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

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General Works on the History of Logic in Western Thought

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Some works on the history of logic up to 1977

There is a paucity of works which treat the complete history of logic. Investigation of some of the problems in this field has increased in the last decades, mostly due to symbolic logic, which has established that many of the results obtained were familiar to the Stoics and particularly to the Scholastics. But these have not been overall studies of the science. The authors of the studies we possess usually aimed at rediscovering the results reached in symbolic logic by earlier logical schools, and so many problems of historical interest have in the past been only little explored or not at all. We shall quote below only those studies published in volumes, and which have a more general aim, even when treating special problems, or limited periods of time.
The first history of logic seems to be the work of Petrus Ramus, entitled *Scholae in liberales artes* -- "Schools of Liberal Arts" (Basle, 1569). The first eight chapters of this book deal with history of logic and are called *Scholae dialecticae* -- "Dialectic Schools". Unfortunately, the author naively believes all historical or legendary personages to have been logicians and in the chapter *Logica Patrum* ("Logic of our Ancestors") he lists among them Noah and Prometheus.
After this, studies of the history of logic become more scientific. Here we quote:

- Bartholomäus Keckermann: *Praecognitorum Logicorum Tractatus III* -- "Three Treatises on the most well-known Logicians" (Hanover, 1598). It is rather a useful list of authors and titles, with some indication of contents.
- Jacob Friedrich Reimmann: *Critisirender Geschichts-Calender von der Logica* -- "Critical and Historical Calendar of Logic" (Frankfort-on-Main, 1699). Written in defective German, this work nevertheless contains valuable information.
- Pierre Gassendi: *De origine et varietate logicae* -- "On the Origin and Diversity of Logic" (Lyons, 1658), a very valuable work.
- Johann Albert Fabricius: *Specimen elencticum historiae logicae* -- "Index of Subjects of the History of Logic" (Hamburg, 1699). This "Index" is actually a catalogue of the treatises of logic known by this scholar.
- Johannes Georgius Walchius [Johann Georg Walch]: *Historia Logicae* -- "History of Logic" (Leipzig, 1721). This book differs from the preceding ones in the correctness of

its information.

- Heinrich Christoph Wilhelm Sigwart: De historia logicae inter Graecos usque ad Socratem commentatio -- "On the History of Logic among Greeks as far as Socrates" (Tübingen, 1832).
- Frederich Auguste de Reiffenberg: *Principes de la Logique suivis de l'Histoire et de la bibliographie de cette Science* --" The Principles of Logic followed by the History and Bibliography of this Science" (Brussels, 1833).
- Adolphe Frank: *Esquisse d'une histoire de la logique precedée d'une Analyse etendue de l'Organum d'Aristote* -- "Sketch of a History of Logic Preceded by an Extensive Analysis of Aristotle's Organon" (Paris, 1838).
- Friedrich Adolf Trendelenburg: *Geschichte der Kategorienlehre* -- "History of the Theory of Categories" (Berlin, 1845).
- Robert Blakey: Historical Sketch of Logic, *from the Earliest Times to the Present Day* (Edinburgh, 1851).
- We have reached now the monumental work in four volumes, Carl Prantl's *Geschichte der Logic im Abendlande* -- "History of logic in Western Europe" (Leipzig, 1855-1870). This writing offers an inexhaustible source of information, of original Greek and Latin texts, some of them copied down from inaccessible books and manuscripts (which the present, work has also used). Yet this work has at least two shortcomings: it expounds the history of logic only down to the sixteenth century, and it is blemished by opinions that are inadmissible because of their violence and by a lack of understanding of ideas different from his own. Although Prantl was convinced he had written a work "so that it would not be necessary, at least for some time, to write another history of logic" (op. cit., IV, *Vorwort*), the material he collected can be only a source of information for other histories of logic. Prantl's method is exclusively chronological and therefore entails repetitions.
- Paul Janet and Gabriel Séailles: *Histoire de la Philosophie* (Paris 1887). In this "History of Philosophy", a large part deals with history of logic in a very original manner, dividing it into its main problems: history of the problem of concept, of judgement, of syllogism, of induction. It is a didactic handbook, supplying an important amount of information, sometimes following closely the treatise of Prantl.
- Friederich Harms: *Die Philosophie in ihrer Geschichte* "Philosophy in its History".
- The second volume of this work is entitled *Geschichte der Logik* - “History of Logic”. (Berlin, 1881), and deals in a very general way with the history of this discipline.
- Robert Adamson: *A Short History of Logic* (Edinburgh, 1911; reprinted, Dubuque, Iowa, 1962).
- Clarence Irving Lewis: *A Survey of Symbolic Logic* (Berkeley, 1918). This book contains numerous historical indications about mathematical logic.
- Theodor Ziehen: *Lehrbuch der Logik auf positivistischer Grundlage mit Berücksichtigung der Geschichte der Logik*, - "Treatise on Logic, on Positivist Ground, Considering also the History of Logic" (Bonn, 1920).
- Oswald Külpe: *Vorlesungen über Logik* - "Lessons on Logic" (Leipzig, 1923). The first part of this book is a short history of logic, containing competent opinions, and a very judicious division of the history of this science.
- Federigo Enriques: *Per la storia della logica* - "For the History of Logic" (Bologna, 1922). This study contains some interesting remarks, gives the logic a larger framework, (including the methodologic and philosophical logic), but aims to show the connections between mathematics and logic.
- Henrich Scholz: *Geschichte der Logik* - "History of Logic" (Berlin, 1931). This is a short, but very erudite study, which underlines only those data which confirm or prefigure the results of mathematical logic.

