimited.
I have used the phrase "the tradition of medieval logic" in the title in order to indicate that although I include the seventeenth century, I am not concerned with the contributions of modern philosophy. The work of men such as Pascal, Descartes, Arnauld, Leibniz and Locke carries us far indeed from medieval discussions of logic and semantics. Moreover, there is already such an extensive literature on these figures that to include them in my bibliography would completely change its character. On the other hand, I do include humanist logic and renaissance Aristotelianism, since they involve a reaction to the medieval tradition which can only properly be understood in the light of that tradition.
This is a bibliography of secondary works and of modern editions of early texts. Accordingly I have excluded those nineteenth century reprints of earlier works such as Aldrich's *Artis Logicae Compendium* which were produced merely as text books, and I have also excluded modern facsimile editions of early printed texts unless they are accompanied by substantial editorial material. In addition, I have omitted a list of the various editions of Milton's *Artis Logicae Plenior Institutio*, since printings of his complete works are both numerous and easily found. The earliest book I list is Victor Cousin's 1836 edition of Abelard, since this can properly be viewed as the starting point of modern scholarly work on medieval logicians.
I do not refer to short edited or translated passages in books of readings. I have included only the more lengthy book reviews, and only a few unpublished dissertations. I have not included biographical and general historical works unless they have some specific contribution to make to the history of logic. I have tried to include all relevant material published before 1977, but the listing of 1976 publications is inevitably incomplete, given the delays which so often occur in the printing of books and journals.
I have endeavoured to look at each item personally, and to include as much information as possible. In those cases where I have failed to locate an item, or have located it in a place where I could not conveniently see it, I have made a note of my failure. The reader should bear in mind that these entries may be quite inaccurate. Where I have only been able to see a copy of an article, I have added the note: "Journal not seen."
Works which deal with the period as a whole will be found in Part One.
Where an author has more than one book or article, the items are arranged chronologically.
Below each item I list the headings under which it is indexed and, where relevant, cross-references to reviews, discussions, translations and reprints. The ordering of

the headings corresponds to the four indexes I have provided: (1) an index of names; (2) an index of texts; (3) an index of translations; (4) an index of subjects. Only substantial texts and translations are indexed. In the few cases where a book review is not cross-referenced, the reason is that only the review contains material relevant to my purposes. It is my hope that these indexes, which are based on my knowledge of a work's contents rather than its title alone, will prove one of the most valuable aspects of my bibliography.

Readers who wish to find articles dealing with related fields or published after 1976 are recommended to consult two bibliographical sources in particular. They are:

1. *Repertoire Bibliographique de la Philosophie*. Publié par l'Institut supérieur de philosophic de l'Université catholique de Louvain.
2. *The Philosopher's Index*. An International Index to Philosophical Periodicals.

Readers who wish to remedy the omissions I describe in my first three paragraphs are also recommended to consult the following:

Risse, Wilhelm. *Bibliographia Logica*. Band II. 1801-1969. Hildesheim-New York: Georg Olms Verlag, 1973.

Risse's work is far more comprehensive than my own, since he includes not only formal logic, but what might be described as the logic of ideas.

On the other hand, his bibliography is arranged chronologically rather than alphabetically; and inevitably, given the scope of his work, he does not give full publication details and his indexes are minimal. Volume II contains only books, and it is to be hoped that the volume listing journal articles will appear before too long. (*)

I owe a great debt of gratitude to those people who went through an earlier version of this bibliography and provided me with a large number of extra references. In particular I would like to thank William McMahon, Jan Pinborg, Charles Schmitt, and Paul Vincent Spade. I would also like to thank the editorial staff of the Pontifical Institute of Mediaeval Studies for their helpful advice on organization and presentation, the staff of Inter-Library Loan at the University of Waterloo for their unfailing help, and the Canada Council for various grants which have enabled me to work in British libraries. Finally, I should like to thank the Humanities Research Council of Canada for aiding the publication of this book." (*Preface*, pp. VII-IX)

(*) [Bibliographia logica. III. *Verzeichnis der Zeitschriftenartikel zur Logik.* Hildesheim-New York: Georg Olms Verlag, 1979].

There is a continuation volume: Fabienne Pironet, *The Tradition of Medieval Logic and Speculative Grammar. A Bibliography (1977-1994*), Turnhout: Brepols 1997.

3. ———. 1985. *Studies in Post-Medieval Semantics*. London: Variorum Reprints.

Reprint of 12 essays already published.

CONTENTS: Preface IX-X;

REFERENCE IN INTENSIONAL CONTEXTS

I 'For Riding is Required a Horse": A Problem of Meaning and Reference in Late fifteenth and Early sixteenth Century Logic - Vivarium XII. 1974; II I Promise you a Horse": A Second Problem of Meaning and Reference in Late fifteenth and Early sixteenth Century Logic (Parts 1 & 2) - Vivarium XIV. 1976; III Chimeras and Imaginary Objects: A Study in the Post-Medieval Theory of Signification - Vivarium XV. 1977;

PROPOSITIONS AND MENTAL LANGUAGE

IV Theories of the Proposition: Some Early sixteenth Century Discussions - Franciscan Studies 38. 1978 (1981); V The Structure of Mental Language: Some Problems Discussed by Early Sixteenth Century Logicians - Vivarium XX. 1982; VI Mental Language and the Unity of Propositions: A Semantic Problem Discussed by Early Sixteenth Century Logicians - Franciscan Studies 41. 1981 (1984);

SCHOLASTIC INFLUENCES ON JOHN LOCKE

VII "Do Words Signify Ideas or Things?" The Scholastic Sources of Locke's Theory of Language - Journal of the History of Philosophy XIX. 1981; VIII Locke on Language - Canadian Journal of Philosophy XIV/1. 1984;

LOGICAL ANALYSIS

IX The Doctrine of Exponibilia in the Fifteenth and Sixteenth Centuries - Vivarium XI. 1973; X Multiple Quantification and the Use of Special Quantifiers in Early Sixteenth Century Logic - Notre Dame Journal of Formal Logic XIX. 1978;
SEMANTIC PARADOXES
XI Thomas Bricot (d. 1516) and the Liar Paradox - Journal of the History of Philosophy XV. 1977; XII Will Socrates Cross the Bridge? A Problem in Medieval Logic - Franciscan Studies 46. 1976 (1977);
Addenda et Corrigenda; Index.
"With one exception (IX) the papers in this volume were written after my first book, *Language and Logic in the Post-Medieval Period* (Synthèse Historical Library 12, Dordrecht: Reidel 1974), and they are devoted to a single theme, the philosophy of language in the period from the late fifteenth to the late seventeenth century. The first group of papers (I, II, III) deals with problems of reference in intensional contexts, and the second (IV, V, VI) with problems concerning the nature of propositions and mental language. The last three groups of papers take up more specialized problems. VII and VIII deal with scholastic influences on John Locke's philosophy of language; IX and X discuss two areas of technical logical analysis which had a close bearing on semantic issues; and XI and XII discuss two types of paradox, one of which is clearly semantic, and one of which should perhaps be classified as pragmatic. Many of the issues had been touched on in my book, but here they are presented in much greater depth, on the basis of a closer analysis of the relevant sources. The papers also represent my growing awareness both of the importance of the medieval background to post-medieval philosophy, and of the diversity of intellectual currents which characterized the post-medieval period. For a summing-up of these matters, which will place the logicians discussed here in their proper historical context, I refer the reader to my chapter on logic and language in the *Cambridge History of Renaissance Philosophy*, edited by Charles B. Schmitt (Cambridge: Cambridge University Press, [1988]).
On re-reading the papers collected here, I found that in general I still agree with what I wrote. Nonetheless there are some things that I would now do differently. In particular, I would edit the Latin texts, rather than presenting them in their raw form. I would also try to standardize my use of language. For instance, the verb 'supponere' is variously translated here as 'suppose' and 'supposit'. In this reprint the opportunity has been taken to correct misprints and simple mistakes in the texts themselves; more complicated mistakes are discussed in the *Addenda et Corrigenda*. Where there is, inevitably, an overlap of material I have sometimes used the *Addenda* to indicate where my most up-to-date treatment of the subject is found. I have also brought bibliographical references up to date, and I have added details of recent editions of Latin texts." (from the *Preface*)

4. ———. 2008. *Les Théories De L'analogie Du Xiie Au Xvie Siècle*. Paris: Vrin. Conférences Pierre Abélard, Université de Paris-IV Sorbonne (2004).
Table des matières: Avant-propos par Irène Rosier-Catach 7; Préface de l'auteur 11; Chapitre premier: Les problèmes: logique, métaphysique, théologie 13; Chapitre II: Thomas d'Aquin: interprétations et malentendus 33; Chapitre III: L'analogie et les concepts: le virage vers l'intérieur 55; Chapitre IV: Autour de l'analogie: ambiguïté et métaphore 79; Bibliographie 105; Index nominum des auteurs avant 1650 119; Index nominum des auteurs modernes 121.
"Afin de donner au lecteur une idée plus précise du plan de mon exposé, je dirai que dans les trois premiers chapitres, j'essaierai d'expliquer le trajet qui mène des Catégories et des Réfutations sophistiques d'Aristote à la tripartition de l'analogie telle que Burley la présente. Dans le premier chapitre, je donnerai un bref historique de la réception des textes et de I 'apparition de l'analogie d'attribution au mn e siècle. Je parlerai aussi des antécédents de la notion dans les textes des théologiens de la fin du XII e siècle et du début du XIII e siècle. Dans le chapitre il, je commençerai par un bref aperçu de la pensée de Thomas d'Aquin au sujet de l'analogie en général, avant d'examiner l'analogie de proportionnalité plus en détail. Dans le chapitre in, nous serons de nouveau avec Gauthier Burley et sa doctrine des concepts

analogiques. Pour terminer, je consacrerai le dernier chapitre à deux problèmes concernant le langage parlé ou écrit: quand faut- il désambiguïser les propositions en faisant des distinctions, et quel est le rôle de la métaphore dans les discussions des théologiens et logiciens du Moyen Âge?
Prenons comme point de départ la question de savoir pourquoi les auteurs du Moyen Âge ont cru nécessaire de développer une théorie de l'analogie sémantique. Afin de trouver une réponse, nous devrons répondre à trois questions préliminaires: 1) Quelles sont les théories métaphysiques et théologiques qui ont produit l'analogie métaphysique? 2) Quelle est la théorie du langage qui prédominait? (3) Quels sont les textes canoniques qui donnaient les instruments que l'on pouvait utiliser pour résoudre le problème des rapports entre réalité et langage? Dans ce qui suit, j'esquisserai une réponse aux trois questions, avant de parler plus en détail des textes logiques. Ensuite je retournerai aux théologiens afin de parler d'une solution au problème des noms divins qui semble contenir les racines d'une théorie de l'analogie. Pour terminer ce chapitre, j'expliquerai comment l'arrivée des nouvelles traductions d' Aristote et des écrits arabes a mené à la théorie de l'analogie telle qu'on la retrouve chez Thomas d'Aquin. Évidemment je ne serai pas en mesure de donner les réponses avec toute la complexité qui s'impose, surtout à la première question, mais ces quelques remarques, même superficielles, pourront déjà nous indiquer la direction à suivre." (pp. 15-16)

Books edited

1. Sanderson, Robert. 1985. *Logicae artis compendium*. Bologna: Editrice CLUEB Reprint of the second edition (1618, first anonymous edition 1615), edited with an introduction by E. J. Ashworth.
Contents: Editor's Introduction IX-LV; I. Robert Sanderson: Life and works XI; II. The history of logic in the Sixteenth century XVI; III. Logic in England XXIII; IV. The Oxford curriculum XXXII; V. An analysis of the *Logicae Artis Compendium* XXXV-LV.
Logicae artis compendium. Pars prima 11; Pars secunda 81; Pars tertia 129; Appendix prima 243; Appendix posterior 331; Indices; Index of pre-twentieth century authors and works 371; Index of twentieth-century authors 375; Index of names used in examples 377; Index of Latin terms 379-382.
"V. An Analysis of the *Logicae Artis Compendium.*
In this section I intend to relate Sanderson to his background by focussing on four specific aspects of the *Logicae artis compendium*. I shall discuss (i) the nature of logic; (ii) the medieval heritage; (iii) changes in syllogistic; (iv) method and the art of discourse.
(i) The Nature of Logic
I shall begin by analyzing Sanderson's first chapter, which in a brief compass touches on a range of classificatory issues that were the subject of lively debate during the sixteenth century. The first of these issues concerns the very use of the word 'logica' as opposed to 'dialectica'. It was a medieval commonplace that the word 'dialectica' could be used in two senses, a broad sense which equated dialectic with logic, and a narrow sense, whereby dialectic was that kind of probable argumentation discussed in the *Topics*. (94) Which word was used for the study of all kinds of argumentation was a matter of taste. Peter of Spain had used 'dialectica'; John Buridan and others preferred logica'. However, in the sixteenth century greater doctrinal significance became attached to the word 'dialectica'. Ramus argued at some length that Aristotle's 'Organon' did not as was commonly thought discuss three special kinds of logic, i.e. apodictic or demonstrative, dealing with necessary material; dialectic, dealing with probable material; and sophistic, dealing with fallacious material. Instead, there was one general doctrine, which included a general doctrine of invention. (95) Hence, there was no specialized use of the term