- Jörgen Jörgensen: *A Treatise of Formal Logic* (3 vols., Copenhagen - London, 1931). The first volume bears the title *Historical Developments*, and offers precious information.
- Evert Willem Beth: *De Wijsbegeerte der Wiskunde van Parmenides tot Bolzano* - "The Theory of Science from Parmenides to Bolzano" (in Dutch, Antwerp-Nijmegen, 1944);
- Evert Willem Beth: *Geschiedenis der Logica* - "History of Logic" (in Dutch, the Hague, 1944).
- Francesco Albergamo: *Storia della logica delle scienze esatte* - "History of the Logic of Exact Sciences" (Bari, 1947).
- Antoinette Virieux-Reymond: *La logique et l'épistémologie des Stoïciens* - "Logic aad Epistemology of the Stoics" (Lausanne, 1949).
- Philotheus Boehner: *Medieval Logic, an outline of its development from 1350 to c. 1400* (Manchester, 1952).
- Robert Feys: *De ontwikkelung van het logisch denken* - "Development of Logic Thought" (in Dutch, Antwerp - Nijmegen, 1949).
- Alonzo Church: *Introduction to Mathematical Logic* (Princeton, 1956). This masterly treatise on mathematical logic contains numerous and important historical references. Church has also published regularly in "Journal of Symbolic Logic" the bibliography of this science (beginning from 1936).
- Józef Maria Bochenski: Formale Logik - "Formal Logic" (Freiburg - Munchen, 1956). This is, in our opinion, an important work in this field. It contains an anthology of texts, taken from the original writings of the logicians, beginning with Greeks until now, translated into German, and is chronological. The principle of this work is to give the texts which prefigure or present the results obtained in our time by mathematical logic. Formale Logik also gives short information about Indian logic. [Translated in English as *A history of formal logic* (1961)
- Francesco Barone: *Logica formale e Logica transcendentale* - "Formal and Transcendental Logic" (2 vols., Turin, 1957-1965). The first volume is entitled *Da Leibniz aKant* - "From Leibniz to Kant", and the second one *L'algebra della logica* - “The algebra of logic”. Barone's work, although limited to a certain determined period, is rich in personal comment and contains much information.
- Ettore Carruccio: *Matematica e logica nella storia e nel pensiero contemporaneo* "Mathematics and Logic In the History and In the Contemporary Thought" (Turin, 1958).
- Benson Mates: *Stoic Logic* (Berkeley and Los Angeles, 1961).
- William and Martha Kneale: *The Development of Logic* (Oxford, 1962): We think this is the third important work in this field (chronologically, after those of Prantl and of Bochenski), very important as a work of references. The aim of this book is, as the authors say in the "Preface", "an account of the growth of logic, rather than an attempt to chronicle all that past scholars, good or bad, have said about their science". Kneale's method is not that used by Bochenski (anthology of texts), but their aim coincides with Bochenski's, being "to record the first appearances of those ideas which seem to us most important in the logic of our own day".
- Tadeusz Kotarbinski: *Leçons sur l'histoire de la logique* - "Lessons in the History of Logic" (Paris, 1964). The book is the translation of the lessons given by the author at the University of Warsaw, and though short offers a larger framework for the history of this discipline, also discussing other logic problems, for instance methodological ones, which were not considered by Bochenski or Kneale. Notwithstanding, this work aims to show the historical filiation of mathematical logic.
- Nicolai Ivanovici Stiazhkin: *Stanovlenie idei matematiceskoi logiki* - "The Genesis of the Idea of Mathematical Logic" (Moscow, 1964). This book has been translated into

English under the title History of Mathematical Logic from Leibniz to Peano (Cambridge, Mass., London, 1969).