'dialectic' and it both could and should properly be applied to logic as a whole. In response Zabarella, for instance, argued that 'dialectic' did name a distinct part of logic, and should be used as the name of that part only. (96) Sanderson allows the wider use; but his remark that logica' is `Synecdochiche Dialectica' is significant, given that synecdoche is the figure of speech whereby a part is put for the whole. Sanderson next classifies logic as an 'ars instrumentalis'. Once more, his choice of words has to be understood in the light of sixteenth century polemic. There were four ways in which logic could be classified. (97) Peter of Spain had called it both an art and a science; scholastics tended to call it a science; humanists tended to call it an art;" and Zabarella called it neither an art nor a science but an instrumental habit. Giulio Pace in turn argued that an instrumental habit was in fact an art;" and it seems to be this usage that Sanderson has adopted. Moreover, Sanderson was fully conscious of the implications of his choice, for in Appendix 1, chapter 2, pp. 31-37, he gives a sample speech on the genus of logic. He cites Zabarella (as well as Keckermann) and he concludes that logic is properly speaking an art. In this he is departing from some of his English predecessors, especially Seton, who had classified logic as a science. (100)

The final part of Sanderson's initial characterization of logic is the phrase "dirigens mentem nostram in cognitionem omnium intelligibilium." This definition is very similar to one found in Keckermann, who may well have influenced Sanderson here. Keckermann wrote "[Logica] Est ars humani intellectus operationes sive Hominis cogitationes ordinandi & dirigendi in rerum cognitione." (101) According to the Conimbricenses, the view that logic directed the operations of the mind was found in Fonseca and Suarez, and it is not found explicitly in the *antiquiores*. (102) In order to understand the full significance of Sanderson's definition, it is necessary to relate his remark about directing the mind to his subsequent discussion of the divisions of logic, and it is also necessary to explore his reference to the knowledge of intelligible things in relation to his subsequent classification of the objects and subjects of logic." (pp. XXXV-XXXVIII)

(...)

"Conclusion.

Tolstoi’s view of history as an inevitable process, which the actions of Napoleon affect no more and no less than those of the meanest soldier, is an overstatement. Yet it is true that the textbook-writers and schoolteachers of a period may be as important as the leading intellectuals, for it is by these minor figures that all innovations are accepted, altered, and made into the new commonplace. To concentrate solely upon the great thinkers is to obscure the reality of university and school, of the main stream of orthodoxy which lies behind these thinkers and which feeds them. To judge the true stature of such men as Locke it is helpful to know both what they were taught and how their teaching affected others; but to judge the intellectual quality of the seventeenth century as a whole, such a wider knowledge is essential. Great men stand to some extent outside their period, and it is only the minor thinkers who can provide a safe basis for generalization about that period. This fact alone would be a sufficient basis for the investigation of Sanderson’s *Logicae artis compendium*. One cannot claim that it shows new insights into formal logic or the philosophy of language, but it is clearly written and well organized; and, given its success as a logic textbook, it is a valuable historical document. A study of this book will throw ihuch light upon the training and the preoccupations of those who used it; and it will help us to understand not only the development of logic textbooks in seventeenth century England, but also the type of education offered at Oxford and Cambridge." (pp. LIV-LV)

(94) See, e.g., the commentary by John Dorp in *Perutile compendium totius logice Joannes Buridani* (Venice 1499, facsimile edition Frankfurt am Main, 1965), sig.a 2ra. For discussion see Pierre Michaud-Quantin, "L'emploi des termes logica et dialectica au moyen age" in *Arts libéraux et philosophie au moyen age* (Montreal, Institut d'études médiévales, Paris, J. Vrin, 1965), pp. 855-862. See also *Commentarii Collegii Conimbricensis in universam dialecticam Aristotelis* (Cologne, 1607: facsimile edition Hildesheim, New York, 1976) col. 25.

(95) Petrus Ramus, *Scholarum dialecticarum seu animadversionum in Organum Aristotelis*, in *Scholae in tres primas liberales antes* (Francofurti 1581, facsimile edition, Frankfurt am Main 1965), pp. 40-43. He suggested (p. 40) that sophistic was not properly a part of the art of logic, just as 'barbarismorum doctrina' is not properly a part of the art of grammar. Virtue is homogeneous but vices are heterogeneous, he remarked.
(96) Jacobus Zabarella, *De natura logicae* in *Opera Logica* (Cologne 1597, facsimile edition Hildesheim 1966), col. 20. Cf. the discussion by Pedro da Fonseca, *Instituiçoes Dialécticas* / *Institutionum dialecticarum libri octo*, edited by J. Ferreira Gomes (Universidade de Coimbra, 1964), p. 22. Fonseca remarked that the definition of dialectic as dealing with the probable could not apply to dialectic in the wide sense.
(97) For discussions of these alternatives (and a fifth alternative, that logic is a faculty) see Conimbricensis, cols. 33-37; Zabarella, *De natura logicae*, cols. 5-24.
(98) One favourite phrase of those in the humanist tradition was "ars disserendi". Agricola wrote, for instance, "Erit ergo nobis hoc pacto definita dialectice, ars probabiliter de qualibet re proposita disserendi": Rodolphus Agricola, *De inventione dialectica* (Cologne 1523, facsimile edition Frankfurt am Main, 1967), p. 193. For discussion and further references see Ong, *Ramus, Method and the Decay of Dialogue*, pp. 178-179; and Conimbricensis, cols. 25-27.
(99) Julius Pacius, *In Porphyrii Isagogen et Aristotelis Organum Commentarius Analyticus* (Frankfurt 1597, facsimile edition, Hildesheim 1966), p. 2a: "Ergo logica est habitus instrumentalis, id est ars."
(100) Seton (sig. A 59 wrote: "Dialectica est scientia, probabiliter de quovis themate disserendi." Cf. John Sanderson, Institutionum dialecticarum (Oxoniae 1602) p. 3 and Samuel Smith, *Aditus ad logicam* (Oxonii, 1684, editio nona) p. I, for similar definitions.
(101) Bartholomaeus Keckermann, *Praecognitorum logicorum tractatus tres* in *Operum omnium quae extant tomus Primus* (Genevae, 1614), col. 90-91.
(102) Conimbricensis, col. 42.

2. Bricot, Thomas. 1986. *Tractatus Insolubilium*. Nijmegen: Ingenium Publishers *Artistarium* Vol. 6. Critical edition of the treatise by Thomas Bricot with an introduction, notes, appendices and indices by E. J. Ashworth.
Table of Contents: Introduction: 1. Thomas Bricot: Life and Works XIII; 2. The *Tractatus Insolubilium* XIV; 3. About this Edition XV; 4. Description of the Early Printed Editions Used XV; Notes to the Introduction XIX; Bibliography of Secondary Sources XXII; Edition of text: Table of Contents 5; Signs and Abbreviations 11; *Tractatus Insolubilium Magistri Thomae Bricot* 13; Notes to the Text 113; Appendices: Appendix One 123; Appendix Two 129; Appendix Three 138; Indexes: 1. Index of Names 147; 2. Index of Examples 149; 3. Subject Index 153-155.
"1. *Thomas Bricot: Life and Works*
Thomas Bricot was one of the men who laid the foundations for the last flowering of medieval logical doctrines which took place at the University of Paris in the first two decades of the sixteenth century. (1) Little seems to be known about his early life except that he came from Amiens. (2) He took his BA at Paris in 1478, his MA in 1479, and his doctorate of theology in March 1490. Diring the 1480s he taught philosophy at the Collège de Sainte-Barbe, but when he took his licence of theology in January 1490 he was a *bursarius* of the Collège des Cholets. After 1490 he held a variety of ecclesiastical and academic posts. He spent some time in Amiens; but by 1502 he was back in Paris. Between 1506 and 1516 he often served as dean of the faculty of theology; and he was both canon and penitentiary of Notre Dame. He died in Paris on April 10, 1516. His philosophical work belongs entirely to his early years in Paris.
Much of his activity was directed toward editing the works of others, including a 1487 edition of John Buridan's *Tractatus Summularum*. (3) He produced abbreviated versions of Aristotle's *Organon* and of his natural philosophy; (4) he