- Ernst Kapp: *Der Ursprung der Logik bei den Griechen* - "The Origin of Logic with Greeks" (Gottingen, 1965) [Originally published in English as *Greek foundations of traditional logic*, 1942)
- Wilhelm Risse : *Bibliographia Logica*. The author intends to continue the work of Prantl, in his studies bearing this general title, but in an objective manner, beginning from where the last has left it, i. e. end of the sixteenth century. This bibliography is planned to appear in four volumes, the first being already published: *Bibliographia Logica. Verzeichnis der Druckschriften zur Logik mit Angabe ihrer Fundorte*. Band I, 1172 -1800 - "Logic Bibliography. List of printed writings with indication where they are to be found. Vol. I, 1472-1800" (Hildesheim - New York, 1965). Beside this vast bibliography, (which will also list the manuscripts of logic), Risse has published another work in two volumes (which will be continued too): *Die Logik der Neuzeit* Band I, 1600-1640 - "Logic of Recent Times, vol. I, 1500-1640" (Stuttgart - Bad Cannstatt, 1964); *Die Logik der Neuzeit* Band II, 1640-1780 (Stuttgart - Bad Cannstatt, 1970). These two volumes expound, in Prantl's manner, but more systematically, the treatises on logic from the mentioned periods. The studies of Risse, as well as those of Prantl, are indispensable to all researches in the field of history of logic.
- Peter Harold Nidditch: *The Development of Mathematical Logic* (London, New York, 1960).
- Guido Calogero: *Storia della logica antica* - "History of the ancient logic" (Bari, 1967). The author, mentions that this is the first of a series of volumes - "The Archaic Epoch", dealing with logic from Heraclitus to Leucippus and Democritus [other volumes were never published]. Calogero also published the important work *I fondamenti della logica aristotelica* - The Bases of Aristotle's Logic" (2nd ed., Florence, 1968) [First edition: Rome, 1932]
- Alexandr Osipovich Makovelski: *Istoria Logiki* - "History of Logic" (Moscow, 1967), short general and didactic handbook of this discipline [translated in French by Geneviève Dupond as: *Histoire de la logique*, Moscou, Éditions du Progrés, 1978].
- James C. Colbert: *La evolucion de la logica simbolica y sus implicaciones* - "Evolution of Symbolic Logic and its Philosophical Implications" (Pamplona, 1968). This writing studies mathematical logic and some important authors.
- Anton Dumitriu: *Istoria Logicii* - "History of Logic" (Bucharest, 1969). The work highlights all the historical aspects of logic. It contains a chapter on logic in China and another on logic in India. An ample compendium of the whole book, in two parts, was published by “Scientia”, and appeared simultaneously in French and English versions (Nos. VII-X, 1971). [Translated in English as *History of logic* (1977)]
- Robert Blanché: *La logique et son histoire. D'Aristote à Russell* - "Logic and its History. From Aristotle to Russell" (Paris, 1970), The book is full of interesting remarks, but it neglects, as many other works do, methodology, Renaissance logic, and other important problems.
- Reuben Louis Goodstein: *Development of Mathematical Logic* (NewYork, London 1971).
- Vicente Muñoz Delgado: *Logica Hispano-Portuguesa hasta 1600* - "The Spanish-Portuguese Logic till 1600" (Salamanca, 1972). This is an important study of logic in the Iberian Peninsula, containing information ignored till now.
- Stanislaw Surma (editor): *Studies in the History of Mathematical Logic* (Wroclaw - Warszawa - Krakow - Gdansk, 1973).

We can see from the above list, that very few of the works quoted are really "histories of logic". The importance of all these contributions cannot be diminished but -- and this is a curious fact -- they generally defend or emphasize some particular results and thus neglect others.

We realize, in this way, that, indisputably, one veritable historical work, in the above list, is nevertheless, in spite of its weak side, Prantl's *Geschichte der Logik im Abendlande*, because the author does not select the logicians nor the theories he is treating of. He is judging them severely when they contradict his conception, and that is his error. But his work is unquestionably historical in character, and Prantl is really a historian, although his judgements are often too subjective and rudely expressed." (Vol. I, pp. XIII-XVI)

From: Anton Dumitriu, *History of logic*, Tunbridge Wells: Abacus Press, 1977.

> The most important recent works are the *Handbook of the History of Logic,* edited by Dov Gabbay and John Woods (11 volumes) and *The Development of Modern Logic* edited by Leila Haaparanta; see the following section for the bibliographic details.

General works on the history of logic

Studies in English

Handbook of the History of Logic

1. Gabbay, Dov, and Woods, John, eds. 2004. *Greek, Indian and Arabic Logic*. Amsterdam: Elsevier.
Handbook of the History of Logic: Vol. 1.
Contents: Dov M. Gabbay and John Woods: Preface VII-VIII; List of Contributors IX; Julius Moravcsik: Logic before Aristotle: Development or Birth? 1; John Woods and Andrew Irvine: Aristotle's Early Logic 27; George Boger: Aristotle's Underlying Logic: 161; Fred Johnson: Aristotle's Modal Syllogisms 247; Jonardon Ganeri: Indian Logic 309; Robert R. O'Toole and Raymond E. Jennings: The Megarians and the Stoics 397; Tony Street: Arabic Logic 523; Charles Burnett: The Translation of Arabic Works on Logic into Latin in the Middle Ages and Renaissance 597; Index 607-617.

2. ———, eds. 2008. *Mediaeval and Renaissance Logic*. Amsterdam: Elsevier.
Handbook of the History of Logic: Vol. 2.
Contents: Dov M. Gabbay and John Woods: Preface VII; List of Contributors IX; John Marenbon: Logic before 1100: The Latin Tradition 1; John Marenbon:: Logic at the Turn of the Twelfth Century 65; Ian Wilks: Peter Abelard and his Contemporaries 83; Terence Parsons: The Development of Supposition Theory in the Later 12th through 14th Centuries 157; Henrik Lagerlund: The Assimilation of Aristotelian and Arabic Logic up to the Later Thirteenth Century 281; Ria van der Lecq: Logic and Theories of Meaning in the Late 13th and Early 14th Century including the Modistae 347; Gyula Klima: The Nominalist Semantics of Ockham and Buridan: A ‘Rational Reconstruction’ 389; Catarina Dutilh Novaes: Logic in the 14th Century after Ockham 433; Simo Knuuttila: Medieval Modal Theories and Modal Logic 505; Mikko Yrjönsuuri: Treatments of the Paradoxes of Self-reference 579; E. Jennifer Ashworth: Developments in the Fifteenth and Sixteenth Centuries 609; Petr Dvořák: Relational Logic of Juan Caramuel 645; Russell Wahl: Port Royal: The Stirrings of Modernity 667; Index 701-716,