wrote a series of questions on the *Analytica Posteriora;* (5) but most notably he edited and added questions to the commentaries on Aristotle and on Peter of Spain which had been written by the Paris master, George of Brussels. (6) Bricot's only original works seem to have been the *Tractatus Insolubilium* and the *Tractatus Obligationum* which were always published together and which received at least nine editions between 1489 and 1511. (7) The *Tractatus Obligationum* is largely based on the *De Obligationibus* of Marsilius of Inghen; (8) the *Tractatus Insolubilium* will be discussed below.

Bricot's works enjoyed considerable success in Paris in the last two decades of the fifteenth century as one can see from the number of editions printed there, as well as in other French centres. He was also known outside France. His abbreviation of the *Organon* was printed in Basel in 1492 and in Salamanca, ca.1496. It was printed together with a work by George of Brussels in Venice in 1506. (9) Bricot was prescribed to be read at the University of Vienna in 1499; (10) and some of his works were sold by the Oxford bookseller,

John Dorne, in 1520 . (11) Indeed, as late as 1535 the University of Cambridge found it necessary to forbid the reading of Bricot.(12) However, I judge that his success was largely due to the usefulness of his texts as teaching manuals rather than to any great originality. The only doctrine of his which I know to have been discussed by other logicians was his solution to the problem of semantic paradoxes found in the *Tractatus Insolubilium*, to which I shall now turn.

2. The '*Tractatus Insolubilium*'

In the *Tractatus Insolubilium* Bricot discusses three approaches to the problem of semantic paradoxes. (13) In the second question he takes up the solution attributed to Ockham, (14) whereby the part of a proposition cannot supposit for the whole. Bricot did not favour this solution. In the third question he discusses two versions of a solution stemming from Peter of Ailly but reworked by George of Brussels. In the first question he presents his own view. This owes much to Roger Swyneshed, but avoids some of the more paradoxical consequences of Swyneshed's view. Bricot allows self-reference to be legitimate; and he treats simple insolubles as being straightforward categorical propositions. However, he revises the conditions under which a proposition is said to be true. An affirmative proposition is true if and only if (I) it signifies that things are as they are and (II) it does not signify itself to be false. On the other hand, a negative proposition needs to meet only one condition. Either (I) it signifies that things are not as they are not or (II) its contradictory signifies itself to be false. It is here that Bricot differs from Swyneshed, who had treated affirmative and negative propositions alike.

Among the authors who were to discuss Bricot's solution are found Pierre Tartaret; (15) David Cranston; (16) John Mair; (17) and Domingo de Soto. (18) In the version of his *De Insolubilibus* published in 1516, John Mair said explicitly that *opinio magistri nostri thome Briquot ... nunc est communis*. (19)

The *Tractatus Insolubilium* is noteworthy for its treatment of two other issues. First, there is a short discussion of non-semantic paradoxes. (20) Second, there is a very long discussion of the issue of *complexe significabilia* or the significates of propositions, when the latter are viewed as occurrent entities. (21) As with semantic paradoxes, I have discussed Bricot's treatment of these issues at length in other places, and will not dwell on them here.

As an appendix to my edition of the *Tractatus Insolubilium* I have included two short texts in which Bricot takes up the issue of semantic paradoxes once more, and a third text in which he discusses *complexe significabilia*." (pp. XIII-XIV)

3. Pauli, Veneti. 1988. *Logica Magna. Secunda pars. Tractatus de Obligationibus*. Oxford: Oxford University Press

Classical and Medieval Logic Texts V. Edited with an English Translation and Notes by E. Jennifer Ashworth.

Contents; Introduction VII-XVI; Part One. 3; Part Two: Concerning *positio*; Chapter One: Against the Rules 101; Chapter Two: On Conjunctions 327; Chapter Three: On Disjunctions 335; Chapter Four: On Similars and Dissimilars 345; Parth Three:

Concerning *depositio*; Chapter One: Rules 369; Chapter Two: Theses 379; Chapter Three: Sophisms 379; Bibliography: I. Oblications Treatises 393; II. Other Sources 394; Indexes: Index of sophisms 398; Index of names 401; Index of doctrines 404-409.

"*The Purpose of Obligations Treatises*

A contentious and as yet unresolved issue has to do with the purpose of lllillgations treatises. The treatises themselves do not offer much discussion of this point, being content to remark that the opponent in a disputation is to try to push the respondent into accepting a contradiction, whereas the respondent has to resist this, even when faced with the curious consequences Ilf grunting such a propositum as 'You do not exist.'(23) In the process both participants would have their knowledge of valid inferences thoroughly tested, for each proposition put forward would be such that it followed from preceding steps, or such that its negation followed, or such that neither it nor Its negation followed. In this third case either it or its negation would enter the sequence as an extra premiss for further conclusions or non-conclusions. It should also be emphasized that the bulk of almost all treatises on obligations consisted of a series of sophisms which, as Edith Sylla has argued Ilf the 'physical' sophisms, formed an integral part of logic teaching, at least in fourteenth century Oxford, and were designed to develop a student's subtlety and skill in handling logical rules.(24) These remarks suggest that obligational disputations (if such were ever in fact held) had the primary function of providing oral exercise in formal logic, and hence were of mainly pedagogical significance.

This solution has been adopted by a number of authors; but reflection on the complex and sophisticated nature of the controversy between Swyneshed and others has led P.V. Spade to suggest that obligations treatises offer us an account of counterfactual reasoning.(25) This theory in turn has been criticized by E. Stump, who points out that the treatises reflect a number of diverse concerns, including 'epistemic logic, indexicals, propositional attitudes, and other issues in the philosophy of language.'(26) She also points out that in Burley at least there was 'a concern with special sorts of difficulties in evaluating consequences or inferences as a result of the disputational context in which the inferences occur.'(27)

My own view is that there is probably something to be said for all these accounts. Insofar as the treatises described a routine to be followed in class-room disputations, the purpose could only have been that of testing a student's skill in formal logic, since truth was explicitly not an issue;(28) but the authors and readers of such treatises obviously welcomed the opportunity to discuss other matters in some depth. Paul himself was particularly concerned with the difference between use and mention, as will be seen from many of his sophisms. One must also bear in mind the often-noted link between treatises on obligations and treatises on insolubles. They go together not only in Paul, but in Swyneshed, Albert of Saxony and Strode, to mention but three names. This suggests a general interest in discussing all kinds of paradoxes, both semantic and non-semantic. Whatever the final answer is, reading Paul of Venice should help us to arrive at it, since his Tractatus de Obligationibus is a compendium of all the main views current in the second half of the fourteenth century."

(23) For detailed references, see Part 1, section 2, note 3.

(24) Edith Dudley Sylla, 'The Oxford calculators' in CH, 540-563.

(25) See Spade, 'Some theories', pp. 1-2, for an account of the literature, and throughout for a defence of his thesis about counterfactual reasoning.

(26) See Stump, 'Roger Swyneshed', pp. 169-174: 'The purpose and function of obligations', p. 171 n. 45 is particularly important for her discussion of Spade's thesis.

(27) Stump in CH, p. 328.

(28) For an account of the distinction between doctrinal disputations, which were designed to arrive at the truth of some claim, and obligational disputations, see E.J. Ashworth, 'Renaissance man as logician: Josse Clichtove (1472-1543) on disputations', *History and Philosophy of Logic*, 7 (1986), 15-29.

References

CH = Nortman Kretzmann, Anthony P. Kenny, Jan Pinborg (eds.), *The Cambridge History of Later Medieval philosophy: From the Rediscovery of Aristotle to the Disintegration of Scholasticism, 1100-1600,* Cambridge: Cambridge University Press 1982.
Paul Vincent Spade, "Three theories of obligationes: Burley, Kilvington and Swyneshed on Counterfactual Reasoning", *History and Philosophy of Logic* 3 (1):1-32 (1982)
Eleonore Stump, "Roger Swyneshed's Theory of Obligations", *Medioevo* 7:135-174 (1981)
Eleonore Stump, "Obligations. A. From the beginning to the early fourteenth century", in CH, pp. 315-334.

4. Sophista, Richard. 2016. *Master Richard Sophista: Abstractiones*. New York: Oxford University Press
Critical edition and Introduction by Sten Ebbesen, Mary Sirridge, and E. Jennifer Ashworth.

5. Donati, Silvia, Trifogli, Cecilia, and Ashworth, Earline Jennifer, eds. 2017. *Geoffrey of Aspall: Questions on Aristotle's Physics*. Oxford: Oxford University Press
Auctores Britannici medii aevi, voll. 26-27.
Edited by Silvia Donati and Cecilia Trifogli; English translation by E. Jennifer Ashworth and Cecilia Trifogli.

Articles 1967-1972

1. Ashworth, Earline Jennifer. 1967. "Joachim Jungius (1587-1657) and the Logic of Relations." *Archiv für Geschichte der Philosophie* no. 49:72-85.
"In histories of logic, the sixteenth and seventeenth centuries, at least until Leibniz began his work, are either ignored or are referred to with the utmost brevity as being hardly worthy of attention (1).
(...)
However, there is one name which appears with fair regularity in the literature, and that is the name of Joachim Jungius, whose *Logica Hamburgensis* is often contrasted favorably with the Port Royal Logic. Both Bochenski and the Kneales allow this book, published in 1638 for the use of the Classical Schools at Hamburg, to be one of the better textbooks of the period (2); while Heinrich Scholz in his influential *Geschichte der Logik*, not only praises it highly, but discusses Jungius's contributions to logic at some length (3). More impressive yet are the varied tributes paid to Jungius by Leibniz, who called him "one of the most able men that Germany has ever had" (4); compared him with Galileo and Descartes (5); and said that "he surpassed all others in the knowledge of true logic, not even excepting the author of the *Artis Cogitandi* [Arnauld]" (6). Of course, much of Leibniz's praise arose from his admiration of Jungius's varied activities, his career as a medical doctor, his contributions to physics, botany, mineralogy, theology, educational theory, and his foundation of the first-learned society in Germany (7). More specifically, however, Leibniz admired Jungius for his demonstration that not all inferences could be reduced to syllogistic form, and he praised his logical acuteness in this respect on a number of occasions (8). The purpose of this paper is to shed some light on a much neglected area of the history of logic by inquiring whether Jungius's treatment of non-syllogistic or, in this context, relational inferences, is commensurate with the logical distinction which has been claimed for him; and, more briefly, to see whether there are any further factors which set Jungius above other logicians of the same period." (pp. 72-73)
(...)
"In conclusion one may say that although the *Logica Hamburgensis* shares in all the faults of its age, the superficiality, the lack of metalogical perceptiveness, it also has

merits which are peculiarly its own. The body of truth-functional logic contained in it would alone be sufficient to distinguish Jungius from his contemporaries, and still more impressive, given the background, is his use of relational inferences. It is true that the argument *a divisis ad composita* is both unoriginal and unremarkable, despite Scholz's praise; it is true that the inversion of relations is found in other contemporary logicians; while discussion of the oblique syllogism was quite usual; but the argument *a rectis ad obliqua* was both original and clearly presented. Moreover, Jungius seems to have been fully conscious that relational inferences were inferences in their own right, to be treated as such and not to be hidden away among the categories. Without this realization, any amount of originality in the discovery of actual inferences could have gone for nought. Hence, while the verdict of Heinrich Scholz needs modification, his praise of Jungius is basically justified, for it was he who brought the logic of relations to the attention of his successors, especially Leibniz." (p. 85)

(1) In this context, it must be acknowledged that historians of thought have been kinder than those devoted strictly to formal logic. For instance, Peter Petersen's seminal work, *Geschichte der aristotelischen Philosophie im protestantischen Deutschland*, Leipzig 1921. contains much material of interest to the historian of logic. The publication in 1964 of Dr. Wilhelm Risse's work, *Die Logik der Neuzeit. 1. Band. 1500—1640*, Stuttgart-Bad Cannstatt 1964, marks a great step forward in the study of the field.

(2) I. Bochenski, *History of Formal Logic*, translated and edited by Ivo Thomas, Notre Dame, Indiana, 1961, p. 257, W. & M. Kneale, *The Development of Logic*, Oxford 1962, p. 313.

(3) H. Scholz, *Geschichte der Logik*, Berlin 1931, pp. 41—2.

(4) "Letter to Christian Habbeus, Jan. 1676", *Samtliche Schriften und Briefe*, edited by the Prussian Academy of Sciences (1923) 1st Series, Vol. I, p. 443.

(5) *Opuscules et fragments inédits de Leibniz*, edited by L. Couturat, Paris 1903, p. 345.

(6) "Letter to Koch, 1708", quoted by Couturat in *La logique de Leibniz*, Paris 1901, note 4, p. 74.

(7) *The Societas Ereunetica*, founded in Rostock in 1622. Unhappily, it lasted at most only two years. For further information on Jungius's life, see the following works:

G. Guhrauer, *Joachim Jungius und sein Zeitalter*, Stuttgart und Tübingen 1850; *Beiträge zur Jungius-Forschung. Prolegomena zu der von der Hamburgischen Universität beschlossenen Ausgabe der Werke von Joachim Jungius* (1587—1657), edited by A. Meyer, Hamburg 1929; Joachim Jungius-Gesellschaft der Wissenschaften: *Die Entfaltung der Wissenschaft. Zum Gedenken an Joachim Jungius*, Hamburg 1957. The second work mentioned contains an extensive bibliography.