3. ———, eds. 2004. *The Rise of Modern Logic: from Leibniz to Frege*. Amsterdam: Elsevier.
Handbook of the History of Logic: Vol. 3.
Contents: Dov M. Gabbay and John Woods: Preface VII; List of Contributors IX; Wolfgang Lenzen: Leibniz's Logic 1; Mary Tiles: Kant: From General to Transcendental Logic 85; John W. Burbidge: Hegel's Logic 131; Paul Rusnock and Rolf George: Bolzano as Logician 177; Richard Tieszen: Husserl's Logic 207; Theodore Hailperin: Algebraical Logic 1685-1900 323; Victor Sanchez Valencia: The Algebra of Logic 389; Ivor Grattan-Guinness: The Mathematical Turn in Logic 545; Volker Peckhaus: Schr6der's Logic 557; Risto Hilpinen: Peirce's Logic 611; Peter M. Sullivan: Frege's Logic 659; Index 751-770.

4. ———, eds. 2008. *British Logic in the Nineteenth Century*. Amsterdam: Elsevier.
Handbook of the History of Logic: Vol. 4.
Contents: Dov M. Gabbay and John Woods: Preface VII; List of Contributors XIII; Gordon R. McOuat and Charissa S. Varma: Bentham’s Logic 1; Tim Milnes: Coleridge’s Logic 33; James Van Evra: Richard Whately and Logical Theory 75; Ralph Jessop: The Logic of Sir William Hamilton: Tunnelling through Sand to Place the Keystone in the Aristotelic Arch 93; Laura J. Snyder: “The Whole Box of Tools”: William Whewell and the Logic of Induction 163; Fred Wilson: The Logic of John Stuart Mill 229; Michael E. Hobart and Joan Richards: De Morgan’s Logic 283; Dale Jacquette: Boole’s Logic 331; Maria Panteki; French ‘Logique’ and British ‘Logic’: On the Origins of Augustus de Morgan’s Early Logical Enquiries, 1805–1835 381; Amirouche Moktefi: Lewis Carroll’s Logic 457; James Van Evra: John Venn and Logical Theory 507; Bert Mosselmans and Ard van Moer: William Stanley Jevons and the Substitution of Similars 515; Shahid Rahman and Juan

Redmond: Hugh McColl and the Birth of Logical Pluralism 533; David Sullivan: The Idealists 605; William J. Mander: Bradley's Logic 663; Index 719-735.

5. ———, eds. 2009. *Logic from Russell to Church*. Amsterdam: Elsevier.
Handbook of the History of Logic: Vol. 5.
Contents: Preface VII; Contributors XI; Andrew D. Irvine: Bertrand Russell's Logic 1; Dale Jacquette: Logic for Meinongian Object Theory Semantics 29; Joan Rand Moschovakis: The Logic of Brouwer and Heyting 77; Jens Erik Fenstad and Hao Wang: Thoralf Albert Skolem 127; Claus-Peter Wirth, Jörg Siekmann, Christoph Benzmüller, Serge Autexier: Jacques Herbrand: Life, Logic. and Automated Deduction 195; Michael Potter: The Logic of the *Tractatus* 255; Peter M. Simons: Leśniewski' Logic 305; Wilfried Sieg: Hilbert's Proof Theory 321; Barry Hartley Slater: Hilbert's Epsilon Calculus and Its Successors 385; Mark van Atten and Juliette Kennedy: Gödel's Logic 449; Keith Simmons: Tarski's Logic 511; Alasdair Urquhart: Emil Post 617; Jan von Plato: Gentzen's Logic 667; Felice Cardone and J. Roger Hindley: Lambda-Calculus and Combinatorics in the 20th Century 723; Jonathan P. Seldin: The Logic of Church and Curry 819; Andrea Cantini: Paradoxes, Self-Reference and Truth in the 20th Century 875; Index 1015-1056.

6. Gabbay, Dov, Kanamori, Akihiro, and Woods, John, eds. 2012. *Sets and Extensions in the Twentieth Century*. Amsterdam: Elsevier.
Handbook of the History of Logic: Vol. 6.
Contents: Preface VII; Contributors XI; Akihiro Kanamori: Set Theory from Cantor to Cohen 1; Juris Steprāns: History of the Continuum in the 20th Century 73; Jean A. Larson: Infinite Combinatorics 145; Akihiro Kanamori: Large Cardinals with Forcing 359; William J. Mitchel!: Inner Models for Large Cardinals 415; Paul B. Larson: A Brief History of Determinacy 457; Menachem Kojman: Singular Cardinals: From Hausdorff's Gaps to Shelah 's pcf Theory 509; M. Randall Holmes, Thomas Forster, and Thierry Libert: Alternative Set Theories 559; John L. Bell: Types, Sets, and Categories 633; Jean-Pierre Marquis and Gonzalo E. Reyes: The History of Categorical Logic: 1963- 1977 689; Fairouz Kamareddine, Twan Laan, and Robert Constable: Russell 's Orders in Kripke's Theory of Truth and Computational Type Theory 801; Index 847-865.