(8) *Opuscules et fragments inédits*, p. 287, p. 330, p. 406.

2. ———. 1968. "Propositional Logic in the Sixteenth and Early Seventeenth Centuries." *Notre Dame Journal of Formal Logic* no. 9:179-192.

"Until recently, historians of logic have regarded the early modern period with unremitting gloom. Father Boehner, for instance, claimed that at the end of the fifteenth century logic entered upon a period of unchecked regression, during which it became an insignificant preparatory study, diluted with extra-logical elements, and the insights of men like Burleigh into the crucial importance of propositional logic as a foundation for logic as a whole were lost.(1) Nor is this attitude entirely unwarranted, for the new humanism in all its aspects was hostile to such medieval developments as the logic of terms and the logic of consequences. Those who were devoted to a classical style condemned medieval works as unpolished and arid, and tended to subordinate logic to rhetoric; while those who advocated a return to the original works of Aristotle, freed from medieval accretions, naturally discounted any additions to the subject matter of the *Organon.*

But it would be a mistake to dismiss the logical work of the period too readily. In the first place, the writings of the medieval logicians were frequently published and widely read. To cite only a few cases, the *Summulae Logicales* of Petrus Hispanus received no fewer than 166 printed editions;(2) Ockham's *Summa Totius Logicae* was well known; the 1639 edition of Duns Scotus included both the *Grammaticae Speculativae* attributed to Thomas of Erfurt and the very interesting *In Universam Logicam Quaestiones of Pseudo-Scotus*; (3) the *Logica* of Paulus Venetus was very popular; and a number of tracts by lesser known men like Magister Martinus and Paulus Pergulensis were printed. Moreover, since logic still played such a preeminent role in education, contemporary scholars were not backward in producing their own textbooks; and numerous rival schools of logic flourished.(4) The purpose of this paper is to make a preliminary survey of some of the wealth of material available from the sixteenth and first half of the seventeenth centuries, in order to ascertain how much of the medieval propositional logic had in fact been retained.(5) It will become clear that the situation was better than has been thought." (p. 179)

(1) See P. Boehner, "Bemerkungen zur Geschichte der De Morgannsche Gesetze in der Scholastik," *Archivâr Philosophie,* 4 (1951), p. 145.

(2) See J. P. Mullally, *The Summulae Logicales of Peter of Spain* (Notre Dame, Indiana, 1945), p. LXXVIII.

(3) In Joannes Duns Scotus, *Opera Omnia,* edited by L. Wadding (Lugduni, 1639), Vol. I.

(4) For a comprehensive account of the various schools of logic, see Dr. Wilhelm Risse, *Die Logik der Neuzeit. I. Band 1500-1640,* (Stuttgart-Bad Cannstatt, 1964).

(5) I have limited myself to material in the British Museum and the Cambridge University Library for the purposes of this introductory survey.

3. ———. 1968. "Petrus Fonseca and Material Implication." *Notre Dame Journal of Formal Logic* no. 9:227-228.

"Little attention has been paid to the question of whether material implication was recognized in the sixteenth and seventeenth centuries, although it has been argued that John of St. Thomas was aware of the equivalence '(p ⊃ q) ≡ (~p v q)'.(1) The other usual test-case for a knowledge of material implication is '(p ⊃ q) ≡ ~(p . ~q) and I intend to show that the sixteenth century Jesuit, Petrus Fonseca, whose *Institutionum Dialecticarum libri octo* was one of the most popular textbooks of the period, (2) was well acquainted with this second equivalence." (p. 227)

(...)

"One must conclude that Fonseca was aware both of strict and of material implication." (p. 228)

(1) See Ivo Thomas, "Material Implication in John of St. Thomas", *Dominican Studies* 3 (1950), p. 180; and John J. Doyle, "John of St. Thomas and Mathematical Logic", *The New Scholasticism* 27 (1953), pp. 3-38.

(2) First published in 1564, it went into at least 44 editions. See Wilhelm Risse, *Die Logik der Neuzeit*, Band I. 1500-1640 (Stuttgart-Bad Cannstatt, 1964), p. 362, n. 395.

4. ———. 1969. "The Doctrine of Supposition in the Sixteenth and Seventeenth Centuries." *Archiv für Geschichte der Philosophie* no. 51:260-285.

"The purpose of this paper is to make a preliminary survey of some of the wealth of material available from the sixteenth and first half of the seventeenth centuries, in order to ascertain how much of the medieval propositional logic had in fact been retained.(5) It will become clear that the situation was better than has been thought. The vocabulary and organization of the textbooks under consideration were fairly standard. The discussion of the proposition [*Enuntiatio, Propositio*, or, in Ramist texts, *Axioma*] followed sections on the predicaments and predicables or the Ramist equivalent, on arguments. Medieval logicians had called the compound proposition 'hypothetical', but sixteenth and seventeenth century writers more usually referred to *enuntiatio coníuncta* or *composita*, sometimes with a note to the effect that it is vulgarly or improperly called 'hypothetical'.(6) Melancthon retained the name

'hypothetical', as did one or two others.(7) The Spanish scholastic, Petrus Fonseca, discussed the whole question in some detail, saying that the name 'hypothetical' most properly applies to conditional propositions, but can also be used of disjunctions, because they imply a conditional.(8) A compound proposition was generally said to consist of two (or more) categorical propositions, joined by one (or more) of a list of propositional connectives. The assumption that the truth of these propositions depended upon the truth of the parts, the kind of connective employed, and in certain cases the relationship between the parts usually remained implicit, but the seventeenth century German logician, Joachim Jungius, said explicitly that truth or falsity depended on "the kind of composition involved";(9) while Alsted had written previously that truth or falsity depended "on the disposition of parts". (10)
There was much agreement as to the kinds of compound proposition to be considered. Conditional, conjunctive, and disjunctive propositions were always mentioned. Those logicians in the scholastic tradition, like Campanella, Cardillus, Fonseca, Hunnaeus and John of St. Thomas, included causal and rational propositions, as did some outside the tradition like Cornelius Martini and Jungius, who discussed the causal proposition at length. Only a few, including Fonseca and C. Martini, mentioned the temporal and local propositions which had been discussed by such medieval logicians as Ockham and Burleigh; but both Ramus and Burgersdijck spoke of 'related' propositions which exhibit 'when' and 'where' among other connectives.(11)
Ramus and those influenced by him added a new kind of compound proposition, the discretive.
Although compound propositions were rarely called 'hypothetical', the traditional title of 'hypothetical syllogism' was usually retained for the discussion of propositional inference forms. Only a few spoke of *syllogismus compositus* or *coniunctus*. (12) In all cases the categorical syllogism was discussed before the hypothetical, and usually such matters as sorites, example, enthymeme and induction also came first. A few books had, in addition, a section on the rules for valid inference or *bona consequeentia*.
Melancthon in his *Erotemata Dialectices* included a chapter entitled *De Regulis Consequentiarum* after his discussion of sorites and before his discussion of the hypothetical syllogism. Alsted placed his canons of material consequence in the same position; while the remarks of Caesarius come after his section on the hypothetical syllogism. On the other hand, the three scholastics, Campanella, Fonseca, and Hunnaeus introduced their rules for good consequence before they discussed the syllogism, thus approaching most closely to the later medieval order of priorities." (pp. 179-180)
(...)
"It is indeed true that the logicians of the sixteenth and early seventeenth centuries failed to appreciate the fundamental importance which the logicians of the later middle ages had attributed to propositional logic; and a number of the texts I have been concerned with even give instructions for the reduction of hypothetical syllogisms to categorical syllogisms.(88) On the other hand, the amount of propositional logic retained was by no means negligible, and some authors, such as Fonseca and Jungius, included a great deal. No startling advances were made, but there were innovations in detail, like Jungius's discussion of the posterior subdisjunctiva, or the linking of the conditional with a negated conjunction.
One may therefore conclude that, while the period is not one of great excitement for the historian of logic, it merits considerably more attention than it has been granted in the past." (p. 188)
(5) I have limited myself to material in the British Museum and the Cambridge University Library for the purposes of this introductory survey.
(6) Cf. Thomas Campanella, *Philosophiae Rationalis Partes quinque. 2. Dialectíca* (Parisiis, 1638), p. 334; Augustinus Hunnaeus, *Dialectíca seu generalía logices praecepta omnia* (Antverpiae, 1585), p. 147; and Amandus Polanus, *Logicae libri duo* (Basileae, 1599), p. 147.