7. Gabbay, Dov, and Woods, John, eds. 2006. *Logic and the Modalities in the Twentieth Century*. Amsterdam: Elsevier.
Handbook of the History of Logic: Vol. 7.
Contents: Preface VII; List of Contributors XI; Rob Goldblatt: Mathematical Modal Logic: A View of its Evolution 1; Paul Gochet and Pascal Gribomont: Epistemic Logic 99; Paul McNamara: Deontic Logic 197; Greg Restall: Relevant and Substructural Logics 289; Peter Øhrstrøm and Per F. V. Hasle: A. N. Prior's Logic 399; Peter Øhrstrøm and Per F. V. Hasle: Modern Temporal Logic: The Philosophical Background 447; Jan van Eijck and Martin Stokhof: The Gamut of Dynamic Logics 499; Keith Devlin: Situation Theory and Situation Semantics 601; Erik Krabbe: Dialogue Logic 665; Index 705-719.

8. ———, eds. 2007. *The Many-Valued and Nonmonotonic Turn in Logic*. Amsterdam: Elsevier.
Handbook of the History of Logic: Vol. 8.
Contents: Preface VII; List of Authors XI; Grzegorz Malinowski: Many-valued Logic and its Philosophy 13; Bryson Brown: Preservationism: A Short History 95; Graham Priest: Paraconsistency and Dialetheism 129; Maria Luisa Dalla Chiara, Roberto Giuntini and Miklos Rédei: The History of Quantum Logic 205; Dominic Hyde: Logics of Vagueness 285; Didier Dubois, Francesc Esteva, Lluís Godo and Henri Prade: Fuzzy-set Based Logics — An History-oriented Presentation of their Main Developments 325; Karl Schlechta: Nonmonotonic Logics: A Preferential Approach 451; Grigoris Antoniou and Kewen Wang: Default Logic 517; Alexander Bochman: Nonmonotonic Reasoning 557; Carl J. Posy: Free Logics 633; Index 681-689.

9. Gabbay, Dov, Siekmann, Jörg H., and Woods, John, eds. 2014. *Computational Logic*. Amsterdam: Elsevier.
Handbook of the History of Logic: Vol. 9.
Contents: Jörg Siekmann and Dov Gabbay: Editorial note VII; List of Authors and Readers VIII;
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Jos Baeten and Davide Sangiori: Concurrency Theory: a Historical Perspective on Coinduction and Process Calculi 399; Klaus Ambos-Spies and Peter A. Fejer: Degrees of Unsolvability 443; Lance Fortnow and Steven Homer: Computational Complexity 495; Robert Kowalski: Logic Programming 523; Jack Minker, Dietmar Seipel and Carlo Zaniolo: Logic and Databases: A History of Deductive databases 571; John-Jules Ch. Meyer: Logics for Intelligent Agents and Multi Agent Systems 629; Matthias Knorr and Pascal Hitzler: Description Logics 659; Pascal Hitzler, Jens Lehmann and Axel Polleres: Logics for the Semantic Web 679;
Index 711-734.

10. Gabbay, Dov, Hartmann, Stephan, and Woods, John, eds. 2011. *Inductive Logic*. Amsterdam: Elsevier.
Handbook of the History of Logic: Vol. 10.
Contents: Introduction VII; Contributors IX; J. R. Milton: Induction Before Hume 1; Marc Lange: Hume and the Problem of Induction 43; Malcolm Forster: The Debate Between Whewell and Mill on the Nature of Scientific Induction 93; Stathis Psillos: An Explorer Upon Untrodden Ground: Peirce on Abduction 117; Maria Carla Galavotti: The Modern Epistemic Interpretations of Probability: Logicism and Subjectivism 153; Alan Musgrave: Popper and Hypothetico-Deductivism 205; Jan Sprenger: Hempel and the Paradoxes of Confirmation 235; S. L. Zabell: Carnap and the Logic of Inductive Inference 265; Ilkka Niiniluoto: The Development of Hintikka Program 311; Frederick Eberhardt and Clark Glymour: Hans Reichenbach's Probability Logic 357; Robert Schwartz: Goodman and the Demise of Syntactic and Semantic Models 391; James M. Joyce: The Development of Subjective Bayesianism 415; Jonathan Weisberg: Varieties of Bayesianism 477; Nick Chater, Mike Oaksford, Ulrike Hahn and Evan Heit: Inductive Logic and Empirical Psychology 553; Jan-Willem Romeijn: Inductive Logic and Statistics 625; Ulrike von Luxburg and Bernhard Schölkopf: Statisical Learning Theory: Models, Concepts, and Results 651; Daniel Osherson and Scott Weinstein: Formal Learning Theory in Context 707; Ronald Ortner and Hannes Leitgeb: Mechaninzing Induction 719; Index 773-785.

11. Gabbay, Dov, Pelletier, Francis Jeffrey, and Woods, John, eds. 2012. *Logic: A History of its Central Concepts*. Amsterdam: Elsevier.
Handbook of the History of Logic: Vol. 11.
Contents: Preface VII; List of Authors X; Conrad Asmus and Greg Restall: History of the Consequence Relation 11; Daniel Bonevac: A History of Quantification 63; J. L. Speranza and Laurence R. Horn: A Brief History of Negation 127; Daniel Bonevac and Josh Dever: A History of the Connectives 175; Jean-Yves Beziau: A History of Truth-Values 235; Simo Knuuttila: A History of Modal Traditions 309; Francis Jeffry Pelletier and Allen P. Hazen: A History of Natural Deduction 341;

Storrs McCall: A History of Connexivity 415; Fairouz Kamareddine, Twan Laan and Rob Nederpelt: AHistory of Types 451; John Woods: A History of the Fallacies in Western Logic 513; Amirouche Moktefi and Sun-Joo Shin: A History of Logic Diagrams 611; Index 683-706.

Other studies in English A- C

1. Angelelli, Ignacio, and Cerezo, María, eds. 1996. *Studies on the History of Logic. Proceedings of the III. Symposium on the History of Logic*. Berlin: Walter de Gruyter.
Contents: Preface V; List of Contributors XI; Mario Mignucci: Aristotle's theory of predication 1; Robin Smith: Aristotle's regress argument 21, Hermann Weidemann: Alexander of Aphrodisias, Cicero and Aristotle's definition of possibility 33; Donald Felipe: Fonseca on topics 43; Alan Perreiah: Modes of scepticism in medieval philosophy 65; Mikko Yrjönsuuri: Obligations as thoughts experiments 79; Angel d'Ors: *Utrum propositio de futuro sit determinate vera vel falsa* (Antonio Andrés and John Duns Scotus) 97; Earline Jennifer Ashworth: Domingo de Soto (1494-1560) on analogy and equivocation 117; Allan Bäck: The *Triplex Status Naturae* and its justification 133; William E. McMahon: The semantics of Ramon Llull 155; Paloma Pérez-Ilzarbe: The doctrine of descent in Jerónimo Pardo: meaning, inference, truth 173; Jeffrey Coombs: What's the matter with matter: *Materia propositionum* in the post-medieval period 187; Rafael Jiménez Cataño: *Copulatio* in Peter of capua (12th century) and the nature of the proposition 197; Lynn Cates: Wyclif on *sensus compositus et divisus* 209; Mauricio Beuchot: Some examples of logic in New Spain (Sixteenth-Eighteenth century) 215; Adrian Dufour: necessity and the Galilean revolution 229; Guy Debrock: Peirce's concept of truth within the context of his conception of logic 241; Pierre Thibaud: Peirce's concept of proposition 257; Jaime Nubiola: Scholarship on the relations between Ludwig Wittgenstein and Charles S. Peirce 281; José Miguel Gambra: Arithmetical abstraction in Aristotle and Frege 295; Herbert Hochberg: The role of subsistent propositions and logical forms in Russell's 1913 *Philosophical logic* and in the Russell-Wittgenstein dispute 317; Alfonso García Suárez: Are the objects of the *Tractatus* phenomenological objects? 343; María Cerezo: Does a proposition affirm every proposition that follows from it? 357; Javier Legris: Carnap's reconstruction of intuitionistic logic in the *Logical syntax of language* 369; Albert C. Lewis: Some influences of Hermann Grassmann's program on modern logic 377; Juan Carlos León: Indeterminism and future contingency in non-classical logics 383; Christian Thiel: Research on the history of logic at Erlangen 397; Index 403.

2. Bar-Am, Nimrod. 2003. "A Framework for a Critical History of Logic." *Sudhoffs Archiv* no. 87:80-89.
Abstract: "The view that science has evolved while using the critical method (dialectics) is undisputed these days. Initially, the traditional view that scientific knowledge is sound and unshakable knowledge, has hindered the view of its development as a critical process. In this respect the history of logic suffered more than other branches of knowledge because the view of logic as developing belongs essentially to the last 150 years. Even today, there is no critical history of logic (the telling of its development by the critical method). This paper is a preliminary attempt in this direction."
"Let us sum up then: At the heart of traditional logic lies the traditional question, what is a sound inference? Modern logic took its first step by criticizing this question (Hume, Bolzano and Boole) and, by replacing it with the modern question, what is a valid inference?
(Boole, Russell and Tarski). This was not a technical novelty. It was a type 6 novelty, an upheaval, a meta-logical revolution which determined future agenda for years to come. Key figures, such as Whewell and Frege, did not take part in this revolution. This discovery is an interesting result of the use of our framework: Their achievements were made despite them being fence-sitters. On the one hand, they still clung to judgments, viewing as useless the merely valid inferences. On the other hand, they postponed the task of securing empirical science by means of logic." (p. 89)