(7) Philippus Melancthon, *Erotemata Dialectices*, (---, 1540?), p. 96. Cf. Johannes Caesarius, *Dialectica* (Coloniae, 1559), Tract. IV [No pagination]; and Cornelius Martini, *Commentatiomm logicorum adversus Ramistas* (Helmstadii, 1623), p. 204.
(8) Petrus Fonseca, Institutionum Dialectícarum libri octo (Conimbricae, 1590), Vol. I, p. 173. Cf. Abelard's discussion of the same point in his Dialectica, edited by de Rijk (Assen, 1956), p. 488.
(9) Joachim Jungius, *Logica Hamburgensis*, edited by R. W. Meyer (Hamburg, 1957), p. 98. '([Enuntiatio conjuncta] . . . secundum illam compositionis speciem, veritatis et falsitatis est particeps".
(10) J. H. Alsted, *Logicae Systema Harmonium* (Herbonae Nassoviorum, 1614), p. 321. "Compositi axiomatis veritas & necessitas pendet specialiter ex partium dispositione".
(11) Petrus Ramus, *Dialecticae libri duo* (Parisiis, 1560), p. 126; and Franco Burgersdijck, *Institutionum Logicarum libri duo*, (Lugduni Batavorum, 1634), pp. 166-167.
(12) E.g., Fonseca, op. cit., vol. II, p. 100, refers to "syllogismus coniunctus"; and Polanus, op. cit., p. 165, refers to "syllogismus compositus".
(88) E.g., Conrad Dietericus, *Institutiones Dialecticae* (Giessae Hassorum, 1655), p. 312; Fortunatus Crellius, *Isagoge Logica* (Neustadii, 1590),pp. 243-246; and Jungius, *op. cit*., *passim*.

5. ———. 1970. "Some Notes on Syllogistic in the Sixteenth and Seventeenth Centuries." *Notre Dame Journal of Formal Logic* no. 11:17-33.
"Although a number of different schools of logic flourished in the sixteenth and seventeenth centuries (2), they seem to have shared a lack of interest in formal logic which expressed itself in a greater concern for the soundness than for the validity of arguments. An example of this tendency is the emphasis placed upon the Topics, or the ways of dealing with and classifying precisely those arguments which were not thought to be susceptible of formal treatment, since they depended for their effectiveness upon the meaning of the terms involved.(3) It is true, of course, that the Humanists and, later, the Ramists, devoted considerably more space to the Topics and to the "invention" of arguments than did the scholastics, the Aristotelians, the Philippists or followers of Melancthon, or even the eclectics; but this was balanced by the greater devotion of the other schools to the categories, the predicables, the pre-, post-, and even extra-predicaments.(4) However, there was one subject which was both formal in inspiration and common to all text-books, namely, the syllogism; and as a result it provides a very good test of how much interest and competence in purely formal matters was retained during these centuries of logical decline." (p. 17)
(...)
"In the light of this discussion, I find myself driven to the reluctant conclusion that genuine competence in formal logic was not often to be found in this period, at least where syllogistic was concerned. One distressing feature is the lack of discussion of issues like the definition of the major and minor terms or the status of singular propositions. Frequently one is left to guess differences in meta-theory from differences in usage.
And even where there is discussion, it is not always adequate. For instance, a doctrine of the relationship between terms was used to exclude the fourth figure without any realization that this doctrine could not properly be applied to the first, second or third figures. Another characteristic of logicians of this period was a random introduction of new modes. What reason could be given for listing only two indirect modes of the second figure, or for allowing singular terms to appear only in third figure syllogisms? Finally, many logicians introduced frankly extra-logical considerations into their discussions. What was natural, what was fitting, what people tended to say, were all thought to be relevant issues. Only Arnauld and Alsted and, to a lesser extent, Campanella, present the right doctrines for the right reasons, unencumbered by extraneous material." (pp. 27-28)

(1) This study is based on an examination of printed texts in the British Museum, the Cambridge University Library, and the Bodleian. I do not mention Leibniz because he was not a writer of logical textbooks.
(2) For a comprehensive account of the various schools, see Wilhelm Risse, *Die Logik der Neuzeit. I Band. 1500-1640* (Stuttgart-Bad Cannstatt, 1964).
(3) The situation is rather different today. For instance, much of the material discussed under the Topic of *genus* and *species* could be dealt with by set theory, and much of that discussed under the Topic of part and whole could be formalized by the methods of S. Lesniewski. The *Topics*, as treated by Boethius, Abelard, and Peter of Spain, are discussed by Otto Bird, in his article "The Formalizing of the Topics in Mediaeval Logic," *Notre Dame Journal of Formal Logic*, vol. 1 (1960), pp. 138-149.
(4) For a typical account of these matters see Joachim Jungius, *Logica Hamburgensis*, edited by R. W. Meyer (Hamburg, 1957), Book I.