3. Barth, Else M. 1974. *The Logic of the Articles in Traditional Philosophy. A Contribution to the Study of Conceptual Structures*. Dordrecht: Reidel.
Revised translation from the original Dutch (1971) by E. M. Barth and T. C. Potts.
Table of Contents: Preface XIX; Preface to the original edition XXI; On the use of symbols and graphical types XXIII-XXV; Part 1. The problem. I. Introduction: problems and sources 3; II. Naming what is 34; III. The semantics of the logical constants 50; Part 2. Historical survey. IV. From the history of the logic of indefinite propositions 75; V. From the history of the logic of individual propositions 141; VI. Singular - General - Indefinite 180; VII. The identity theories of the copula 204; Part 3. Descent. VIII. Argument by analogy 291; IX: The problem of the logic of relations and its connection with the logic of the articles 337; Part 4. X: Introduction of indefinite propostions by ekthesis 381; XI. Conjunction, potentiality, and disjunction 417; XII. Summary and conclusion 457; Bibliography 482; Index of proper names 502; Index of subjects 509.
"As anybody may verify, both in German, French and other continental philosophical literature, as well as in English philosophical literature written in the continental philosophical tradition, very frequent use is made of the articles - “der”, “die”, “das” in German, “le” and “la” in French, “de” and “het” in Dutch, “-en”, “-a”, “-et” in Scandinavian languages and so on - that is, of the definite articles as grammarians call them.
Sentences which in German would begin with a definite article are frequently translated into English by indefinite articles, and often also occur without any preceding article or other operator. In any case, the choice between a definite and an indefinite prenex article in English philosophical literature can seldom be said to be philosophically significant." (p. 4)
(...)
"It is certainly no accident that sentences with definite articles, or, as is often the case in English, indefinite articles, and general sentences with no prenex articles or other prenex operators at all, were found earlier much more frequently in scientific literature, too, than today. The development on this point which introduction: problems and sources has taken place in the social sciences can be illustrated by the following
quotation: “The emphasis has shifted from the attempt to discover the characteristics of the leader, to an understanding of the leader-follower relationship” (Klineberg 1954/466). Due to the development of a logic of relations by De Morgan and Peirce, from 1860 onwards, in combination with Frege’s revision of the logic of “all’’ and “some”, the language form exemplified by “the state” and “die Sprache” gradually disappeared from theoretical logic. The development in the social sciences to which Klineberg refers is not necessarily directly connected with that theoretical logic, but it could be. In any case the similarity between these developments is an interesting symptom of a generally felt need." (p. 5, a note omitted)
References
Klineberg, O., 1954 [1940], *Social Psychology*. Second revised edition. New York.

4. Bochenski, Joseph. 1961. *A History of Formal Logic*. Notre Dame: Indiana University Press.
Translated from the German edition "*Formale Logik*" (1956) by Ivo Thomas.
Reprinted New York, Chelsea Publishing Co., 1970.
"As an introduction to the present state of research and to justify the arrangement of this book, a summary presentation of results is now needed. The view we present is a new one of the growth of formal logic, stated here for the first time. It is a view which markedly diverges not only from all previous conceptions of the history of logic, but also from opinions that are still widespread about the general history of thought. But it is no 'synthetic a priori judgment', rather is it a position adopted in accordance with empirical findings and based on the total results of the present book. Its significance seems not to be confined within the boundaries of the history

of logic: the view might be taken as a contribution to the general history of human thought and hence to the sociology of knowledge." (p. 10)
(...)
"The history of western logic can be divided into five periods: 1. the ancient period (to the 6th century A.D.); 2. the high Middle Age (7th to 11th centuries); 3. the Scholastic period (11th to 15th centuries); 4. the older period of modern 'classical' logic (16th to 19th centuries); 5. mathematical logic (from the middle of the 19th century). Two of those are not creative periods - the high Middle Age and the time of 'classical' logic, so that they can be left almost unnoticed in a history of problems. The hypothesis that there was no creative logical investigation between the ancient and Scholastic periods might very probably be destroyed by a knowledge of Arabian logic, but so far little work has been done on this, and as the results of what research has been undertaken are only to be found in Arabic, they are unfortunately not available to us." (p. 11)

5. ———. 1974. "Logic and Ontology." *Philosophy East and West* no. 24:275-292.
Abstract: "The scope of this article is to present a broad survey of the relations between logic and ontology as they have been conceived of in the history of Western thought. While it is true that Hindu philosophy offers a similar field of research, the impression is that we are not yet prepared to handle it in any synthetic way. We simply do not know enough about the details of the Hindu doctrines."

6. ———. 1981. "The general sense and character of modern logic." In *Modern Logic - A Survey. Historical, Philosophical, and Mathematical Aspects of Modern Logic and Its Applications*, edited by Agazzi, Evandro, 3-14. Dordrecht: Reidel.
"By 'Modem Logic' (abridged as 'ML') the class of studies is meant which were originated by Leibniz, developed, among others, by Boole, Peirce, Frege, Peano, Lesniewski and their followers; in other terms the class of studies listed in Alonzo Church's Bibliography and in *The Journal of Symbolic Logic*."
(...)
"The aim of the paper is to describe - as the title selected by the organizers of the conference indicates - the general sense and character of ML thus understood. In other terms an attempt will be made to find the fundamental characteristics of ML-al studies.
The method used will be comparative. We are going to ask: How does ML compare with three fields with which it is usually linked: logic, mathematics and philosophy? Is ML Logic and, if so, how does it differ from
other types of logic? Is it a mathematical discipline and, if that is the case, what is the difference between it and other mathematical sciences? Is it philosophy and, this being admitted, what is its place among the other philosophical disciplines?
The present paper will be mostly concerned with the first class of problems, the comparison between ML and the other types of logic; the other two classes of problems will be treated only marginally. As far as the
main problems are concerned, the method will necessarily be historical: for, contrary to mathematics and philosophy, all other forms of logic with which ML may be compared belong to the past." (p. 3)

7. Brumberg-Chaumont, Julie, and Rosental, Caude, eds. 2021. *Logical Skills: Social-Historical Perspectives*. Cham (Switzerland): Birkhäuser.
"The volume wishes to address a variety of questions arising when logic is approached by overriding compartmentalization, by adopting an interdisciplinary viewpoint, and by taking into account its fully social and historical dimensions. By raising the question of logical skills, it aims at pausing and stepping aside from an approach essentially centered on the doctrinal history of logical theories." (Preface, p. V)
(...)
"This volume differs from many psychology publications in that it does not seek to highlight the acquisition, possession, or lack of logical skills in anonymous and interchangeable “subjects” according to a reference logic. It deals with socio-

historically situated actors and groups and analyzes the conceptions of logic that are mobilized to valuate their skills and to devise educational “politics of logic.”
The volume is also different from various philosophical works that offer a reflection on the (il)logical ways of thinking and acting of societies—or of the individuals who compose them. On the contrary, such reflections are taken as an object of social historical study in its own right.
Furthermore, it differs from histories of ideas in the field of logic. It does not set out from a definition of logic that would serve as a once-and-for-all fixed reference, which would lead to select some approaches to logic and exclude others from the scope of our study. It develops a social historical approach to logic. By focusing on logical skills, it shows the many ways in which logic can be understood. Logic does not simply appear as a set of theories and doctrines, but also as a tool that individuals and groups use for numerous purposes in various institutional, political, and social contexts. Generally speaking, logic is seen as a social practice." (Preface, p. VI)

8. Carruccio, Ettore. 1964. *Mathematics and Logic in History and in Contemporary Thought*. Chicago: Aldine.
Original Italian edition: *Matematica e logica nella storia e nel pensiero contemporaneo*, Torino: Gheroni 1958.
"The history of mathematics, understood in this sense, should as far as possible be studied directly from documents and from originals; what is required is not so much erudition as an effort to enliven the texts by interpretation and by relating them to their own times. The field which the historian of mathematics should cover in tracing the development, ancient and modern, of the subject, and its relationship with other aspects of life and culture, is broad enough to daunt the student; but while obviously no one can cover the whole of it in detail, each student must choose what best suits his own intellectual interests.
The subjects treated in this book have been chosen mainly to show the development of the most important fundamental concepts of mathematics, and particularly the contribution made by mathematical thought to the evolution of logic. This will allow us to cover the entire history of mathematics from ancient times to our -own day, observing the changes that have taken place in the conception of the structure of a rational theory, until we reach the delicate, and often lively and disconcerting, problems of contemporary logic. Though narrowed down like this, our field of enquiry is still too vast to be treated all in one piece. Yet, as our object is essentially formative rather than informative, we prefer to leave occasional gaps, in order to emphasize subjects which seem fundamental in the training of those who will do research in the history and philosophy of mathematics.
At this point the reader may wish for a precise definition of what we mean by the terms 'mathematics' and 'logic'. But the meaning of the terms themselves, as we shall see, keeps changing in the course of the history of thought. To understand adequately what thinkers have meant by these terms we need, therefore, a broad idea of the historical development of mathematics and logic. To understand clearly what is meant by such terms today we need too, I think, a knowledge of the evolution of the ideas in question, and it is this evolution that we shall follow in this book." (pp. 10-11)

9. Church, Alonzo. 1956. *Introduction to Mathematical Logic*. Princeton: Princeton University Press.
Third reprint 1996. See in particular the *Historical notes*: Chapter II. *The propositional calculus (continued)* § 29 pp. 155-166; Chapter IV. *The pure functional calculus of First Order* 49 pp. 288-294.

10. Cresswell, Max, Mares, Edwin, and Rini, Adriane, eds. 2016. *Logical Modalities from Aristotle to Carnap: The Story of Necessity*. Cambridge: Cambridge University Pres.
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1; 1Adriane Rini: Aristotle on the Necessity of the Consequence 11; 2 Marko Malink: Aristotle on One-Sided Possibility 29; 3 Robin Smith: Why Does Aristotle Need a Modal Syllogistic? 50; 4 Vanessa de Harven: Necessity, Possibility, and Determinism in Stoic Thought 70; 5 Paul Thom: Necessity in Avicenna and the Arabic Tradition 91; 6 Christopher J. Martin: Modality without the *Prior Analytics*: Early Twelfth Century Accounts of Modal Propositions 113; 7 Calvin G. Normore: Ockham and the Foundations of Modality in the Fourteenth Century 133; 8 Jack MacIntosh: Theological and Scientific Applications of the Notion of Necessity in the Mediaeval and Early Modern Periods 154; 9 Peter R. Anstey: Locke and the Problem of Necessity in Early Modern Philosophy 174; 10 Brandon C. Look: Leibniz's Theories of Necessity 194; 11 Jonathan Westphal: Leibniz and the Lucky Proof 218; 12 Nicholas F. Stang: Divine Necessity and Kant's Modal Categories 232; 13 Catherine Legg and Cheryl Misak: Charles Sanders Peirce on Necessity 256; 14 Edwin Mares: The Development of C. I. Lewis's Philosophy of Modal Logic 279; 15 Max Cresswell: Carnap's Modal Predicate Logic 298; Bibliography 317; Index 339-348.

"Interest in the metaphysics and logic of possible worlds goes back at least as far as Aristotle, but few books address the history of these important concepts. This volume offers new essays on the theories about the logical modalities (necessity and possibility) held by leading philosophers from Aristotle in ancient Greece to Rudolf Carnap in the twentieth century. The story begins with an illuminating discussion of Aristotle's views on the connection between logic and metaphysics, continues through the Stoic and mediaeval (including Arabic) traditions, and then moves to the early modern period with particular attention to Locke and Leibniz. The views of Kant, Peirce, C. I. Lewis and Carnap complete the volume. Many of the essays illuminate the connection between the historical figures studied and recent or current work in the philosophy of modality. The result is a rich and wide-ranging picture of the history of the logical modalities." (p. I)