6. ———. 1972. "The Treatment of Semantic Paradoxes from 1400 to 1700." *Notre Dame Journal of Formal Logic* no. 13:34-52.
"During the middle ages, semantic paradoxes, particularly in the form of "Socrates speaks falsely", where this is taken to be his sole utterance, were discussed extensively under the heading of *insolubilia.* Some attention has been paid to the solutions offered by Ockham, Buridan, and Paul of Venice, but otherwise little work seems to have been done in this area.
My own particular interest is with the generally neglected period of logic between the death of Paul of Venice in 1429 and the end of the seventeenth century; and the purpose of this paper is to last some light both upon the new writings on paradoxes and upon the marked change in emphasis which took place during the sixteenth century. Although the traditional writings on *insolubilia* were available throughout the period, the detailed discussions of the fifteenth and early sixteenth centuries were soon entirely replaced by briefer comments whose inspiration seems wholly classical. Even the mediaeval word *insolubile* was replaced by the Ciceronian *inexplicabile*. In this area at least there is strong evidence for the usual claim that the insights of scholastic logic were swamped by the new interests and studies of Renaissance humanism." (p. 34)
(...)
"Whether any of these solutions is likely to bear fruit today is for the reader to decide. It is, however, clear that the writers of the fifteenth and early sixteenth century were inspired by a genuine interest in problems of logic and language, and that they handled them with the finest tools available. That their discussions should have been so completely ignored by subsequent logicians, some of whom were doubtless their pupils, is surprising, given both the availability of their books and the persistence of other traditional doctrines like supposition. (81)" (p. 45)
(81) See my article, "The Doctrine of Supposition in the Sixteenth and Seventeenth Centuries", *Archiv fur Geschichte der Philosophie* vol. 51 (1969), pp. 260-285.

7. ———. 1972. "Strict and Material Implication in the Early Sixteenth Century." *Notre Dame Journal of Formal Logic* no. 13:556-560.
"One of the favorite games played by historians of logic is that of searching their sources for signs of the Lewis-Langford distinction between strict and material implication. There are three ways of going about this, but the first two are often reminiscent of the conjurer searching for his rabbit, and only the third has real merit, for it alone involves the study of what was said about the conditional as such. I shall look at each way in turn, in relation to writers of the early sixteenth century." (p. 556)
(...)
"I think it is fair to conclude by saying that some early sixteenth century logicians were beyond doubt aware of the distinction between strict and material implication; and that no special pleading is necessary to establish this." (p. 560)

8. ———. 1972. "Descartes' Theory of Clear and Distinct Ideas." In *Cartesian Studies*, edited by Butler, Ronald Joseph, 89-105. Oxford: Basil Blackwell.
"It is widely agreed that Descartes took ideas to be the objects of knowledge and that his theory of clear and distinct ideas arose from his attempt to find a way of picking out those ideas whose truth was so certain and self-evident that the thinker could be said to know them with certainty. To say of an idea that it is clear and distinct was, he believed, to say of it both that it was certainly true and that any claim to know it was justified. No other criterion need be appealed to. It is at this point, however, that most of those who set out to expound Descartes' theory of knowledge are brought to a standstill. The part played by clear ideas is obvious enough, but what did Descartes mean by `clear and distinct'? This paper is an attempt, not to make an original contribution to the study of Descartes, but to elucidate his terms and evaluate his criterion in the light of what both he and others have written." (p. 89)
(...)
"The fact that Descartes adopted the word ‘idea’ is itself significant. When scholastic philosophers discussed human cognition, they spoke of the mind as containing concepts (*species, intentiones*). They claimed that these concepts originated through our sense perceptions, and hence that they stood in some relation to external objects. The term ‘concept’ was contrasted with the term ‘idea’. Ideas were the eternal essences or archetypes contemplated by God, and the question of their external reference did not arise. They were an integral part of God’s mind. God could create instances of one of his ideas, but his idea was in no way dependent upon the existence of such instances. Descartes took the word ‘idea’ and applied it to the contents of the human mind because he wanted to escape the suggestion that these contents must be in some sense dependent on the external world as a causal agent. (9) He wished to establish the logical possibility that a mind and the ideas contained within it are unrelated to other existents, and can be discussed in isolation from them.
Descartes saw the term ‘idea’ as having a very wide extension.
He said “ . . . I take the term idea to stand for whatever the mind directly perceives,”(10) where the verb ‘perceive’ refers to any possible cognitive activity, including sensing, imagining and conceiving.(11) Thus a sense datum, a memory, an image, and a concept can all be called ideas. This, of course, leads to the blurring of distinctions. For Descartes, “I have an idea of red” may mean that I am now sensing something red, or that I have a concept of the colour red, even if I am not now picking out an instance of that concept. Moreover, when Descartes speaks of an idea, he may be taking it as representative of some object or quality in the physical world, as when he says “I have an idea of the sky and stars,” or he may be referring to the meaning he assigns to a word, as when he says “I have an idea of substance.” Nor does he make any distinction between “having an idea” and “entertaining a proposition.” Such statements as “Nothing comes from nothing” and “The three angles of a triangle are equal to two right angles” are categorized as ‘common notions’,(12) and are included among the contents of the mind. Descartes does remark that in some cases an idea may be expressed by a name, in other cases by a proposition,(13) but he does not bother to pursue this line of inquiry.
One of the characteristics of an idea is 'objective reality’, a scholastic phrase which Descartes adopted, but used in a new way. In scholastic writings the terms ‘subjective’ and ‘objective’ have meanings which are the reverse of the modem meanings. An object like a table exists subjectively or as a subject if it has spatio-temporal existence, if it is real or actual. In contrast, the concept of a table can be looked at as having two kinds of existence. The concept *qua* concept has formal existence, but the concept as having some specifiable content is said to have objective existence, or existence as an object of thought. The concepts of a table and of a chair are formally similar but objectively different. So far as subjective realities were concerned, the scholastics assigned them different grades of reality according to their perfection and causal power. For instance, a substance is more perfect and

causally more efficacious than an accident, hence a man has a higher grade of reality than the colour red.
It was also held that every effect had a cause with either an equal or a higher grade of reality. These doctrines were not seen as having any relevance to concepts. As formally existent, a concept has of course to have some cause, but the content of the concept was not seen as having any independent reality. Descartes, however, felt that the objective reality could be considered independently of its formal reality, and that it must be graded just as subjective reality was graded. The idea of a man, he felt, has more objective reality than the idea of a colour. Moreover, the cause of the idea containing a certain degree of objective reality must have an equal or greater degree of subjective reality. For instance, the idea of God has so high a degree of objective reality that only God himself is perfect enough to be the cause of such an idea.(14)" (pp. 91-93)
(...)
"Although Descartes struggled to defend his criterion, his struggles ended in an impasse. He had made the mistake of trying to prove too much. He had wanted to develop an introspective technique by which he could be sure of recognizing those ideas which were objects of certain knowledge; but such an enterprise was doomed from the start. He could only escape from the objection that nothing about an idea can justify us in making judgment about its external reference by entering into an uneasy and unjustifiable alliance with God; and by such an alliance he negated his claim that a single criterion for true and knowable ideas could be found." (p. 105)
(9) E. S. Haldane, G. R. T. Ross (eds.) , *The Philosophical Works of Descartes*, (Cambridge, 1911) [cited as 'HR'] vol. II, 68.
(10) HR II, 67-8.
(11) HR I, 232.
(12) HR I, 239.
(13) C. Adam P. Tannery, *Oeuvres de Descartes* (Paris 1897-1913) [cited as 'AT'] AT III, 395.
(14) HR I, 161-170.